

# BSS



**Fire protection  
systems  
Ukraine**

**2019/2020**

**Building Connections**

**OBO**  
**BETTERMANN**



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www.obo.ua**



# Planning and mounting aids

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# 1

## First protection aim: Maintenance of the fire sections

The division of buildings into fire sections protects unaffected building sections against the spread of fires for specific periods of time. Insulation maintains the fire sections, thus limiting the spread of fire and smoke. These constructive measures protect people and property, allowing fire brigades to prevent the spread of fires to other parts of the building through extinguishing measures.

### Function of fire walls

Fire walls should ensure that a fire cannot pass to neighbouring buildings or building sections. This creates so-called fire sections. The construction design of these fire walls (materials, fire resistance classes, stress values) is regulated by the building regulations and standards.

Electrical cables and pipes may only be run through walls and ceilings at the ends of rooms when there is a guarantee that they do not present an opportunity for fire and smoke to spread. Insulation systems reliably seal the ceiling and wall penetrations required for installations against fire and smoke.



### Special requirements

The following requirements apply to cable penetrations with cable insulation:

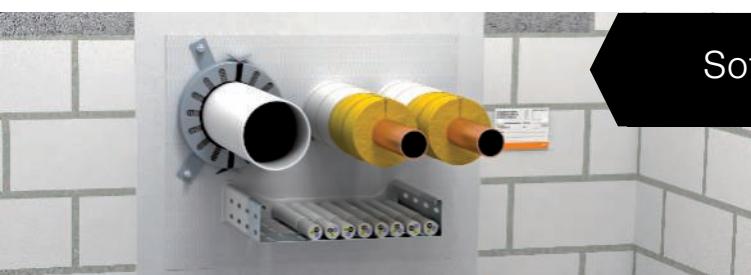
- The spread of fire and smoke must be prevented
- Room closure must be guaranteed
- On the side of the insulation away from the fire, the surfaces of cables, pipes, cable support systems and the surface of the insulation may not heat up to an impermissible level

*Insulation systems reliably seal the ceiling and wall penetrations required for installations against fire and smoke.*

# Insulation systems



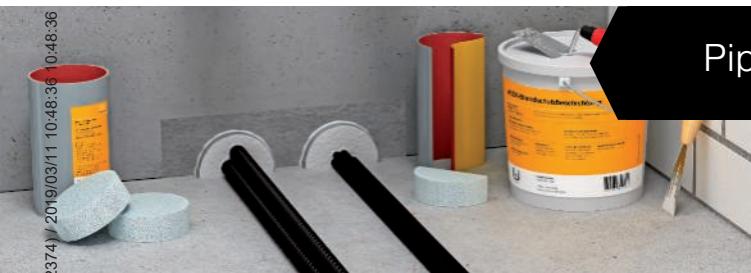
Mortar insulation systems



Soft insulation systems



Foam systems



Pipe shell systems



Cushion insulation systems



# 2

## Second protection aim: Protection of escape routes



### What is an emergency and escape route?

According to the construction regulations, there must be routes in buildings which not only permit access to the building in a horizontal and vertical direction in normal situations, but which also offer the option of rescue in case of fire. It is therefore obligatory to equip buildings with at least one constructive emergency and escape route. Additional emergency and escape routes may also be necessary, depending on the type of building.

These include:

- Necessary staircases (vertical access)
- Connecting rooms between the necessary stairwells and exits to the outside
- Necessary corridors (horizontal access)

There must be a guarantee that, if there is a fire, these routes can be used to leave the building without any risk. In addition to evacuation, the emergency and escape routes also aid the local fire brigades as a point of attack.

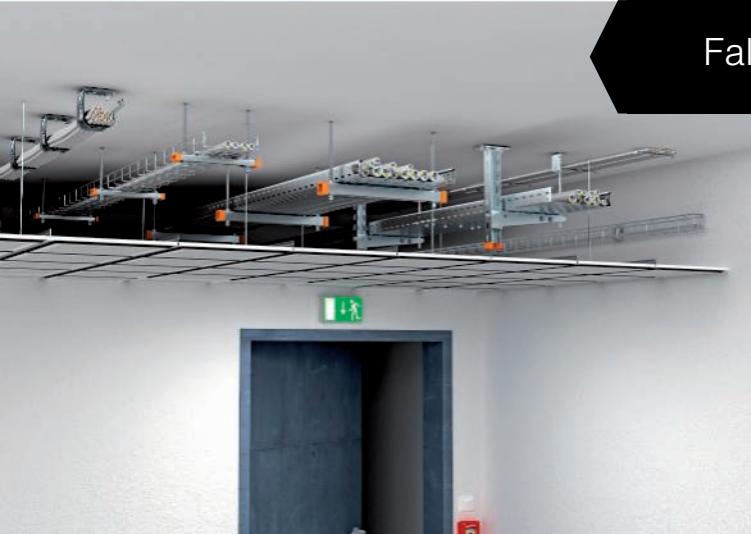
In the area of emergency and escape routes, an installation may not pose an additional fire load. This requirement can be fulfilled using an appropriate type of installation:

- Concealed installation
- Installation in fire protection duct systems
- Installation above suspended fire protection ceilings
- Use of non-combustible materials
- Routing of cables with improved behaviour in case of fire

*Approximately 95% of all deaths during fires are caused by smoke poisoning! In case of fire, emergency and escape routes are the central lifeline of the building and must remain usable under all circumstances.*



## Escape route installations



False ceiling mounting



Fire protection ducts



Cable bandages

# 3

## Third protection aim: Maintaining the function of electrical systems

If there is a fire, emergency and escape routes must remain usable and important technical equipment, such as emergency lighting, fire alarm systems and smoke extraction systems, continue to function. Therefore, it is essential that the power supply for these systems is specially protected. In addition, certain technical systems must support the fire brigades in fighting fires for a sufficiently long period of time.

Where is the maintenance of electrical function required?

Technical equipment that maintains electrical function is required for the following buildings and systems:

- Hospitals
- Hotels and restaurants
- Tower blocks
- Meeting points
- Commercial buildings
- Closed large garages
- Underground railway systems
- Chemicals industry
- Power stations
- Tunnels

This could be because these constructions are regularly frequented by many people. This creates an increased safety risk for gatherings of people. However, with certain systems, property and the environment must also be protected.



**E30**

### 30 minutes: Maintenance of electrical function for a safe evacuation and rescue

The first 30 minutes after the start of a fire play an important role. For the affected building to be cleared quickly the maintenance of electrical function must be guaranteed for the following equipment during this time:

- Safety lighting systems
- Lifts with fire control
- Fire alarm systems
- Alarm systems and systems to issue instructions
- Fire extraction systems

**E90**

### 90 minutes: Maintenance of electrical function for effective fire-fighting

To support fire-fighting operations, it is imperative that certain technical equipment is supplied with sufficient power even up to 90 minutes after a fire breaks out in a building. This equipment includes:

- Water pressure increase systems for fire water supply
- Mechanical smoke extraction systems and smoke protection pressure systems
- Fire brigade lifts
- Bed lifts in hospitals and similar equipment



# Systems that maintain the electrical function



Cable trays and cable ladders



Vertical ladders



Individual routing



Junction boxes

## Technical support



### Seminars

#### **OBO BSS seminars: First-hand knowledge**

With a comprehensive programme of training courses and seminars on the subject of fire protection systems, OBO is able to support its customers with specialist knowledge from a single source. Alongside the basic theoretical principles, the programme also deals with practical implementation in everyday applications. Special calculation and application examples round off the comprehensive programme of knowledge transfer.





## Construct BSS Online Tool

Works on any computer with Internet access: The BSS software simplifies the planning of suitable fire protection systems. After the basic data has been entered, the user obtains an overview of the approved insulation systems, as well as of necessary and optional system accessories. Thus, they can create, edit and export a personal shopping list in a targeted manner. All the key information on standards and approvals can be found directly with the systems.

## BSS app

The Construct BSS app makes finding the right product even quicker. In only a short time, the app determines the fire protection systems required for the appropriate project. It offers the full scope of the Construct BSS module, allowing simple planning and material calculations in any location. Practical: The parts list can be sent directly by e-mail. Available for Android and Apple devices for Google Play Store and the iTunes App Store.



## Fire protection guide

In the guide, we wish to explain the interconnections of fire protection in technical building equipment. Perhaps you will find some new aspects which can help you in the planning or implementation of fire protection systems.



OBO

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# Mortar insulation PYROMIX®

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**System description**

14

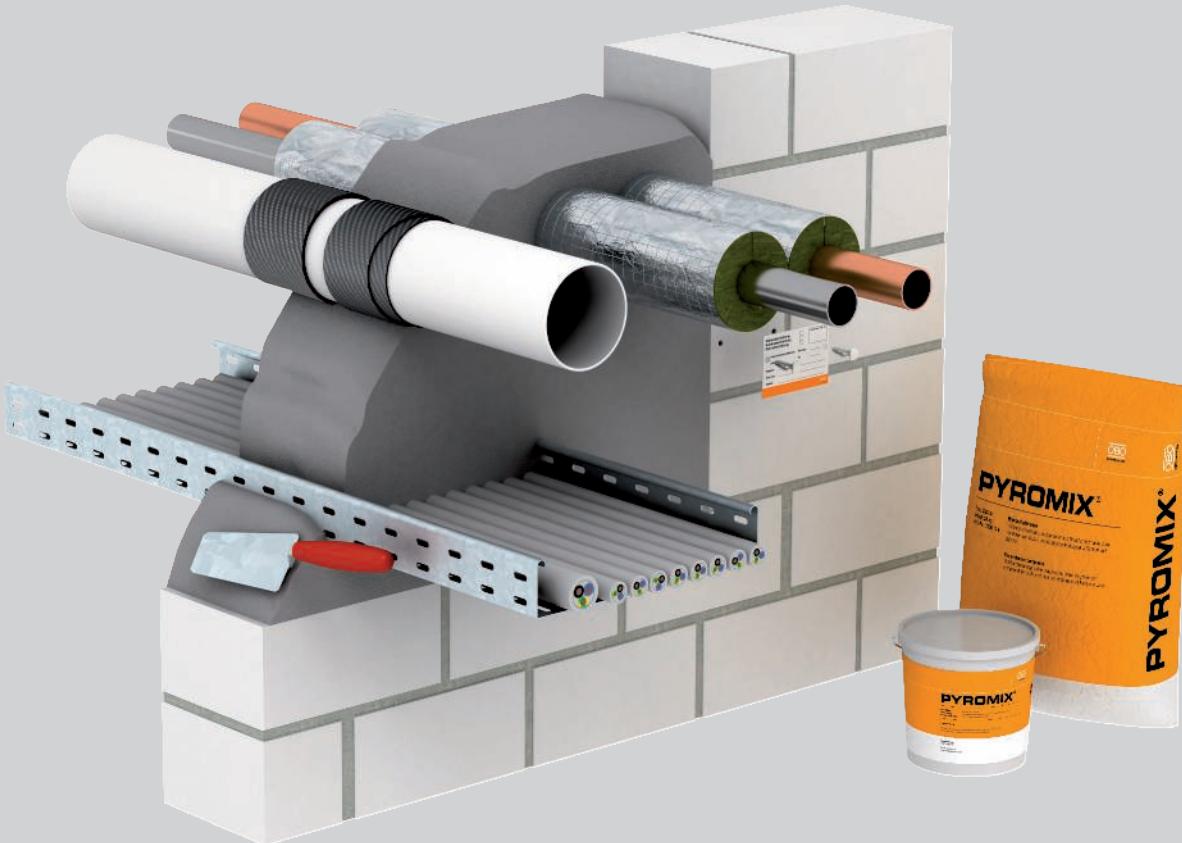
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**Products**

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## Mortar insulation PYROMIX®

### System description



The PYROMIX® system from OBO is used to create cable and combination insulation made of a mineral fibre-free special mortar. Depending on the amount of water added, the finished compound can be applied to openings by hand, with pumps or with presses. The high level of substrate adhesion makes lining unne-

cessary for small insulation areas. The porous consistency of the mortar means that retroinstallation is easy. If there is a fire, the fire protection mortar reliably prevents the spread of fire and smoke.

# Mortar insulation PYROMIX®

## Installation principle



Stir the mortar with water until the desired consistency is reached.



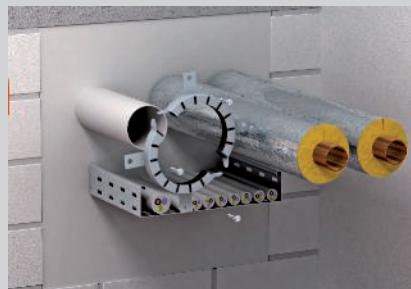
Apply mortar to the opening, use lining as necessary.



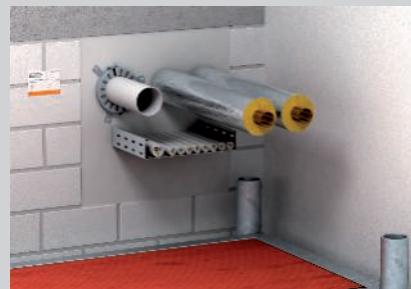
Use approved section insulation for metal pipes.



Section insulation should also be applied to steel electrical installation pipes.



Mount pipe sleeves for combustible pipes on both sides of the wall.



Apply labelling to combination insulation for various structures.

Classification to DIN

S30      S60      S90

Classification to EN

EI15      EI30      EI45      EI60      EI90      EI120



Erectors of combination insulation require training.

Always indicate the item number when ordering.





## Mortar insulation PYROMIX®

### Registration data

#### Combination insulation in walls/ceilings

<b>Fire resistance class</b>	EI 180, EI 240
<b>Proof of application</b>	European Technical Assessment of DIBt, Berlin
<b>Approval number</b>	ETA-17/0472
<b>Testing standard</b>	EN 1366-3

## Installation locations

### Insulation in walls and ceilings

Component	Rigid walls	Flexible walls	Rigid floors
Min. component strength		15 cm (EI 60 / EI 90 / EI 120)	–
Min. insulation thickness		15 cm (EI 60 / EI 90 / EI 120) 24 cm (EI 120)	15 cm (EI 60 / EI 90 / EI 120) 24 cm (EI 120)
Opening size		<p>↔ ≤ 120 cm (for EI 120)            ↓ ≤ 200 cm</p> <p>↔ 120 cm (for EI 120)            ↓ ≤ 60 cm x ≤ 60 cm</p>	<p>↔ ≤ 100 cm            ↓ Unlimited</p> <p>↔ 120 cm (for EI 120)            ↓ ≤ 60 cm x ≤ 60 cm</p>



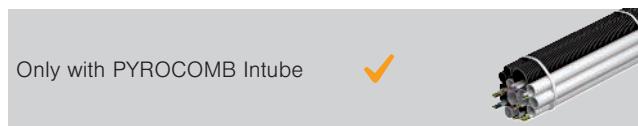
# Mortar insulation PYROMIX®

## Installations

### Cable



### Pipe bundle of electrical installation pipes



### Cable bundle



### Electrical installation pipe made of steel



### Individual lines for control purposes



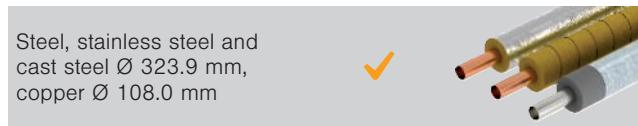
### Cable support systems



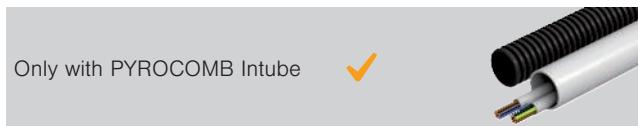
### Electrical installation pipe made of plastic, rigid



### Metal pipes with path insulation



### Electrical installation pipe made of plastic, flexible

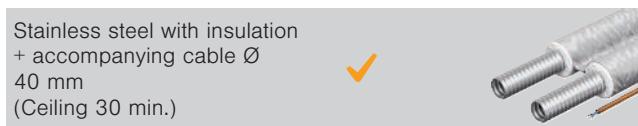


### Plastic pipes

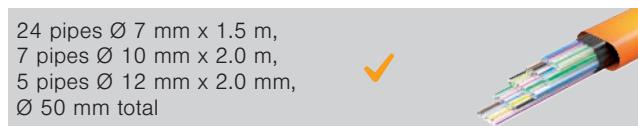


## Special installations

### Double solar pipes



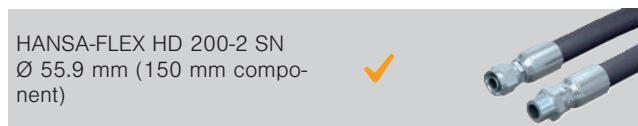
### Speed pipe



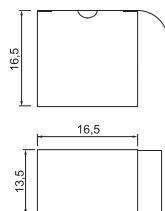
### Klimasplit



### Hydraulic hoses



Details on the version can be found in the proof of suitability or mounting instructions.  
All the stated dimensions are maximum values.

**Coil for insulation**

Type  
**FSB-WB BS |**

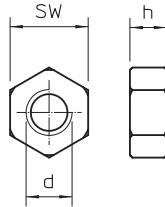
Pack. Weight  
pcs kg/100 pcs. **Item No.**  
**| 1 | 215.000 | 7203165**

**Threaded rod**

Type	Thread	Dimension d mm	Dimension L mm	Pack. pcs	Weight kg/100 pcs.	<b>Item No.</b>
<b>TR M6 1M G</b>	M6	6	1000	10	18.300	<b>3141047</b>
<b>TR M8 1M G</b>	M8	8	1000	10	30.000	<b>3141128</b>

**St** Steel  
**G** Electrogalvanised

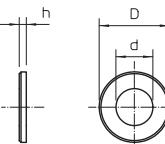
Threaded rod to DIN 976.

**Hexagonal nut DIN 934**

Type	Thread	Dimension SW mm	Dimension h mm	Dimension d mm	Pack. pcs	Weight kg/100 pcs.	<b>Item No.</b>
<b>HN M6 G</b>	M6	10	5.2	6	100	0.225	<b>3400069</b>
<b>HN M8 G</b>	M8	13	6.8	8	100	0.474	<b>3400085</b>

**St** Steel  
**G** Electrogalvanised

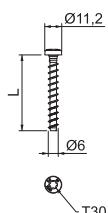
Hexagonal nut to DIN 934 with metric thread.

**Washer ISO 7093**

Type	Thread	Dimension h mm	Dimension D mm	Dimension d mm	Pack. pcs	Weight kg/100 pcs.	<b>Item No.</b>
<b>WS M6 D28 G</b>	M6	6.5	28	2.5	100	1.150	<b>3402207</b>
<b>WS M8 D28 G</b>	M8	8.5	28	2.5	100	1.100	<b>3402215</b>

**St** Steel  
**G** Electrogalvanised

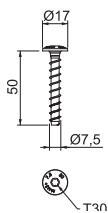
Washer of large outer diameter for universal use.

**Fire protection screw tie**

Type	Dimension	Anchor length	Bore hole Ø	Head Ø	Screw system	Pack. pcs	Weight kg/100 pcs.	<b>Item No.</b>
<b>MMS-plus 6X50</b>	6 x 50	50	5	11.2	Torx	100	1.000	<b>3498108</b>
<b>MMS-plus 6X35</b>	6 x 50	50	5	11.2	Torx	100	0.900	<b>3498103</b>

**St** Steel  
**G** Electrogalvanised

Fire protection bolt tie with pan head for direct installation without additional anchors. Drive T30, drill hole 5 mm. Tested anchor according to ETAG 001 - Part 3. Fire resistance class to R120 for concrete and masonry.

**Fire protection screw tie**

Type	Dimension	Anchor length	Bore hole Ø	Head Ø	Screw system	Pack. pcs	Weight kg/100 pcs.	<b>Item No.</b>
<b>MMS-plus 7.5X50</b>	7.5 x 50	50	6	17	Torx	100	1.500	<b>3498261</b>

**St** Steel  
**G** Electrogalvanised

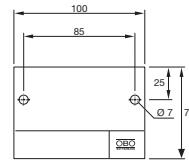
Fire protection bolt tie with large pan head for direct mounting without additional anchors. Drive T30, drill hole 6 mm. Tested anchor according to ETAG 001 - Part 3. Fire resistance class to R120 for concrete and masonry.

## Identification plate

Type	Language	Pack.	Weight	Item No.
		pcs	kg/100 pcs.	
<b>KS-S EN</b>	English	1	2.400	<b>7205429</b>
<b>KS-S FR</b>	French	1	2.400	<b>7205430</b>

 Polystyrene

Universal identification plate to be written on with waterproof and light-resistant felt-tip pen for all types of OBO insulation. For approved identification, including two push-fit anchors.





# Soft insulation, PYROPLATE® Fibre

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**System description**

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**Products**

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## Soft insulation PYROPLATE® Fibre

### System description



The PYROPLATE® Fibre system from OBO is used to create cable and combination insulation. The core of the system is the mineral fibre plate coated with a moisture-resistant ablation coating. When there is a fire, the fire protection coating creates an insulating carbon foam and, in combination with the mineral fibre plate, prevents the spread of fire and smoke. According to the European Technical Assessment, in ad-

dition to the cables, pipes made of steel, copper or various plastics may also be run through the same insulation. For pipelines, additional fire protection measures, such as section insulation and pipe sleeves, are required. The mortar or soft insulation made of PYROPLATE® Fibre is thus combination insulation which is appropriate for diverse structures.

# Soft insulation PYROPLATE® Fibre

## Installation principle



The installation is possible in light-duty partition walls or in solid walls.



Moisten the component layer and apply the coating to the cut edges for adhesion.



The plates can be inserted carefully with a hammer and board.



Use approved section insulation for metal pipes.



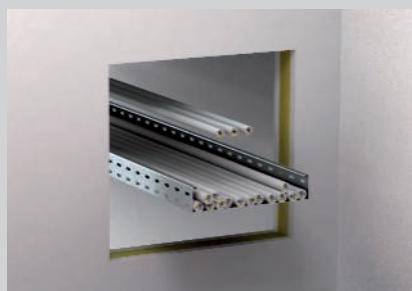
Apply the final coating to the surface and the installations.



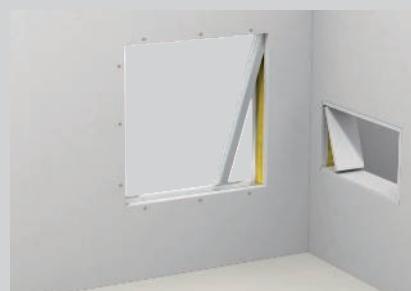
Secure soft insulation in ceilings against footfall.



Cut the plates for mounting.



Finished installation in a light-duty partition wall.



Classification to DIN

S30      S60      S90

Classification to EN

EI15      EI30      EI45      EI60      EI90      EI120      EI180      EI240



Erectors of combination insulation require training.

Always indicate the item number when ordering.

# Soft insulation PYROPLATE® Fibre

## Registration data

### Combination insulation in walls and ceilings

<b>Fire resistance class</b>	EI 15, EI 30, EI 45, EI 60, EI 90, EI 120, EI, 180, EI 240
<b>Proof of application</b>	European Technical Assessment of DIBt, Berlin
<b>Approval number</b>	ETA-17/0364
<b>Testing standard</b>	DIN EN 1366 Part 3

### Installation locations

#### Insulation in walls and ceilings

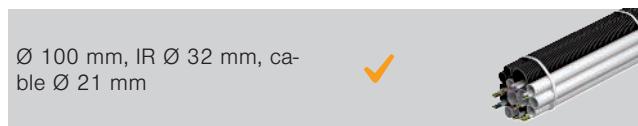
Component	Rigid walls	Flexible walls	Rigid floors
Min. component strength			
	10 cm (EI 15 / EI 30 / EI 60 / EI 90) 10 cm (EI 15 / EI 30 / EI 60 / EI 90 / EI 120) 20 cm (EI 15 / EI 30 / EI 60 / EI 90 / EI 120 / EI 180 / EI 240)	10 cm (EI 15 / EI 30 / EI 60 / EI 90 / EI 120)	12.5 cm (EI 15 / EI 30 / EI 60 / EI 90) 15 cm (EI 15 / EI 30 / EI 60 / EI 90 / EI 120) 20 cm (EI 15 / EI 30 / EI 60 / EI 90 / EI 120 / EI 180 / EI 240)
Min. insulation thickness			
	6 cm (EI 15 / EI 30 / EI 60 / EI 90) 12 cm (EI 15 / EI 30 / EI 60 / EI 90 / EI 120) 24 cm (EI 15 / EI 30 / EI 60 / EI 90 / EI 120 / EI 180 / EI 240)	6 cm (EI 15 / EI 30 / EI 60 / EI 90) 12 cm (EI 15 / EI 30 / EI 60 / EI 90 / EI 120) 24 cm (EI 15 / EI 30 / EI 60 / EI 90 / EI 120 / EI 180 / EI 240)	6 cm (EI 15 / EI 30 / EI 60 / EI 90) 12 cm (EI 15 / EI 30 / EI 60 / EI 90 / EI 120) 24 cm (EI 15 / EI 30 / EI 60 / EI 90 / EI 120 / EI 180 / EI 240)
Opening size for 6 cm insulation thick- ness			
	↔ ≤ 117.5 cm ↓ ≤ 120 cm	↔ ≤ 117.5 cm ↓ ≤ 120 cm	↔ ≤ 120 cm x ≤ 240 cm ↓ ≤ 80 cm x ≤ unlimited
Opening size for 12 cm insulation thick- ness			
	↔ ≤ 140 cm ↓ ≤ 200 cm	↔ ≤ 140 cm ↓ ≤ 200 cm	↔ ≤ 140 cm ↓ ≤ 200 cm
Opening size for 24 cm insulation thick- ness			
	↔ ≤ 60 cm ↓ ≤ 60 cm	–	↔ ≤ 60 cm ↓ ≤ Unlimited

# Soft insulation PYROPLATE® Fibre Installations

## Cable



## Pipe bundle of electrical installation pipes



## Cable bundle



## Electrical installation pipe made of steel



## Individual lines for control purposes



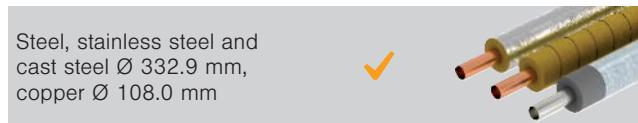
## Cable support systems



## Electrical installation pipe made of plastic, rigid



## Metal pipes with path insulation



## Electrical installation pipe made of plastic, flexible

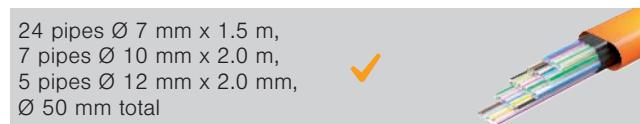


## Plastic pipes

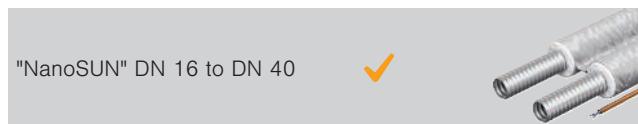


## Special installations

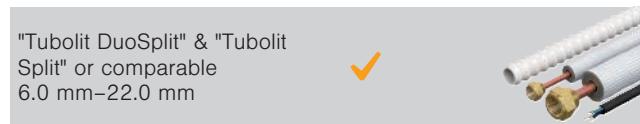
### Speed pipe



### Double solar pipes



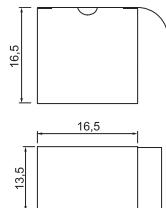
### Klimasplit



Details on the version can be found in the proof of suitability or mounting instructions.  
All the stated dimensions are maximum values.

## Soft insulation, PYROPLATE® Fibre

### Coil for insulation



Type  
FSB-WB BS |

Pack. Weight  
pcs kg/100 pcs. Item No.  
| 1 | 215.000 | 7203165

### Threaded rod



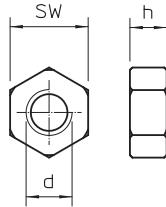
Type Thread Dimension d Dimension L  
mm mm  
TR M6 1M G | M6 | 6 | 1000  
TR M8 1M G | M8 | 8 | 1000

Pack. Weight  
pcs kg/100 pcs. Item No.  
| 10 | 18.300 | 3141047  
| 10 | 30.000 | 3141128

St Steel  
G Electrogalvanised

Threaded rod to DIN 976.

### Hexagonal nut DIN 934



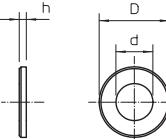
Type Thread Dimension SW Dimension h Dimension d  
mm mm mm mm  
HN M6 G | M6 | 10 | 5.2 | 6  
HN M8 G | M8 | 13 | 6.8 | 8

Pack. Weight  
pcs kg/100 pcs. Item No.  
| 100 | 0.225 | 3400069  
| 100 | 0.474 | 3400085

St Steel  
G Electrogalvanised

Hexagonal nut to DIN 934 with metric thread.

### Washer ISO 7093



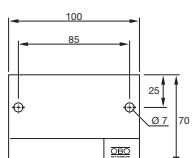
Type Thread Dimension d Dimension D Dimension h  
mm mm mm mm  
WS M6 D28 G | M6 | 6.5 | 28 | 2.5  
WS M8 D28 G | M8 | 8.5 | 28 | 2.5

Pack. Weight  
pcs kg/100 pcs. Item No.  
| 100 | 1.150 | 3402207  
| 100 | 1.100 | 3402215

St Steel  
G Electrogalvanised

Washer of large outer diameter for universal use.

### Identification plate



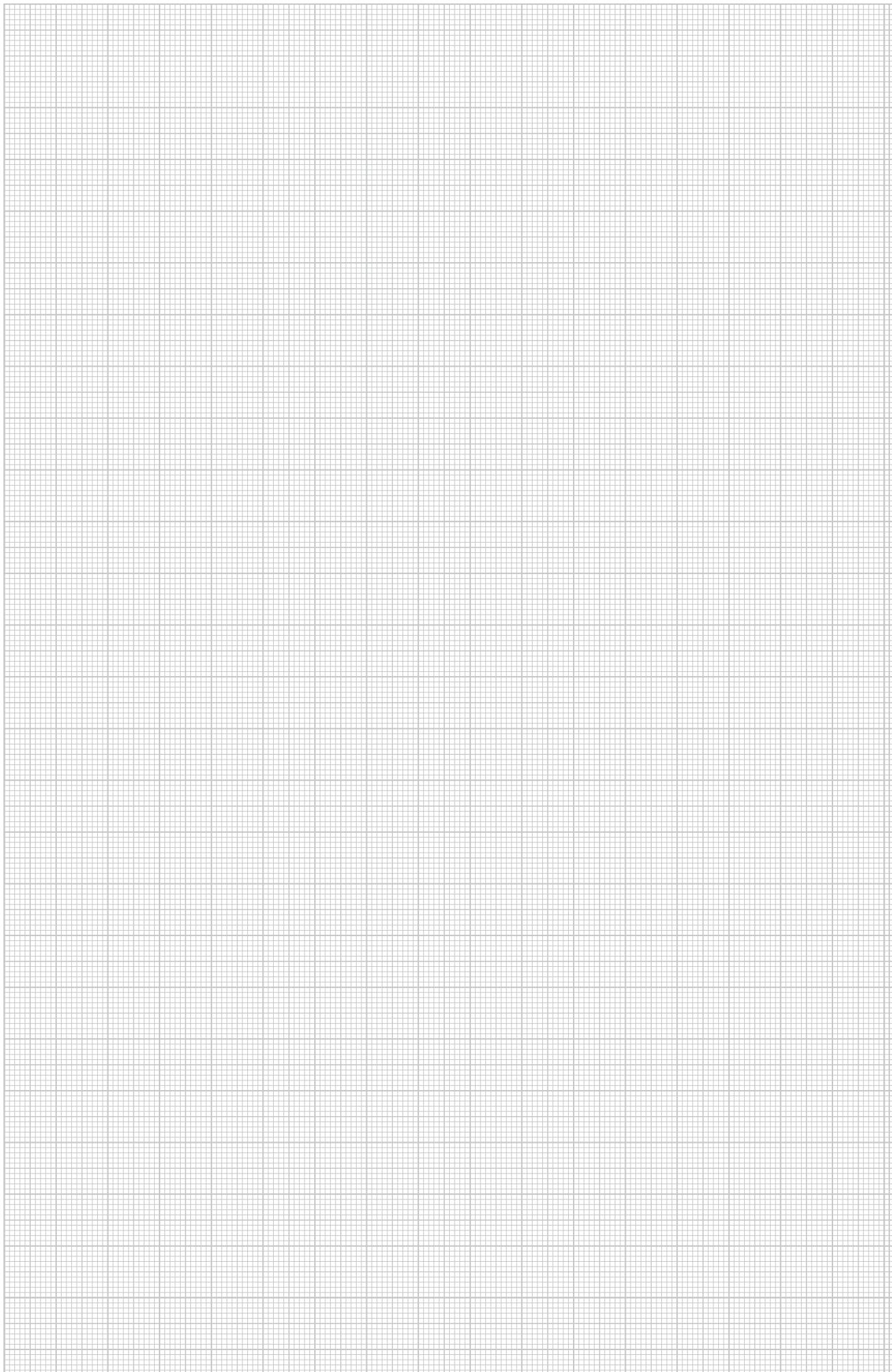
Language

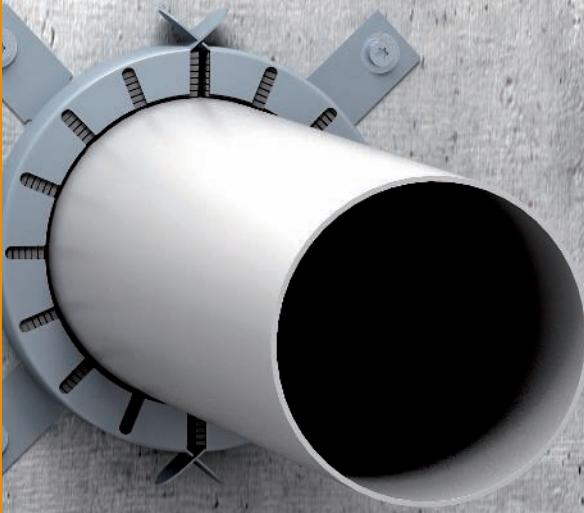
Type  
KS-S EN | English  
KS-S FR | French

Pack. Weight  
pcs kg/100 pcs. Item No.  
| 1 | 2.400 | 7205429  
| 1 | 2.400 | 7205430

PS Polystyrene

Universal identification plate to be written on with waterproof and light-resistant felt-tip pen for all types of OBO insulation. For approved identification, including two push-fit anchors.

