HEINZ KAMPHAUSEN

Grounding material for the fire brigade

GROUNDING MATERIAL

System hk-grounding

Technical Manual



GROUNDING MATERIAL

hk-grounding system

HEINZ KAMPHAUSEN

Grounding material for the fire brigade

Bücherbahn 36
41812 Erkelenz
☎ +49 (0) 24 31 / 97 10 30
🖹 +49 (0) 24 31 / 97 10 31
✉ info@hk-erdung.de
www.hk-erdung.de

The company's devices

hk-grounding

comply with the relevant German regulations

(in particular DIN 14555-12 and TRGS 727)

and may be used in

explosive atmospheres!

Contents

1.	Notes for the user and operator	7
2.	Instructions for use	8
2.1	General information	8
2.2	Special Notes	9
2.3	Algorithm of grounding measures (summary)	10
2.4	Procedure of the grounding measures (detailed description)	12
3.	Technical description	16
4.	Grounding Sets	26

1. Information for the user and operator

The grounding material may **ONLY** be used to dissipate electrostatic charges.

Inspections
The deadlines for periodic inspections must be determined by the contractor on the basis of a risk assessment or on the basis of the operator's experience.

We recommend that the grounding material be tested annually for electrical conductivity in accordance with the german „Technical Rules for Hazardous Substances" TRGS 727. The resistance between the ends should not exceed 1 ohm per metre of cable length in order to preclude cable breakage or damage to the strands. After each use, the material used should be subjected to a visual inspection. The tests of the grounding and equipotential bonding devices must be carried out independently of other electrical tests (TRGS 727; 8.7).
The review is to be transcripted.

The TRGS 727, DIN 14555-12:2015-04 (fire service vehicle for Dangerous Goods) as well as all other relevant regulations and the state of the technology must be observed.

The cables and all connected elements must not be subjected to tension.

Further information and teaching presentations can be found at www.hk-erdung.de in download.

2. Instructions for use

2.1 General information

In order to dissipate the static charge, all devices, containers, etc. integrated in the conveying flow must be connected to each other and to the ground in a conductive manner.

In areas where explosive atmospheres are to be expected constantly, over long periods of time or frequently during use, no clamping or plugging measures may be executed. (Monitoring with explosive-atmosphere-detector!) For this reason, the star point (cable reel) should be outside the explosive atmosphere.

It must be ensured that all connection points and the Ground spike have good contact. All measures that may result in charge compensation (ignition sparks) must be executed outside explosive atmospheres if possible.

When transferring flammable liquids, the instructions of TRGS 727 must be observed.

Further information and teaching presentations can be found at www.hk-erdung.de in download.

2.2 Special Notes

In order to avoid an explosion during the grounding measures, the damaged object should first be clamped at as far away as possible from the exit point (explosive atmosphere). In this case, the star point (cable reel) should initially have no conductive connection to the ground and should be outside the explosive atmosphere if possible. The conductive connection to the ground on the Ground spike or similar should only be established after the completion of the grounding processes on the damaged object.

Attention: Electrostatic charges can occur even before the start of the fire brigade's measures or during implementation!

In addition, clamping and plugging processes as well as all other measures that may result in charge compensation (ignition sparks) should be monitored with an explosive-atmosphere-detector so that they are not carried out in an explosive atmosphere as far as possible. By using conductive materials and avoiding measures that lead to static charge (friction, pulling tarpaulin over the floor), the risk of ignition can be further reduced.

In most cases, the damaged container must first be grounded from the product and the collection container (if possible, conductive), which is placed under the leak as an "immediate measure". The conveyor line for pumping the product is then set up. This only needs to be grounded once if it is ensured that there is a conductive connection over the entire route. Finally, the recovery container, which should also be conductive if possible, is grounded. Now the suction hose of the conveyor line can be immersed and the pumping process can begin.

During the entire period of use, the grounding measures must be monitored and checked to ensure that no plugs or pliers have come loose!

2.3 Algorithm of Grounding Measures (Summary)

0 If necessary, pull the pick-up container / tarpaulin under the damaged container

1 Look for a grounding point outside the danger area.
(Grounding spike, lightning rod, crash barrier, ...)

2 Unroll the cable reel from the direction of the grounding point to the central star point. There should be no explosive atmosphere here. (Monitor with explosive-atmosphere-detector!) Do not connect to the grounding point yet.

3 Locate the grounding point on a damaged container, vehicle, ..., as far away as possible from the leak or explosive atmosphere.
Attach the extension cable there with pliers or similar and then lay it to the cable reel and connect it there.

4 Clamp the cable of the cable reel to the grounding point.

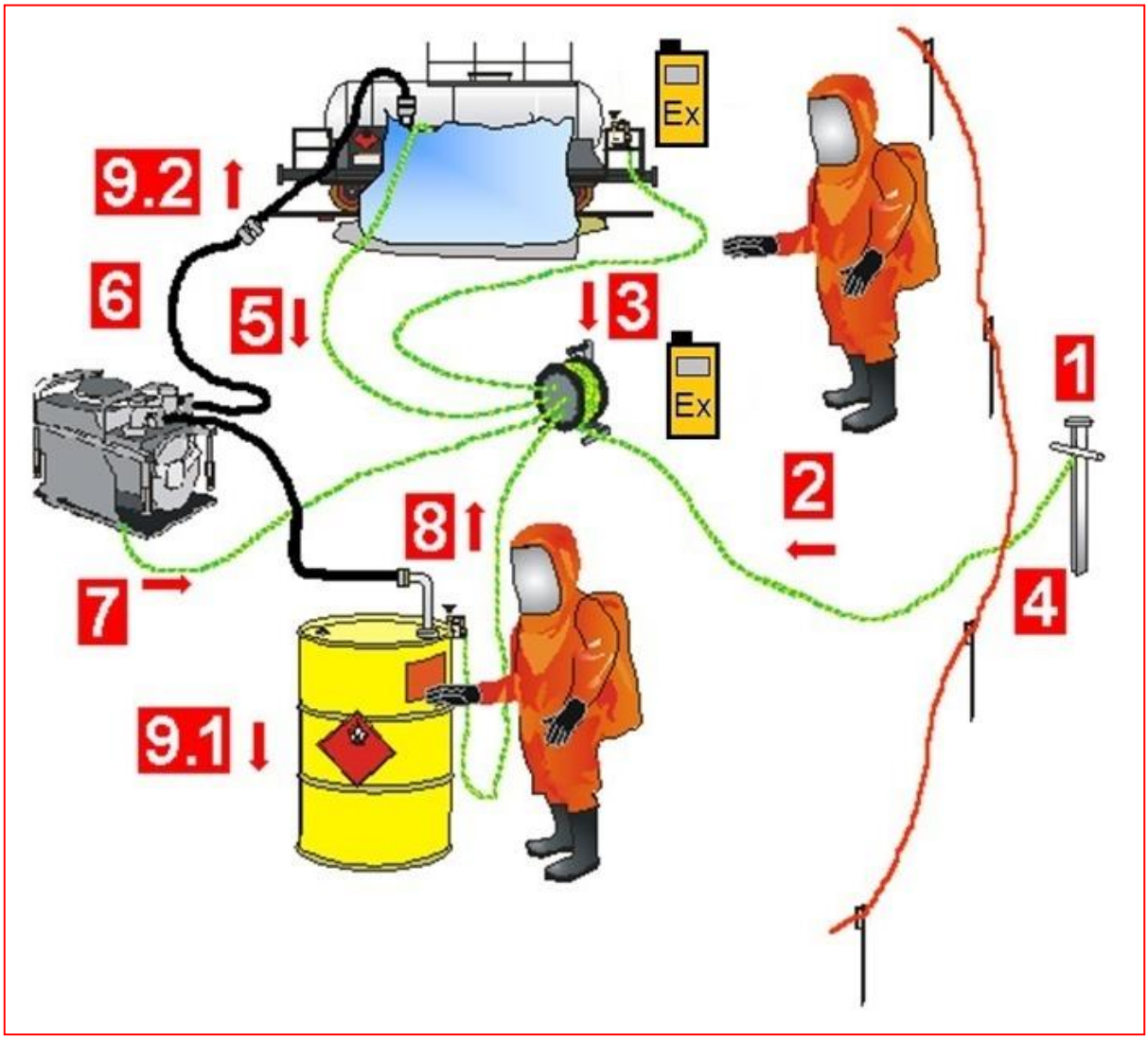
5 Ground the collection container / tarpaulin and lay the extension cable to the cable reel and connect it there.

6 Setting up the transfer line

7 Ground the transfer line and lay the extension cable to the cable reel and connect it there. (Here, one grounding point is sufficient if the transfer line has a conductive connection.)