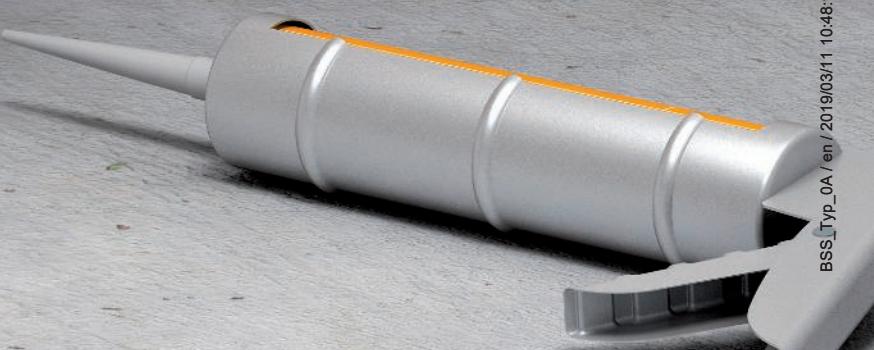




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Kombiabschottung	<input type="checkbox"/>	
Rohrabschottung	<input type="checkbox"/>	
Isolierwiderstandsklasse		Minuten
Zulassung		Nr.
System:		
Errichter:		
Datum:		



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Kombiabschottung	<input type="checkbox"/>	
Rohrabschottung	<input type="checkbox"/>	
Isolierwiderstandsklasse		Minuten
Zulassung		Nr.
System:		
Errichter:		
Datum:		



# Pipe seal PYROCOMB®Tubes

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<b>System description, PYROCOMB® pipe insulation</b>	34
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## PYROCOMB® Tubes pipe sleeve

### System description



The PYROCOMB® Tubes system is used to create cable insulation with pipe sleeves. The system comprises multiple sizes of the pipe sleeve, type TCX. This allows simple insulation of bundles of plastic electrical installation pipes, rigid or flexible, up to a size of M63. It is irrelevant whether the pipes are filled with cables

or are empty. In the event of fire, the fire protection material inserted within the seal foams up after a few minutes under high pressure, closing the softened bundles at a high pressure. This safely prevents the spread of fire and smoke, should a fire occur.

# PYROCOMB® Tubes pipe sleeve

## Installation principle



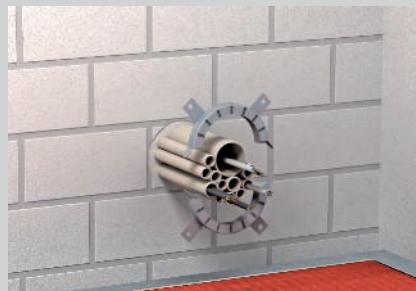
Two-sided arrangement of the pipe sleeves for wall mounting.



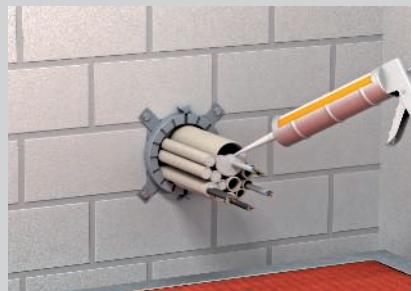
Mounting on the underside of the ceiling with metal anchors.



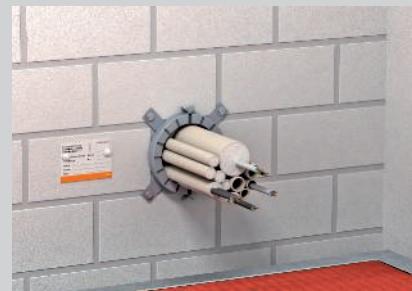
Closing of the ring gap with the insulation layer creator DSX.



Combination of the sleeve halves and fastening on the wall.



Closing of the pipe ends with the insulation layer creator DSX.



Labelled insulation of installation pipe bundles.

Classification to DIN

S30      S60      S90

Classification to EN

EI15      EI30      EI45      EI60      EI90      EI120



Erectors of combination insulation require training.

Always indicate the item number when ordering.





## PYROCOMB® Tubes pipe sleeve

### Registration data

#### Combination insulation in walls and ceilings

<b>Fire resistance class</b>	EI 15, EI 30, EI 45, EI 60, EI 90, EI 120
<b>Proof of application</b>	General construction approval of OIB, Vienna
<b>Approval number</b>	ETA-12/0207
<b>Testing standard</b>	EN 1366-3

## Installation locations

### Insulation in walls and ceilings

Component	Rigid walls	Flexible walls	Rigid floors
Min. component strength			
	10 cm (EI 30 / EI 60 / EI 90 / EI 120)	10 cm (EI 30 / EI 60 / EI 90 / EI 120)	15 cm (EI 30 / EI 60 / EI 90 / EI 120)
Min. insulation thickness			
	10 cm (EI 60 / EI 90 / EI 120)	10 cm (EI 60 / EI 90 / EI 120)	15 cm (EI 60 / EI 90 / EI 120)
Opening size			
	Ø 32 mm, Ø 40 mm, Ø 50 mm, Ø 63 mm, Ø 75 mm, Ø 90 mm, Ø 110 mm, Ø 125 mm	Ø 32 mm, Ø 40 mm, Ø 50 mm, Ø 63 mm, Ø 75 mm, Ø 90 mm, Ø 110 mm, Ø 125 mm	Ø 32 mm, Ø 40 mm, Ø 50 mm, Ø 63 mm, Ø 75 mm, Ø 90 mm, Ø 110 mm, Ø 125 mm

# PYROCOMB® Tubes pipe sleeve Installations

Cable



Pipe bundle of electrical installation pipes



Cable bundle



Electrical installation pipe made of steel



Individual lines for control purposes



Cable support systems



Electrical installation pipe made of plastic, rigid



Metal pipes with path insulation



Electrical installation pipe made of plastic, flexible



Plastic pipes



Details on the version can be found in the proof of suitability or mounting instructions.  
All the stated dimensions are maximum values.



## PYROCOMB® pipe sleeve

### System description



The PYROCOMB® system can be used as independent pipe sealing for combustible pipes (e.g. sanitary wastewater pipes). It is primarily made up of the pipe sleeves, type TCX. In the event of fire, the fire protection material inserted within the seal foams up after a few minutes under high pressure, closing the soft plastic pipes. This safely prevents the spread of fire

and smoke, should a fire occur. With wall mounting, the pipe sleeves are mounted on both sides of the wall with metal anchors. Ceiling penetrations only have a tube seal from the underside. In light-duty partitions, the pipe sleeves are fastened on passed-through threaded rods and connected together.

# PYROCOMB® pipe sleeve

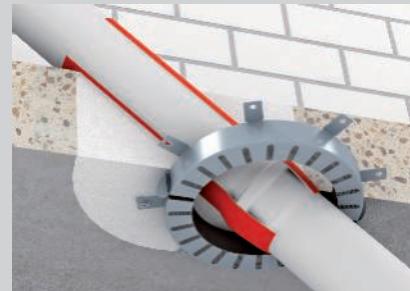
## Installation principle



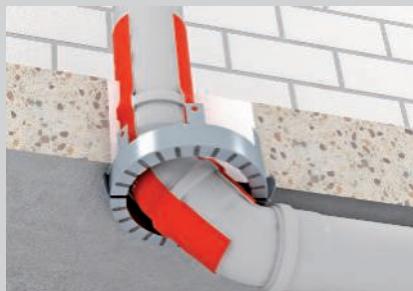
Two-sided arrangement of the pipe sleeves for wall mounting.



Mounting on the underside of the ceiling with metal anchors.



Sloping pipe penetration up to an angle of 39°.



Pipe sleeves in the area of the penetration.



Eccentric arrangement with max. 3 levels of larger pipe sleeves.



Pipe post systems with 2 accompanying cables.

Classification to DIN

**S30      S60      S90**

Classification to EN

**EI15    EI30    EI45    EI60    EI90    EI120    EI180    EI240**



Erectors of combination insulation require training.

Always indicate the item number when ordering.

# PYROCOMB® pipe sleeve

## Registration data

### Pipe insulation in underfloor ducts

<b>Fire resistance class</b>	EI 15, EI 30, EI 45, EI 60, EI 90, EI 120, EI 180, EI 240
<b>Proof of application</b>	General construction approval of OIB, Vienna
<b>Approval number</b>	ETA-12/0182
<b>Testing standard</b>	EN 1366-3

## Installation locations

### Pipe insulation in walls and ceilings

Component	Rigid walls	Flexible walls	Rigid floors
Min. component strength	 10 cm (EI 30 / EI 60 / EI 90 / EI 120 / EI 240)	 10 cm (EI 30 / EI 60 / EI 90 / EI 120)	 15 cm (EI 30 / EI 60 / EI 90 / EI 120) 30 cm (EI 180 / EI 240)
Min. insulation thickness	 10 cm (EI 30 / EI 60 / EI 90 / EI 120 / EI 240)	 10 cm (EI 60 / EI 90 / EI 120)	 15 cm (EI 30 / EI 60 / EI 90 / EI 120) 30 cm (EI 180 / EI 240)
Opening size	 Ø 32 mm, Ø 40 mm, Ø 50 mm, Ø 63 mm, Ø 75 mm, Ø 90 mm, Ø 110 mm, Ø 125 mm, Ø 140 mm, Ø 160 mm, Ø 180 mm, Ø 200 mm, Ø 225 mm, Ø 250 mm, Ø 280 mm, Ø 300 mm, Ø 315 mm, Ø 355 mm, Ø 400 mm	 Ø 32 mm, Ø 40 mm, Ø 50 mm, Ø 63 mm, Ø 75 mm, Ø 90 mm, Ø 110 mm, Ø 125 mm, Ø 140 mm, Ø 160 mm, Ø 180 mm, Ø 200 mm, Ø 225 mm, Ø 250 mm, Ø 280 mm, Ø 300 mm, Ø 315 mm, Ø 355 mm, Ø 400 mm	 Ø 32 mm, Ø 40 mm, Ø 50 mm, Ø 63 mm, Ø 75 mm, Ø 90 mm, Ø 110 mm, Ø 125 mm, Ø 140 mm, Ø 160 mm, Ø 180 mm, Ø 200 mm, Ø 225 mm, Ø 250 mm, Ø 280 mm, Ø 300 mm, Ø 315 mm, Ø 355 mm, Ø 400 mm

# PYROCOMB® pipe sleeve Installations

Cable



Pipe bundle of electrical installation pipes



Cable bundle



Electrical installation pipe made of steel



Individual lines for control purposes



Cable support systems



Electrical installation pipe made of plastic, rigid



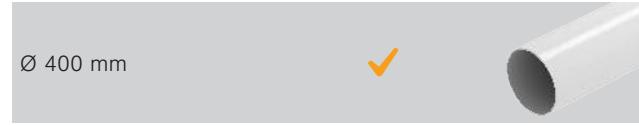
Metal pipes with path insulation



Electrical installation pipe made of plastic, flexible



Plastic pipes

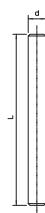


Details on the version can be found in the proof of suitability or mounting instructions.  
All the stated dimensions are maximum values.



## PYROCOMB® pipe sleeve

### Threaded rod



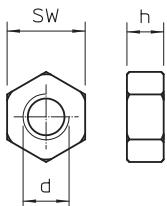
Type	Thread	Dimension d mm	Dimension L mm	Pack. pcs	Weight kg/100 pcs.	Item No.
TR M6 1M G	M6	6	1000	10	18.300	3141047
TR M8 1M G	M8	8	1000	10	30.000	3141128

St Steel

G Electrogalvanised

Threaded rod to DIN 976.

### Hexagonal nut DIN 934



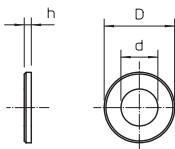
Type	Thread	Dimension SW mm	Dimension h mm	Dimension d mm	Pack. pcs	Weight kg/100 pcs.	Item No.
HN M6 G	M6	10	5.2	6	100	0.225	3400069
HN M8 G	M8	13	6.8	8	100	0.474	3400085

St Steel

G Electrogalvanised

Hexagonal nut to DIN 934 with metric thread.

### Washer ISO 7093



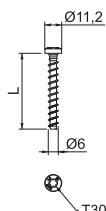
Type	Thread	Dimension d mm	Dimension D mm	Dimension h mm	Pack. pcs	Weight kg/100 pcs.	Item No.
WS M6 D28 G	M6	6.5	28	2.5	100	1.150	3402207
WS M8 D28 G	M8	8.5	28	2.5	100	1.100	3402215

St Steel

G Electrogalvanised

Washer of large outer diameter for universal use.

### Fire protection screw tie



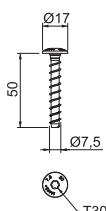
Type	Dimension mm	Anchor length mm	Bore hole Ø mm	Head Ø mm	Screw system	Pack. pcs	Weight kg/100 pcs.	Item No.
MMS-plus 6X50	6 x 50	50	5	11.2	Torx	100	1.000	3498108
MMS-plus 6X35	6 x 50	50	5	11.2	Torx	100	0.900	3498103

St Steel

G Electrogalvanised

Fire protection bolt tie with pan head for direct installation without additional anchors. Drive T30, drill hole 5 mm. Tested anchor according to ETAG 001 - Part 3. Fire resistance class to R120 for concrete and masonry.

### Fire protection screw tie



Type	Dimension mm	Anchor length mm	Bore hole Ø mm	Head Ø mm	Screw system	Pack. pcs	Weight kg/100 pcs.	Item No.
MMS-plus 7.5X50	7.5 x 50	50	6	17	Torx	100	1.500	3498261

St Steel

G Electrogalvanised

Fire protection bolt tie with large pan head for direct mounting without additional anchors. Drive T30, drill hole 6 mm. Tested anchor according to ETAG 001 - Part 3. Fire resistance class to R120 for concrete and masonry.

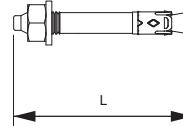
## Nail anchor N with thread

Type	Thread	Bore hole Ø	Bore hole depth	Clamping range	Dimension L	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>N 6-5-10/49</b>	M6	6	40	5 - 10	49	100	1.160	<b>3498396</b>

St Steel

G Electrogalvanised

The nail anchor N can be used for multiple fastenings of non-load-bearing systems and in cracked and non-cracked concrete, thereby combining the benefits of a bolt tie with even easier mounting. The nail tie only needs to be hammered into the drill hole. It is not necessary to apply torque subsequently. When the load occurs, the nail tie spreads itself and bolts itself in the drill hole.



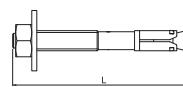
## Bolt tie BZ-U

Type	Thread	Dimension L	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>BZ-U 8-10-21/75</b>	M8	75	50	3.460	<b>3498320</b>

St Steel

G Electrogalvanised

Bolt tie BZ for the anchoring of medium-duty to heavy-duty loads, both in cracked and non-cracked concrete. It combines high approved loads with small edge distances and axial spacings.

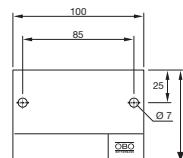


## Identification plate

Type	Language	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>KS-S EN</b>	English	1	2.400	<b>7205429</b>
<b>KS-S FR</b>	French	1	2.400	<b>7205430</b>

PS Polystyrene

Universal identification plate to be written on with waterproof and light-resistant felt-tip pen for all types of OBO insulation. For approved identification, including two push-fit anchors.





# Escape route installations for hollow ceilings

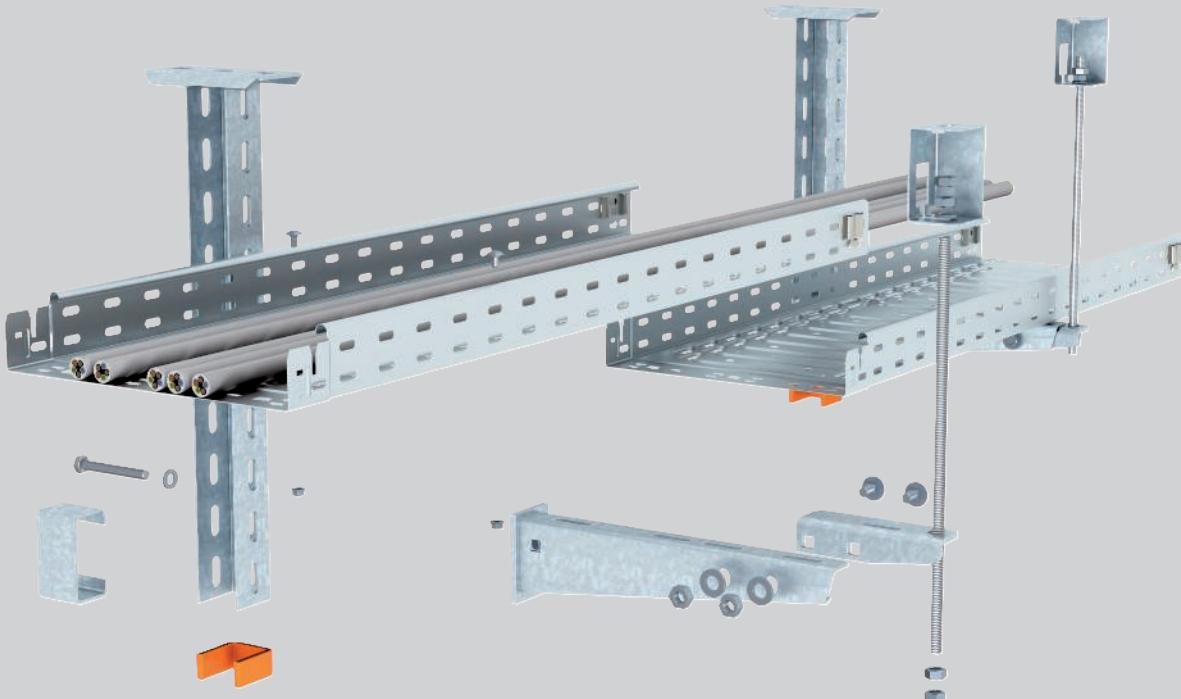
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# RKS-Magic® cable tray

## System description



The tested RKS-Magic® cable tray system is suitable for installation in the false ceiling area of escape and rescue routes. In the event of fire, the system has a proven mechanical stability of 30 minutes. The RKS-Magic® cable tray can be mounted under the ceiling or on the wall with brackets. The brackets are additionally secured on the ceiling with a threaded rod to prevent them from bending if there is a fire. A further option for ceiling mounting is the support of the cable tray on profile rails, each mounted under the ceiling

with two threaded rods. As the cable tray deforms in the event of fire, sufficient distance to the false ceiling must be maintained. This minimum distance is documented in the proof of testing for the various versions of the RKS-Magic® cable trays. If the cable loads and tray widths listed in the proof of testing are maintained and the minimum spacings to the false ceiling taken into account, then multi-layer variants can also be implemented.

# RKS-Magic® cable tray

## Installation principle



Single-layer ceiling suspension.



Two-layer ceiling suspension with bracket arrangement on one side.



Two-layer ceiling suspension with bracket arrangement on both sides.



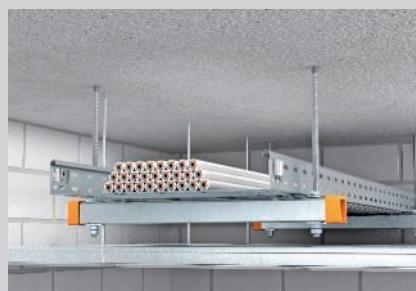
Wall mounting, one and two-layer possible.



Mounting of the threaded rod lock through the connection bracket on the tip of the bracket.



Complete screwless joint connection.



Single-layer ceiling mounting above suspended fire protection ceiling.



Two-layer ceiling mounting above suspended fire protection ceiling.



Clamp fastening for high load capacities.

Tested mounting options



**CAUTION: No maintenance of electrical functionality according to DIN 4102 Part 12!**

Always indicate the item number when ordering.



# RKS-Magic® cable tray

## Proof

### Fire-proof fastening above fire protection ceilings

<b>Fire load</b>	30 minutes
<b>Proof of testing</b>	OBO Bettermann
<b>Document no. - Mounting with suspended support / bracket</b>	05/170503-02
<b>Document no. - Mounting with mounting rails</b>	05/170503-01
<b>Testing principles</b>	In accordance with DIN 4102

### Support spacing for wall / ceiling mounting with suspended support / bracket

Cable tray width	Cable load per cable tray						
200 mm	max. 30 kg/m	max. 1.50 m					
300 mm	max. 45 kg/m	max. 1.50 m					
400 mm	max. 60 kg/m	max. 1.50 m	max. 1.20 m	max. 1.50 m	max. 1.50 m	max. 1.50 m	max. 1.20 m

### Support spacing for ceiling mounting with mounting rails

Cable tray width	Cable load per cable tray		
100 mm	max. 15 kg/m	max. 1.50 m	max. 1.50 m
200 mm	max. 30 kg/m	max. 1.50 m	max. 1.50 m
300 mm	max. 45 kg/m	max. 1.50 m	max. 1.50 m
400 mm	max. 60 kg/m	max. 1.50 m	max. 1.20 m

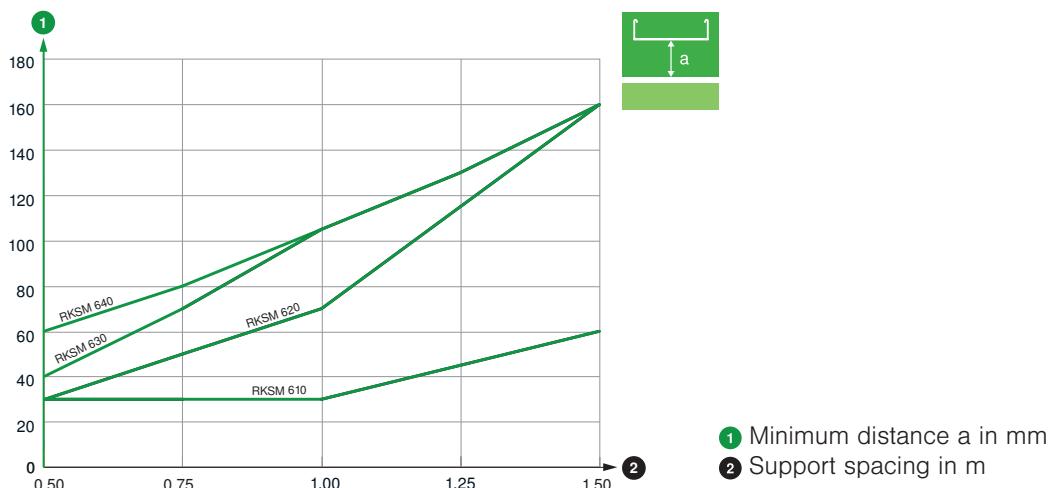
### Required minimum spacing "a" under fire load at different support spacings

Cable tray width	Cable load per cable tray	max. 0.50 m	max. 0.75 m	max. 1.00 m	max. 1.25 m	max. 1.50 m
100 mm	max. 15 kg/m	30 mm	30 mm	30 mm	45 mm	60 mm
200 mm	max. 30 kg/m	30 mm	50 mm	70 mm	115 mm	160 mm
300 mm	max. 45 kg/m	40 mm	70 mm	105 mm	130 mm	160 mm
400 mm	max. 60 kg/m	60 mm	80 mm	105 mm	130 mm	160 mm

The stated values for the wall / ceiling mounting with suspended support / bracket and for ceiling mounting with mounting rails

The minimum spacing "a" relates to the distance of the under side of the cable tray to the top side of the fire protection ceiling.

### Spacing diagram, RKSM cable tray



## RKS-Magic® cable tray

### Components used: RKSM cable tray

#### Wall/ceiling mounting with suspended support/bracket

Component	Type					
Cable tray	RKSM 6... FS	1	2	2	1	2
Support	US 5 K ... FT	1	1	1	0	0
Protective cap	US 5 KS OR	1	1	1	0	0
Wall and support brackets	AW30F... FT	1	2	2	1	2
Spacer	DSK 45	1	2	1	0	0
Hexagonal bolt	SKS 10x 90 F	1	2	1	0	0
Truss-head bolt	FRSB 6x 15 F	2	4	4	2	4
Threaded rod	2078 M12 G	1	2	2	1	2
Hexagonal nut	DIN 934 M12 G	4	5	8	4	5
Washer	966 M12 G	2	3	4	2	3
Connection sleeve	12005 M12 G	0	1	0	0	1
Fire protection clamp	BSB	1	1	2	1	1

Choose the fastening anchors according to the substrate



#### Ceiling mounting with mounting rails

Component	Type		
Cable tray	RKSM 6... FS	1	2
Mounting rail	See table	1	2
Protective cap	MS41... EK	2	4
Threaded rod	2078 M12 G	2	4
Hexagonal nut	DIN 934 M12 G	6	10
Large washer	DIN440 14 F	2	4
Washer	966 M12 G	2	4
Connection sleeve	12005 M12 G	0	2
Truss-head bolt	FRSB 6x 15 F	2	4
Large washer	DIN440 7 F	2	4

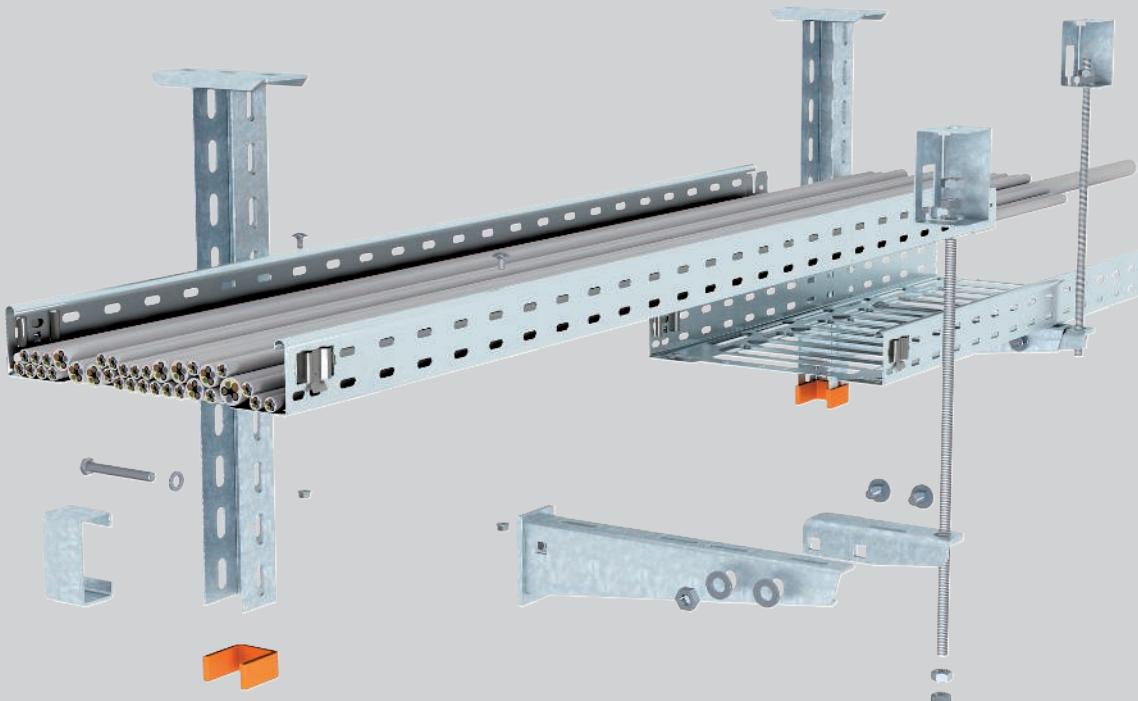
Choose the fastening anchors according to the substrate

#### Mounting rails to be used according to support spacing

Cable tray type	Cable tray width	max. 0.50 m	max. 0.75 m	max. 1.00 m	max. 1.25 m	max. 1.50 m
RKSM 610 FS	100 mm	MS4121P	MS4121P	MS4121P	MS4121P	MSL4141P
RKSM 620 FS	200 mm	MS4121P	MS4121P	MS4121P	MSL4141P	MSL4141P
RKSM 630 FS	300 mm	MS4121P	MSL4141P	MSL4141P	MSL4141P	MS4141P
RKSM 640 FS	400 mm	MSL4141P	MSL4141P	MSL4141P	MS4141P	MS4141P

# MKS-Magic® cable tray

## System description



The tested MKS-Magic® cable tray system is suitable for installation in the false ceiling area of escape and rescue routes. In the event of fire, the system has a proven mechanical stability of 30 minutes. The MKS-Magic® cable trays can be mounted under the ceiling or on the wall with brackets. The brackets are additionally secured on the ceiling with a threaded rod to prevent them from bending in a fire. As the cable trays deform in a fire, sufficient distance to the false ceiling must be maintained. This minimum distance is documented in the proof of testing of the MKS-Magic® cable trays. If the cable loads and tray widths listed in

the proof of testing are maintained and the minimum spacings to the false ceiling taken into account, then multi-layer variants can also be implemented. A further option for ceiling mounting is the support of the cable trays on profile rails, each mounted under the ceiling with two threaded rods. With this mounting variant, sufficient distances to the false ceiling must be maintained. A two-layer arrangement of the cable trays is possible, providing that the approved tensile stress in the threaded rods is also maintained in the event of fire.

# MKS-Magic® cable tray

## Installation principle



Single-layer ceiling suspension.



Two-layer ceiling suspension with bracket arrangement on one side.



Two-layer ceiling suspension with bracket arrangement on both sides.



Wall mounting, single and double-layer possible.



Mounting of the threaded rod lock through the connection bracket on the tip of the bracket.



Screwless joint connection, only the base lugs need to be bent.



Single-layer ceiling mounting above suspended fire protection ceiling.



Two-layer ceiling mounting above suspended fire protection ceiling.



Clamp fastening for high load capacities.

Tested mounting options



**CAUTION: No maintenance of electrical functionality according to DIN 4102 Part 12!**

Always indicate the item number when ordering.

# MKS-Magic® cable tray

## Proof

### Fire-proof fastening above fire protection ceilings

<b>Fire load</b>	30 minutes
<b>Proof of testing</b>	OBO Bettermann
<b>Document no. - Mounting with suspended support / bracket</b>	05/130301-04
<b>Document no. - Mounting with mounting rails</b>	05/130301-03
<b>Testing principles</b>	In accordance with DIN 4102

Proofs of testing are also available for the MKS cable trays and can be requested accordingly.

### Support spacing for wall / ceiling mounting with suspended support / bracket

Cable tray width	Cable load per cable tray						
200 mm	max. 30 kg/m	max. 1.50 m					
300 mm	max. 45 kg/m	max. 1.50 m					
400 mm	max. 60 kg/m	max. 1.50 m	max. 1.20 m	max. 1.50 m	max. 1.50 m	max. 1.50 m	max. 1.20 m

### Support spacing for ceiling mounting with mounting rails

Cable tray width	Cable load per cable tray		
100 mm	max. 15 kg/m	max. 1.50 m	max. 1.50 m
200 mm	max. 30 kg/m	max. 1.50 m	max. 1.50 m
300 mm	max. 45 kg/m	max. 1.50 m	max. 1.50 m
400 mm	max. 60 kg/m	max. 1.50 m	max. 1.20 m

### Required minimum spacing "a" under fire load at support spacing max. 1.50 m

Cable tray width	Cable load per cable tray	max. 1.50 m
100 mm	max. 15 kg/m	55 mm
200 mm	max. 30 kg/m	105 mm
300 mm	max. 45 kg/m	180 mm
400 mm	max. 60 kg/m	180 mm



The stated values for the wall / ceiling mounting with suspended support / bracket and for ceiling mounting with mounting rails

The minimum spacing "a" relates to the distance of the under side of the cable tray to the top side of the fire protection ceiling.

# MKS-Magic® cable tray

## Components used, MKSM cable trays

### Wall/ceiling mounting with suspended support/bracket

Component	Type					
Cable tray	MKSM 6... FS	1	2	2	1	2
Support	US 5 K ... FT	1	1	1	0	0
Protective cap	US 5 KS OR	1	1	1	0	0
Wall and support brackets	AW30F... FT	1	2	2	1	2
Spacer	DSK 45	1	2	1	0	0
Hexagonal bolt	SKS 10x 90 F	1	2	1	0	0
Truss-head bolt	FRSB 6x 15 F	2	4	4	2	4
Threaded rod	2078 M12 G	1	2	2	1	2
Hexagonal nut	DIN 934 M12 G	4	5	8	4	5
Washer	966 M12 G	2	3	4	2	3
Connection sleeve	12005 M12 G	0	1	0	0	1
Fire protection clamp	BSB	1	1	2	1	1
Choose the fastening anchors according to the substrate	12005 M12 G	0	1	0	0	1
Fire protection clamp	BSB	1	1	2	1	1

Choose the fastening anchors according to the substrate

### Ceiling mounting with mounting rails

Component	Type		
Cable tray	MKSM 6... FS	1	2
Mounting rail	See table	1	2
Protective cap	MS4141 EK	2	4
Threaded rod	2078 M12 G	2	4
Hexagonal nut	DIN 934 M12 G	6	10
Large washer	DIN440 14 F	2	4
Washer	966 M12 G	2	4
Connection sleeve	12005 M12 G	0	2
Truss-head bolt	FRSB 5x 15 F	2	4
Large washer	DIN440 7 F	2	4

Choose the fastening anchors according to the substrate

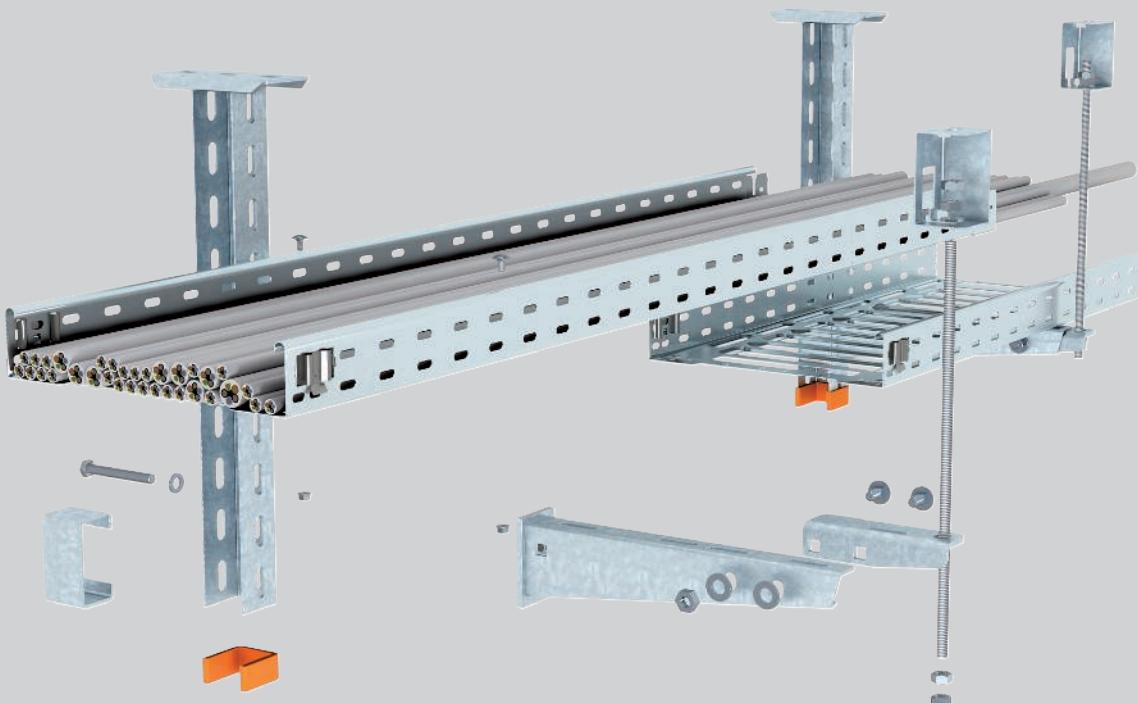
### Mounting rails to be used according to support spacing

Cable tray type	Cable tray width	max. 1.50 m
MKSM 610 FS	100 mm	MSL4141P
MKSM 620 FS	200 mm	MSL4141P
MKSM 630 FS	300 mm	MS4141P
MKSM 640 FS	400 mm	MS4141P



## Cable tray SKS-Magic®

### System description



The tested SKS-Magic® cable trays can be mounted under the ceiling or on the wall with brackets. In the event of fire, the system has a proven mechanical stability of 30 minutes. The SKS-Magic® cable trays can be mounted under the ceiling or on the wall with brackets. The brackets are additionally secured on the ceiling with a threaded rod to prevent them from bending in a fire. As the cable trays deform in a fire, sufficient distance to the false ceiling must be maintained. This minimum distance is documented in the proof of testing of the SKS-Magic® cable trays. If the cable loads and tray widths listed in the proof of test-

ing are maintained and the minimum spacings to the false ceiling taken into account, then multi-layer variants can also be implemented. A further option for ceiling mounting is the support of the cable trays on profile rails, each mounted under the ceiling with two threaded rods. With this mounting variant, sufficient distances to the false ceiling must also be maintained. A two-layer arrangement of the cable trays is possible, providing that the approved tensile stress in the threaded rod is maintained in the event of fire.

# Cable tray SKS-Magic®

## Installation principle



Single-layer ceiling suspension.



Two-layer ceiling suspension with bracket arrangement on one side.



Two-layer ceiling suspension with bracket arrangement on both sides.



Wall mounting, one and two-layer possible.



Mounting of the threaded rod lock through the connection bracket on the tip of the bracket.



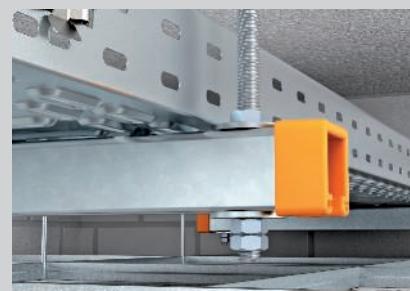
Screwless joint connection, only the base lugs need to be bent.



Single-layer ceiling mounting above suspended fire protection ceiling.



Two-layer ceiling mounting above suspended fire protection ceiling.



Clamp fastening for high load capacities.

Tested mounting options



**CAUTION: No maintenance of electrical functionality according to DIN 4102 Part 12!**

Always indicate the item number when ordering.



# Cable tray SKS-Magic®

## Proof

### Fire-proof fastening above fire protection ceilings

<b>Fire load</b>	30 minutes
<b>Proof of testing</b>	OBO Bettermann
<b>Document no. - Mounting with suspended support / bracket SKSM</b>	05/170601-02
<b>Document no. - Mounting with mounting rails</b>	05/170601-01
<b>Testing principles</b>	In accordance with DIN 4102

Proofs of testing are also available for the SKS cable trays and can be requested accordingly.

### Support spacing for wall / ceiling mounting with suspended support / bracket

Cable tray width	Cable load per cable tray					
200 mm	max. 30 kg/m	max. 1.50 m				
300 mm	max. 45 kg/m	max. 1.50 m				
400 mm	max. 60 kg/m	max. 1.50 m	max. 1.20 m	max. 1.50 m	max. 1.50 m	max. 1.20 m
500 mm	max. 75 kg/m	max. 1.50 m	max. 0.90 m	max. 1.50 m	max. 1.50 m	max. 0.90 m
600 mm	max. 90 kg/m	max. 1.50 m	max. 0.75 m	max. 1.50 m	max. 1.50 m	max. 0.75 m

### Support spacing for ceiling mounting with mounting rails

Cable tray width	Cable load per cable tray		
100 mm	max. 15 kg/m	max. 1.50 m	max. 1.50 m
200 mm	max. 30 kg/m	max. 1.50 m	max. 1.50 m
300 mm	max. 45 kg/m	max. 1.50 m	max. 1.50 m
400 mm	max. 60 kg/m	max. 1.50 m	max. 1.20 m
500 mm	max. 75 kg/m	max. 1.50 m	max. 0.90 m
600 mm	max. 90 kg/m	max. 1.50 m	max. 0.75 m

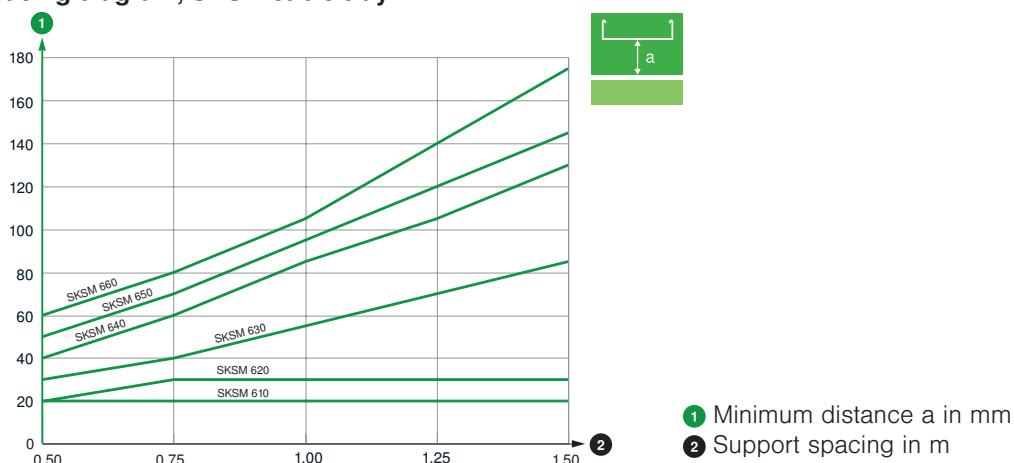
### Required minimum spacing "a" under fire load at different support spacings

Cable tray width	Cable load per cable tray	max. 0.50 m	max. 0.75 m	max. 1.00 m	max. 1.25 m	max. 1.50 m
100 mm	max. 15 kg/m	20 mm				
200 mm	max. 30 kg/m	20 mm	30 mm	30 mm	30 mm	30 mm
300 mm	max. 45 kg/m	30 mm	40 mm	55 mm	70 mm	85 mm
400 mm	max. 60 kg/m	40 mm	60 mm	85 mm	105 mm	130 mm
500 mm	max. 75 kg/m	50 mm	70 mm	95 mm	120 mm	145 mm
600 mm	max. 90 kg/m	60 mm	80 mm	105 mm	140 mm	175 mm

The stated values for the wall / ceiling mounting with suspended support / bracket and for ceiling mounting with mounting rails

The minimum spacing "a" relates to the distance of the under side of the cable tray to the top side of the fire protection ceiling.

### Spacing diagram, SKSM cable tray



# Cable tray SKS-Magic®

## Components used, SKSM cable trays

### Wall/ceiling mounting with suspended support/bracket

Component	Type						
Cable tray	SKSM 6... FS	1	2	2	1	2	
Support	US 5 K ... FT	1	1	1	0	0	
Protective cap	US 5 KS OR	1	1	1	0	0	
Wall and support brackets	AW30F... FT	1	2	2	1	2	
Spacer	DSK 45	1	2	1	0	0	
Hexagonal bolt	SKS 10x 90 F	1	2	1	0	0	
Truss-head bolt	FRSB 6x 15 F	2	4	4	2	4	
Threaded rod	2078 M12 G	1	2	2	1	2	
Hexagonal nut	DIN 934 M12 G	4	5	8	4	5	
Washer	966 M12 G	2	3	4	2	3	
Connection sleeve	12005 M12 G	0	1	0	0	1	
Fire protection clamp	BSB	1	1	2	1	1	
Choose the fastening anchors according to the substrate	12005 M12 G	0	1	0	0	1	
Fire protection clamp	BSB	1	1	2	1	1	

Choose the fastening anchors according to the substrate

### Ceiling mounting with mounting rails

Component	Type		
Cable tray	SKSM 6... FS	1	2
Mounting rail	See table	1	2
Protective cap	MS41... EK	2	4
Threaded rod	2078 M12 G	2	4
Hexagonal nut	DIN 934 M12 G	6	10
Large washer	DIN440 14 F	2	4
Washer	966 M12 G	2	4
Connection sleeve	12005 M12 G	0	2
Truss-head bolt	FRSB 6x 15 F	2	4
Large washer	DIN440 7 F	2	4

Choose the fastening anchors according to the substrate

### Mounting rails to be used according to support spacing

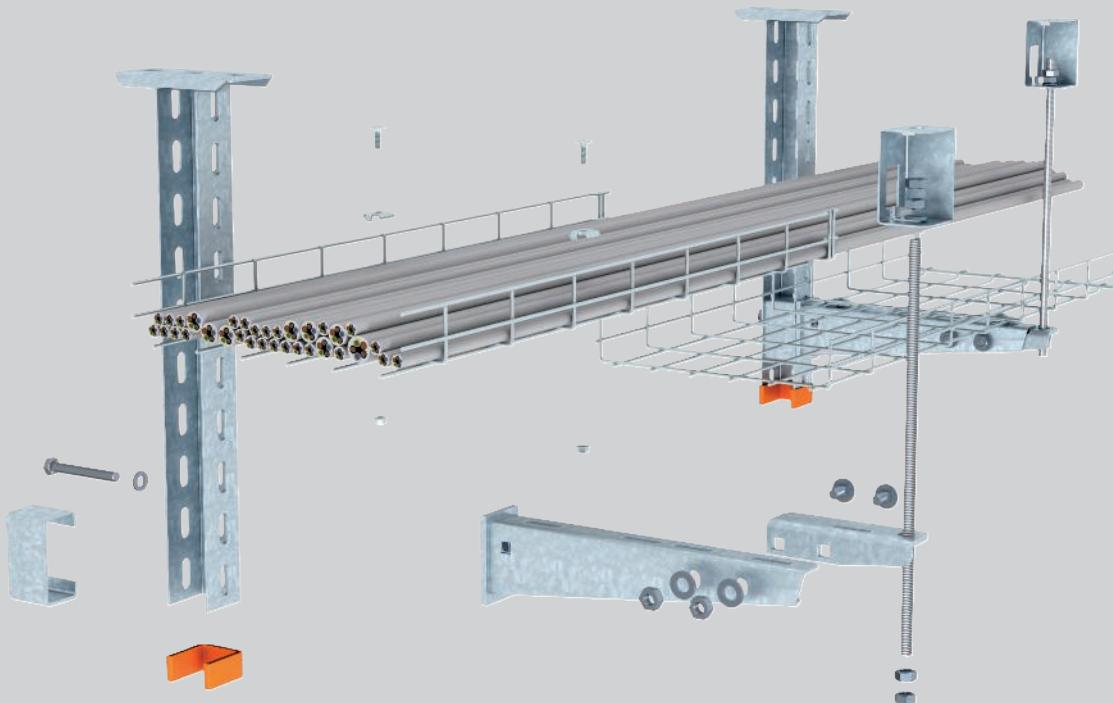
Cable tray type	Cable tray width	max. 0.50 m	max. 0.75 m	max. 1.00 m	max. 1.25 m	max. 1.50 m
SKSM 610 FS	100 mm	MS4121P	MS4121P	MS4121P	MS4121P	MSL4141P
SKSM 620 FS	200 mm	MS4121P	MS4121P	MS4121P	MSL4141P	MSL4141P
SKSM 630 FS	300 mm	MS4121P	MSL4141P	MSL4141P	MSL4141P	MS4141P
SKSM 640 FS	400 mm	MSL4141P	MSL4141P	MSL4141P	MS4141P	MS4141P
SKSM 650 FS	500 mm	MS4141P	MS4141P	MS4141P	MS4141P	MS4141P
SKSM 660 FS	600 mm	MS4141P	MS4141P	MS4141P	MS4141P	MS4141P

Always indicate the item number when ordering.



# GR-Magic® mesh cable tray

## System description



The tested GR-Magic® mesh cable tray system is suitable for installation in the false ceiling area of escape and rescue routes. In the event of fire, the system has a proven mechanical stability of 30 minutes. The GR-Magic® mesh cable tray can be mounted under the ceiling or on the wall with brackets. The brackets are additionally secured on the ceiling with a threaded rod to prevent them from bending in a fire. As the mesh cable tray deforms in a fire, sufficient distance to the false ceiling must be maintained. This minimum distance is documented in the proof of testing for the various versions of the GR-Magic® mesh cable tray. If the cable loads and tray widths listed in the proof of

testing are maintained and the minimum spacings to the false ceiling taken into account, then multi-layer variants can also be implemented. A further option for ceiling mounting is the support of the mesh cable tray on profile rails, each mounted under the ceiling with two threaded rods. With this mounting variant, sufficient distances to the false ceiling must be maintained. A two-layer arrangement of the cable trays is possible, providing that the approved tensile stress in the threaded rods is also maintained in the event of fire.

## GR-Magic® mesh cable tray

### Installation principle



Single-layer ceiling suspension with suspended support and bracket.



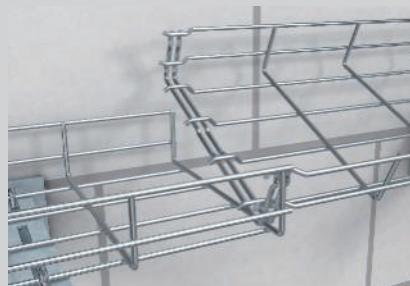
Two-layer ceiling suspension with bracket arrangement on one side.



Two-layer ceiling suspension with bracket arrangement on both sides.



Wall mounting, one and two-layer possible.



Interconnecting of two stock lengths of the mesh cable tray.



Screwless joint connection.



Single-layer ceiling mounting above suspended fire protection ceiling.



Two-layer ceiling mounting above suspended fire protection ceiling.



Clamp fastening for high load capacities.

Tested mounting options



**CAUTION: No maintenance of electrical functionality according to DIN 4102 Part 12!**

Always indicate the item number when ordering.

# GR-Magic® mesh cable tray

## Proof

### Fire-proof fastening above fire protection ceilings

<b>Fire load</b>	30 minutes
<b>Proof of testing</b>	OBO Bettermann
<b>Document no. - Mounting with suspended support / bracket</b>	05/130301-06
<b>Document no. - Mounting with mounting rails</b>	05/130301-05
<b>Testing principles</b>	In accordance with DIN 4102

### Support spacing for wall / ceiling mounting with suspended support / bracket

Mesh cable tray width	Cable load per mesh cable tray					
200 mm	max. 20 kg/m	max. 1.50 m	max. 1.50 m	max. 1.50 m	max. 1.50 m	max. 1.50 m
300 mm	max. 30 kg/m	max. 1.50 m	max. 1.50 m	max. 1.50 m	max. 1.50 m	max. 1.50 m
400 mm	max. 40 kg/m	max. 1.50 m	max. 1.50 m	max. 1.50 m	max. 1.50 m	max. 1.50 m

### Support spacing for ceiling mounting with mounting rails

Mesh cable tray width	Cable load per mesh cable tray		
100 mm	max. 10 kg/m	max. 1.50 m	max. 1.50 m
200 mm	max. 20 kg/m	max. 1.50 m	max. 1.50 m
300 mm	max. 30 kg/m	max. 1.50 m	max. 1.50 m
400 mm	max. 40 kg/m	max. 1.50 m	max. 1.50 m

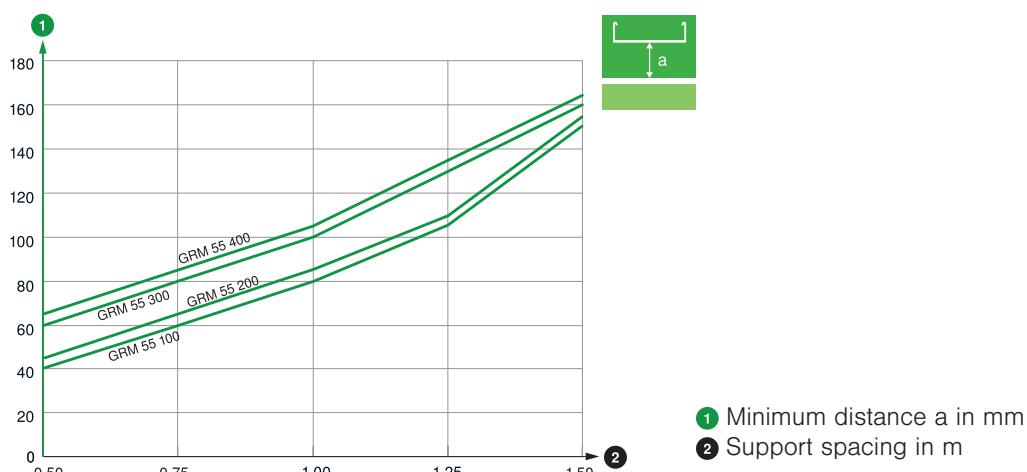
### Required minimum spacing "a" under fire load at support spacing max. 1.5 m

Mesh cable tray width	Cable load per mesh cable tray	max. 1.50 m
100 mm	max. 10 kg/m	150 mm
200 mm	max. 20 kg/m	155 mm
300 mm	max. 30 kg/m	160 mm
400 mm	max. 40 kg/m	165 mm

The stated values for the wall / ceiling mounting with suspended support / bracket and for ceiling mounting with mounting rails



The minimum spacing "a" relates to the distance of the under side of the mesh cable tray to the top side of the fire protection ceiling.



# GR-Magic® mesh cable tray

## Components used, mesh cable trays GRM

### Wall/ceiling mounting with suspended support/bracket

Component	Type					
Mesh cable tray	GRM 55 ... G	1	2	2	1	2
Support	US 5 K ... FT	1	1	1	0	0
Protective cap	US 5 KS OR	1	1	1	0	0
Wall and support brackets	AW30F... FT	1	2	2	1	2
Spacer	DSK 45	1	2	1	0	0
Hexagonal bolt	SKS 10x 90 F	1	2	1	0	0
Clamping piece	GKS 34G	2	4	4	2	4
Threaded rod	2078 M12 G	1	2	2	1	2
Hexagonal nut	DIN 934 M12 G	4	5	8	4	5
Washer	966 M12 G	2	3	4	2	3
Connection sleeve	12005 M12 G	0	1	0	0	1
Fire protection clamp	BSB	1	1	2	1	1

Choose the fastening anchors according to the substrate

### Ceiling mounting with mounting rails

Component	Type		
Mesh cable tray	GRM 55 ... G	1	2
Mounting rail	See table	1	2
Protective cap	MS41... EK	2	4
Threaded rod	2078 M12 G	2	4
Hexagonal nut	DIN 934 M12 G	6	10
Large washer	DIN440 14 F	2	4
Washer	966 M12 G	2	4
Connection sleeve	12005 M12 G	0	2
Clamping piece	GKS 34G	2	4
Large washer	DIN440 7 F	2	4

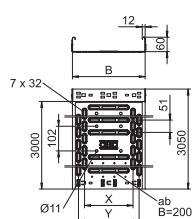
Choose the fastening anchors according to the substrate

### Mounting rails to be used according to support spacing

Mesh cable tray type	Mesh cable tray width	max. 1.50 m
GRM 55 100 G	100 mm	MS4121P
GRM 55 200 G	200 mm	MS4121P
GRM 55 300 G	300 mm	MSL4141P
GRM 55 400 G	400 mm	MSL4141P

## False ceiling, cable tray

### Cable tray RKS-Magic® 60



Type	Width mm	Plate thickness mm	Dimension B mm	Dimension x mm	Dimension y mm	Pack. m	Weight kg/100 m	Item No.
RKSM 610 FS	100	0.75	100	—	50	3	132.131	6047611
RKSM 620 FS	200	0.75	200	100	150	3	183.000	6047638
RKSM 630 FS	300	0.75	300	200	250	3	235.080	6047654
RKSM 640 FS	400	0.90	400	300	350	3	331.340	6047689

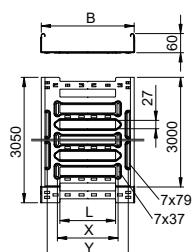
St Steel

FS Strip-galvanised

Cable tray with integrated quick fastening system. The usable length of the cable tray is 3,000 mm.

The cable tray possesses continuous side perforations of 7 x 20 mm for the installation of additional connection and mounting components.  
The perforation for direct threaded rod suspension has a diameter of 11 mm.

### Cable tray MKS-Magic® 60



Type	Width mm	Plate thickness mm	Dimension B mm	Dimension x mm	Dimension y mm	Dimension L mm	Pack. m	Weight kg/100 m	Item No.
MKSM 610 FS	100	1.00	100	—	62	30	3	165.000	6059000
MKSM 620 FS	200	1.00	200	96	162	80	3	219.340	6059004
MKSM 630 FS	300	1.00	300	196	262	180	3	256.720	6059006
MKSM 640 FS	400	1.00	400	296	362	280	3	294.000	6059008

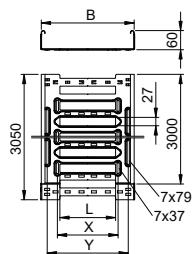
St Steel

FS Strip-galvanised

Cable tray with integrated quick fastening system. The usable length of the cable tray is 3,000 mm.

The cable tray possesses continuous side perforations of 7 x 20 mm for the installation of additional connection and mounting components.

### Cable tray SKS-Magic® 60



Type	Width mm	Plate thickness mm	Dimension B mm	Dimension x mm	Dimension y mm	Dimension L mm	Pack. m	Weight kg/100 m	Item No.
SKSM 610 FS	100	1.50	100	—	62	30	6	247.540	6059456
SKSM 620 FS	200	1.50	200	96	162	80	3	329.180	6059460
SKSM 630 FS	300	1.50	300	196	262	180	3	385.250	6059462
SKSM 640 FS	400	1.50	400	296	362	280	3	441.320	6059464
SKSM 650 FS	500	1.50	500	396	462	380	3	497.370	6059466
SKSM 660 FS	600	1.50	600	496	562	480	3	553.440	6059468

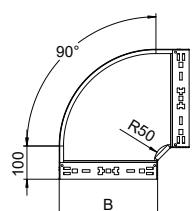
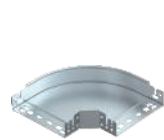
St Steel

FS Strip-galvanised

Cable tray with integrated quick fastening system. The usable length of the cable tray is 3,000 mm.

The cable tray possesses continuous side perforations of 7 x 20 mm for the installation of additional connection and mounting components.

### 90° Magic bend



Type	Width mm	Dimension B mm	Pack. pcs	Weight kg/100 pcs.	Item No.
RBM 90 610 FS	100	100	1	65.700	6041130
RBM 90 620 FS	200	200	1	122.100	6041134
RBM 90 630 FS	300	300	1	192.800	6041136
RBM 90 640 FS	400	400	1	275.400	6041138
RBM 90 650 FS	500	500	1	376.300	6041140
RBM 90 660 FS	600	600	1	493.000	6041142

St Steel

FS Strip-galvanised

90° bend with quick connector system. For all cable tray types of 60 mm side height.

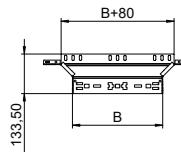
**Magic add-on tee**

Type	Width mm	Dimension B mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>RAAM 610 FS</b>	100	100	1	37.700	<b>6041230</b>
<b>RAAM 620 FS</b>	200	200	1	50.100	<b>6041234</b>
<b>RAAM 630 FS</b>	300	300	1	63.500	<b>6041236</b>
<b>RAAM 640 FS</b>	400	400	1	75.700	<b>6041238</b>
<b>RAAM 650 FS</b>	500	500	1	89.300	<b>6041240</b>
<b>RAAM 660 FS</b>	600	600	1	102.700	<b>6041242</b>

St Steel

FS Strip-galvanised

Magic add-on tee with quick connector system. For all cable tray types of 60 mm side height.

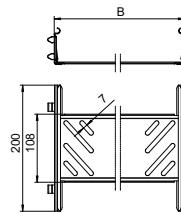
**Magic straight connector set FS**

Type	Side height mm	Dimension B mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>KTSMV 610 FS</b>	60	100	1	30.500	<b>6068914</b>
<b>KTSMV 620 FS</b>	60	200	1	37.200	<b>6068918</b>
<b>KTSMV 630 FS</b>	60	300	1	44.000	<b>6068920</b>
<b>KTSMV 640 FS</b>	60	400	1	50.700	<b>6068922</b>
<b>KTSMV 650 FS</b>	60	500	1	57.400	<b>6068924</b>
<b>KTSMV 660 FS</b>	60	600	1	64.200	<b>6068926</b>

St Steel

FS Strip-galvanised

Cable tray connector with quick fastening for the screwless connection of perforated cable trays with a side height of 60 mm.

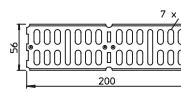
**Straight and angle connector 60**

Type	Dimension mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>RWVL 60 FS</b>	200 x 56	10	16.400	<b>6067115</b>

St Steel

FS Strip-galvanised

Straight and angle connector for cable trays and fittings with a side height of 60 mm.

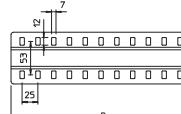
**Joint plate**

Type	Dimension B mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>SSLB 100 FS</b>	100	20	7.700	<b>7070205</b>
<b>SSLB 200 FS</b>	200	20	16.700	<b>7070213</b>
<b>SSLB 300 FS</b>	300	20	25.700	<b>7070217</b>
<b>SSLB 400 FS</b>	400	20	34.700	<b>7070221</b>
<b>SSLB 500 FS</b>	500	20	43.700	<b>7070225</b>
<b>SSLB 600 FS</b>	600	20	52.700	<b>7070233</b>

St Steel

FS Strip-galvanised

Wide joint plate for use in all cable trays and wide span cable trays.

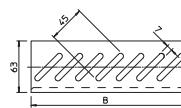


Type	Width mm	Dimension B mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>BEB 100 FS</b>	100	100	100	5.400	<b>7083106</b>
<b>BEB 200 FS</b>	200	200	100	11.400	<b>7083203</b>
<b>BEB 300 FS</b>	300	300	100	17.200	<b>7083300</b>
<b>BEB 400 FS</b>	400	400	100	23.100	<b>7083408</b>
<b>BEB 500 FS</b>	500	500	50	29.000	<b>7083505</b>
<b>BEB 600 FS</b>	600	600	50	35.000	<b>7083602</b>

St Steel

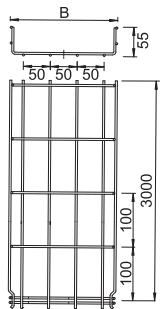
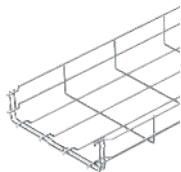
FS Strip-galvanised

Bottom end plate for floor reinforcement at the ends of the cable tray and as cable protection.



## False ceiling, mesh cable tray

### Mesh cable tray GRM 55



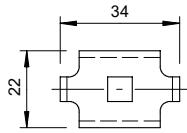
Type	Width mm	Wire Ø mm	Dimension B mm	Pack. m	Weight kg/100 m	Item No.
<b>GRM 55 100 G</b>	100	3.9	100	3	72.400	<b>6001442</b>
<b>GRM 55 200 G</b>	200	3.9	200	3	100.667	<b>6001446</b>
<b>GRM 55 300 G</b>	300	4.8	300	3	194.900	<b>6001448</b>
<b>GRM 55 400 G</b>	400	4.8	400	3	236.700	<b>6001450</b>

St Steel

G Electrogalvanised

Mesh cable tray with shaped connector of side height 55 mm.

### Clamping piece



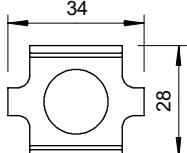
Type	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>GKS 34 G</b>	20	2.000	<b>6016855</b>

St Steel

G Electrogalvanised

Clamp for fixing mesh cable trays to wall or support brackets.

### Connector



Type	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>GSV 34 G</b>	20	3.000	<b>6016596</b>

St Steel

G Electrogalvanised

Screwed version of joint connector for mesh cable trays.

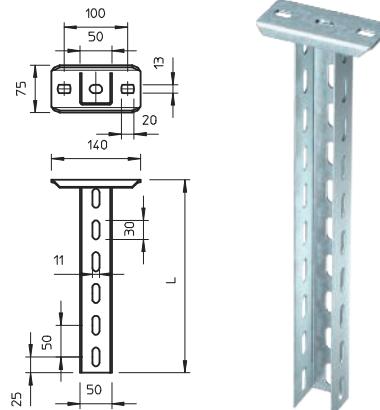
## US 5 support

Type	Length mm	Material thickness mm	Dimension L mm	Pack. pcs	Weight kg/100 pcs.	Item No.
US 5 K 20 FT	200	2.5	200	1	85.000	6341527
US 5 K 30 FT	300	2.5	300	1	110.000	6341535
US 5 K 40 FT	400	2.5	400	1	136.000	6341543
US 5 K 50 FT	500	2.5	500	1	161.000	6341551
US 5 K 60 FT	600	2.5	600	1	185.000	6341578
US 5 K 70 FT	700	2.5	700	1	210.000	6341586
US 5 K 80 FT	800	2.5	800	1	236.000	6341594
US 5 K 90 FT	900	2.5	900	1	261.000	6341608
US 5 K 100 FT	1000	2.5	1000	1	286.000	6341616
US 5 K 110 FT	1100	2.5	1100	1	311.000	6341624
US 5 K 120 FT	1200	2.5	1200	1	337.000	6341632

St Steel

FT Hot-dip galvanised

U support of dimensions 50 x 50 mm with welded head plate.

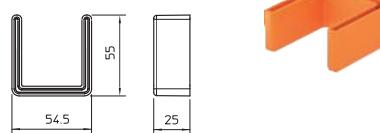


## End cap

Type	Colour	Pack. pcs	Weight kg/100 pcs.	Item No.
US 5 KS OR	Pastel orange	20	1.300	6338462

PE Polyethylene

End cap to cover the ends of US 5 supports.



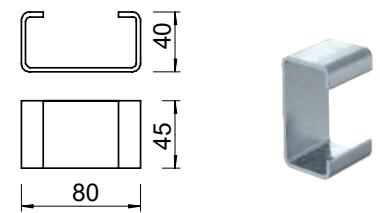
## Spacer

Type	Pack. pcs	Weight kg/100 pcs.	Item No.
DSK 45 FT	20	18.000	6416500

St Steel

FT Hot-dip galvanised

Spacer for use in U 5 support and in the head plate, type KU 7 VQP.



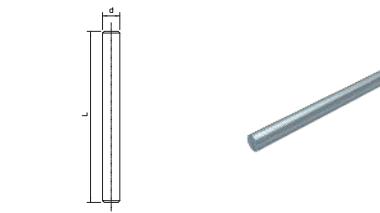
## Threaded rod

Type	Thread	Dimension d mm	Dimension L mm	Pack. pcs	Weight kg/100 pcs.	Item No.
TR M12 1M G	M12	12	1000	10	62.000	3141306

St Steel

G Electrogalvanised

Threaded rod to DIN 976.



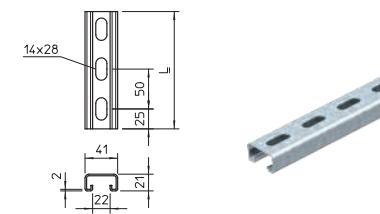
## MS4121 mounting rail, slot width 22 mm, perforated

Type	Length mm	Dimension W x H mm	Material thickness mm	Dimension L mm	Pack. m	Weight kg/100 m	Item No.
MS4121P2000FS	2000	41x21	2	2000	2	175.000	1122918
MS4121P3000FS	3000	41x21	2	3000	3	141.900	1122920
MS4121P2000FT	2000	41x21	2	2000	2	183.000	1122923
MS4121P3000FT	3000	41x21	2	3000	3	151.300	1122924

St Steel

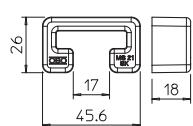
FS Strip-galvanised FT Hot-dip galvanised

Heavy-duty C profile rail for individual installation of support constructions, e.g. for cable trays or as a panel for switchgear cabinets. Can also be used for cable routing, in conjunction with clamp clips with a U foot.