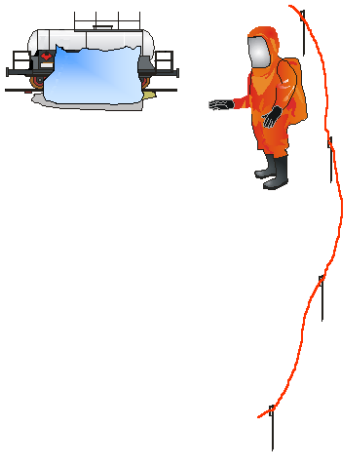
8 Ground the recovery container and lay the extension cable to the cable reel and connect it there.

9 Dip in transfer line into the containers and carry out further measures.


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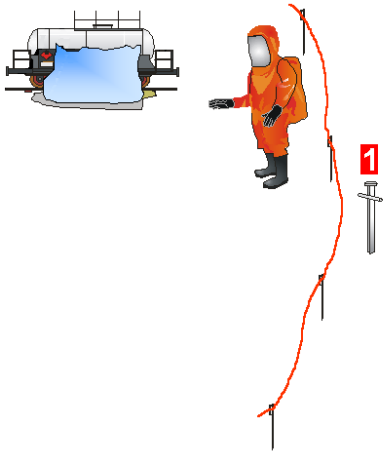
2.4 Sequence of grounding measures (detailed description)

The processes described in the following section are merely examples which should be implemented depending on the specific use case.



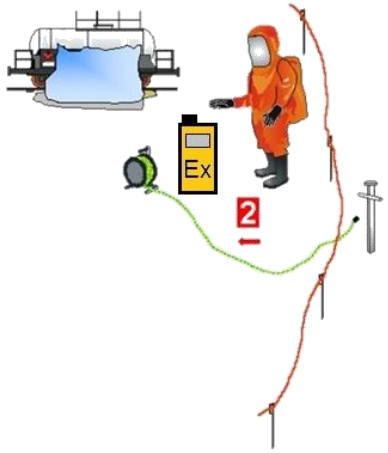
Procedure 0

- Place the collection container / tarpaulin under the leak
- Use a conductive collection container if possible
- Alternatively: start grounding immediately.



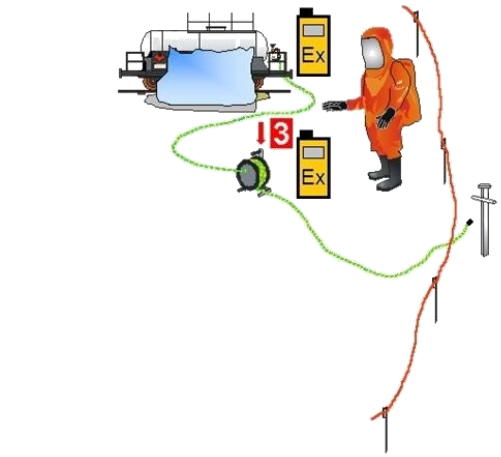
Procedure 1

- Look for an grounding point (e.g. ground spike, lightning rod, railway tracks, crash barriers, ...) outside the danger zone
- Hammer the ground spike all **the way into the ground** at the shut-off boundary
- If the soil is dry, water the soil
- (these measures may run in parallel with the following).



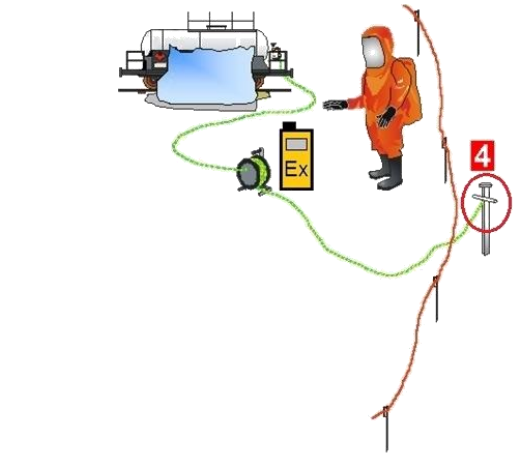
Procedure 2

- Unwind the cable reel from the direction of the grounding point to a central star point
- Attention: **do not connect to the grounding point yet!**
- The star point **must** be outside the explosive atmosphere
- If possible, permanently monitor the star point with an explosive-atmosphere-detector.



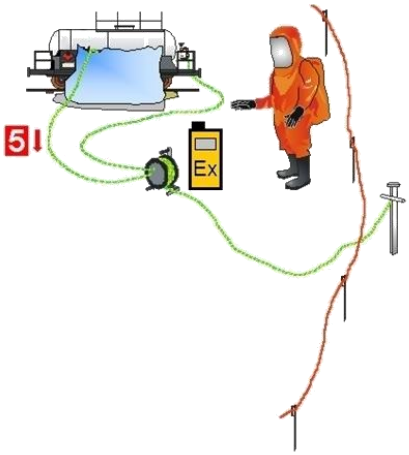
Procedure 3

- Attach clamping pliers to the damaged object (as far away as possible from the exit point and outside an explosive atmosphere)
- If possible, monitor the clamping point with an explosive-atmosphere-detector.
- Lay the grounding cable from the defective container to the cable reel and connect it there.



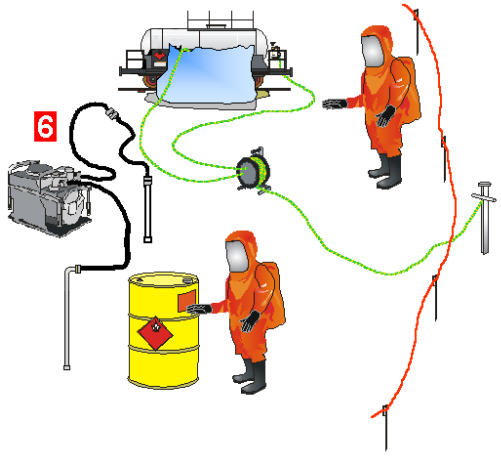
Procedure 4

- Connect the cable reel to the grounding point.



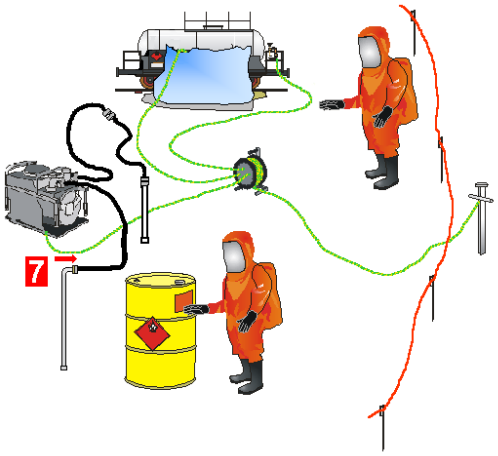
Procedure 5

- Lay the grounding cable from the collection container to the cable reel and connect it there.



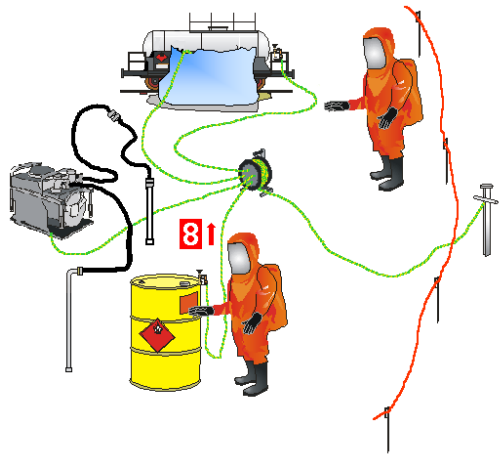
Procedure 6

- If possible, set up a transfer line outside the explosive atmosphere
- **Do not immerse the suction line yet**.



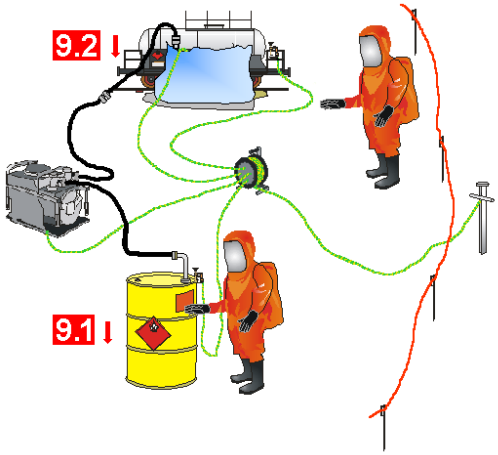
Procedure 7

- Connect the transfer line to the cable reel
- If the transfer section between the two ends is conductive, grounding is carried out only once (preferably at the grounding point of the pump).



Procedure 8

- Prepare conductive tailings tank
- Connect the recovery container to the cable reel.



Procedure 9

- Dip the discharge line into the tailings container down to the bottom of the container
- Dip the suction line into the container to be emptied.

3. Technical description

The entire grounding material is suitable for use according to TRGS 727 in the explosive atmosphere.