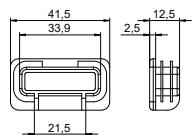
## Protective cap MS4121



Colour	Pack. pcs	Weight kg/100 pcs.	Item No.
Type <b>MS4121 SK</b>   Pastel orange PE Polyethylene	25	0.650	<b>1122902</b>

Protective caps for profile rail, type MS4121.

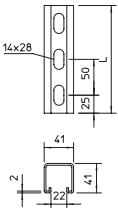
## End cap MS4121



Colour	Pack. pcs	Weight kg/100 pcs.	Item No.
Type <b>MS4121 EK</b>   Pastel orange PE Polyethylene	50	0.645	<b>1122904</b>

End cap for profile rail, type MS4121.

## MS4141 mounting rail, slot width 22 mm, perforated



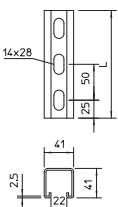
Type	Length mm	Dimension W x H mm	Material thickness mm	Dimension L mm	Pack. m	Weight kg/100 m	Item No.
<b>MSL4141P1000FS</b>	1000	41x41	2	1000	1	201.100	<b>1122970</b>
<b>MSL4141P3000FS</b>	3000	41x41	2	3000	3	201.100	<b>1122972</b>
<b>MSL4141P1000FT</b>	1000	41x41	2	1000	1	214.700	<b>1122962</b>
<b>MSL4141P3000FT</b>	3000	41x41	2	3000	3	214.700	<b>1122964</b>

St Steel

FS Strip-galvanised FT Hot-dip galvanised

Heavy-duty C profile rail for individual installation of support constructions, e.g. for cable trays or as a panel for switchgear cabinets. Can also be used for cable routing, in conjunction with clamp clips with a U foot.

## MS4141 mounting rail, slot width 22 mm, perforated



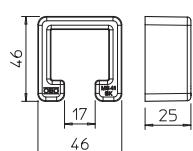
Type	Length mm	Dimension W x H mm	Material thickness mm	Dimension L mm	Pack. m	Weight kg/100 m	Item No.
<b>MS4141P1000FS</b>	1000	41x41	2.5	1000	1	247.500	<b>1122908</b>
<b>MS4141P3000FS</b>	3000	41x41	2.5	3000	3	247.500	<b>1122910</b>

St Steel

FS Strip-galvanised

Heavy-duty C profile rail for individual installation of support constructions, e.g. for cable trays or as a panel for switchgear cabinets. Can also be used for cable routing, in conjunction with clamp clips with a U foot.

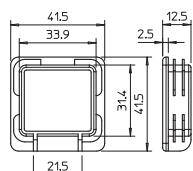
## Protective cap MS4141



Colour	Pack. pcs	Weight kg/100 pcs.	Item No.
Type <b>MS4141 SK</b>   Pastel orange PE Polyethylene	25	1.320	<b>1122900</b>

Protective caps for profile rail, type MS4141.

## End cap MS4141



Colour	Pack. pcs	Weight kg/100 pcs.	Item No.
Type <b>MS4141 EK</b>   Pastel orange PE Polyethylene	50	0.670	<b>1122906</b>

End cap for profile rail, type MS4141.

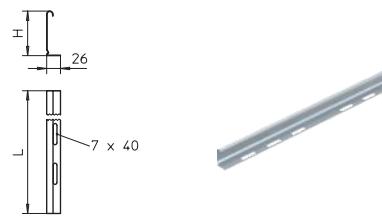
**Barrier strip 45**

Type	Dimension H mm	Plate thickness mm	Dimension L mm	Pack. m	Weight kg/100 m	Item No.
TSG 45 FS	45	0.75	3000	3	46.700	6062033

St Steel

FS Strip-galvanised

Separating retainer for separation of cables of different voltages or functions.

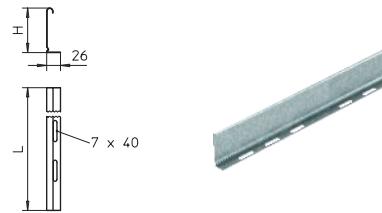
**Barrier strip 60**

Type	Dimension H mm	Plate thickness mm	Dimension L mm	Pack. m	Weight kg/100 m	Item No.
TSG 60 FS	60	0.75	3000	3	55.700	6062068

St Steel

FS Strip-galvanised

Separating retainer for separation of cables of different voltages or functions.

**Hold-down clamp for separating retainer fastening in RKSM**

Type		Pack. pcs	Weight kg/100 pcs.	Item No.
KS KR A2		30	0.537	6062280

V2A Stainless steel, A2

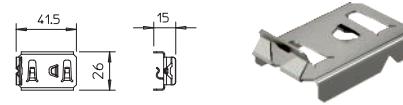
Clamping piece for screwless fastening of separating retainer in the cable tray types RKSM, MKS and SKS.

**Hold-down clamp for separating retainer fastening**

Type		Pack. pcs	Weight kg/100 pcs.	Item No.
KS GR A2		30	0.830	6062282

V2A Stainless steel, A2

Hold-down clamp for fastening separating retainer in mesh cable trays.

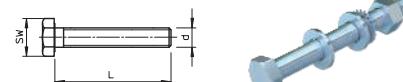
**Hexagonal bolt with nut and washer**

Type	Dimension mm	Dimension L mm	Dimension d mm	Dimension SW mm	Pack. pcs	Weight kg/100 pcs.	Item No.
SKS 10x90 F	M10 x 90	90	10	17	20	7.800	6418252

St Steel

F Hot-dip galvanised

Hexagonal bolt for universal fixing of structure components.

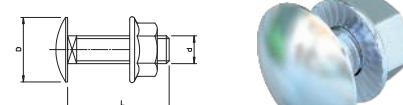
**Truss-head bolt with flange nut**

Type	Dimension mm	Dimension L mm	Dimension D mm	Dimension d mm	Pack. pcs	Weight kg/100 pcs.	Item No.
FRSB 6x12 F	M 6 x 12	12	13.5	6	100	0.990	6406122
FRSB 6x20 F	M 6 x 20	20	13.5	6	100	1.000	6406203

St Steel

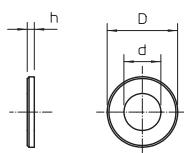
F Hot-dip galvanised

Truss-head bolt with square neck including flange nut.



## False ceiling, mounting systems

### Large washer



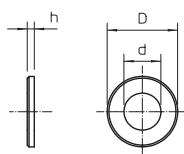
Type	Dimension D mm	Dimension d mm	Dimension h mm	Pack. pcs	Weight kg/100 pcs.	Item No.
DIN440 7 F	22	6.6	2	100	0.550	6408702
DIN440 14 F	44	13.5	4	50	4.736	6408737

St Steel

F Hot-dip galvanised

Washer of particularly large outer diameter.

### Washer



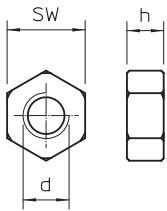
Type	Thread	Dimension d mm	Dimension D mm	Dimension h mm	Pack. pcs	Weight kg/100 pcs.	Item No.
WS M12 D24 G	M12	13	24	2.5	100	0.627	3402126

St Steel

G Electrogalvanised

Washer according to DIN 125, shape A, for universal use.

### Hexagonal nut DIN 934



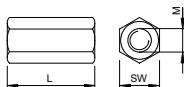
Type	Thread	Dimension SW mm	Dimension h mm	Dimension d mm	Pack. pcs	Weight kg/100 pcs.	Item No.
HN M12 G	M12	19	10.8	12	100	1.730	3400123

St Steel

G Electrogalvanised

Hexagonal nut to DIN 934 with metric thread.

### Connection sleeve



Type	Thread	Dimension L mm	Dimension SW mm	Pack. pcs	Weight kg/100 pcs.	Item No.
CSTR M12 G	M12	40	19	25	7.000	6410111

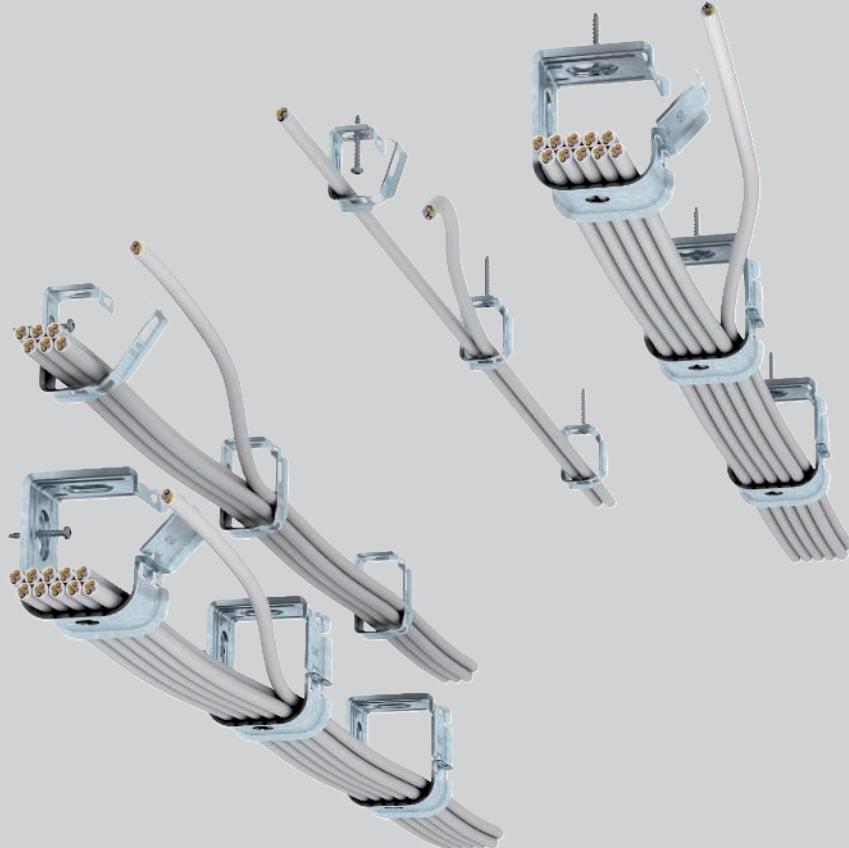
St Steel

G Electrogalvanised

Connection sleeve with continuous internal thread.

## Grip M grouped support

### System description



The tested Grip M grouped supports are suitable for installation in the false ceiling area of escape and rescue routes. In the event of a fire, the grouped supports have a proven mechanical stability of 30 to 90 minutes. They can be mounted under the ceiling or on the wall. The grouped supports are made of sheet steel and can be opened and closed easily without

the use of tools. To allow simple cable insertion, the supports remain open during cable routing. Then, the grouped supports are closed through simple locking. The construction of the grouped support and weight of the installed cables prevent the lock from opening itself unintentionally.

## Grip M grouped support Installation principle



Ceiling mounting of the grouped supports 2031 M15 and 2031 M 30.



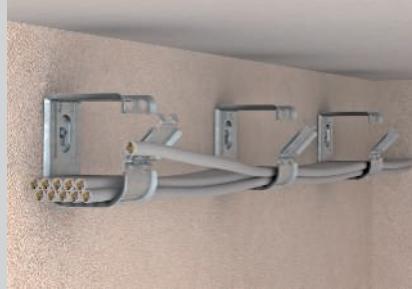
Wall-mounted grouped supports 2031 M15 and 2031 M 30.



Grouped support 2031 M 70 as wall and ceiling mounting for large cable volume.



Opening of the grouped support and insertion of the cables.



Simple insertion the cables in the opened grouped support.

Tested mounting options



**CAUTION: No maintenance of electrical functionality according to DIN 4102 Part 12!**

# Grip M grouped support

## Proof

### Fire-proof fastening above fire protection ceilings.

<b>Fire load</b>	30 and 90 minutes
<b>Proof of testing</b>	OBO Bettermann
<b>Document no.</b>	05/151214-01
<b>Testing principles</b>	In accordance with DIN 4102

### Grouped support 2031 M 15, mounting parameter and required minimum spacing "a"

<b>Fire load</b>	<b>Fastening spacing</b>	<b>Cable assignment</b>		
30 minutes	max. 0.6 m	max. 3.3 kg/m	80 mm	100 mm
30 minutes	max. 0.8 m	max. 2.5 kg/m	100 mm	120 mm
90 minutes	max. 0.6 m	max. 3.3 kg/m	100 mm	120 mm
90 minutes	max. 0.8 m	max. 2.5 kg/m	120 mm	140 mm

### Grouped support 2031 M 30, mounting parameter and required minimum spacing "a"

<b>Fire load</b>	<b>Fastening spacing</b>	<b>Cable assignment</b>		
30 minutes	max. 0.6 m	max. 5.8 kg/m	80 mm	110 mm
30 minutes	max. 0.8 m	max. 4.3 kg/m	100 mm	130 mm
90 minutes	max. 0.6 m	max. 5.8 kg/m	100 mm	130 mm
90 minutes	max. 0.8 m	max. 4.3 kg/m	120 mm	150 mm

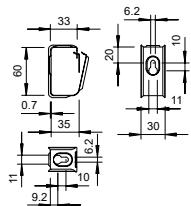
### Grouped support 2031 M 70, mounting parameter and required minimum spacing "a"

<b>Fire load</b>	<b>Fastening spacing</b>	<b>Cable assignment</b>		
30 minutes	max. 0.6 m	max. 20.0 kg/m	80 mm	120 mm
30 minutes	max. 0.8 m	max. 15.0 kg/m	100 mm	140 mm
90 minutes	max. 0.6 m	max. 13.0 kg/m	100 mm	140 mm
90 minutes	max. 0.8 m	max. 10.0 kg/m	120 mm	160 mm

The minimum spacing "a" relates to the distance of the under side of the grouped support to the top side of the fire protection ceiling.

## False ceiling, grouped support and pressure clip

### GRIP "M" 15



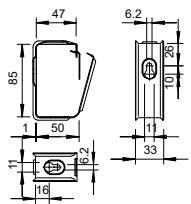
Type	No. of conductors	Shipping box	Pack. pcs	Weight kg/100 pcs.	Item No.
2031 M 15 FS	15	50	50	3.700	2207028

St Steel

FS Strip-galvanised

Metal cable tidy for high mechanical stability, even in case of fire. Suitable for safe mounting above fire protection ceilings. Also approved as a cable-specific variant for the maintenance of electrical function to DIN 4102 part 12. For wall and ceiling mounting. Lock can be opened without tools. Detailed information on the approved routing variants can be found in the appropriate testing documentation.

### GRIP "M" 30



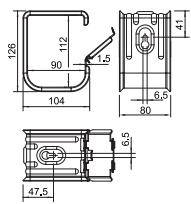
Type	No. of conductors	Shipping box	Pack. pcs	Weight kg/100 pcs.	Item No.
2031 M 30 FS	30	25	25	6.200	2207036

St Steel

FS Strip-galvanised

Metal cable tidy for high mechanical stability, even in case of fire. Suitable for safe mounting above fire protection ceilings. Also approved as a cable-specific variant for the maintenance of electrical function to DIN 4102 part 12. For wall and ceiling mounting. Lock can be opened without tools. Detailed information on the approved routing variants can be found in the appropriate testing documentation.

### GRIP "M" 70



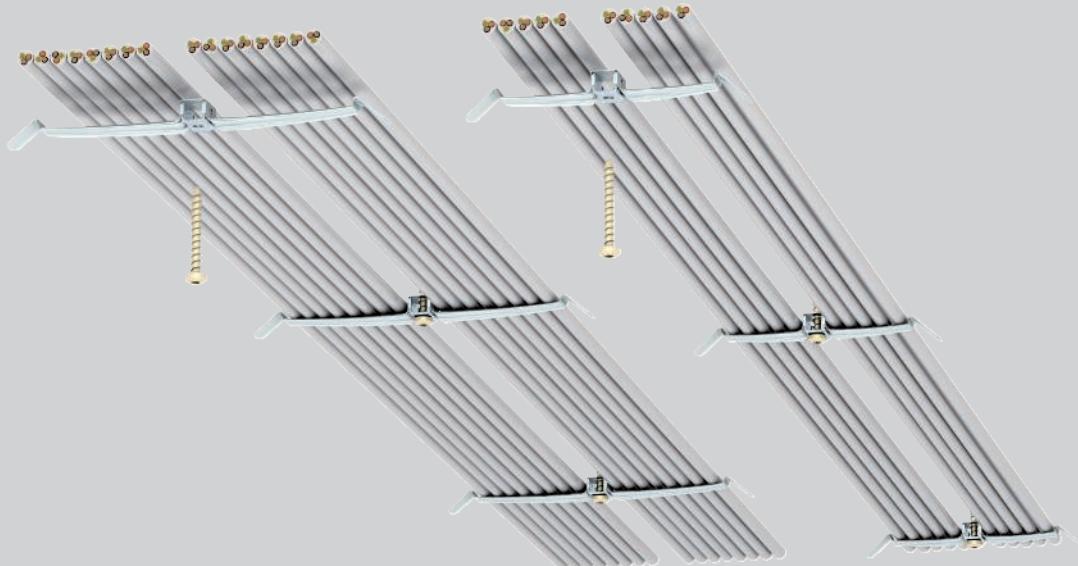
Type	No. of conductors	Shipping box	Pack. pcs	Weight kg/100 pcs.	Item No.
2031 M 70 FS	70	10	10	34.500	2207060

St Steel

FS Strip-galvanised

Metal cable tidy for high mechanical stability, even in case of fire. Suitable for safe mounting above fire protection ceilings. Also approved as a cable-specific variant for the maintenance of electrical function to DIN 4102 part 12. For wall and ceiling mounting. Lock can be opened without tools. Detailed information on the approved routing variants can be found in the appropriate testing documentation.

## Metal pressure clip System description



The tested pressure clips are suitable for installation in the false ceiling area of escape and rescue routes. In the event of fire, the pressure clips have a proven mechanical stability of 30 minutes. They are mounted under the ceiling. The pressure clips are made of sprung, rustproof steel. For installation, the hips of the

pressure clips are simply bent downwards without tools and the cables pushed in from the side. The edges of the clip are sloping to exclude the possibility of damage to the cables.

# Metal pressure clip

## Installation principle



Ceiling mounting with pressure clip 2034M.



Ceiling mounting with pressure clip 2033 M.



Ceiling mounting with pressure clip 2035 M.



Simple cable installation through side insertion of the cables.



Space-saving and fireproof mounting of cables above a fire protection ceiling.

Tested mounting options



**CAUTION:** No maintenance of electrical functionality according to DIN 4102 Part 12!

# Metal pressure clip

## Proof

**Fire-proof fastening above fire protection ceilings.**

<b>Fire load</b>	30 minutes
<b>Proof of testing</b>	OBO Bettermann
<b>Document no.</b>	05/170329-01
<b>Testing principles</b>	In accordance with DIN 4102

**Pressure clip 2033 M, mounting parameter and required minimum spacing "a"**

<b>Fire load</b>	<b>Fastening spacing</b>	<b>Cable assignment</b>	
30 minutes	max. 0.5 m	2x max. 1.84 kg/m	70 mm

**Pressure clip 2034 M, mounting parameter and required minimum spacing "a"**

<b>Fire load</b>	<b>Fastening spacing</b>	<b>Cable assignment</b>	
30 minutes	max. 0.5 m	2x max. 1.15 kg/m	50 mm

**Pressure clip 2035 M, mounting parameter and required minimum spacing "a"**

<b>Fire load</b>	<b>Fastening spacing</b>	<b>Cable assignment</b>	
30 minutes	max. 0.5 m	1x max. 1.84 kg/m	70 mm



# Fire protection ducts

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**Products** 76

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**System description, PYROLINE® Con D** 106

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**Products** 108

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**System description, PYROLINE® Fibre Optics** 110

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**Products** 112

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**System description, PYROLINE® Sun PV** 114

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**Products** 116

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# PYROLINE® Rapid

## Metal fire protection duct for direct and suspended mounting

### System description



OBO's PYROLINE® Rapid fire protection duct is made from sheet steel with a profiled lid closing contour and an intumescence interior coating. If there is a fire, this provides active fire load encapsulation and safe prevention of the fire spread. This means that the escape and rescue routes remain free from fire and smoke. The PYROLINE® Rapid is tested and approved as an escape route duct for the classes I 30 to I 120. The shape matches the standard Rapid 80 cable routing duct. The fire protection duct can be installed directly on the wall or the ceiling. Mounting on

wall brackets or on a support system suspended from the ceiling is also possible. The lids can be engaged easily in the base, simultaneously creating the equipotential bonding. The connectors can also be used for suspension. Even overhead mounting is possible, as special brackets keep the cable load away from engaged lids. All the components are prefabricated. There are also no screw ends in the interior of the ducts, meaning that cables cannot be damaged.

# PYROLINE® Rapid

## Metal fire protection duct for direct and suspended mounting

### Installation principle



Direct wall and ceiling mounting.



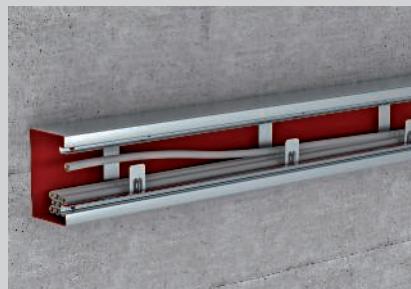
Mounting on raw concrete in system base.



Suspended mounting with vertical bends.



Cable outlet with V-TEC glands, singly or with multiple sealing ring.



Retaining clamps as installation aid to prevent cables from falling out.



Lid mounting without screws through locking.

Classification according to DIN 4102 Part 11

**I30**    **I60**    **I90**    **I120**

#### Metal installation duct with intumescent inner coating

<b>Fire resistance class</b>	I30 to I120
<b>Proof of application</b>	General construction approval of DIBt, Berlin
<b>Approval number</b>	Z-19.30-2229
<b>Testing standard</b>	DIN 4102 Part 11

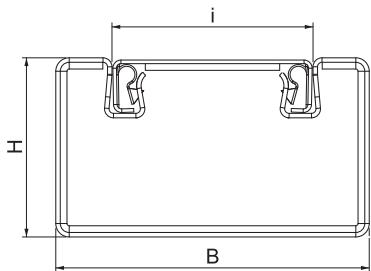
The data in the named proofs of applicability applies.

Note: For this metal installation duct with intumescent inner coating, only a general construction approval of the DIBt, Berlin, is available. In countries where a European Technical Assessment (ETA/ETB) is required, the possible use of these components must be agreed with the local fire protection authorities!

## Metal fire protection duct, I30 to I120



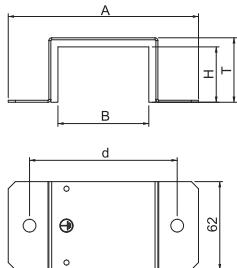
### Dimensions



### Connector



### Dimensions



Type	Dimen- sion B mm	Dimen- sion H mm	Dimension i mm	Length mm	Colour	Pack. m	Weight kg/100 m	Item No.
<b>BSKM 0407 RW</b>	70	40	30	2000	Pure white	2	254.650	7216501

St Steel

L Painted

Sheet steel duct with intumescent inner coating.

In case of fire, actively prevents the spread of fire in the duct and protects emergency and escape routes against the impacts of a cable fire. The cover and base are securely interconnected using the self-contacting patented locking brackets. This also creates the equipotential bonding.

Fire resistance classes I30 to I120 according to DIN 4102 Part 11.

Mounting options: directly on the wall or under the ceiling, beneath system floors on the raw floor, or suspended on support systems or using connector elements (support spacing, max. 1 m).

Included in the delivery: Cover and base as a unit, complete.

Type	Dimen- sion B mm	Dimen- sion H mm	Colour	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>BSKM-VD 0407 RW</b>	70	40	Pure white	1	24.000	7216511

St Steel

L Painted

Clamp with integrated seal for BSKM 0407, for connection and smoke-proof sealing of duct joints. Usable at min. 30 mm side distance of the duct to the ceiling or wall. Including loose seal for combination with support profile.

## Connector for corner mounting

Type	Dimen- sion B mm	Dimen- sion H mm	Colour	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>BSKM-VE 0407 RW</b>	70	40	Pure white	5	17.000	<b>7216513</b>

St Steel

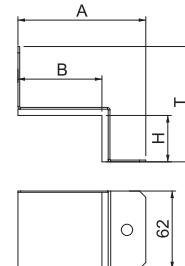
L Painted

Clamp with integrated seal for BSKM 0407, for smoke-proof sealing of duct joints in the case of corner mounting without duct spacing to the ceiling or wall.



Type	Dimen- sion A mm	Dimen- sion T mm	Colour
<b>BSKM-VE 0407 RW</b>	102	92	

## Dimensions



## Support

Type	Dimen- sion T mm	Dimen- sion A mm	Dimen- sion d mm	Colour	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>BSKM-AD 0407 RW</b>	180	67	156	Pure white	1	35.700	<b>7216516</b>

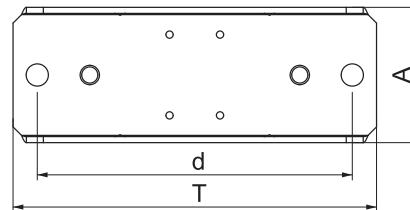
St Steel

L Painted

Support profile for suspended mounting of BSKM 0407, suitable as a suspension point to accept two M10 threaded rods and as the counter bearing to seal the joint, including nuts.



## Dimensions



## End piece



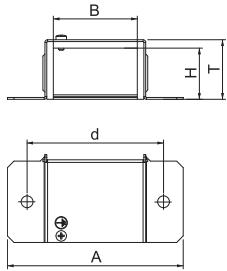
Type	Dimen- sion B mm	Dimen- sion H mm	Colour	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>BSKM-VK 0407 RW</b>	70	40	Pure white	1	30.500	<b>7216561</b>

St Steel

L Painted

For smoke-tight end closure of the BSKM 0407 duct for direct wall and ceiling mounting, in connection with the support profile BSKM-AD 0407, even for suspended mounting. Including glued-in seals to close the joints and loose seal when combined with a support; screw for equipotential bonding also included.

## Dimensions



Type	Dimen- sion T mm	Dimen- sion A mm	Dimen- sion d mm
<b>BSKM-VK 0407 RW</b>	45	134	104

## Metal fire protection duct, I30 to I120

Type	Dimen- sion B mm	Dimen- sion H mm	Dimension i mm	Length mm	Colour	Pack. m	Weight kg/100 m	Item No.
<b>BSKM 0711RW</b>	110	70	60	2000	Pure white	2	387.000	<b>7216600</b>

St Steel

L Painted

Sheet steel duct with intumescent inner coating.

In case of fire, actively prevents the spread of fire in the duct and protects emergency and escape routes against the impacts of a cable fire. The cover and base are securely interconnected using the self-contacting patented locking brackets. This also creates the equipotential bonding.

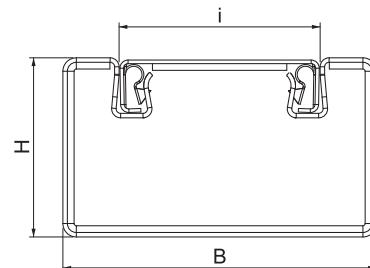
Fire resistance classes I30 to I120 according to DIN 4102 Part 11.

Mounting options: directly on the wall or under the ceiling, beneath system floors on the raw floor, or suspended on support systems or using connector elements (support spacing, max. 1 m).

Included in the delivery: Cover and base as a unit, complete.



Dimensions



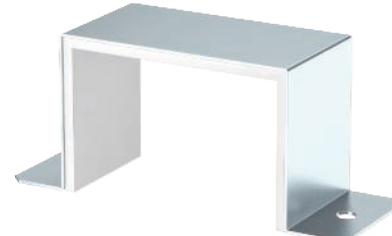
## Connector

Type	Dimen- sion B mm	Dimen- sion H mm	Colour	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>BSKM-VD 0711RW</b>	110	70	Pure white	1	37.800	<b>7216601</b>

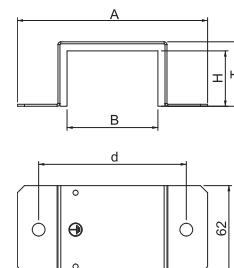
St Steel

L Painted

Clamp with integrated seal for BSKM 0711, for connection and smoke-proof sealing of duct joints. Usable at min. 30 mm side distance of the duct to the ceiling or wall. Including loose seal for combination with support profile.



Dimensions



Type	Dimen- sion A mm	Dimen- sion T mm	Dimen- sion d mm
<b>BSKM-VD 0711RW</b>	174	75	144



## Connector for corner mounting

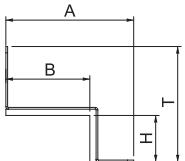


Type	Dimen- sion B mm	Dimen- sion H mm	Colour	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>BSKM-VE 0711RW</b>	110	70	Pure white	5	25.500	<b>7216602</b>

St Steel  
L Painted

Clamp with integrated seal for BSKM 0711, for smoke-proof sealing of duct joints in the case of corner mounting without duct spacing to the ceiling or wall.

### Dimensions



Type	Dimen- sion A mm	Dimen- sion T mm
<b>BSKM-VE 0711RW</b>	142	122

## Support

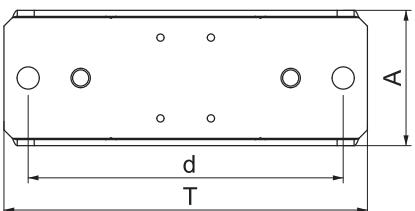


Type	Dimen- sion T mm	Dimen- sion A mm	Dimen- sion d mm	Colour	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>BSKM-AD 0711RW</b>	220	67	196	Pure white	1	43.500	<b>7216603</b>

St Steel  
L Painted

Support profile for suspended mounting of BSKM 0711, suitable as a suspension point to accept two M10 threaded rods and as the counter bearing to seal the joint, including nuts.

### Dimensions



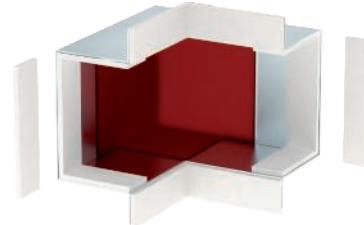
## External corner

Type	Dimen- sion B mm	Dimen- sion H mm	Colour	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>BSKM-AE 0711RW</b>	110	70	Pure white	1	128.500	<b>7216604</b>

St Steel

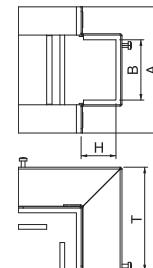
L Painted

Fitting hood to cover two BSKM 0711 duct ends as external cover for direct wall and ceiling mountings. Including glued-in seals for closing the joints and loose seals when combining with lock plate.



Type	Dimen- sion T mm	Dimen- sion A mm	Colour
<b>BSKM-AE 0711RW</b>	170	174	

## Dimensions



## Lock plate for external corner

Type	Dimen- sion T mm	Dimen- sion A mm	Dimen- sion d mm	Colour	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>BSKM-GA 0711RW</b>	220	95	196	Pure white	1	99.600	<b>7216605</b>

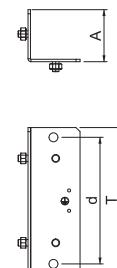
St Steel

L Painted

Adapter plate for suspended mounting of the external corner hood BSKM-AE 0711, with acceptance option for M10 threaded rods, including nuts.



## Dimensions



## Internal corner



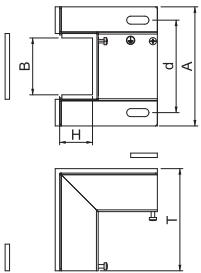
Type	Dimen- sion B mm	Dimen- sion H mm	Colour	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>BSKM-IE 0711RW</b>	110	70	Pure white	1	94.000	<b>7216608</b>

St Steel

L Painted

Fitting hood to cover two BSKM 0711 duct ends as internal cover for direct wall and ceiling mountings. Including glued-in seals for closing the joints and loose seals when combining with lock plate; screws for equipotential bonding also included.

### Dimensions



Type	Dimen- sion T mm	Dimen- sion A mm	Dimen- sion d mm
<b>BSKM-IE 0711RW</b>	135	174	144

## Lock plate for internal corner



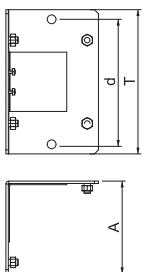
Type	Dimen- sion T mm	Dimen- sion A mm	Dimen- sion d mm	Colour	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>BSKM-GI 0711RW</b>	220	135	196	Pure white	1	145.800	<b>7216609</b>

St Steel

L Painted

Adapter plate for suspended mounting of the internal corner hood BSKM-IE 0711, with acceptance option for M10 threaded rods, including nuts.

### Dimensions



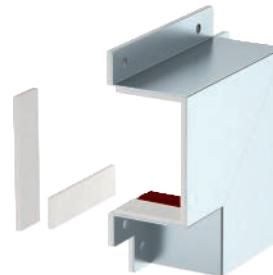
## Flat angle

Type	Dimen- sion B mm	Dimen- sion H mm	Colour	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>BSKM-FW 0711RW</b>	110	70	Pure white	1	116.300	<b>7216606</b>

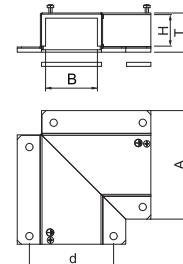
St Steel

L Painted

Fitting hood to cover two BSKM 0711 duct ends as flat angle for direct wall and ceiling mountings. Including glued-in seals for closing the joints and loose seals when combining with lock plate; screws for equipotential bonding also included.



## Dimensions



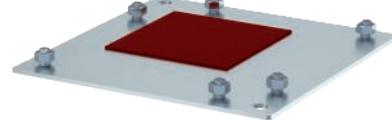
## Lock plate for flat angle

Type	Dimen- sion T mm	Dimen- sion A mm	Colour	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>BSKM-GF 0711RW</b>	210	210	Pure white	1	122.400	<b>7216607</b>

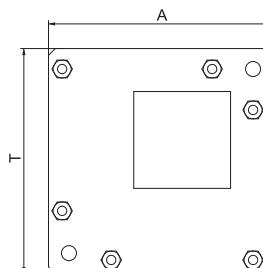
St Steel

L Painted

Adapter plate for suspended mounting of the flat angle hood BSKM-FW 0711, with acceptance option for M10 threaded rods, including nuts.