Not all of the parts listed need to be present in your grounding kit.

<table>
<tr><th colspan="2">Description</th><th>Art.Nr.</th></tr>
<tr>
<td></td>
<td>
Cable reel (5 sockets)

Description:
Stranded copper wire 6 mm green-yellow sheathed, wound on a reel with socket at the end of the cable and integrated busbar with 5 sockets as the central star point according to TRGS 727 suitable in Explosive atmospheres.
According to DIN 14555-12

Technical data:
<table>
<tr><td>Dimensions</td><td>4.78 kg</td></tr>
<tr><td>Length</td><td>240 mm</td></tr>
<tr><td>Width</td><td>210 mm</td></tr>
<tr><td>Height</td><td>300 mm</td></tr>
<tr><td>Cable length</td><td>50 m</td></tr>
<tr><td>Cable cross-section</td><td>6 mm²</td></tr>
<tr><td>Diameter mandrel for plug / socket</td><td>9 mm</td></tr>
</table>
Components:
<table>
<tr><td>Reel body</td><td>Art. No. 0613</td></tr>
<tr><td>Cable H07V-K</td><td>Art. No. 0614</td></tr>
<tr><td>Panel Socket</td><td>Art. No. 0011</td></tr>
<tr><td>Cable socket</td><td>Art. No. 0012</td></tr>
<tr><td>Cover plate VA</td><td>Art. No. 0616</td></tr>
</table>
</td>
<td>0610</td>
</tr>
</table>



Cable reel (1 socket)

Description:
Stranded copper wire green-yellow sheathed, wound on a reel with socket at the end of the cable and a socket on the reel, suitable for explosive atmospheres in accordance with TRGS 727.
According to DIN 14555-12

Technical data:

Dimensions	4.38 kg
Length	240 mm
Width	210 mm
Height	300 mm
Cable length	50 m
Cable cross-section	6 mm²
Diameter mandrel for plug / socket	9 mm

Components:

Reel body	Art. No. 0613
Cable H07V-K	Art. No. 0614
Panel Socket	Art. No. 0011
Cable socket	Art. No. 0012
Cover plate PVC	Art. No. 0617

0611



Cable reel (auxiliary reel)

Description:
Stranded copper wire 6 mm², 50 m long, green-yellow sheathed,
wound on a reel with socket on the
Auxiliary reel with one metre of cable and socket at the end of the cable, suitable for explosive atmospheres in accordance with TRGS 727.

Technical data:

Dimensions	4.6 kg
Length	240 mm
Width	210 mm
Height	300 mm
Cable length	50 m + 1 m
Cable cross-section	6 mm²
Diameter mandrel for plug / socket	9 mm

Components:

Reel body	Art. No. 0613
Cable H07V-K	Art. No. 0614
Panel Socket	Art. No. 0011
Cable socket	Art. No. 0012
Auxiliary reel PVC	Art. No. 0617

0612

Description	Art.Nr.

Extension cable 15 m

Description:
Copper wire sheathed green-yellow, with socket and plug at the cable ends as well as Velcro cable ties as fastening.
According to DIN 14555-12

Technical data:

Dimensions	1.10 kg
Diameter rolled approx.	200 mm
Height rolled approx.	40 mm
Cable length	15 m
Cable cross-section	6 mm²
Diameter mandrel for plug / socket	9 mm

Components:

Cable H07V-K	Art. No. 0614
Cable socket	Art. No. 0012
Cable Connector	Art. No. 0013
Velcro cable ties black	Art. No. 0023

0620

Extension cable 10 m



Description:
Copper wire sheathed green-yellow, with socket and plug at the cable ends as well as Velcro cable ties as fastening.

Technical data:

Dimensions	0.77 kg
Diameter rolled approx.	200 mm
Height rolled approx.	30 mm
Cable length	10 m
Cable cross-section	6 mm²
Diameter mandrel for plug / socket	9 mm

Components:

Cable H07V-K	Art. No. 0614
Cable socket	Art. No. 0012
Cable Connector	Art. No. 0013
Velcro cable ties red	Art. No. 0024

0621

Extension cable 5 m

Description:
Copper wire sheathed green-yellow, with socket and plug at the cable ends as well as Velcro cable ties as fastening.

Technical data:

Dimensions	0.41 kg
Diameter rolled approx.	200 mm
Height rolled approx.	25 mm
Cable length	5 m
Cable cross-section	6 mm²
Diameter mandrel for plug / socket	9 mm

Components:

Cable H07V-K	Art. No. 0614
Cable socket	Art. No. 0012
Cable Connector	Art. No. 0013
Velcro cable ties blue	Art. No. 0025

0622

Description	Art.Nr.
	**Extension spiral cable 5 m** **Description:** Stranded copper wire sheathed in green-yellow, highly flexible, with socket and plug at the cable ends, designed as a spiral cable. **Technical data:** Dimensions: 0.95 kg Spiral length approx.: 1000 mm Spiral diameter approx.: 29 mm Cable length: 5000 mm Cable cross-section: 6 mm² Diameter mandrel for plug / socket: 9 mm **Components:** Grounding Spiral Cable 5 m: Art. No. 0628 Cable socket: Art. No. 0012 Cable Connector: Art. No. 0013	0626
	Extension spiral cable 3 m **Description:** Stranded copper wire sheathed in green-yellow, highly flexible, with socket and plug at the cable ends, designed as a spiral cable. **Technical data:** Dimensions: 0.65 kg Spiral length approx.: 600 mm Spiral diameter approx.: 29 mm Cable length: 3000 mm Cable cross-section: 6 mm² Diameter mandrel for plug / socket: 9 mm **Components:** Grounding spiral cable 3 m: Art. No. 0629 Cable socket: Art. No. 0012 Cable Connector: Art. No. 0013	0627

Description		Art.Nr.
	**Clamping pliers VA** **Description:** made of chrome-nickel steel with bite, in a robust industrial design and with sharp teeth made of stainless steel. According to DIN 14555-12 **Technical data:** Dimensions: 0.29 kg Pliers length: 150 mm Pliers width: 30 mm Clamp height: 80 mm Opening width: 45 mm Cable length: 300 mm Cable cross-section: 6 mm² Diameter mandrel for plug / socket: 9 mm **Components:** Pliers VA (item): Art. No. 0031 Device cables: Art. No. 0680	0630
	**Clamping pliers VA with locking screw** **Description:** made of chrome-nickel steel with bite, in a robust industrial design with pliers clamping over wing nut, integrated strain relief and with sharp teeth made of stainless steel. **Technical data:** Dimensions: 0.31 kg Pliers length: 150 mm Pliers width: 30 mm Clamp height: 110 mm Opening width: 45 mm Cable length: 300 mm Cable cross-section: 6 mm² Diameter mandrel for plug / socket: 9 mm **Components:** Pliers with fuse VA (single part): Art. No. 0033 Device cables: Art. No. 0680	0635

Description		Art.Nr.
	**Clamping pliers MS** **Description:** made of brass, with low sparks, with prismatic mouth opening. According to DIN 14555-12 **Technical data:** Dimensions: 0.67 kg Pliers length: 170 mm Pliers width: 30 mm Clamp height: 90 mm Opening width: 30 mm Cable length: 300 mm Cable cross-section: 6 mm² Diameter mandrel for plug / socket: 9 mm **Components:** Pliers MS (Item): Art. No. 0041 Device cables: Art. No. 0680	0640
	**Parallel grip clamp** **Description:** nickel-plated, parallel clamping surface with prism recess, screw clamp function due to constant parallelism, Do not insert clamp in explosive atmospheres. **Technical data:** Dimensions: 1.03 kg Pliers length: 260 mm Pliers width: 30 mm Clamp height: 190 mm Opening width: 100 mm Cable length: 300 mm Cable cross-section: 6 mm² Diameter mandrel for plug / socket: 9 mm **Components:** Parallel grip pliers (single part): Art. No. 0051 Device cables: Art. No. 0680	0650

Description	Art.Nr.
	**C-Groundclamp MS** **Description:** made of copper-zinc alloy. According to DIN 14555-12 **Technical data:** Dimensions: 1.04 kg Pliers length: 200 mm Pliers width: 50 mm Clamp height: 130 mm Opening width: 100 mm Cable length: 300 mm Cable cross-section: 6 mm² Diameter mandrel for plug / socket: 9 mm **Components:** Pole screw clamp MS (single part): Art. No. 0056 Device cables: Art. No. 0680	0655
	**Magnet** **Description:** very strong adhesive force, magnetic surfaces with double clamp connection, flat design, Pole plate 4 mm thick, handle mounted on top. **Technical data:** Dimensions: 0.70 kg Length: 200 mm Width: 35 mm Height: 75 mm Handle diameter: 45 mm Adhesive force: 300 N Cable length: 300 mm Cable cross-section: 6 mm² Diameter mandrel for plug / socket: 9 mm **Components:** Grounding Solenoid (Item): Art. No. 0061 Device cables in special design: Art. No. 0685 Blind plug: Art. No. 0021	0660