## Dimensions



## Fire protection duct PYROLINE® Rapid - BSKM 0711

### 45° vertical bend, rising

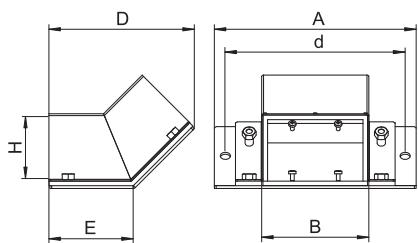


Type	Dimen- sion B mm	Dimen- sion H mm	Colour	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>BSKM-ES 0711RW</b>	110	70	Pure white	1	180.900	<b>7216610</b>

**S**t Steel  
 **L** Painted

Rising vertical bend for creation of vertical jumps for suspended mounting of the BSKM 0711, with acceptance option for M10 threaded rods, including seals and nuts as well as screws for equipotential bonding.

#### Dimensions



Type	Dimen- sion A mm	Dimen- sion D mm	Dimen- sion d mm	Dimen- sion E mm
<b>BSKM-ES 0711RW</b>	220	159	144	92

### 45° vertical bend, falling

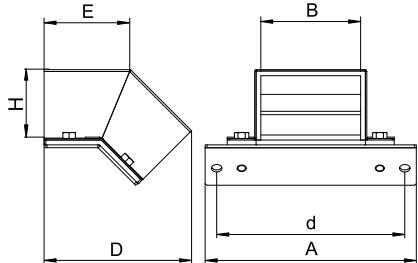


Type	Dimen- sion B mm	Dimen- sion H mm	Colour	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>BSKM-EF 0711RW</b>	110	70	Pure white	1	139.400	<b>7216611</b>

**S**t Steel  
 **L** Painted

Falling vertical bend for creation of vertical jumps for suspended mounting of the BSKM 0711, with acceptance option for M10 threaded rods, including seals and nuts as well as screws for equipotential bonding.

#### Dimensions



Type	Dimen- sion A mm	Dimen- sion D mm	Dimen- sion d mm	Dimen- sion E mm
<b>BSKM-EF 0711RW</b>	220	154	144	89

## Reducing piece

Type	Dimen- sion B mm	Dimen- sion H mm	Colour	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>BSKM-RE 1025RW</b>	250	100	Pure white	1	73.200	<b>7216631</b>

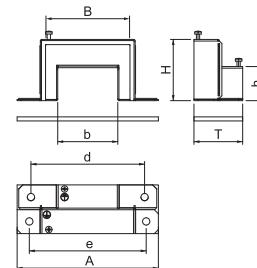
St Steel

L Painted

Fitting hood to cover a symmetrical reduction on a straight stretch of BSKM 1025 to BSKM 0711. Including glued-in seals for closing the joints and loose seals when combining with lock plate; screws for equipotential bonding also included.



## Dimensions



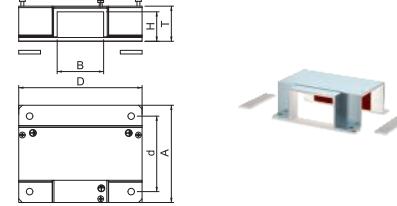
## T branch hood

Type	Dimen- sion B mm	Dimen- sion H mm	Colour	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>BSKM-TA 0711RW</b>	110	70	Pure white	1	110.800	<b>7216613</b>

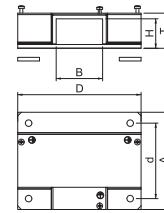
St Steel

L Painted

Fitting hood to cover three BSKM 0711 duct ends running towards each other in a T shape. Including glued-in seals for closing the joints and loose seals when combining with lock plate; screws for equipotential bonding also included.



## Dimensions



Type	Dimen- sion T mm	Dimen- sion A mm	Dimen- sion D mm	Dimen- sion d mm
<b>BSKM-TA 0711RW</b>	78	174	210	144

## Lock plate, T branch piece



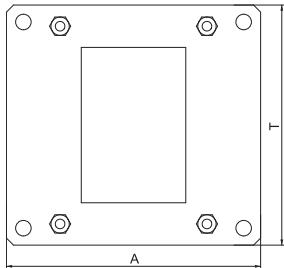
Type	Dimension T mm	Dimension A mm	Colour	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>BSKM-GT 0711RW</b>	220	170	Pure white	1	114.900	<b>7216614</b>

St Steel

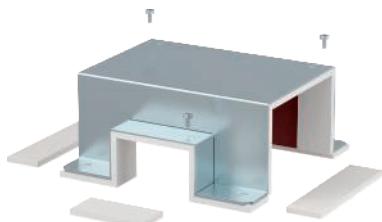
L Painted

Adapter plate for suspended mounting of a BSKM-TA 0711 T branch, with acceptance option for M10 threaded rods, including nuts.

### Dimensions



## T reducing branch piece



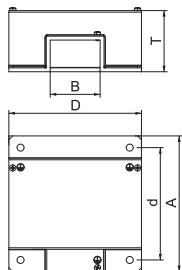
Type	Dimension B mm	Colour	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>BSKM-TR 0711RW</b>	70	Pure white	1	118.000	<b>7216616</b>

St Steel

L Painted

Hood for the covering of three duct ends running towards each other in a T shape. Straight stretch, twice BSKM 0711, branch reduced to BSKM 0407. Including glued-in seals for closing the joints and loose seals when combining with lock plate; screws for equipotential bonding also included.

### Dimensions



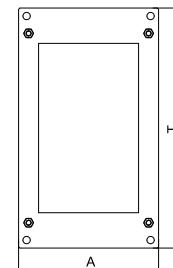
Type	Dimension T mm	Dimension A mm	Dimension D mm	Dimension d mm
<b>BSKM-TR 0711RW</b>	78	174	170	144

**Lock plate, T reducing branch piece**

Type	Dimen- sion T mm	Dimen- sion A mm	Colour	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>BSKM-GR 0711RW</b>	220	170	Pure white	1	94.000	<b>7216617</b>

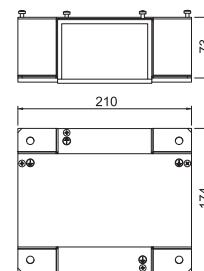
St Steel  
L Painted

Adapter plate for suspended mounting of a BSKM-TR 0711 T reducing branch, with acceptance option for M10 threaded rods, including nuts.

**Dimensions****BSKM intersection, duct height 110**

Type	Colour	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>BSKM-KR 0711RW</b>	Pure white	1	116.000	<b>7216615</b>

Intersection as a cover of intersecting cable ends BSKM 0711. Wall and ceiling mounting is intended. Including seals for closing the joints.

**Dimensions**

## Fire protection duct PYROLINE® Rapid - BSKM 0711

### End piece

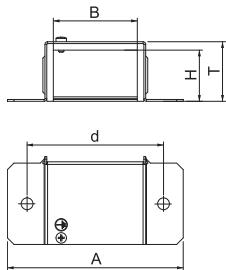


Type	Dimen- sion B mm	Dimen- sion H mm	Dimen- sion H Colour	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>BSKM-VK 0711RW</b>	110	70	Pure white	1	51.300	<b>7216612</b>

St Steel  
L Painted

For smoke-tight end closure of the BSKM 0711 duct for direct wall and ceiling mounting, in connection with the support profile BSKM-AD 0711, even for suspended mounting. Including glued-in seals to close the joints and loose seal when combined with a support; screw for equipotential bonding also included.

#### Dimensions



Type	Dimen- sion T mm	Dimen- sion A mm	Dimen- sion d mm
<b>BSKM-VK 0711RW</b>	75	174	144

### Wall connection I120



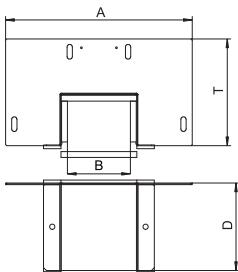
Type	Dimen- sion B mm	Dimen- sion T mm	Dimen- sion A mm	Dimen- sion D mm	Colour	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>BSKM-WA 0711RW</b>	110	183	320	150	Pure white	1	252.000	<b>7216620</b>

St Steel  
L Painted

Frame as additional insulation in the area of the wall transition for direct wall and ceiling mounting of the BSKM 0711. Including screen and glued-in seals to close the joints, loose seal when combined with a support and with screw for equipotential bonding.

Only needed for I120 requirements.

#### Dimensions

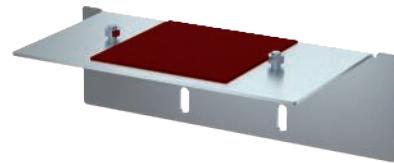


## Lock plate for wall connection I120

Type	Colour	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>BSKM-GW 0711RW</b>	Pure white	1	169.300	<b>7216621</b>

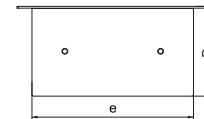
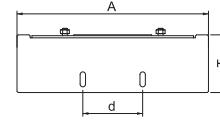
Steel  
Painted

Adapter plate for suspended mounting of the wall connection BSKM-WA 0711, with acceptance option for M10 threaded rods, including nuts.



Type	Dimensions				
	Dimension A mm	Dimension D mm	Dimension T mm	Dimension e mm	Dimension d mm
<b>BSKM-GW 0711RW</b>	320	150	96	270	100

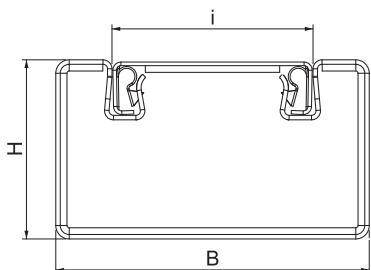
## Dimensions



## Metal fire protection duct, I30 to I120



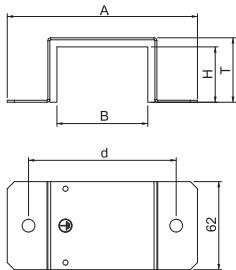
**Dimensions**



## Connector



**Dimensions**



Type	Dimen- sion B mm	Dimen- sion H mm	Dimension i mm	Length mm	Colour	Pack. m	Weight kg/100 m	Item No.
<b>BSKM 1025RW</b>	250	100	200	2000	Pure white	2	638.750	7216630

**St** Steel

**L** Painted

Sheet steel duct with intumescent inner coating.

In case of fire, actively prevents the spread of fire in the duct and protects emergency and escape routes against the impacts of a cable fire. The cover and base are securely interconnected using the self-contacting patented locking brackets. This also creates the equipotential bonding.

Fire resistance classes I30 to I120 according to DIN 4102 Part 11.

Mounting options: directly on the wall or under the ceiling, beneath system floors on the raw floor, or suspended on support systems or using connector elements (support spacing, max. 1 m).

Included in the delivery: Cover and base as a unit, complete.

Type	Dimen- sion B mm	Dimen- sion H mm	Colour	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>BSKM-VD 1025RW</b>	250	100	Pure white	1	67.200	7216633

**St** Steel

**L** Painted

Clamp with integrated seal for BSKM 1025, for connection and smoke-proof sealing of duct joints. Usable at min. 30 mm side distance of the duct to the ceiling or wall. Including loose seal for combination with support profile.

## Connector for corner mounting

Type	Dimen- sion B mm	Dimen- sion H mm	Colour	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>BSKM-VE 1025RW</b>	250	100	Pure white	5	45.200	<b>7216634</b>

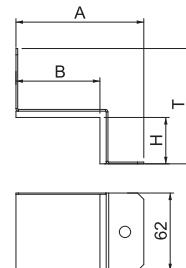
St Steel

L Painted

Clamp with integrated seal for BSKM 1025,  
for smoke-proof sealing of duct joints in the case of corner mounting without duct spacing to the  
ceiling or wall.



## Dimensions



## Support

Type	Dimen- sion T mm	Dimen- sion A mm	Dimen- sion d mm	Colour	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>BSKM-AD 1025RW</b>	360	67	336	Pure white	1	70.100	<b>7216635</b>

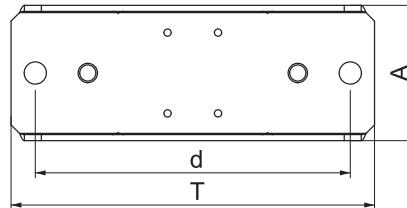
St Steel

L Painted

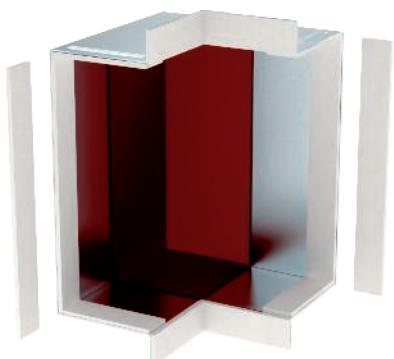
Support profile for suspended mounting of BSKM 1025,  
suitable as a suspension point to accept two M10 threaded rods and as the counter bearing to  
seal the joint, including nuts.



## Dimensions



## External corner

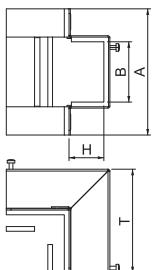


Type	Dimen- sion B mm	Dimen- sion H mm	Colour	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>BSKM-AE 1025RW</b>	250	100	Pure white	1	214.700	<b>7216636</b>

S Steel  
 L Painted

Fitting hood to cover two BSKM 1025 duct ends as external cover for direct wall and ceiling mountings. Including glued-in seals for closing the joints and loose seals when combining with lock plate.

### Dimensions



Type	Dimen- sion T mm	Dimen- sion A mm
<b>BSKM-AE 1025RW</b>	200	314

## Lock plate for external corner

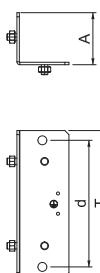


Type	Dimen- sion T mm	Dimen- sion A mm	Dimen- sion d mm	Colour	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>BSKM-GA 1025RW</b>	360	95	336	Pure white	1	160.800	<b>7216637</b>

S Steel  
 L Painted

Adapter plate for suspended mounting of the external corner hood BSKM-AE 1025, with acceptance option for M10 threaded rods, including nuts.

### Dimensions



## Internal corner

Type	Dimen- sion B mm	Dimen- sion H mm	Colour	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>BSKM-IE 1025RW</b>	250	100	Pure white	1	157.600	<b>7216640</b>

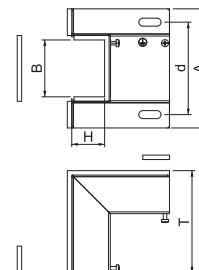
St Steel

L Painted

Fitting hood to cover two BSKM 1025 duct ends as internal cover for direct wall and ceiling mountings. Including glued-in seals for closing the joints and loose seals when combining with lock plate; screws for equipotential bonding also included.



## Dimensions



Type	Dimen- sion T mm	Dimen- sion A mm	Dimen- sion d mm
<b>BSKM-IE 1025RW</b>	165	314	284

## Lock plate for internal corner

Type	Dimen- sion T mm	Dimen- sion A mm	Dimen- sion d mm	Colour	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>BSKM-GI 1025RW</b>	360	165	336	Pure white	1	275.800	<b>7216641</b>

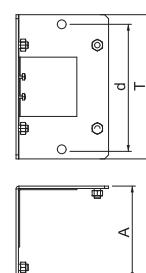
St Steel

L Painted

Adapter plate for suspended mounting of the internal corner hood BSKM-IE 1025, with acceptance option for M10 threaded rods, including nuts.



## Dimensions



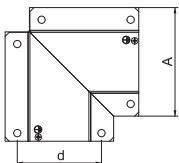
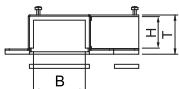
## Flat angle



Type	Dimen- sion B mm	Dimen- sion H mm	Colour	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>BSKM-FW 1025RW</b>	250	100	Pure white	1	289.800	<b>7216638</b>
<b>St</b> Steel						
<b>L</b> Painted						

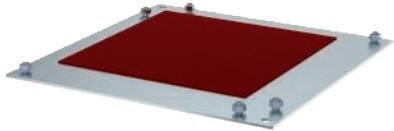
Fitting hood to cover two BSKM 1025 duct ends as flat angle for direct wall and ceiling mountings. Including glued-in seals for closing the joints and loose seals when combining with lock plate; screws for equipotential bonding also included.

### Dimensions



Type	Dimen- sion T mm	Dimen- sion A mm	Dimen- sion d mm
<b>BSKM-FW 1025RW</b>	108	349	284

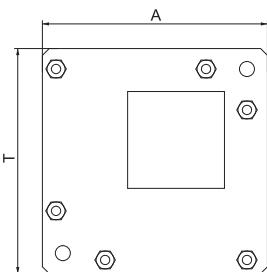
## Lock plate for flat angle



Type	Dimen- sion T mm	Dimen- sion A mm	Colour	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>BSKM-GF 1025RW</b>	350	350	Pure white	1	307.700	<b>7216639</b>
<b>St</b> Steel						
<b>L</b> Painted						

Adapter plate for suspended mounting of the flat angle hood BSKM-FW 1025, with acceptance option for M10 threaded rods, including nuts.

### Dimensions



## 45° vertical bend, rising

Type	Dimen- sion B mm	Dimen- sion H mm	Colour	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>BSKM-ES 1025RW</b>	250	100	Pure white	1	282.900	<b>7216642</b>

St Steel

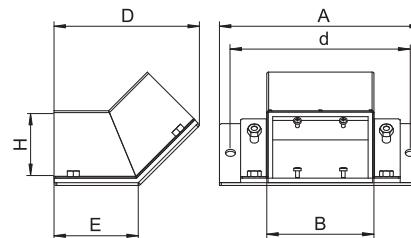
L Painted

Rising vertical bend for creation of vertical jumps for suspended mounting of the BSKM 1025, with acceptance option for M10 threaded rods, including seals and nuts as well as screws for equipotential bonding.



Type	Dimen- sion A mm	Dimen- sion D mm	Dimen- sion d mm	Dimen- sion E mm
<b>BSKM-ES 1025RW</b>	360	176	284	102

## Dimensions



## 45° vertical bend, falling

Type	Dimen- sion B mm	Dimen- sion H mm	Colour	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>BSKM-EF 1025RW</b>	250	100	Pure white	1	242.400	<b>7216643</b>

St Steel

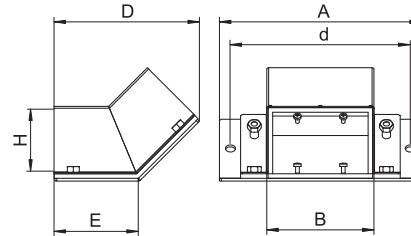
L Painted

Falling vertical bend for creation of vertical jumps for suspended mounting of the BSKM 1025, with acceptance option for M10 threaded rods, including seals and nuts as well as screws for equipotential bonding.



Type	Dimen- sion A mm	Dimen- sion D mm	Dimen- sion d mm	Dimen- sion E mm
<b>BSKM-EF 1025RW</b>	360	171	284	99

## Dimensions



## Reducing piece

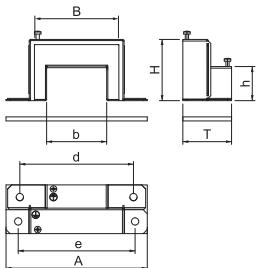


Type	Dimen- sion B mm	Dimen- sion H mm	Colour	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>BSKM-RE 1025RW</b>	250	100	Pure white	1	73.200	<b>7216631</b>

St Steel  
L Painted

Fitting hood to cover a symmetrical reduction on a straight stretch of BSKM 1025 to BSKM 0711. Including glued-in seals for closing the joints and loose seals when combining with lock plate; screws for equipotential bonding also included.

### Dimensions



Type	Dimen- sion h mm	Dimen- sion b mm	Dimen- sion T mm	Dimen- sion A mm	Dimen- sion d mm	Dimen- sion e mm
<b>BSKM-RE 1025RW</b>	70	110	61	314	220	284

## Lock plate reducing piece

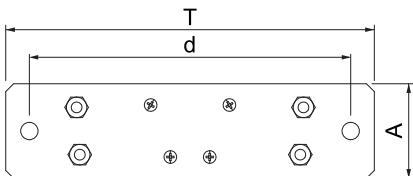


Type	Dimen- sion T mm	Dimen- sion A mm	Dimen- sion d mm	Colour	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>BSKM-RG 1025RW</b>	360	67	336	Pure white	1	73.200	<b>7216632</b>

St Steel  
L Painted

Adapter plate for suspended mounting of a symmetrical BSKM-RE 1025 reducing piece, with acceptance option for M10 threaded rods, including nuts.

### Dimensions



**T branch hood**

Type	Dimen- sion B mm	Dimen- sion H mm	Colour	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>BSKM-TA 1025RW</b>	250	100	Pure white	1	263.100	<b>7216645</b>

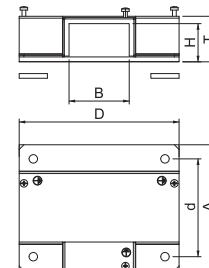
St Steel

L Painted

Hood for covering of three BSKM 1025 duct ends running towards each other in a T shape. Including glued-in seals for closing the joints and loose seals when combining with lock plate; screws for equipotential bonding also included.



Type	Dimen- sion T mm	Dimen- sion A mm	Dimen- sion D mm	Dimen- sion d mm
<b>BSKM-TA 1025RW</b>	108	314	350	284

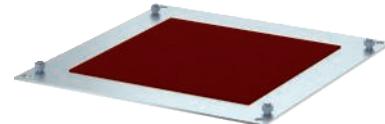
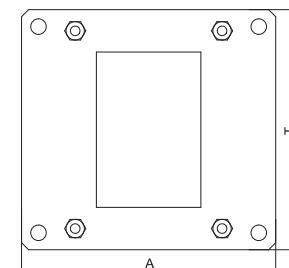
**Dimensions****Lock plate, T branch piece**

Type	Dimen- sion T mm	Dimen- sion A mm	Colour	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>BSKM-GT 1025RW</b>	360	350	Pure white	1	313.000	<b>7216646</b>

St Steel

L Painted

Adapter plate for suspended mounting of a BSKM-TA 1025 T branch, with acceptance option for M10 threaded rods, including nuts.

**Dimensions**

## T reducing branch piece



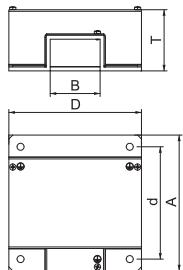
Type	Dimen- sion B mm	Colour	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>BSKM-TR 1025RW</b>	110	Pure white	1	153.200	<b>7216647</b>

St Steel

L Painted

Hood for the covering of three duct ends running towards each other in a T shape. Straight stretch, twice BSKM 1025, branch reduced to BSKM 0711. Including glued-in seals for closing the joints and loose seals when combining with lock plate; screws for equipotential bonding also included.

### Dimensions



Type	Dimen- sion T mm	Dimen- sion A mm	Dimen- sion D mm	Dimen- sion d mm
<b>BSKM-TR 1025RW</b>	108	314	210	284

## Lock plate, T reducing branch piece



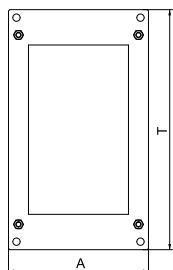
Type	Dimen- sion T mm	Dimen- sion A mm	Colour	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>BSKM-GR 1025RW</b>	360	210	Pure white	1	189.000	<b>7216649</b>

St Steel

L Painted

Adapter plate for suspended mounting of a BSKM-TR 1025 T reducing branch, with acceptance option for M10 threaded rods, including nuts.

### Dimensions



**T reducing branch piece**

Type	Dimension B mm	Colour	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>BSKM-TRK 1025RW</b>	70	Pure white	1	196.000	<b>7216648</b>

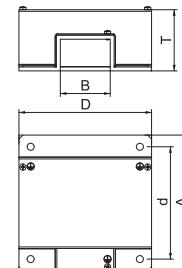
St Steel

L Painted

Hood for the covering of three duct ends running towards each other in a T shape. Straight stretch, twice BSKM 1025, branch reduced to BSKM 0407. Including glued-in seals for closing the joints and loose seals when combining with lock plate; screws for equipotential bonding also included.



Type	Dimension T mm	Dimension A mm	Dimension D mm	Dimension d mm
<b>BSKM-TRK 1025RW</b>	108	314	170	284

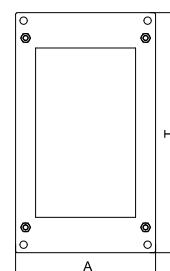
**Dimensions****Lock plate, T reducing branch piece**

Type	Dimension T mm	Dimension A mm	Colour	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>BSKM-GRK 1025RW</b>	360	170	Pure white	1	153.000	<b>7216650</b>

St Steel

L Painted

Adapter plate for suspended mounting of a BSKM-TRK 1025 T reducing branch, with acceptance option for M10 threaded rods, including nuts.

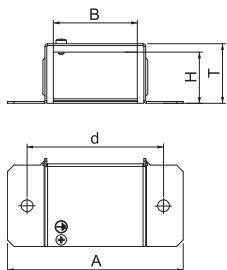
**Dimensions**

**End piece**

Type	Dimen- sion B mm	Dimen- sion H mm	Colour	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>BSKM-VK 1025RW</b>	250	100	Pure white	1	106.400	<b>7216644</b>

St Steel  
L Painted

For smoke-tight end closure of the BSKM 1025 duct for direct wall and ceiling mounting, in connection with the support profile BSKM-AD 1025, even for suspended mounting. Including glued-in seals to close the joints and loose seal when combined with a support; screw for equipotential bonding also included.

**Dimensions**

Type	Dimen- sion T mm	Dimen- sion A mm	Dimen- sion d mm
<b>BSKM-VK 1025RW</b>	105	314	284

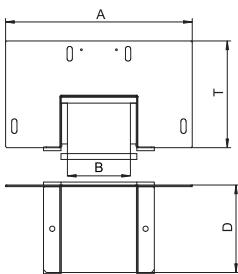
**Wall connection I120**

Type	Dimen- sion B mm	Dimen- sion T mm	Dimen- sion A mm	Dimen- sion D mm	Colour	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>BSKM-WA 1025RW</b>	250	213	460	150	Pure white	1	408.500	<b>7216654</b>

St Steel  
L Painted

Frame as additional insulation in the area of the wall transition for direct wall and ceiling mounting of the BSKM 1025. Including screen and glued-in seals to close the joints and loose seal when combined with a support; with screw for equipotential bonding.

Only needed for I120 requirements.

**Dimensions**

## Lock plate for wall connection I120

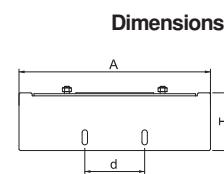
Type	Colour	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>BSKM-GW 1025RW</b>	Pure white	1	259.500	<b>7216655</b>

Steel  
Painted

Adapter plate for suspended mounting of the wall connection BSKM-WA 1025, with acceptance option for M10 threaded rods, including nuts.



Type	Dimensions				
	Dimension A mm	Dimension D mm	Dimension T mm	Dimension e mm	Dimension d mm
<b>BSKM-GW 1025RW</b>	460	150	96	406	180



## Cable gland, metric thread



Type	Thread	Pack.		Weight kg/100 pcs.	Item No.
		pcs	kg/100 pcs.		
V-TEC VM12 MS	M12 x 1,5	50	1.200	2086018	
V-TEC VM16 MS	M16 x 1,5	50	1.640	2086024	
V-TEC VM20 MS	M20 x 1,5	25	3.140	2086030	
V-TEC VM25 MS	M25 x 1,5	25	4.260	2086036	
V-TEC VM32 MS	M32 x 1,5	20	7.160	2086042	
V-TEC VM40 MS	M40 x 1,5	5	12.240	2086048	
V-TEC VM50 MS	M50 x 1,5	5	22.700	2086054	

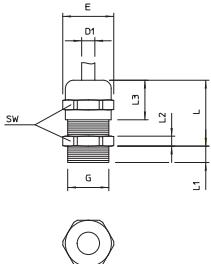
CuZn Brass

N Nickel-plated

With metric connecting thread to IEC 423, robust cap-nut cable gland with large sealing area. Strain relief, wringing protection and tightness over the whole clamping area. Neoprene sealing ring. Polyamide terminal insert. With pre-mounted O sealing ring on connection thread, VDE-tested to DIN EN 50262, protection rating IP68 at 5 bar for 1 hr, max. permitted ambient temperature -20 - 100°C.

\* Prices according to DEL notation.

## Dimensions



G	D1	SW	E	L max. mm	L1	L2	L3
	mm	mm	mm	mm	mm	mm	mm
M12 x 1,5	3-6	14	15.5	20	5	11.5	3
M16 x 1,5	5-9	17	19	24	5	15	3
M20 x 1,5	9-13	22	24	27	6	16.5	3.5
M25 x 1,5	11-16	27	30	29.5	7		
M32 x 1,5	14-21	34	36	30	8	18.5	4.5
M40 x 1,5	19-27	43	46	33	8	21	4.5
M50 x 1,5	24-35	55	60	38.5	9	25	4.5

## Locknut, metric thread



Type	Thread	Dimen-		Dimen-	Pack.	Weight	Item No.
		SW	tion E				
169 MS M12	M12 x 1,5	15	16.6	3	100	0.220	2091607
169 MS M16	M16 x 1,5	20	22.1	2.8	100	0.310	2091615
169 MS M20	M20 x 1,5	24	25.6	3	100	0.580	2091623
169 MS M25	M25 x 1,5	30	33.2	3.5	100	0.880	2091631
169 MS M32	M32 x 1,5	35	38.7	4	100	1.120	2091658
169 MS M40	M40 x 1,5	45	49.8	4.5	50	1.920	2091666
169 MS M50	M50 x 1,5	55	60.4	5.5	50	3.070	2091674

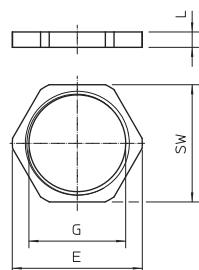
CuZn Brass

N Nickel-plated

Locknuts DIN 46319 with metric thread IEC 423.

\* Prices according to DEL notation.

## Dimensions

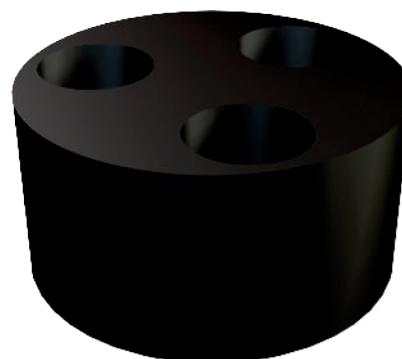


## Multiple sealing insert, metric

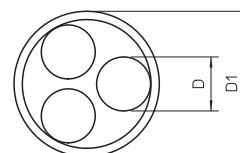
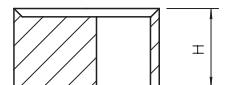
Type	Size mm	Dimen- sion D mm	Dimen- sion H mm	Dimen- sion D1 mm	Number of drill holes	Pack. pcs	Weight kg/100 pcs.	Item No.
107 C VM 20 2x4	M20	4	8.1	15.1	2	50	0.130	2029672
107 C VM 20 4x5	M20	5	8.1	15.1	4	50	0.080	2029675
107 C VM 20 2x6	M20	6	8.1	15.1	2	50	0.100	2029677
107 C VM 25 5x4	M25	4	10	19.8	5	50	0.180	2029679
107 C VM 25 3x6	M25	6	10	19.8	3	50	0.210	2029682
107 C VM 25 2x6	M25	6	10	19.8	2	50	0.260	2029685
107 C VM 25 3x7	M25	7	10	19.8	3	50	0.180	2029688
107 C VM 25 2x8	M25	8	10	19.8	2	50	0.200	2029690
107 C VM 32 2x8	M32	8	13.4	25.1	2	25	0.530	2029693
107 C VM 32 4x8	M32	8	13.4	25.1	4	25	0.400	2029696

NBR-SBR Rubber mixture

Use to insert multiple thin cables in the V-TEC VM cable glands, is replaced with the simple sealing ring of the cable gland.



Dimensions

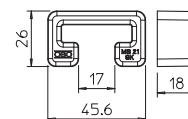


## Protective cap MS4121

Type	Colour	Pack. pcs	Weight kg/100 pcs.	Item No.
MS4121 SK	Pastel orange	25	0.650	1122902

PE Polyethylene

Protective caps for profile rail, type MS4121.



## Threaded rod

Type	Thread	Dimen- sion d mm	Dimen- sion L mm	Pack. pcs	Weight kg/100 pcs.	Item No.
TR M10 1M G	M10	10	1000	10	49.000	3141209

St Steel

G Electrogalvanised

Threaded rod to DIN 976.



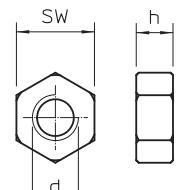
## Hexagonal nut DIN 934

Type	Thread	Dimen- sion SW mm	Dimen- sion h mm	Dimen- sion d mm	Pack. pcs	Weight kg/100 pcs.	Item No.
HN M10 G	M10	17	8.4	10	100	1.084	3400107

St Steel

G Electrogalvanised

Hexagonal nut to DIN 934 with metric thread.



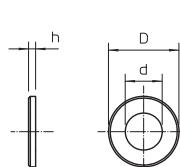
## Washer ISO 7093

Type	Thread	Dimen- sion d mm	Dimen- sion D mm	Dimen- sion h mm	Pack. pcs	Weight kg/100 pcs.	Item No.
WS M10 D28 G	M10	11	28	2.5	100	1.020	3402223

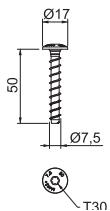
St Steel

G Electrogalvanised

Washer of large outer diameter for universal use.