<table>
<tr><th>Description</th><th>Art.Nr.</th></tr>
<tr><td></td><td>Ground spike (1 connection cable)

Description:
galvanized, made of T-steel, connection options 8 mm, Connection cable with cable plug.According to DIN 14555-12

Technical data:<table><tr><td>Dimensions</td><td>1.21 kg</td></tr><tr><td>Length</td><td>600 mm</td></tr><tr><td>Width</td><td>200 mm</td></tr><tr><td>Height</td><td>35 mm</td></tr><tr><td>Cable length</td><td>550 mm</td></tr><tr><td>Cable cross-section</td><td>6 mm²</td></tr><tr><td>Diameter mandrel for plug / socket</td><td>9 mm</td></tr></table>
Components:<table><tr><td>Ground spike (item)</td><td>Art. No. 0071</td></tr><tr><td>Device cable 500 mm</td><td>Art. No. 0685</td></tr><tr><td>Cap screw M8 x 30 MS</td><td>Art. No. 0072</td></tr><tr><td>Hexavalent. Nut M8 MS</td><td>Art. No. 0073</td></tr><tr><td>Wing nut M8 MS</td><td>Art. No. 0074</td></tr></table></td><td>0670</td></tr>
<tr><td></td><td>Ground spike (without connection cable)

Description:
galvanized, made of T-steel, connection options 8 mm. According to DIN 14555-12

Technical data:<table><tr><td>Dimensions</td><td>1.14 kg</td></tr><tr><td>Length</td><td>600 mm</td></tr><tr><td>Width</td><td>200 mm</td></tr><tr><td>Height</td><td>35 mm</td></tr></table>
Components:<table><tr><td>Ground spike (item)</td><td>Art. No. 0071</td></tr><tr><td>Device cable 500 mm</td><td>Art. No. 0685</td></tr><tr><td>Cap screw M8 x 30 MS</td><td>Art. No. 0072</td></tr><tr><td>Hexavalent. Nut M8 MS</td><td>Art. No. 0073</td></tr><tr><td>Wing nut M8 MS</td><td>Art. No. 0074</td></tr></table></td><td>0671</td></tr>
<tr><td rowspan="3"></td><td>Ground spike (2 connection cables)</td><td>0672</td></tr>
<tr><td>Ground spike (3 connection cables)</td><td>0673</td></tr>
<tr><td>Ground spike (4 connection cables)</td><td>0674</td></tr>
</table>

Description		Art.r.
	**Device cable plug** **Description:** Copper wire sheathed green-yellow, on one side with a stable, tube cable lug for connection to the grounding screw of the fire brigade equipment, at the other end with plug. According to DIN 14555-12 **Technical data:** Dimensions: 0.08 kg Diameter of cable lug: 8 mm Cable length: 300 mm Cable cross-section: 6 mm² Diameter mandrel for plug / socket: 9 mm **Components:** Cable H07V-K: Art. No. 0614 Cable Connector: Art. No. 0013	0680
	**Device cable socket** **Description:** Copper wire sheathed in green-yellow, on one side with a stable, tube cable lug for connection to the grounding screw of the firefighting equipment, at the other end with a socket. **Technical data:** Dimensions: 0.08 kg Diameter of cable lug: 8 mm Cable length: 300 mm Cable cross-section: 6 mm² Diameter mandrel for plug / socket: 9 mm **Components:** Cable H07V-K: Art. No. 0614 Cable socket: Art. No. 0012	0681

Description		Art.r.
	**Connector cable plug-to-plug** **Description:** Copper wire sheathed green-yellow, with plugs on both sides for connecting sockets. **Technical data:** Dimensions: 0.12 kg Cable length: 300 mm Cable cross-section: 6 mm² Diameter mandrel for plug / socket: 9 mm **Components:** Cable H07V-K: Art. No. 0614 Cable Connector: Art. No. 0013	0683
	**Connection cable socket-to-socket** **Description:** Copper wire sheathed green-yellow, with socket on both sides for connecting plugs. **Technical data:** Dimensions: 0.12 kg Cable length: 300 mm Cable cross-section: 6 mm² Diameter mandrel for plug / socket: 9 mm **Components:** Cable H07V-K: Art. No. 0614 Cable socket: Art. No. 0012	0684
Without illus.	**Device cables in special design** **Description:** Stranded copper wire sheathed green-yellow, e.g. with a special cable lug, special length or other cable cross-section. **Technical data:** Dimensions: 0.12 kg Cable length approx.: 300 mm Cable cross-section: 6 mm² Diameter mandrel for plug / socket: 9 mm **Components:** Cable H07V-K: Art. No. 0614 …: Art. No. 0012	0685