## Fire protection screw tie

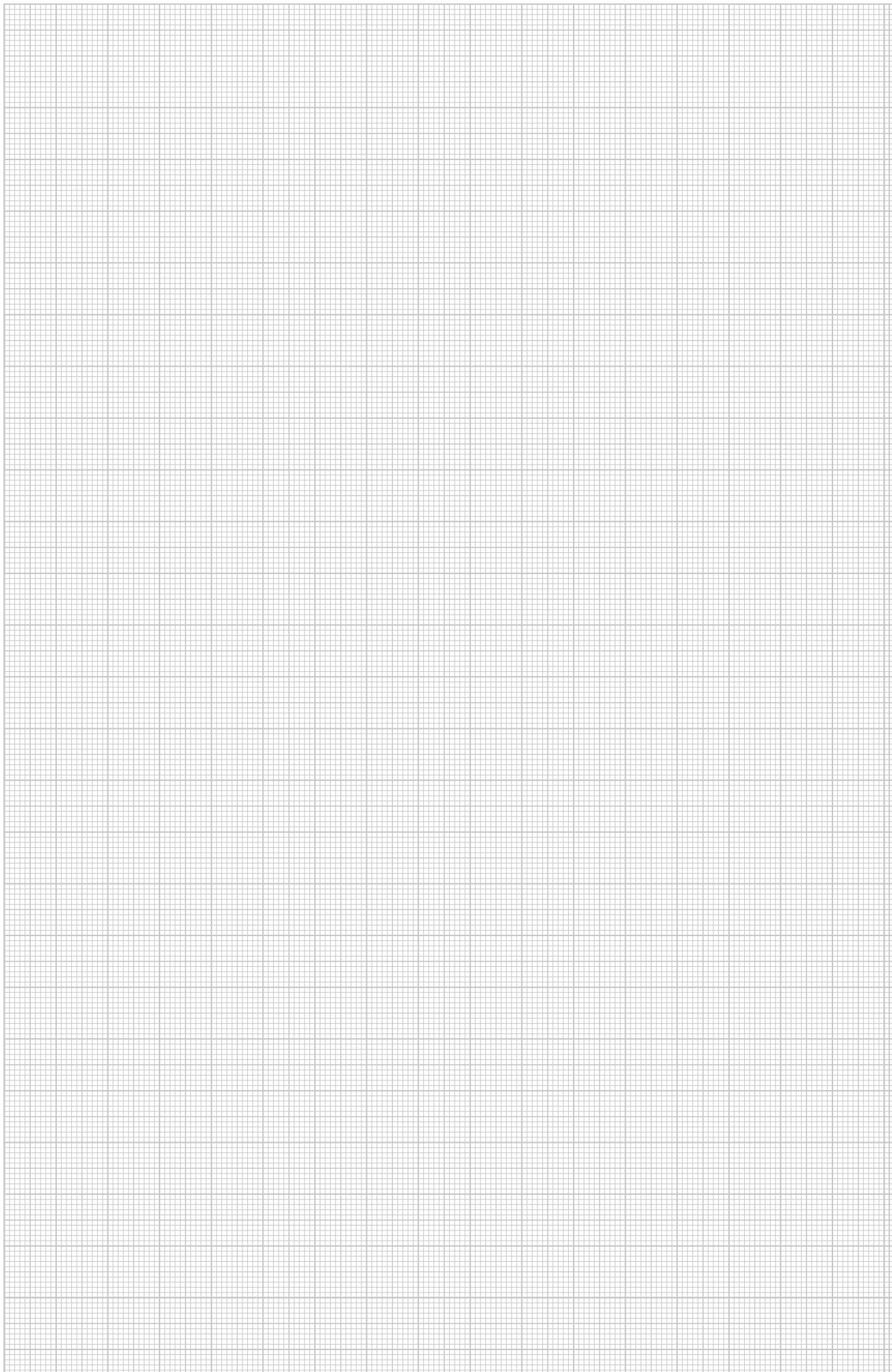


Type	Dimension mm	Anchor length mm	Bore hole Ø mm	Head Ø mm	Screw system	Pack. pcs	Weight kg/100 pcs.	Item No.
MMS-plus 7.5X50	7,5 x 50	50	6	17	Torx	100	1.500	3498261

St Steel

G Electrogalvanised

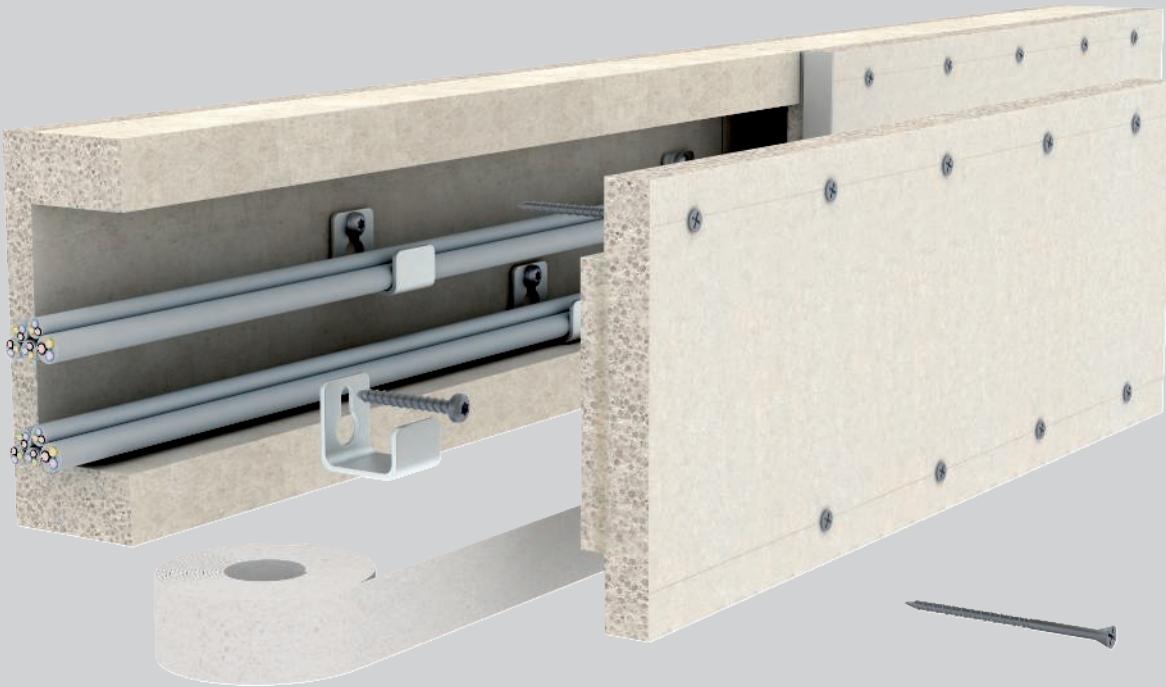
Fire protection bolt tie with large pan head for direct mounting without additional anchors. Drive T30, drill hole 6 mm. Tested anchor according to ETAG 001 - Part 3. Fire resistance class to R120 for concrete and masonry.



# PYROLINE® Con D

## Fire protection duct for direct wall and ceiling mounting

### System description



The PYROLINE® Con D fire protection duct consists of fibreglass light concrete fire protection plates which are resistant to water and frost. The fire protection plates, which are classed as non-combustible (material class A1), have a compacted surface, which is hard, smooth and wear-resistant. The OBO PYROLINE® Con D is used as an I duct to protect escape and rescue routes against the effects of a possible cable fire. This means that the escape and rescue

routes remain free from fire, smoke and heat. As an E duct, PYROLINE® Con D allows the maintenance of electrical functionality of the safety-relevant circuits. The fire protection duct is mounted directly on solid walls and ceilings. Possibly necessary fittings can be created simply and flexibly on-site according to requirements. The fire protection ducts can be painted or papered over, as required.

# PYROLINE® Con D

## Fire protection duct for direct wall and ceiling mounting

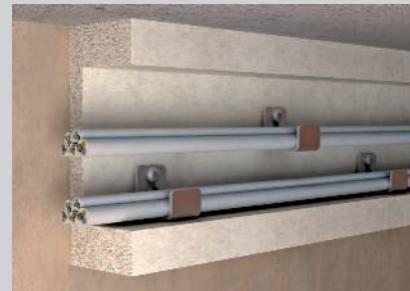
### Installation principle



Mounted fire protection duct on wall and ceiling as I and E duct.



Flexible duct routing through individually creatable fittings.



Retaining profile and retaining clamp as mounting aid for cable insertion.



Cable fastening for vertical duct mounting with clips.



Closing surface treatment through painting or papering.



Minor damage can be eliminated at any time.

Classification according to DIN 4102 part 11 and part 12

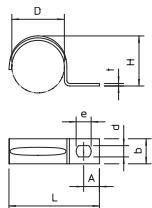
**I90**    **I120**    **E30**    **E90**

#### Installation duct made of fibreglass reinforced lightweight concrete

<b>Fire resistance class</b>	I90 and I120 Installation in escape routes	E30 and E90 Maintenance of electrical functionality
<b>Proof of application</b>	General construction test certificate of the materials testing institute iBMB MPA Braunschweig	General construction test certificate of the materials testing institute iBMB MPA Braunschweig
<b>Approval number</b>	P-3109/0998-MPA BS	P-3320/381/14-MPA BS
<b>Testing standard</b>	DIN 4102 Part 11	DIN 4102 Part 12

The data in the named proofs of applicability applies.

## Fastening clip 604, light-duty



Type	For Ø mm	Hole size mm	Material thickness mm	Pack. pcs	Weight kg/100 pcs.	Item No.
604 3 G	3	4,5 x 6	0.7	100	0.052	1003038
604 4 G	4	4,5 x 6	0.7	100	0.067	1003046
604 5 G	5	4,5 x 6	0.7	100	0.084	1003054
604 6 G	6	4,5 x 6	0.7	100	0.099	1003062
604 7 G	7	4,5 x 6	0.7	100	0.120	1003070
604 8 G	8	4,5 x 6	0.7	100	0.123	1003089
604 9 G	9	4,5 x 6	0.7	100	0.139	1003097
604 10 G	10	4,5 x 6	0.7	100	0.150	1003100
604 11 G	11	4,5 x 6	1	100	0.270	1003119
604 12 G	12	4,5 x 6	0.7	100	0.240	1003127
604 13 G	13	4,5 x 6	1	100	0.280	1003135
604 16 G	16	4,5 x 6	1	100	0.348	1003178
604 19 G	19	4,5 x 6	1	100	0.411	1003194
604 20 G	20	4,5 x 6	1	100	0.431	1003208
604 21 G	21	4,5 x 6	1	100	0.447	1003216
604 23 G	23	4,5 x 6	1	100	0.490	1003232
604 25 G	25	4,5 x 6	1	100	0.900	1003259
604 28 G	28	4,5 x 6	1	100	0.874	1003283
604 32 G	32	4,5 x 6	1	100	1.462	1003321
604 35 G	35	5,5 x 7	1.5	100	1.355	1003356
604 37 G	37	5,5 x 7	1.5	100	1.567	1003372
604 40 G	40	5,5 x 7	1.5	100	1.860	1003402
604 47 G	47	5,5 x 7	1.5	50	2.484	1003461

St Steel

G Electrogalvanised

Single-lobe fastening clip for cables and pipes.

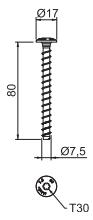
\* Sizes 3 and 4 are not suitable for nail device

\* Sizes 3 to 21 are not suitable for bolt-firing tool

### Dimensions

D mm	L mm	H mm	b mm	t mm	d mm	e mm	A mm
3	12	2.4	7	0.7	4.5	6	4
4	14	3.3	7	0.7	4.5	6	4
5	16.5	4.5	7	0.7	4.5	6	5
6	17.5	5.2	8	0.7	4.5	6	5
7	19.5	6.5	8	0.7	4.5	6	5
8	21	7	8	0.7	4.5	6	5.5
9	21.5	8	8	0.7	4.5	6	5.75
10	22	9	8	0.7	4.5	6	5
11	24	10	10	1	4.5	6	5.5
12	27	11	10	0.7	4.5	6	6.5
13	27	11.5	10	1	4.5	6	6
16	31	14.5	10	1	4.5	6	6.5
19	33	17	10	1	4.5	6	6.5
20	35	18	10	1	4.5	6	6.3
21	36	19	10	1	4.5	6	6.3
23	39	21.5	10	1	4.5	6	7
25	41.3	23	15	1	4.5	6	7
28	45	24.8	15	1	4.5	6	7
32	48.8	30	15	1.5	5.5	7	8
35	54	30	14	1.5	5.5	7	8.75
37	56	34	14	1.5	5.5	7	7.5
40	63	38	14	1.5	5.5	7	10.5
47	69	43.8	14	1.5	5.5	7	10

## Bolt tie



Type	Dimension mm	Anchor length mm	Bore hole Ø mm	Head Ø mm	Screw system	Pack. pcs	Weight kg/100 pcs.	Item No.
MMS-plus 7.5X80	7,5 x 80	80	6	13.2	Torx	50	1.600	3498272

St Steel

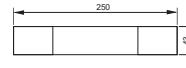
G Electrogalvanised

Fire protection bolt tie with pan head for direct mounting without anchors. Drive T40, drill hole 6 mm. Tested anchor according to ETAG 001 - Part 3. Fire resistance class to R120 for concrete and masonry.

## Identification plate for function maintenance

Language	Pack.	Weight	
Type <b>KS-E EN</b>   English	pcs 10	kg/100 pcs. 0.600	<b>Item No.</b> <b>7205432</b>
PVC Polyvinylchloride			

Self-adhesive identification plate for approved cable system labelling for maintenance of electrical function as required by DIN 4102 part 12.

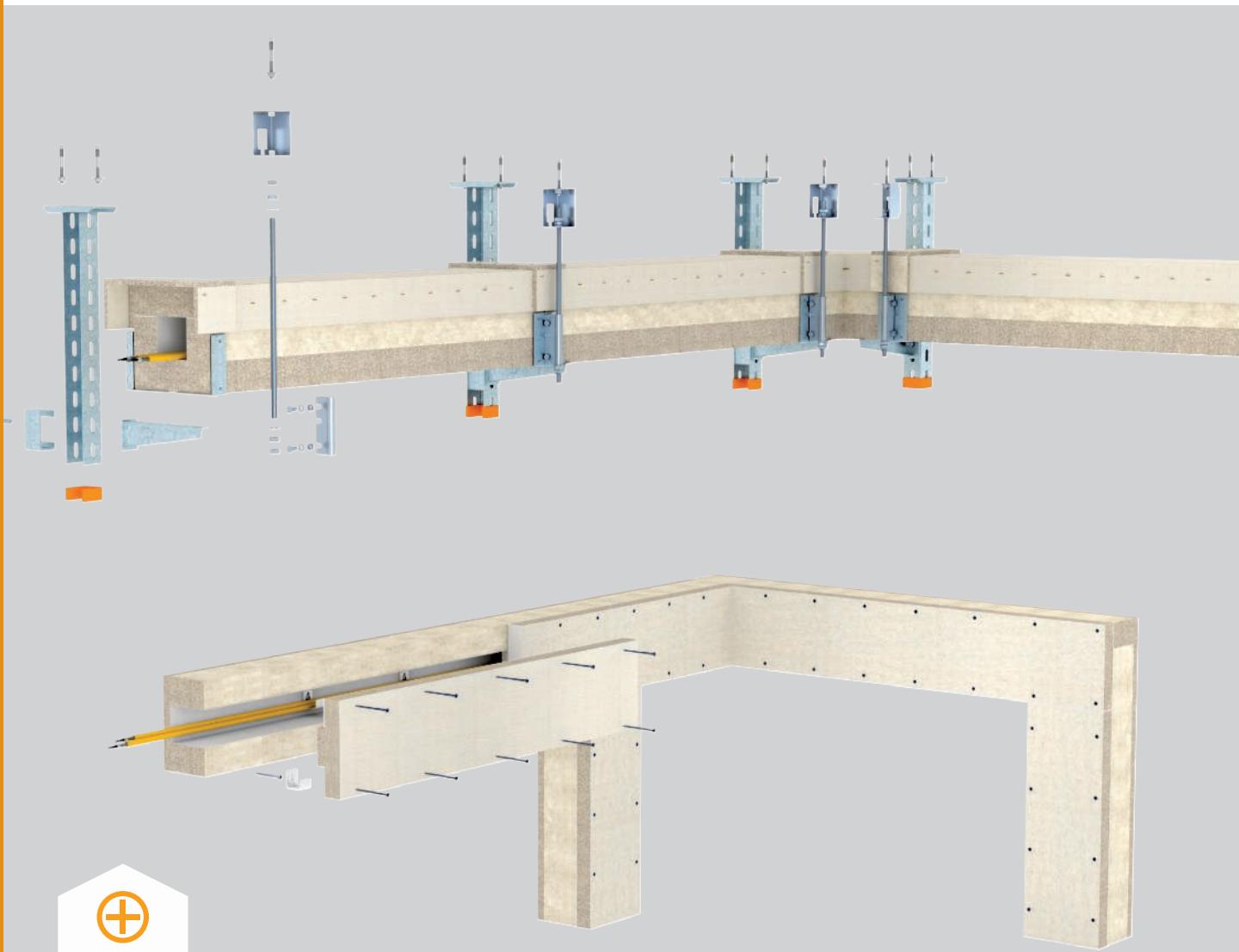


# PYROLINE® Fibre Optics

## Fire protection duct for suspended mounting

### System description

Fire protection ducts



Communication systems must continue to function even if there is a fire. Increasingly often, they are equipped with fibre optic cables, in order to process large data volumes securely. In industrial systems too, optical data transmission systems are used for process control. In the case of a fire, the processes must be ended in a controlled fashion, in order to prevent damage to people and the environment. For this reason, the fibre optic cables must be routed with

special protection in the event of fire.

Fibre optic cables cannot be evaluated according to the testing standard DIN 4102 Part 12, as the basic criteria only relate to copper conductors. The PYROLINE® Fibre Optics fire protection duct protects the fibre optic cables against an external fire for a period of 90 minutes. The achieved maintenance of electrical functionality class is "E 90".

# PYROLINE® Fibre Optics

## Fire protection duct for suspended mounting

### Installation principle



Direct wall and ceiling mounting.



Wall mounting on brackets and additional threaded rod lock.



Suspended ceiling mounting with additional threaded rod lock.



Retaining profile as mounting aid for insertion of the fibre optic cables.



With direct mounting, flexible duct routing through individually creatable fittings.



Prefabricated fittings for direction changes with suspended mounting.

Classification according to DIN 4102 Part 12

**E30**

**E60**

**E90**

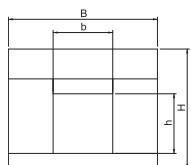
#### Fire protection duct made of fibreglass reinforced lightweight concrete

<b>Maintenance of electrical functionality class</b>	E30 to E90
<b>Proof of application</b>	General construction test certificate of the materials testing institute iBMB MPA Braunschweig
<b>Approval number</b>	P-3320/381/14-MPA BS
<b>Testing standard</b>	DIN 4102 Part 12
<b>Application with fibre optic cables</b>	Surveyor's report no. GA-2017/012-Nau of Ingenieurbüro für Brandschutz von Bauarten, IBB
<b>Mounting variants</b>	Direct wall and ceiling mounting Suspended mounting

The data in the named proofs of applicability applies



## Fire protection duct E90, internal height 80 mm

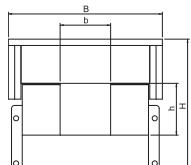


Type	Dimen- sion h mm	Dimen- sion b mm	Dimen- sion H mm	Dimen- sion B mm	Length mm	Pack. m	Weight kg/100 m	Item No.
<b>BSKF-0808</b>	80	80	160	200	1000	1	2,050.000	<b>7214800</b>

Glass-fibre lightweight concrete

Fire protection duct for direct wall and ceiling mounting, consisting of water and frost-resistant fibre glass lightweight concrete of material class A1 in accordance with EN 13501 Part 1 for fireproof routing of fibre optic cables according to the maintenance of electrical function to DIN 4102 Part 12, classified for E30 and E90. Including 10 counter-sunk head screws and 3 x 1 m of sealing strips.

## Fire-proofing duct E90, internal height 80 mm

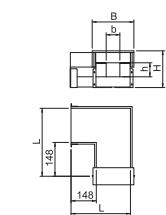


Type	Dimen- sion h mm	Dimen- sion b mm	Dimen- sion H mm	Dimen- sion B mm	Length mm	Pack. m	Weight kg/100 m	Item No.
<b>BSKHF-0808</b>	80	80	200	200	1000	1	2,920.000	<b>7214840</b>

Glass-fibre lightweight concrete

Fire protection duct for suspended ceiling mounting consists of fibreglass light concrete according to EN 13501 part 1 (material class A1) which is resistant to water and frost. The fireproof duct serves to install fibre optic cables, classified for electrical the maintenance of electrical function according to DIN 4102 part 12 class E30 and E90. Including 12 x countersunk head screws and 3 x 1 m sealing strips.

## 90° bend, E90, internal height 80 mm

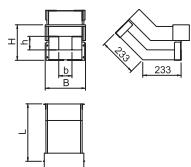


Type	Dimen- sion h mm	Dimen- sion b mm	Dimen- sion H mm	Dimen- sion B mm	Dimen- sion L mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>BSKHF-FB0808</b>	80	80	200	248	352	1	1,520.000	<b>7214852</b>

Glass-fibre lightweight concrete

90° bend in horizontal direction for fire protection duct BSKHF-0808, consisting of water and frost-resistant fibre glass lightweight concrete of material class A1 according to EN 13501 Part 1, for installation on OBO mounting systems. Including mounted connector on both duct ends, connecting bolts and sealing strip. Fittings must be supported by additional brackets.

## 45° vertical bend, rising, E90, internal height 80 mm

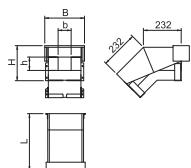


Type	Dimen- sion h mm	Dimen- sion b mm	Dimen- sion H mm	Dimen- sion B mm	Dimen- sion L mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>BSKHF-ES0808</b>	80	80	200	248	398	1	1,200.000	<b>7214856</b>

Glass-fibre lightweight concrete

Vertical bend, 45° rising, for fire protection duct BSKHF-0808, consisting of water and frost-resistant fibre glass lightweight concrete of material class A1 according to EN 13501 Part 1, for installation on OBO mounting systems. Including mounted connector on both duct ends, connecting bolts and sealing strip. Fittings must be supported by additional brackets.

## 45° vertical bend, falling, E90, internal height 80 mm



Type	Dimen- sion h mm	Dimen- sion b mm	Dimen- sion H mm	Dimen- sion B mm	Dimen- sion L mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>BSKHF-EF0808</b>	80	80	200	248	276	1	1,250.000	<b>7214858</b>

Glass-fibre lightweight concrete

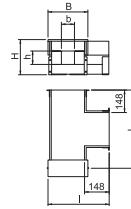
Vertical bend, 45° falling, for fire protection duct BSKHF-0808, consisting of water and frost-resistant fibre glass lightweight concrete of material class A1 according to EN 13501 Part 1, for installation on OBO mounting systems. Including mounted connector on both duct ends, connecting bolts and sealing strip. Fittings must be supported by additional brackets.

**T piece E90, internal height 80 mm**

Type	Dimen- sion h mm	Dimen- sion b mm	Dimen- sion H mm	Dimen- sion B mm	Dimen- sion L mm	Dimen- sion I mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>BSKHF-FT0808</b>	80	80	200	248	500	352	1	1,930.000	<b>7214854</b>

Glass-fibre lightweight concrete

T piece for fire protection duct BSKHF-0808, consisting of water and frost-resistant fibre glass lightweight concrete of material class A1 according to EN 13501 Part 1, for installation on OBO mounting systems. Including mounted connector on all duct ends, connecting bolts and sealing strip. Fittings must be supported by additional brackets.

**Wall connection collar BSKHF, E90, internal height 80 mm**

Type	Length mm	Width mm	Height mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>BSKHF-WA0808</b>	1250	70	60	1	400.000	<b>7214862</b>

Glass-fibre lightweight concrete

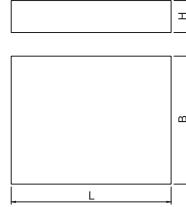
Wall connection collar for fire protection duct BSKHF-0808, consisting of water and frost-resistant fibre glass lightweight concrete of material class A1 according to EN 13501 Part 1, for doubling insulation on wall connections. Including counter-sunk head screws and sealing strip.

**End piece BSKF, E90, internal height 80 mm**

Type	Dimen- sion L mm	Dimen- sion H mm	Dimen- sion B mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>BSKF-E0808</b>	200	60	160	1	150.000	<b>7214810</b>

Glass-fibre lightweight concrete

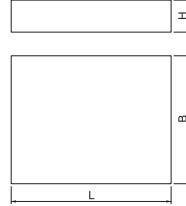
End piece for fire protection duct BSKF-0808 consists of fibreglass light concrete according to EN 13501 part 1 (material class A1). Including countersunk head screws and sealing strips.

**End piece BSKHF, E90, internal height 80 mm**

Type	Dimen- sion L mm	Dimen- sion H mm	Dimen- sion B mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>BSKHF-E0808</b>	200	60	200	1	180.000	<b>7214860</b>

Glass-fibre lightweight concrete

End piece for fire protection duct BSKHF-0808 consists of fibreglass light concrete according to EN 13501 part 1 (material class A1). Including countersunk head screws and sealing strips.

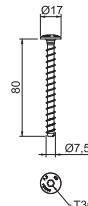
**Bolt tie**

Type	Dimension mm	Anchor length mm	Bore Ø mm	Head Ø mm	Screw system	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>MMS-plus 7.5X80</b>	7,5 x 80	80	6	13,2	Torx	50	1,600	<b>3498272</b>

St Steel

G Electrogalvanised

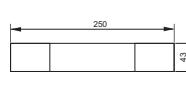
Fire protection bolt tie with pan head for direct mounting without anchors. Drive T40, drill hole 6 mm. Tested anchor according to ETAG 001 - Part 3. Fire resistance class to R120 for concrete and masonry.

**Identification plate for function maintenance**

Type	Language	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>KS-E EN</b>	English	10	0,600	<b>7205432</b>

PVC Polyvinylchloride

Self-adhesive identification plate for approved cable system labelling for maintenance of electrical function as required by DIN 4102 part 12.



# PYROLINE® Sun PV

## Concrete photovoltaic duct for direct and suspended mounting

### System description

Fire protection ducts



The PYROLINE® Sun PV fire protection duct is the ideal fire protection duct for fireproof routing of photovoltaic DC cables. If there is a fire, its non-conductive surface ensures protection against dangerous contact voltages. In addition, the duct fulfils the requirements as an I duct according to DIN 4102 Part 11 for cable installations in emergency and escape routes. In addition, it meets the requirements of the VDE application

rule AR 2100-712. The fire protection duct can be installed directly on the wall or the ceiling. The appropriate connection armatures mean that suspended mounting is also possible. The duct is made of water and frost-resistant glass fibre lightweight concrete fire protection plates (non-combustible, material class A1), meaning that it is suitable for external areas.

# PYROLINE® Sun PV

## Concrete photovoltaic duct for direct and suspended mounting

### Installation principle



Direct wall and ceiling mounting.



Flexible duct routing through individually creatable fittings.



Can be painted or papered over, to permit discreet integration in the building.



Suspended mounting on the connector elements.



Contact protection begins directly with the converter.



Labelling according to the VDE application rule.

Classification according to DIN 4102 Part 11

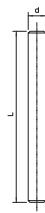
I30

#### Installation duct made of fibreglass reinforced lightweight concrete

<b>Fire resistance class</b>	I30 Installation in escape routes
<b>Proof of application</b>	General construction test certificate of the materials testing institute iBMB MPA Braunschweig
<b>Approval number</b>	P-3109/0998-MPA BS
<b>Testing standard</b>	DIN 4102 Part 11
<b>Photovoltaic application</b>	According to VDE application rule for fireproof routing of PV-DC cables

The data in the named proofs of applicability applies.

## Threaded rod

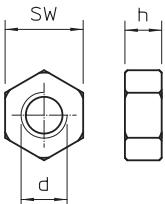


Type	Thread	Dimen-	Dimen-	Pack.	Weight	
	M10	d mm	L mm	pcs	kg/100 pcs.	Item No.
<b>TR M10 1M G</b>	M10	10	1000	10	49.000	<b>3141209</b>

St Steel  
G Electrogalvanised

Threaded rod to DIN 976.

## Hexagonal nut DIN 934

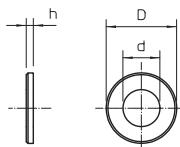


Type	Thread	Dimen-	Dimen-	Pack.	Weight	
	M10	SW mm	h mm	sion d mm	pcs kg/100 pcs.	Item No.
<b>HN M10 G</b>	M10	17	8.4	10	100	1.084

St Steel  
G Electrogalvanised

Hexagonal nut to DIN 934 with metric thread.

## Washer

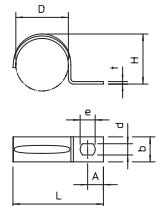


Type	Thread	Dimen-	Dimen-	Dimen-	Pack.	Weight	
	M10	sion d mm	D mm	sion h mm	pcs kg/100 pcs.	Item No.	
<b>WS M10 D20 G</b>	M10	10.5	20	2	100	0.408	<b>3402096</b>

St Steel  
G Electrogalvanised

Washer according to DIN 125, shape A, for universal use.

## Fastening clip 604, light-duty



Type	For Ø size mm	Hole size mm	Material thickness mm	Pack.	Weight	
	mm	mm	mm	pcs	kg/100 pcs.	Item No.
<b>604 4 G</b>	4	4,5 x 6	0.7	100	0.067	<b>1003046</b>
<b>604 5 G</b>	5	4,5 x 6	0.7	100	0.084	<b>1003054</b>
<b>604 6 G</b>	6	4,5 x 6	0.7	100	0.099	<b>1003062</b>
<b>604 7 G</b>	7	4,5 x 6	0.7	100	0.120	<b>1003070</b>
<b>604 8 G</b>	8	4,5 x 6	0.7	100	0.123	<b>1003089</b>
<b>604 9 G</b>	9	4,5 x 6	0.7	100	0.139	<b>1003097</b>
<b>604 10 G</b>	10	4,5 x 6	0.7	100	0.150	<b>1003100</b>

St Steel  
G Electrogalvanised

Single-lobe fastening clip for cables and pipes.

\* Sizes 3 and 4 are not suitable for nail device

\* Sizes 3 to 21 are not suitable for bolt-firing tool

### Dimensions

D mm	L mm	H mm	b mm	t mm	d mm	e mm	A mm
4	14	3.3	7	0.7	4.5	6	4
5	16.5	4.5	7	0.7	4.5	6	5
6	17.5	5.2	8	0.7	4.5	6	5
7	19.5	6.5	8	0.7	4.5	6	5
8	21	7	8	0.7	4.5	6	5.5
9	21.5	8	8	0.7	4.5	6	5.75
10	22	9	8	0.7	4.5	6	5

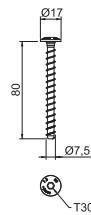
**Bolt tie**

Type	Dimension mm	Anchor length mm	Bore hole Ø mm	Head Ø mm	Screw system	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>MMS-plus 7.5X80</b>	7,5 x 80	80	6	13.2	Torx	50	1.600	<b>3498272</b>

S Steel

G Electrogalvanised

Fire protection bolt tie with pan head for direct mounting without anchors. Drive T40, drill hole 6 mm. Tested anchor according to ETAG 001 - Part 3. Fire resistance class to R120 for concrete and masonry.





## Cable bandages

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<b>System description, PYROWRAP® Wet FSB-WLS</b>	120
<b>System description, PYROWRAP® Wet FSB-WB</b>	122
<b>Products</b>	124

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# PYROWRAP® Wet FSB-WLS

## Application in interior areas and wet rooms

### System description

Cable bandages



The PYROWRAP® Wet FSB-WLS system can be used to wrap large cable bundles or cable support systems within the fire sections, in order to prevent the spread of a fire. The mesh possesses a fire protection coating, which stops a fire in its tracks at an early stage, e.g. in the case of a short circuit. If there is fire coming in from the outside, the material is not involved in the course of the fire, effectively preventing the spread of the fire, both in vertical and horizontal directions.

In the escape and rescue routes of small buildings, the mounting of a cable bandage is permitted, as only low smoke development is to be expected and only a small number of people must be evacuated. In larger buildings, the residual risk of smoke development is accepted, even if considerably more people must be evacuated. Here, the fire protection bandage frequently presents the only economic solution compared to fire protection ceilings or panelling with plate materials.

# PYROWRAP® Wet FSB-WLS

## Application in interior areas and wet rooms

### Installation principle



Complete encasement of the suspended cable run.



Complete encasement of the cables in a cable run as wall mounting.



Bandage fastening with metallic rails in a single-clip installation.



Bandage fastening with metallic tightening straps in a rail installation.



Cable exit with bandaging.



Bandaging of the cable bundles on support systems.

#### Cable jacketing to prevent fire spread

<b>Proof of application</b>	Application approval of DIBt Berlin Material approval of DIBt Berlin
<b>Documents</b>	Z-56.217-3600 Z-19.11-2183
<b>Prevention of fire spread</b>	min. 90 minutes
<b>Material properties</b>	Exterior grey glass fibre mesh, interior light grey materials class C-s2,d0 according to EN 13501-1 – hardly flammable
<b>Max. fastening spacing</b>	0.5 m
<b>Cable types and cross-sections</b>	No restriction

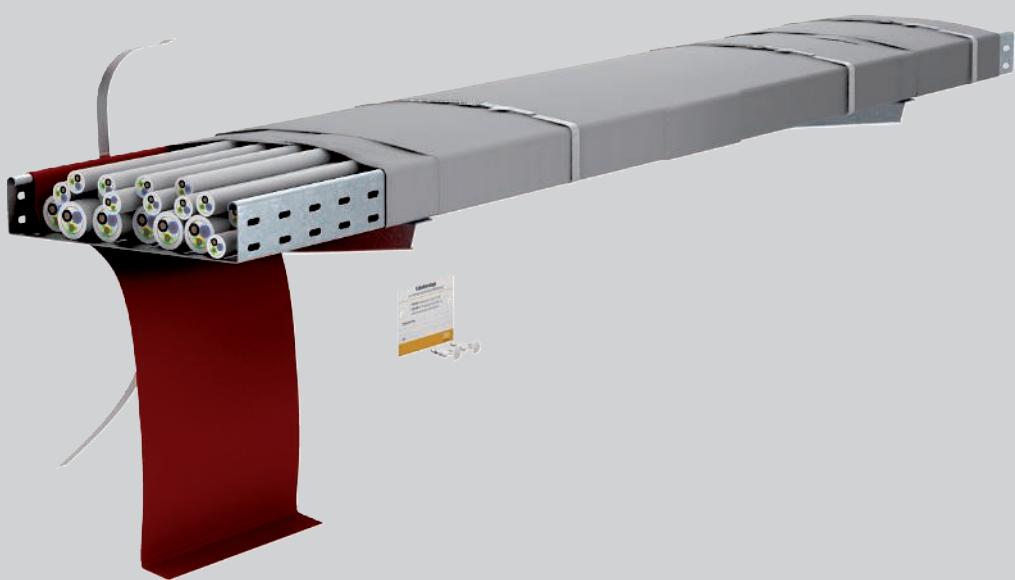
#### Caution!

Use in emergency and escape routes of building classes 4 and 5 may require the approval of the construction supervision, e.g. through a fire protection concept.

# PYROWRAP® Wet FSB-WB

## Application in industrial areas / outdoors

### System description



The PYROWRAP® Wet FSB-WB system comprises a fire protection bandage, which is used in areas with special environmental conditions. The fire protection bandage can be used to wrap large cable bundles or cable support systems, in order to prevent the spread of fire. The bandage is made of a weatherproof material, which is insensitive to various chemicals and oils.

It has construction approval from the DIBt as a highly flame-resistant material according to DIN EN 13501-1. When the fire protection coating foams up in the event of fire, this safely prevents the spread of fire via the cables.

# PYROWRAP® Wet FSB-WB

## Application in industrial areas / outdoors

### Installation principle



Use of the bandage in aggressive environments, e.g. offshore.



Bandaged rising section in the tower of a wind power plant.



Use on support systems in supply rooms or production halls.



Cable tunnel with bandages in power stations.



Bandaged cable support systems in areas with many combustible materials.



Use for photovoltaic cables run over a fire wall.

#### Cable jacketing to prevent fire spread

<b>Proof of application</b>	IEC test report of the iBMB MPA materials testing institute, Braunschweig National and European material approval of DIBt Berlin
<b>Document no.</b>	IEC-3630/081/10-AR Z-19.11-1971 ETA-13/0158
<b>Prevention of fire spread</b>	min. 120 minutes
<b>Material properties</b>	Exterior grey glass fibre mesh, interior red Materials class EN 13501-1: B1,d0,s1 – hardly flammable Weather-resistant, resistant to various chemicals and oils
<b>Max. fastening spacing</b>	0.5 m
<b>Cable types and cross-sections</b>	No restriction

#### Caution!

The use of photovoltaic cables over fire walls may require the approval of the local construction authorities. A positive special report is available.

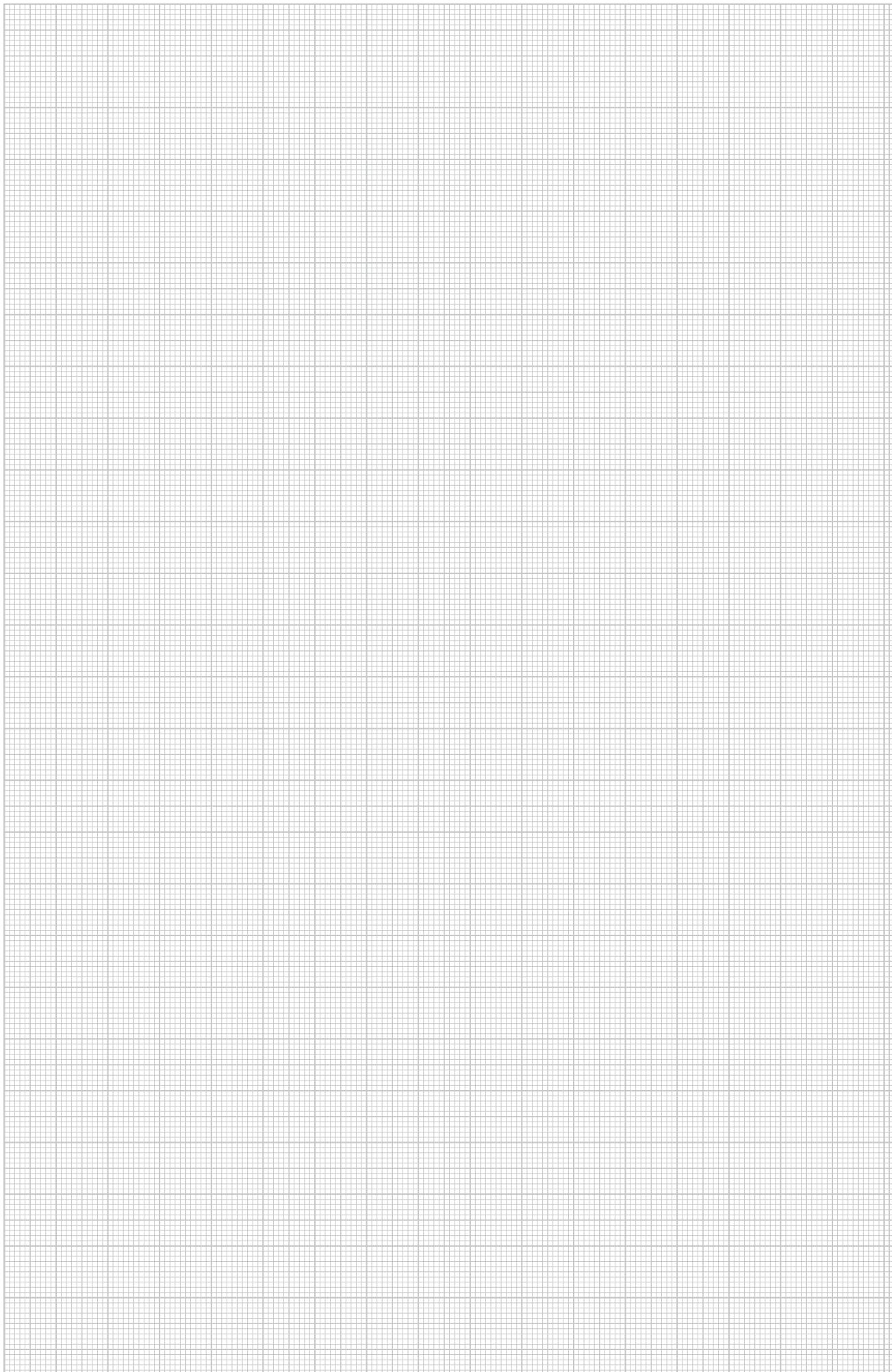
## Cable bandage for dry areas

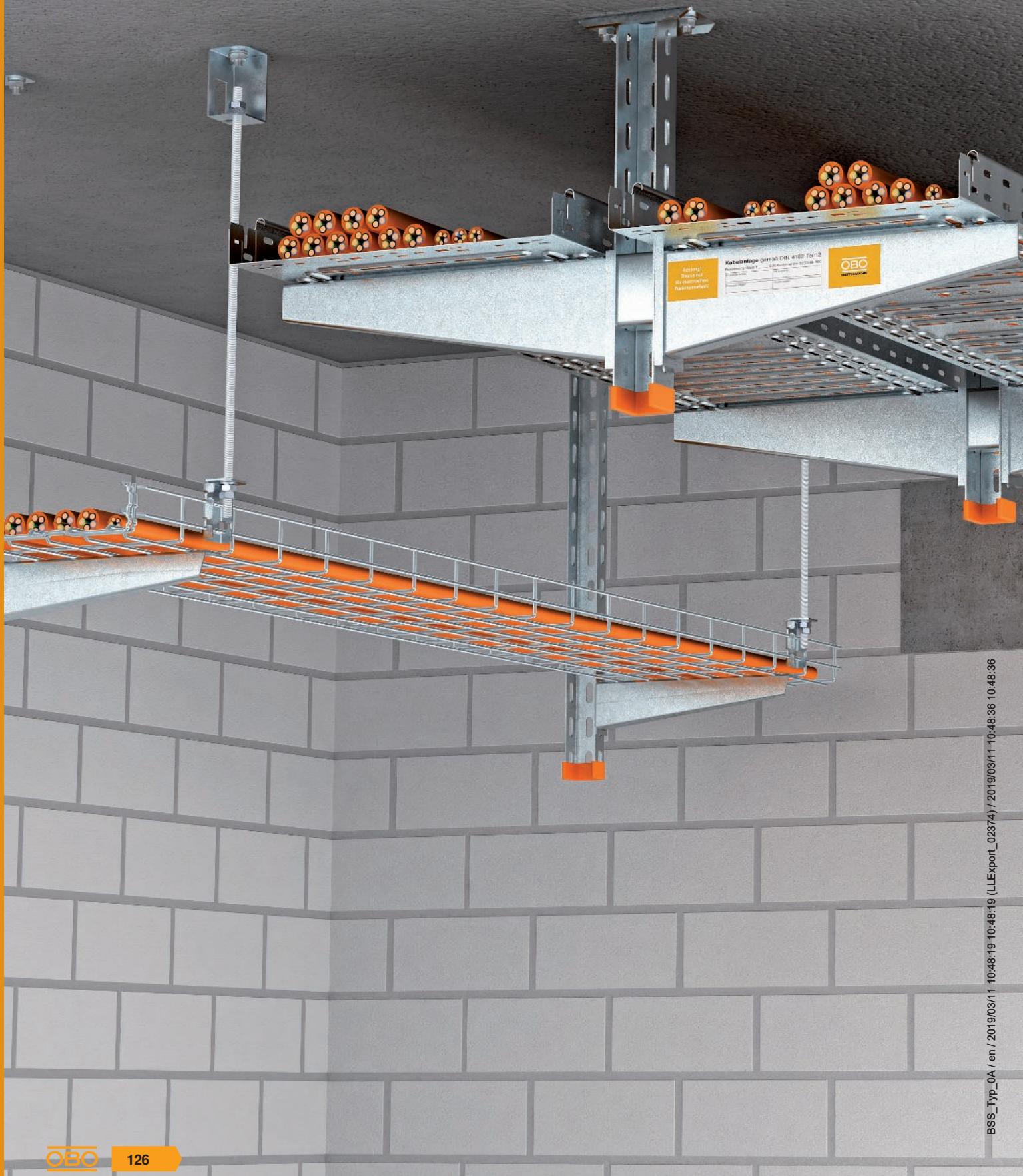


Type	Width mm	Length mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>FSB-WLS</b>	1100	10000	1	1,000.000	<b>7203170</b>

Intumescent material

Fire protection jacketing made of flexible mesh with fire protection coating to prevent fire spreading via cables and cable support systems. If there is a fire, the bandage only creates very little smoke, and is thus approved by the MBO building regulations as a measure for improved behaviour in case of fire in building classes 1 to 3. Hardly-flammable substance, according to EN 13501-1 - Class C-s2, d0). External side grey, internal side light grey. Can be moist wiped, use in interiors and wet rooms. One roll contains 11 m<sup>2</sup>, nominal thickness 0.7 mm.





## Maintaining electrical function – cable-specific support structures

<b>System description, RKS-Magic® cable tray</b>	128
<b>System description, mesh cable tray GR-Magic®</b>	132
<b>Products cable trays, mesh cable trays and mounting components</b>	136
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<b>System description, mesh cable tray GR-Magic® VA</b>	150
<b>Products cable trays, mesh cable trays and mounting components VA</b>	154

# Cable tray systems RKS-Magic®

## System description



The RKS-Magic® cable tray has been tested as a cable-specific support construction for the maintenance of electrical functionality according to DIN 4102 Part 12 and approved for the maintenance of electrical functionality classes E 30 to E 90. Threaded rod locking is not required at the tip of the bracket. This saves not just material but also considerably simplifies and speeds up the installation of cables. The screwless connection system allows interconnection of the RKS-Magic® cable trays without tools and in a particularly

quick and economic manner. To ensure the maintenance of electrical functionality, only the locking lugs in the base need to be bent after the trays have been connected. The double material thickness in the joint area and the beading in the base mean that the cable tray has a very high load capacity. The installation of fittings in the section route is permitted, as is the mounting of separating retainers.

# Cable tray systems RKS-Magic®

## Installation principle



Ceiling mounting on both sides with max. three layers (2+1).



One-sided arrangement with max. two layers.



Wall mounting.



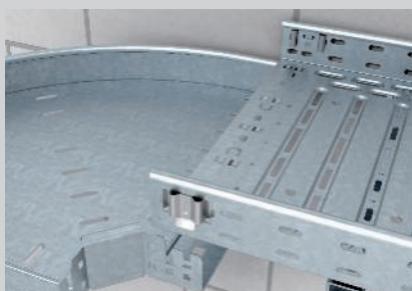
Creation of a straight connector through interconnection of the cable trays.



Bending the locking straps in the base.



Complete screwless joint connection.



Quick and simple fitting mounting with screwless Magic connection.



Separating retainer mounting with truss-head bolts.

Classification according to DIN 4102 Part 12

E30

E60

E90

# Cable tray systems RKS-Magic®

## Proof

### Maintenance of electrical functionality system according to DIN 4102 Part 12

<b>Routing type</b>	Cable-specific support construction
<b>Test certificate no.</b>	P-MPA-E-13-002
<b>Maintenance of electrical functionality classes</b>	E30 to E90
<b>Testing standard</b>	DIN 4102 Part 12
<b>Mounting variant</b>	Ceiling mounting with suspended support and bracket without threaded rod lock Wall mounting with bracket without threaded rod lock
<b>Material version</b>	Galvanised steel

### Support spacing for ceiling mounting with suspended support/bracket

Cable tray width	Cable load per cable tray				
100 mm	max. 20 kg/m	max. 1.50 m	max. 1.50 m	max. 1.50 m	max. 1.50 m
200 mm	max. 20 kg/m	max. 1.50 m	max. 1.50 m	max. 1.50 m	max. 1.50 m
300 mm	max. 20 kg/m	max. 1.50 m	max. 1.50 m	max. 1.50 m	max. 1.50 m
400 mm	max. 20 kg/m	max. 1.50 m	max. 1.50 m	max. 1.50 m	max. 1.50 m

### Support spacing for wall mounting with bracket

Cable tray width	Cable load per cable tray	
100 mm	max. 20 kg/m	max. 1.50 m
200 mm	max. 20 kg/m	max. 1.50 m
300 mm	max. 20 kg/m	max. 1.50 m
400 mm	max. 20 kg/m	max. 1.50 m

# Cable tray systems RKS-Magic®

## Components used

### Ceiling mounting with suspended support/bracket

Component	Type				
Cable tray	RKSM 6... FS	1	2	2	3
Support	US 5 K ... FT	1	1	1	1
Protective cap	US 5 KS OR	1	1	1	1
Wall and support brackets	AW 30 11 FT, AW 55 21 FT, ... 31 FT, ... 41 FT	1	2	2	3
Spacer	DSK 45	1	2	1	2
Hexagonal bolt	SKS 10x 90 F	1	2	1	2
Large washer	DIN440 11 F	1	2	0	1
Truss-head bolt	FRSB 6x 15 F	2	4	4	6

Choose the fastening anchors according to the substrate

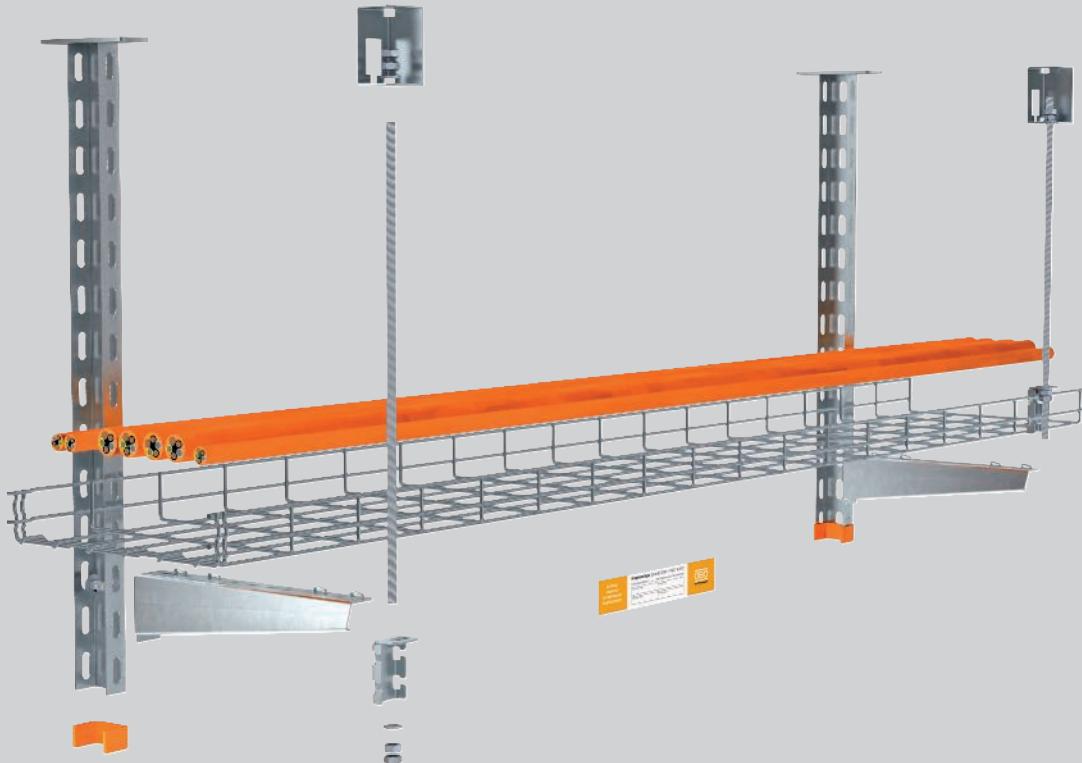
### Wall mounting with bracket

Component	Type	
Cable tray	RKSM 6... FS	1
Wall and support brackets	AW 30 11 FT, AW 55 21 FT, ... 31 FT, ... 41 FT	1
Truss-head bolt	FRSB 6x 15 F	2

Choose the fastening anchors according to the substrate

## GR-Magic® mesh cable trays

### System description



The GR-Magic® mesh cable tray has been tested as a cable-specific support construction for the maintenance of electrical functionality according to DIN 4102 Part 12 and approved for the maintenance of electrical functionality classes E 30 to E 90. The threaded rod lock is mounted directly on the tray rail, using the ABG connection component. This is just at-

tached to the side lengthwise wires of the mesh cable tray. When the threaded rod has been mounted, the component is secured against unintentional release. The screwless connection system of the GR-Magic® mesh cable trays ensures toolless, and thus particularly rapid and economic, mounting.

## GR-Magic® mesh cable trays

### Installation principle



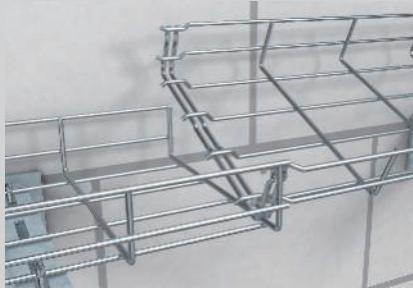
Ceiling mounting with brackets mounted on one side.



Ceiling mounting with brackets arranged on both sides.



Multi-layer wall mounting.



Interconnecting of two stock lengths of the mesh cable tray.



Finished screwless joint connection



Screwless mesh cable tray fastening on the bracket.



Screwless fastening of the connection component to the side wires.

Classification according to DIN 4102 Part 12

E30

E60

E90

# GR-Magic® mesh cable trays

## Proof

### Maintenance of electrical functionality system according to DIN 4102 Part 12

<b>Routing type</b>	Cable-specific support construction
<b>Test certificate no.</b>	P-MPA-E-12-011
<b>Maintenance of electrical functionality classes</b>	E30 to E90
<b>Testing standard</b>	DIN 4102 Part 12
<b>Mounting variant</b>	Ceiling mounting with suspended support and bracket with threaded rod lock Wall mounting with bracket and threaded rod lock
<b>Material version</b>	Galvanised steel

### Support spacing for ceiling mounting with suspended support/bracket

Cable tray width	Cable load per cable tray					
100 mm	max. 15 kg/m	max. 1.50 m	max. 1.50 m	max. 1.50 m	max. 1.50 m	max. 1.50 m
200 mm	max. 15 kg/m	max. 1.50 m	max. 1.50 m	max. 1.50 m	max. 1.50 m	max. 1.50 m
300 mm	max. 15 kg/m	max. 1.50 m	max. 1.50 m	max. 1.50 m	max. 1.50 m	max. 1.50 m
400 mm	max. 15 kg/m	max. 1.50 m	max. 1.50 m	max. 1.50 m	max. 1.50 m	max. 1.50 m

### Support spacing for wall mounting with bracket

Cable tray width	Cable load per cable tray			
100 mm	max. 15 kg/m	max. 1.50 m	max. 1.50 m	max. 1.50 m
200 mm	max. 15 kg/m	max. 1.50 m	max. 1.50 m	max. 1.50 m
300 mm	max. 15 kg/m	max. 1.50 m	max. 1.50 m	max. 1.50 m
400 mm	max. 15 kg/m	max. 1.50 m	max. 1.50 m	max. 1.50 m

## GR-Magic® mesh cable trays

### Components used

#### Ceiling mounting with suspended support/bracket

Component	Type					
Mesh cable tray	GRM 55 ... G	1	2	3	2	3
Support	US 3 K ... FT	1	1	1	1	1
Protective cap	US 3 KS OR	1	1	1	1	1
Wall and support brackets	AWG 15 ... FT	1	2	3	2	3
Truss-head bolt	FRS 10x 25 F	1	2	3	2	3
Connection component	ABG FT	1	2	3	2	3
Threaded rod	2078 M10 G	1	2	0	2	3
Threaded rod	2078 M12 G	0	0	3	0	0
Hexagonal nut	DIN 934 M10 G	4	5	0	8	9
Hexagonal nut	DIN 934 M12 G	0	0	6	0	0
Washer	966 M10 G	2	3	0	4	5
Washer	966 M12 G	0	0	4	0	0
Connection sleeve	12005 M10 G	0	1	0	0	1
Connection sleeve	12005 M12 G	0	0	2	0	0
Fire protection clamp	BSB	1	1	1	2	2

Choose the fastening anchors according to the substrate

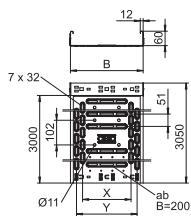
#### Wall mounting with bracket

Component	Type			
Mesh cable tray	GRM 55 ... G	1	2	3
Wall and support brackets	AWG 15 ... FT	1	2	3
Connection component	ABG FT	1	2	3
Threaded rod	2078 M10 G	1	2	0
Threaded rod	2078 M12 G	0	0	3
Hexagonal nut	DIN 934 M10 G	4	5	0
Hexagonal nut	DIN 934 M12 G	0	0	6
Washer	966 M10 G	2	3	0
Washer	966 M12 G	0	0	4
Connection sleeve	12005 M10 G	0	1	0
Connection sleeve	12005 M12 G	0	0	2
Fire protection clamp	BSB	1	1	1

Choose the fastening anchors according to the substrate

## Cable tray RKS-Magic®

### Cable tray RKS-Magic® 60



Type	Width mm	Plate thickness mm	Dimension B mm	Dimension x mm	Dimension y mm	Pack. m	Weight kg/100 m	Item No.
RKSM 610 FS	100	0.75	100	—	50	3	132.131	6047611
RKSM 620 FS	200	0.75	200	100	150	3	183.000	6047638
RKSM 630 FS	300	0.75	300	200	250	3	235.080	6047654
RKSM 640 FS	400	0.90	400	300	350	3	331.340	6047689
RKSM 610 FT	100	1.00	100	—	50	3	197.409	6047612
RKSM 620 FT	200	1.00	200	100	150	3	251.111	6047639
RKSM 630 FT	300	1.00	300	200	250	3	356.295	6047655
RKSM 640 FT	400	1.00	400	300	350	3	419.350	6047690

St Steel

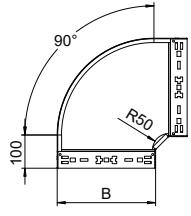
FS Strip-galvanised FT Hot-dip galvanised

Cable tray with integrated quick fastening system. The usable length of the cable tray is 3,000 mm.

The cable tray possesses continuous side perforations of 7 x 20 mm for the installation of additional connection and mounting components.

The perforation for direct threaded rod suspension has a diameter of 11 mm.

### 90° Magic bend



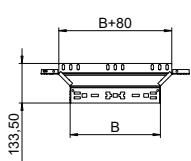
Type	Width mm	Dimension B mm	Pack. pcs	Weight kg/100 pcs.	Item No.
RBM 90 610 FS	100	100	1	65.700	6041130
RBM 90 620 FS	200	200	1	122.100	6041134
RBM 90 630 FS	300	300	1	192.800	6041136
RBM 90 640 FS	400	400	1	275.400	6041138
RBM 90 610 FT	100	100	1	70.700	6041150
RBM 90 620 FT	200	200	1	130.900	6041154
RBM 90 630 FT	300	300	1	206.800	6041156
RBM 90 640 FT	400	400	1	295.300	6041158

St Steel

FS Strip-galvanised FT Hot-dip galvanised

90° bend with quick connector system. For all cable tray types of 60 mm side height.

### Magic add-on tee



Type	Width mm	Dimension B mm	Pack. pcs	Weight kg/100 pcs.	Item No.
RAAM 610 FS	100	100	1	37.700	6041230
RAAM 620 FS	200	200	1	50.100	6041234
RAAM 630 FS	300	300	1	63.500	6041236
RAAM 640 FS	400	400	1	75.700	6041238
RAAM 610 FT	100	100	1	40.800	6041250
RAAM 620 FT	200	200	1	54.200	6041254
RAAM 630 FT	300	300	1	68.100	6041257
RAAM 640 FT	400	400	1	81.800	6041259

St Steel

FS Strip-galvanised FT Hot-dip galvanised

Magic add-on tee with quick connector system. For all cable tray types of 60 mm side height.

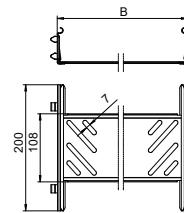
## Magic straight connector set FS

Type	Side height mm	Dimension B mm	Pack. pcs	Weight kg/100 pcs.	Item No.
KTSMV 610 FS	60	100	1	30.500	6068914
KTSMV 620 FS	60	200	1	37.200	6068918
KTSMV 630 FS	60	300	1	44.000	6068920
KTSMV 640 FS	60	400	1	50.700	6068922
KTSMV 610 DD	60	100	1	30.500	6068936
KTSMV 620 DD	60	200	1	37.200	6068940
KTSMV 630 DD	60	300	1	44.000	6068942
KTSMV 640 DD	60	400	1	50.700	6068944

SI Steel

FS Strip-galvanised DD Strip galvanised zinc/aluminium, Double Dip

Cable tray connector with quick fastening for the screwless connection of perforated cable trays with a side height of 60 mm.



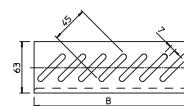
## Bottom end plate

Type	Width mm	Dimension B mm	Pack. pcs	Weight kg/100 pcs.	Item No.
BEB 100 FS	100	100	100	5.400	7083106
BEB 200 FS	200	200	100	11.400	7083203
BEB 300 FS	300	300	100	17.200	7083300
BEB 400 FS	400	400	100	23.100	7083408
BEB 100 DD	100	100	100	5.400	7083618
BEB 200 DD	200	200	100	11.400	7083626
BEB 300 DD	300	300	100	17.200	7083630
BEB 400 DD	400	400	100	23.100	7083634

SI Steel

FS Strip-galvanised DD Strip galvanised zinc/aluminium, Double Dip

Bottom end plate for floor reinforcement at the ends of the cable tray and as cable protection.

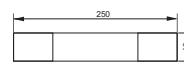


## Identification plate for function maintenance

Type	Language	Pack. pcs	Weight kg/100 pcs.	Item No.
KS-E EN	English	10	0.600	7205432

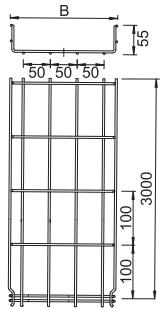
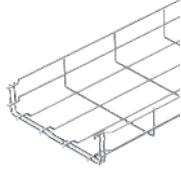
PVC Polyvinylchloride

Self-adhesive identification plate for approved cable system labelling for maintenance of electrical function as required by DIN 4102 part 12.



## Mesh cable tray GR-Magic®

### Mesh cable tray GRM 55



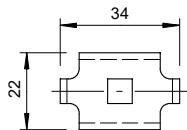
Type	Width mm	Wire Ø mm	Dimension B mm	Pack. m	Weight kg/100 m	Item No.
GRM 55 300 G	300	4.8	300	3	194.900	6001448
GRM 55 400 G	400	4.8	400	3	236.700	6001450

St Steel

G Electrogalvanised

Mesh cable tray with shaped connector of side height 55 mm.

### Clamping piece



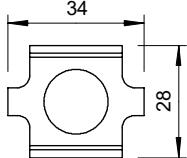
Type	Pack. pcs	Weight kg/100 pcs.	Item No.
GKS 34 G	20	2.000	6016855

St Steel

G Electrogalvanised

Clamp for fixing mesh cable trays to wall or support brackets.

### Connector



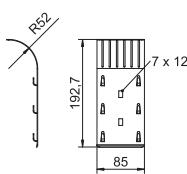
Type	Pack. pcs	Weight kg/100 pcs.	Item No.
GSV 34 G	20	3.000	6016596

St Steel

G Electrogalvanised

Screwed version of joint connector for mesh cable trays.

### Drop-out plate



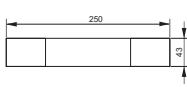
Type	Pack. pcs	Weight kg/100 pcs.	Item No.
KAB GR FS	10	14.100	6220139

St Steel

FS Strip-galvanised

Drop-out plate for mesh cable trays.

### Identification plate for function maintenance



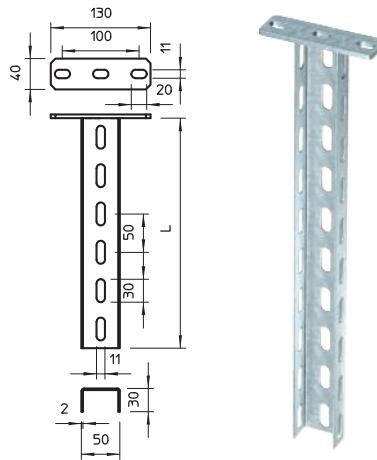
Type	Language	Pack. pcs	Weight kg/100 pcs.	Item No.
KS-E EN	English	10	0.600	7205432

PVC Polyvinylchloride

Self-adhesive identification plate for approved cable system labelling for maintenance of electrical function as required by DIN 4102 part 12.



## US 3 support



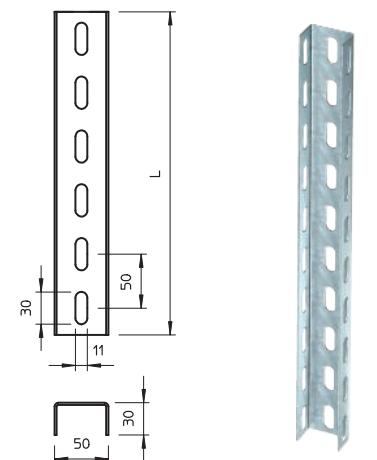
Type	Length mm	Material thickness mm	Dimension L mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>US 3 K 20 FT</b>	200	2	200	1	50.500	<b>6342351</b>
<b>US 3 K 30 FT</b>	300	2	300	1	64.400	<b>6342353</b>
<b>US 3 K 40 FT</b>	400	2	400	1	78.300	<b>6342355</b>
<b>US 3 K 50 FT</b>	500	2	500	1	92.300	<b>6342357</b>
<b>US 3 K 60 FT</b>	600	2	600	1	106.200	<b>6342359</b>
<b>US 3 K 70 FT</b>	700	2	700	1	120.200	<b>6342362</b>
<b>US 3 K 80 FT</b>	800	2	800	1	134.100	<b>6342364</b>
<b>US 3 K 90 FT</b>	900	2	900	1	147.800	<b>6342366</b>
<b>US 3 K 100 FT</b>	1000	2	1000	1	162.000	<b>6342368</b>
<b>US 3 K 110 FT</b>	1100	2	1100	1	175.900	<b>6342370</b>
<b>US 3 K 120 FT</b>	1200	2	1200	1	189.900	<b>6342372</b>

St Steel

FT Hot-dip galvanised

Suspended support (U profile) of dimensions 50 x 30 mm with welded head plate.

## US 3 support



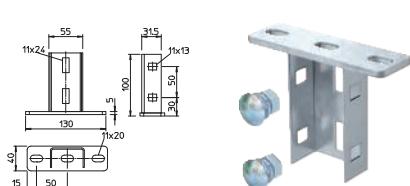
Type	Dimension L mm	Material thickness mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>US 3 20 FS</b>	200	2	1	27.000	<b>6342302</b>
<b>US 3 30 FS</b>	300	2	1	40.000	<b>6342304</b>
<b>US 3 40 FS</b>	400	2	1	53.000	<b>6342306</b>
<b>US 3 50 FS</b>	500	2	1	67.000	<b>6342308</b>
<b>US 3 60 FS</b>	600	2	1	80.000	<b>6342310</b>
<b>US 3 70 FS</b>	700	2	1	93.000	<b>6342312</b>
<b>US 3 80 FS</b>	800	2	1	107.000	<b>6342314</b>
<b>US 3 90 FS</b>	900	2	1	120.000	<b>6342316</b>
<b>US 3 100 FS</b>	1000	2	1	133.000	<b>6342318</b>

St Steel

FS Strip-galvanised

U support in fixed lengths. Dimensions 30 x 50 mm.

## Head plate



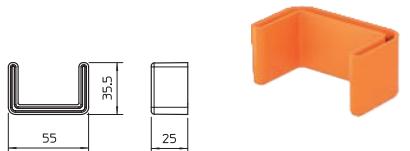
Type	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>KU 3 FT</b>	10	46.800	<b>6348874</b>

St Steel

FT Hot-dip galvanised

Head plate for mounting on US 3 supports.