4. Grounding kits

Description		Art.Nr.
	**Set of grounding material DIN according to DIN 14555-12:2023-03 (GW-G) consisting of** 5 extension cables 15 m Art.Nr. 0620 5 device cables Art.Nr. 0680 1 cable reel (5 sockets) Art.Nr. 0610 with integrated busbar 1 ground spike (1 connection cable) Art.Nr. 0670 3 C-Groundclamps MS Art.Nr. 0655 2 clamping pliers MS Art.Nr. 0640 2 clamping pliers VA Art.Nr. 0630 Weight: 17.1 kg (A different combination of clamps and pliers is possible according to DIN if they serve the same purpose. Price then on request.)	0604
	**Set of grounding material DIN according to DIN 14555-12:2015-04 (GW-G) consisting of** 5 extension cables 15 m Art.Nr. 0620 5 device cables Art.Nr. 0680 1 cable reel (5 sockets) Art.Nr. 0610 with integrated busbar 1 ground spike (1 connection cable) Art.Nr. 0670 3 C-Groundclamps MS Art.Nr. 0655 3 clamping pliers MS Art.Nr. 0640 Weight: 17.0 kg	0603

Description		Art.Nr.
	**Set of grounding material according to equipment proposal hk-grounding consisting of** 1 cable reel (5 sockets) Art.Nr. 0610 6 extension cables 15 m Art.Nr. 0620 2 clamping pliers VA Art.Nr. 0630 2 clamping pliers MS Art.Nr. 0640 1 Parallel grip clamp Art.Nr. 0650 1 C-Groundclamps MS Art.Nr. 0655 1 magnet Art.Nr. 0660 1 ground spike (1 connection cable) Art.Nr. 0670 5 device cables Art.Nr. 0680 Weight: 17.7 kg	0601
	**Set of grounding material Star Point = Ground Spike according to equipment proposal hk-grounding consisting of** 4 cable reels (1 socket) Art.Nr. 0611 2 clamping pliers VA Art.Nr. 0630 2 clamping pliers MS Art.Nr. 0640 1 Parallel grip clamp Art.Nr. 0650 1 C-Groundclamps MS Art.Nr. 0655 1 magnet Art.Nr. 0660 1 ground spike (4 connection cables) Art.Nr. 0674 5 device cables Art.Nr. 0680 Weight: 36.1 kg	0602

Description		Art.Nr.	Price
	**Set of grounding material "Magold" according to equipment proposal Björn Magold consisting of** 2 cable reels (5 sockets) Art.Nr. 0610 16 extension cables 15 m Art.Nr. 0620 3 clamping pliers VA Art.Nr. 0630 4 clamping pliers MS Art.Nr. 0640 6 C-Groundclamp MS Art.Nr. 0655 6 Connection cable socket-to-socket Art.Nr. 0684 1 ground spike (2 connection cable) Art.Nr. 0672 5 device cables Art.Nr. 0680 5 Device cable socket Art.Nr. 0681 Weight: 40,5 kg	0607	4269,40 €
	**expansion set "Magold", according to equipment proposal Björn Magold,** for extending the standard earthing set in accordance with DIN 14555-12:2023-03 (GW-G), **consisting of:** 1 cable reels (5 sockets) Art.Nr. 0610 11 extension cables 15 m Art.Nr. 0620 1 clamping pliers VA Art.Nr. 0630 2 clamping pliers MS Art.Nr. 0640 3 C-Groundclamp MS Art.Nr. 0655 6 Connection cable socket-to-socket Art.Nr. 0684 1 ground spike (2 connection cable) Art.Nr. 0672 5 Device cable socket Art.Nr. 0681 Weight: 24,4 kg	0608	2497,20 €

According to TRGS 727, the grounding material is suitable for use in potentially explosive areas.

Goods/customs Commodity Code for all items: 8544 6010; HS-Code 854460.
All items do not fall into the category of "dual-use goods".
The country of origin for all items is Germany.

Custom-made products (e.g. other cable cross-sections or lengths or plug and plier combinations) can be assembled on request. We reserve the right to make changes in form and technology, dimensions, weights and materials in the interests of the progress of technology. The illustrations are non-binding.