## End cap



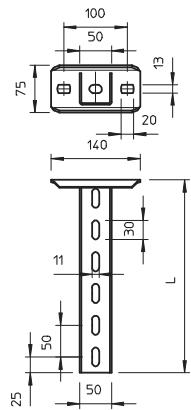
Type	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>US 3 KS OR</b>   Pastel orange	20	1.068	<b>6338458</b>

PE Polyethylene

End cap to cover the ends of US 3 supports.

## Mounting systems

### US 5 support



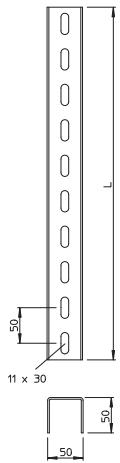
Type	Length mm	Material thickness mm	Dimension L mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>US 5 K 20 FT</b>	200	2.5	200	1	85.000	<b>6341527</b>
<b>US 5 K 30 FT</b>	300	2.5	300	1	110.000	<b>6341535</b>
<b>US 5 K 40 FT</b>	400	2.5	400	1	136.000	<b>6341543</b>
<b>US 5 K 50 FT</b>	500	2.5	500	1	161.000	<b>6341551</b>
<b>US 5 K 60 FT</b>	600	2.5	600	1	185.000	<b>6341578</b>
<b>US 5 K 70 FT</b>	700	2.5	700	1	210.000	<b>6341586</b>
<b>US 5 K 80 FT</b>	800	2.5	800	1	236.000	<b>6341594</b>
<b>US 5 K 90 FT</b>	900	2.5	900	1	261.000	<b>6341608</b>
<b>US 5 K 100 FT</b>	1000	2.5	1000	1	286.000	<b>6341616</b>
<b>US 5 K 110 FT</b>	1100	2.5	1100	1	311.000	<b>6341624</b>
<b>US 5 K 120 FT</b>	1200	2.5	1200	1	337.000	<b>6341632</b>

St Steel

FT Hot-dip galvanised

U support of dimensions 50 x 50 mm with welded head plate.

### US 5 support



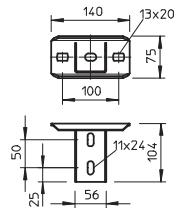
Type	Length mm	Material thickness mm	Dimension L mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>US 5 20 FT</b>	200	2.5	200	1	51.000	<b>6340881</b>
<b>US 5 30 FT</b>	300	2.5	300	1	79.000	<b>6340903</b>
<b>US 5 40 FT</b>	400	2.5	400	1	106.000	<b>6340911</b>
<b>US 5 50 FT</b>	500	2.5	500	1	133.000	<b>6340938</b>
<b>US 5 60 FT</b>	600	2.5	600	1	160.000	<b>6340946</b>
<b>US 5 70 FT</b>	700	2.5	700	1	175.000	<b>6340950</b>
<b>US 5 80 FT</b>	800	2.5	800	1	200.000	<b>6340954</b>
<b>US 5 90 FT</b>	900	2.5	900	1	227.000	<b>6340958</b>
<b>US 5 100 FT</b>	1000	2.5	1000	1	265.000	<b>6340962</b>
<b>US 5 150 FT</b>	1500	2.5	1500	1	395.000	<b>6340966</b>
<b>US 5 200 FT</b>	2000	2.5	2000	1	506.000	<b>6340970</b>

St Steel

FT Hot-dip galvanised

U support in fixed lengths. Dimensions 50 x 50 mm.

### Head plate US 5



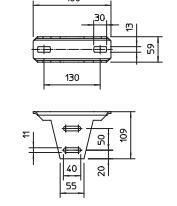
Type	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>KUS 5 FT</b>	10	61.000	<b>6348904</b>

St Steel

FT Hot-dip galvanised

Head plate for installation in US 5 support.

### Head plate, variable FT



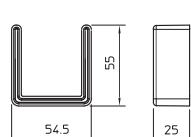
Type	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>KU 5 V FT</b>	4	82.000	<b>6348920</b>

St Steel

FT Hot-dip galvanised

Variable head plate for installation on US 5 support.

### End cap



Type	Colour	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>US 5 KS OR</b>	Pastel orange	20	1.300	<b>6338462</b>

PE Polyethylene

End cap to cover the ends of US 5 supports.

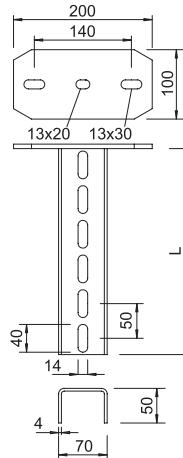
**US 7 support**

Type	Length mm	Material thickness mm	Dimension L mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>US 7 K 20 FT</b>	200	4	200	1	177.000	<b>6339018</b>
<b>US 7 K 30 FT</b>	300	4	300	1	218.000	<b>6339034</b>
<b>US 7 K 40 FT</b>	400	4	400	1	261.000	<b>6339050</b>
<b>US 7 K 50 FT</b>	500	4	500	1	302.000	<b>6339077</b>
<b>US 7 K 60 FT</b>	600	4	600	1	344.000	<b>6339093</b>
<b>US 7 K 70 FT</b>	700	4	700	1	387.000	<b>6339115</b>
<b>US 7 K 80 FT</b>	800	4	800	1	418.000	<b>6339131</b>
<b>US 7 K 90 FT</b>	900	4	900	1	470.000	<b>6339166</b>
<b>US 7 K 100 FT</b>	1000	4	1000	1	499.000	<b>6339182</b>
<b>US 7 K 110 FT</b>	1100	4	1100	1	550.000	<b>6339190</b>
<b>US 7 K 120 FT</b>	1200	4	1200	1	591.000	<b>6339204</b>
<b>US 7 K 130 FT</b>	1300	4	1300	1	636.000	<b>6339212</b>
<b>US 7 K 140 FT</b>	1400	4	1400	1	675.000	<b>6339220</b>
<b>US 7 K 150 FT</b>	1500	4	1500	1	718.000	<b>6339239</b>
<b>US 7 K 160 FT</b>	1600	4	1600	1	760.000	<b>6339247</b>
<b>US 7 K 170 FT</b>	1700	4	1700	1	802.000	<b>6339255</b>
<b>US 7 K 180 FT</b>	1800	4	1800	1	843.000	<b>6339263</b>
<b>US 7 K 190 FT</b>	1900	4	1900	1	884.000	<b>6339271</b>
<b>US 7 K 200 FT</b>	2000	4	2000	1	927.000	<b>6339298</b>

St Steel

FT Hot-dip galvanised

Suspended support (U profile) of dimensions 70 x 50 mm with welded head plate.

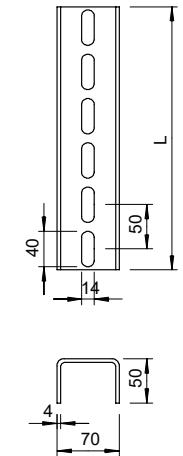
**US 7 support**

Type	Length mm	Material thickness mm	Dimension L mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>US 7 20 FT</b>	200	4	200	1	81.000	<b>6340016</b>
<b>US 7 30 FT</b>	300	4	300	1	121.000	<b>6340032</b>
<b>US 7 40 FT</b>	400	4	400	1	166.000	<b>6340059</b>
<b>US 7 50 FT</b>	500	4	500	1	208.000	<b>6340075</b>
<b>US 7 60 FT</b>	600	4	600	1	249.000	<b>6340091</b>
<b>US 7 70 FT</b>	700	4	700	1	290.000	<b>6340113</b>
<b>US 7 80 FT</b>	800	4	800	1	323.000	<b>6340148</b>
<b>US 7 90 FT</b>	900	4	900	1	370.000	<b>6340164</b>
<b>US 7 100 FT</b>	1000	4	1000	1	416.000	<b>6340180</b>
<b>US 7 110 FT</b>	1100	4	1100	1	457.000	<b>6340199</b>
<b>US 7 120 FT</b>	1200	4	1200	1	484.000	<b>6340202</b>
<b>US 7 130 FT</b>	1300	4	1300	1	540.000	<b>6340210</b>
<b>US 7 140 FT</b>	1400	4	1400	1	580.000	<b>6340229</b>
<b>US 7 150 FT</b>	1500	4	1500	1	620.000	<b>6340237</b>
<b>US 7 160 FT</b>	1600	4	1600	1	660.000	<b>6340245</b>
<b>US 7 180 FT</b>	1800	4	1800	1	750.000	<b>6340261</b>
<b>US 7 190 FT</b>	1900	4	1900	1	790.000	<b>6340288</b>
<b>US 7 200 FT</b>	2000	4	2000	1	803.700	<b>6340296</b>

St Steel

FT Hot-dip galvanised

U support in fixed lengths. Dimensions 70 x 50 mm.

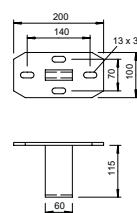
**US 7 support**

Type	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>KU 7 FT</b>	10	148.000	<b>6349102</b>

St Steel

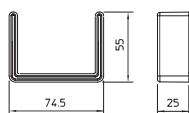
FT Hot-dip galvanised

Light-duty head plate for mounting on US 7 support.

**Head plate for US 7 support**

## Mounting systems

### End cap

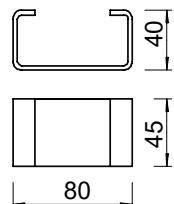


Colour	Pack. pcs	Weight kg/100 pcs.	Item No.
US 7 KS OR   Pastel orange	20	1.806	6338497

PE Polyethylene

End cap to cover the ends of US 7 supports.

### Spacer



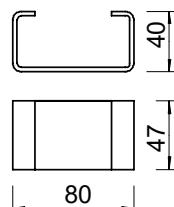
Pack. pcs	Weight kg/100 pcs.	Item No.
DSK 45 FT	20	18.000

St Steel

FT Hot-dip galvanised

Spacer for use in U 5 support and in the head plate, type KU 7 VQP.

### Spacer



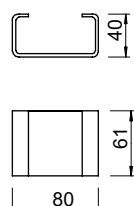
Pack. pcs	Weight kg/100 pcs.	Item No.
DSK 47 FT	20	19.000

St Steel

FT Hot-dip galvanised

Spacer for use in head plate, type KU 5 V.

### Spacer



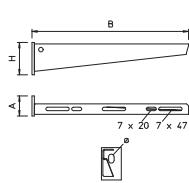
Pack. pcs	Weight kg/100 pcs.	Item No.
DSK 61 FT	20	25.000

St Steel

FT Hot-dip galvanised

Spacer for use in U 7 supports.

### Wall and support bracket AW 15



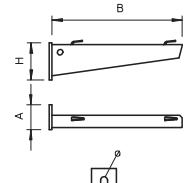
Type	Width mm	Dimen- sion H mm	Dimen- sion A mm	Dimen- sion B mm	Hole Ø mm	Pack. pcs	Weight kg/100 pcs.	Item No.
AW 15 21 FT	210	60	40	210	11	30	24.000	6420680
AW 15 31 FT	310	65	40	310	11	30	39.900	6420710
AW 15 41 FT	410	70	40	410	11	30	54.000	6420745

St Steel

FT Hot-dip galvanised

Light-duty wall and support bracket with welded head plate.

### Wall and support bracket AWG 15



Type	Width mm	Dimen- sion H mm	Dimen- sion A mm	Dimen- sion B mm	Hole Ø mm	Pack. pcs	Weight kg/100 pcs.	Item No.
AW G 15 21 FT	210	60	40	210	11	30	26.000	6420608
AW G 15 31 FT	310	65	40	310	11	30	35.000	6420610
AW G 15 41 FT	410	70	40	410	11	30	56.000	6420612

St Steel

FT Hot-dip galvanised

Light-duty wall and support bracket with welded head plate for screwless mesh cable tray fastening.

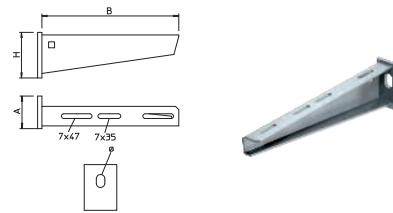
## Wall and support bracket AW 30

Type	Width mm	Dimen- sion H mm	Dimen- sion A mm	Dimen- sion B mm	Hole Ø mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>AW 30 11 FT</b>	110	60	50	110	11	1	22.000	<b>6419704</b>

St Steel

FT Hot-dip galvanised

Medium-duty wall and support bracket with welded head plate.



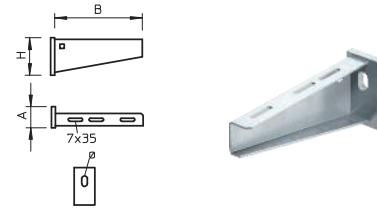
## Wall and support bracket AW 55

Type	Dimen- sion B mm	Dimen- sion H mm	Dimen- sion A mm	Hole Ø mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>AW 55 21 FT</b>	210	90	50	13.5	1	77.000	<b>6418554</b>
<b>AW 55 31 FT</b>	310	110	50	13.5	1	123.000	<b>6418570</b>
<b>AW 55 41 FT</b>	410	130	50	13.5	1	167.000	<b>6418597</b>

St Steel

FT Hot-dip galvanised

Heavy-duty wall and support bracket with welded head plate.



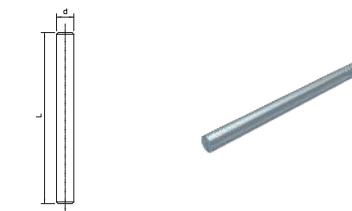
## Threaded rod

Type	Thread	Dimen- sion d mm	Dimen- sion L mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>TR M10 1M G</b>	M10	10	1000	10	49.000	<b>3141209</b>
<b>TR M12 1M G</b>	M12	12	1000	10	62.000	<b>3141306</b>

St Steel

G Electrogalvanised

Threaded rod to DIN 976.



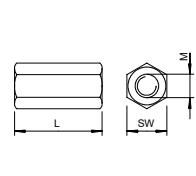
## Connection sleeve

Type	Thread	Dimen- sion L mm	SW mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>CSTR M10 G</b>	M10	30	17	50	4.150	<b>6410103</b>
<b>CSTR M12 G</b>	M12	40	19	25	7.000	<b>6410111</b>

St Steel

G Electrogalvanised

Connection sleeve with continuous internal thread.



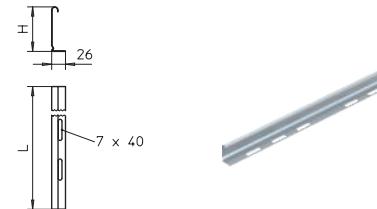
## Barrier strip 45

Type	Dimen- sion H mm	Plate thickness mm	Dimen- sion L mm	Pack. m	Weight kg/100 m	Item No.
<b>TSG 45 FS</b>	45	0.75	3000	3	46.700	<b>6062033</b>

St Steel

FS Strip-galvanised

Separating retainer for separation of cables of different voltages or functions.

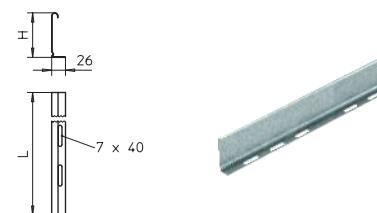


Type	Dimen- sion H mm	Plate thickness mm	Dimen- sion L mm	Pack. m	Weight kg/100 m	Item No.
<b>TSG 60 FS</b>	60	0.75	3000	3	55.700	<b>6062068</b>

St Steel

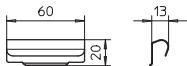
FS Strip-galvanised

Separating retainer for separation of cables of different voltages or functions.



## Mounting systems

### Separating retainer connector



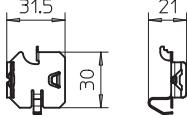
## Type

**TSGV A2**

V2A Stainless steel, A2

Separating retainer connector for screwless connection of the TSG separating retainer in all side heights.

Pack. pcs	Weight kg/100 pcs.	<b>Item No.</b>
10	0.923	<b>6067970</b>



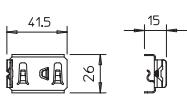
## Type

**KS KR A2**

V2A Stainless steel, A2

Clamping piece for screwless fastening of separating retainer in the cable tray types RKSM, MKS and SKS.

Pack. pcs	Weight kg/100 pcs.	<b>Item No.</b>
30	0.537	<b>6062280</b>



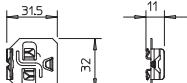
## Type

**KS GR A2**

V2A Stainless steel, A2

Hold-down clamp for fastening separating retainer in mesh cable trays.

Pack. pcs	Weight kg/100 pcs.	<b>Item No.</b>
30	0.830	<b>6062282</b>



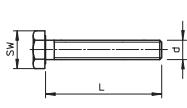
## Type

**KS KL A2**

V2A Stainless steel, A2

Hold-down clamp for screwless fastening of separating retainer in cable ladders.

Pack. pcs	Weight kg/100 pcs.	<b>Item No.</b>
30	0.512	<b>6062284</b>



## Type

**SKS 10x80 F**

St. Steel

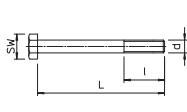
F Hot-dip galvanised

Hexagonal bolt for universal fixing of structure components.

Type	Dimension mm	Dimension L mm	Dimension d mm	SW mm
<b>SKS 10x80 F</b>	M10 x 80	80	10	17
<b>SKS 10x90 F</b>	M10 x 90	90	10	17

Pack. pcs	Weight kg/100 pcs.	<b>Item No.</b>
20	7.700	<b>6418250</b>
20	7.800	<b>6418252</b>

### Hexagonal bolt with hexagonal nut, washer and tooth lock washer



## Type

**SKS 12x80 F**

St. Steel

F Hot-dip galvanised

Hexagonal bolt with hexagonal nut, washer and tooth lock washer.

Type	Dimension mm	Dimension L mm	Dimension I mm	Dimension d mm	SW mm
<b>SKS 12x80 F</b>	M12 x 80	80	30	12	19
<b>SKS 12x100 F</b>	M12 x 100	100	30	12	19
<b>SKS 12x110 F</b>	M12 x 110	110	30	12	19

Pack. pcs	Weight kg/100 pcs.	<b>Item No.</b>
20	11.800	<b>6418287</b>
20	12.600	<b>6418295</b>
20	14.500	<b>6418317</b>



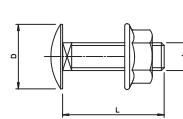
## Truss-head bolt with flange nut

Type	Dimension mm	Dimension L mm	Dimension D mm	Dimension d mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>FRSB 6x12 F</b>	M 6 x 12	12	13.5	6	100	0.990	<b>6406122</b>
<b>FRSB 6x20 F</b>	M 6 x 20	20	13.5	6	100	1.000	<b>6406203</b>

St Steel

F Hot-dip galvanised

Truss-head bolt with square neck including flange nut.



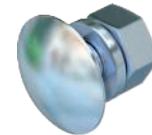
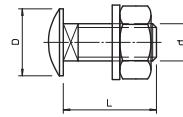
## Truss-head bolt with nut and washer

Type	Dimension mm	Dimension L mm	Dimension D mm	Dimension d mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>FRS 10x25 F</b>	M 10 x 25	25	24	10	50	4.500	<b>6407528</b>

St Steel

F Hot-dip galvanised

Truss-head bolt with square neck. With washer and hexagonal nut.



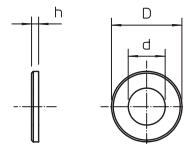
## Large washer

Type	Dimension D mm	Dimension d mm	Dimension h mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>DIN440 11 F</b>	34	11	3	100	1.985	<b>6408729</b>
<b>DIN440 14 F</b>	44	13.5	4	50	4.736	<b>6408737</b>

St Steel

F Hot-dip galvanised

Washer of particularly large outer diameter.



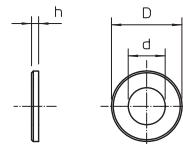
## Washer

Type	Thread	Dimension d mm	Dimension D mm	Dimension h mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>WS M10 D20 G</b>	M10	10.5	20	2	100	0.408	<b>3402096</b>
<b>WS M12 D24 G</b>	M12	13	24	2.5	100	0.627	<b>3402126</b>

St Steel

G Electrogalvanised

Washer according to DIN 125, shape A, for universal use.



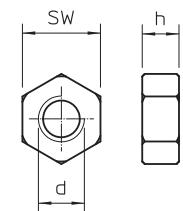
## Hexagonal nut DIN 934

Type	Thread	Dimension SW mm	Dimension h mm	Dimension d mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>HN M10 G</b>	M10	17	8.4	10	100	1.084	<b>3400107</b>
<b>HN M12 G</b>	M12	19	10.8	12	100	1.730	<b>3400123</b>

St Steel

G Electrogalvanised

Hexagonal nut to DIN 934 with metric thread.



## Cable trays, RKS-Magic® VA System description



The RKS-Magic® cable tray has been tested as a cable-specific support construction for the maintenance of electrical functionality according to DIN 4102 Part 12 and approved for the maintenance of electrical functionality classes E 30 to E 90. Threaded rod locking is not required at the tip of the bracket. This saves not just material but also considerably simplifies and speeds up the installation of cables. The screwless connection system allows interconnection of the RKS-Magic® cable trays without tools and in a particularly

quick and economic manner. To ensure the maintenance of electrical functionality, only the locking lugs in the base need to be bent after the trays have been connected. The double material thickness in the joint area and the beading in the base mean that the cable tray has a very high load capacity. The installation of fittings in the section route is permitted, as is the mounting of separating retainers.

# Cable trays, RKS-Magic® VA

## Installation principle



Single-layer ceiling mounting with suspension clamp.



Mounting under sloping ceiling with individually adapted suspension clamp.



Two-layer ceiling mounting with suspension clamp and intermediate clamp.



Two-layer ceiling mounting with suspension clamp and extension.



Fastening of the cable tray with truss-head bolts.



Joint connection without additional gland.

Classification according to DIN 4102 Part 12

E30

E60

E90

# Cable trays, RKS-Magic® VA Proof

## Maintenance of electrical functionality system according to DIN 4102 Part 12

<b>Routing type</b>	Cable-specific support construction
<b>Test certificate no.</b>	P-MPA-E-12-003
<b>Maintenance of electrical functionality classes</b>	E30 to E90
<b>Testing standard</b>	DIN 4102 Part 12
<b>Mounting variant</b>	Ceiling mounting with suspension clamp
<b>Material version</b>	Rustproof steel

## Support spacing for ceiling mounting with suspension clamp

Cable tray width	Cable load per cable tray		
100 mm	max. 30 kg/m	max. 1.50 m	max. 1.50 m
200 mm	max. 30 kg/m	max. 1.50 m	max. 1.50 m
300 mm	max. 30 kg/m	max. 1.50 m	max. 1.50 m
400 mm	max. 30 kg/m	max. 1.50 m	max. 1.50 m

## Cable trays, RKS-Magic® VA

### Components used

#### Ceiling mounting with suspension clamp

Component	Type		
Cable tray	RKSM 6... VA4571	1	2
Suspension clamp	AHB-T	1	1
Truss-head bolt	FRSB 6x12 A4	2	4
Intermediate clamp	AHB-TZ	0	1
Truss-head bolt	FRSB 6x16 A4	0	2

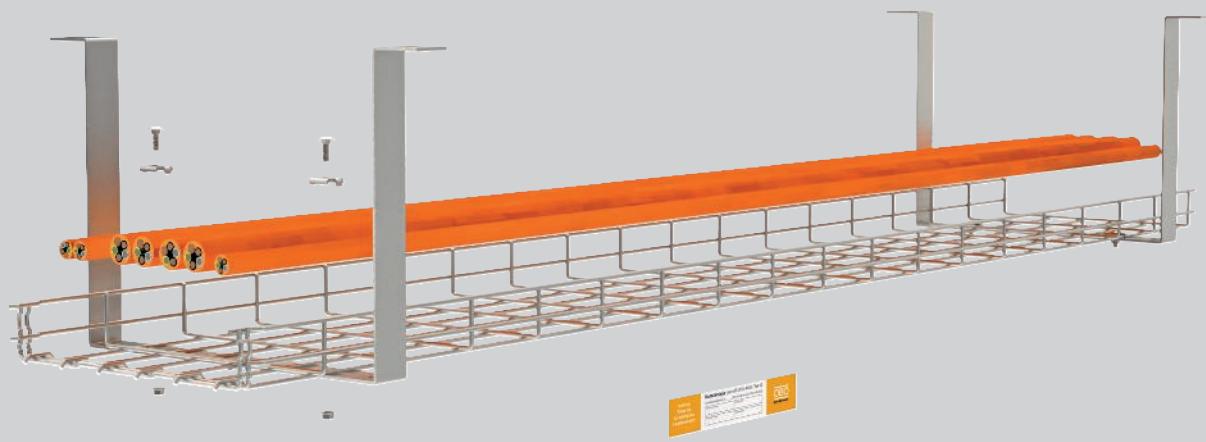
Choose the fastening anchors according to the substrate

Intermediate clamp AHB-TZ on request



## GR-Magic® mesh cable trays VA

### System description



The GR-Magic® mesh cable tray, made from rust-proof steel, has been tested as a cable-specific support structure for the maintenance of electrical functionality according to DIN 4102 Part 12 and approved for the maintenance of electrical functionality classes E 30 to E 90. The rustproof steel version permits mounting in areas with more aggressive ambient conditions. The design of the AHB-T suspension clamp means that it can be mounted on straight, slanting or curved ceilings, thus allowing simple, space-saving in-

stallation of the mesh cable tray. The benefits of the screwless connection systems of the GR-Magic® mesh cable trays also apply to this routing type. This makes mounting of mesh cable trays, for example in the installation of long sections in increased corrosion protection requirements, an economically viable routing variant. With this system, the mounting of separating retainers and lids is permitted.

## GR-Magic® mesh cable trays VA

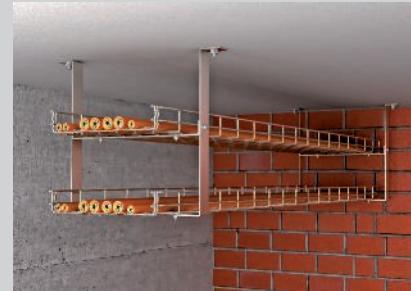
### Installation principle



Single-layer ceiling mounting with suspension clamp.



Mounting under sloping ceiling with individually adapted suspension clamp.



Two-layer ceiling mounting with suspension clamp and intermediate clamp.



Two-layer ceiling mounting with suspension clamp and extension.



Fastening of the mesh cable tray with clamping piece and truss-head bolts.



Joint connection without additional gland.

Classification according to DIN 4102 Part 12

E30

E60

E90

# GR-Magic® mesh cable trays VA

## Proof

### Maintenance of electrical functionality system according to DIN 4102 Part 12

Routing type	Cable-specific support construction
Test certificate no.	P-MPA-E-12-003
Maintenance of electrical functionality classes	E30 to E90
Testing standard	DIN 4102 Part 12
Mounting variant	Ceiling mounting with suspension clamp
Material version	Rustproof steel

### Support spacing for ceiling mounting with suspension clamp

Cable tray width	Cable load per cable tray		
100 mm	max. 20 kg/m	max. 1.50 m	max. 1.50 m
200 mm	max. 20 kg/m	max. 1.50 m	max. 1.50 m
300 mm	max. 20 kg/m	max. 1.50 m	max. 1.50 m
400 mm	max. 20 kg/m	max. 1.50 m	max. 1.50 m

## GR-Magic® mesh cable trays VA

### Components used

#### Ceiling mounting with suspension clamp

Component	Type		
Mesh cable tray	GRM 55 ... VA4401	1	2
Suspension clamp	AHB-T	1	1
Clamping piece	GKS 34 VA4401	2	4
Intermediate clamp	AHB-TZ	0	1
Truss-head bolt	FRSB 6x16 A4	0	2

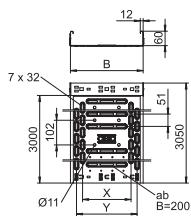
Choose the fastening anchors according to the substrate

Intermediate clamp AHB-TZ on request



## Cable tray RKS-Magic® VA

### Cable tray RKS-Magic® 60



Type	Width mm	Plate thickness mm	Dimension B mm	Dimension x mm	Dimension y mm	Pack. m	Weight kg/100 m	Item No.
RKSM 610 A2	100	0.75	100	—	50	3	132.130	6047613
RKSM 620 A2	200	0.75	200	100	150	3	180.000	6047640
RKSM 630 A2	300	0.75	300	200	250	3	237.700	6047656
RKSM 610 A4	100	0.75	100	—	50	3	132.130	6047614
RKSM 620 A4	200	0.75	200	100	150	3	180.000	6047641
RKSM 630 A4	300	0.75	300	200	250	3	237.700	6047657

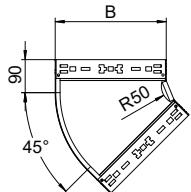
V2A Stainless steel, A2 V4A Stainless steel, A4

Cable tray with integrated quick fastening system. The usable length of the cable tray is 3,000 mm.

The cable tray possesses continuous side perforations of 7 x 20 mm for the installation of additional connection and mounting components.

The perforation for direct threaded rod suspension has a diameter of 11 mm.

### 45° Magic bend

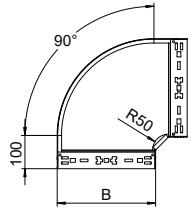


Type	Width mm	Dimension B mm	Pack. pcs	Weight kg/100 pcs.	Item No.
RBM 45 610 A2	100	100	1	50.400	6041080
RBM 45 620 A2	200	200	1	86.000	6041084
RBM 45 630 A2	300	300	1	128.300	6041086

V2A Stainless steel, A2

45° bend with quick connector system. For all cable tray types of 60 mm side height.

### 90° Magic bend

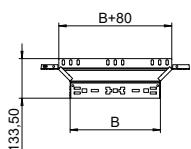


Type	Width mm	Dimension B mm	Pack. pcs	Weight kg/100 pcs.	Item No.
RBM 90 610 A2	100	100	1	65.700	6041180
RBM 90 620 A2	200	200	1	122.100	6041184
RBM 90 630 A2	300	300	1	192.800	6041186

V2A Stainless steel, A2

90° bend with quick connector system. For all cable tray types of 60 mm side height.

### Magic add-on tee

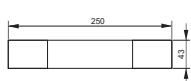


Type	Width mm	Dimension B mm	Pack. pcs	Weight kg/100 pcs.	Item No.
RAAM 610 A2	100	100	1	37.700	6041270
RAAM 620 A2	200	200	1	50.100	6041275
RAAM 630 A2	300	300	1	63.500	6041277

V2A Stainless steel, A2

Add-on tee with quick connector system. For all cable tray types of 60 mm side height.

### Identification plate for function maintenance



Type	Language	Pack. pcs	Weight kg/100 pcs.	Item No.
KS-E EN	English	10	0.600	7205432

PVC Polyvinylchloride

Self-adhesive identification plate for approved cable system labelling for maintenance of electrical function as required by DIN 4102 part 12.

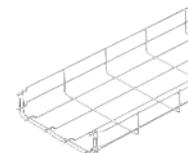
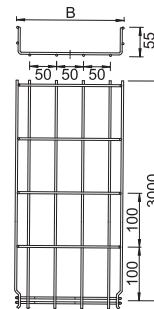
## Mesh cable tray GR-Magic® 55

Type	Width mm	Wire Ø mm	Dimension B mm	Pack. m	Weight kg/100 m	Item No.
<b>GRM 55 300 A2</b>	300	4.8	300	3	191.100	<b>6001078</b>

V2A Stainless steel, A2

GB Stained

Mesh cable tray with shaped connector of side height 55 mm.

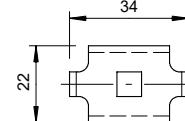


## Clamping piece

Type	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>GKS 34 A2</b>	20	2.000	<b>6016839</b>

V2A Stainless steel, A2

Hold-down clamp for fixing mesh cable trays to wall or support brackets.

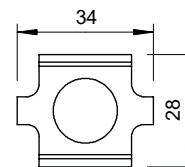


## Joint connector

Type	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>GSV 34 A2</b>	20	3.000	<b>6016642</b>

V2A Stainless steel, A2

Screwed version of joint connector for mesh cable trays.

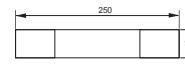


## Identification plate for function maintenance

Type	Language	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>KS-E EN</b>	English	10	0.600	<b>7205432</b>

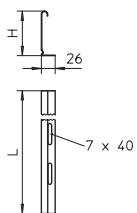
PVC Polyvinylchloride

Self-adhesive identification plate for approved cable system labelling for maintenance of electrical function as required by DIN 4102 part 12.



## Mounting systems, VA

### Barrier strip 45

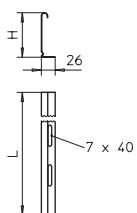


Type	Dimen- sion H mm	Plate thickness mm	Dimen- sion L mm	Pack. m	Weight kg/100 m	Item No.
TSG 45 A2	45	0.75	3000	3	47.000	6062025

V2A Stainless steel, A2

Separating retainer for separation of cables of different voltages or functions.

### Barrier strip 60

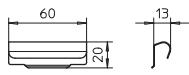


Type	Dimen- sion H mm	Plate thickness mm	Dimen- sion L mm	Pack. m	Weight kg/100 m	Item No.
TSG 60 A2	60	0.75	3000	3	55.000	6062084

V2A Stainless steel, A2

Separating retainer for separation of cables of different voltages or functions.

### Separating retainer connector

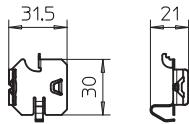


Type	Pack. pcs	Weight kg/100 pcs.	Item No.
TSGV A2	10	0.923	6067970

V2A Stainless steel, A2

Separating retainer connector for screwless connection of the TSG separating retainer in all side heights.

### Hold-down clamp for separating retainer fastening in RKSM

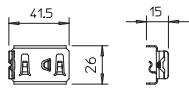


Type	Pack. pcs	Weight kg/100 pcs.	Item No.
KS KR A2	30	0.537	6062280

V2A Stainless steel, A2

Clamping piece for screwless fastening of separating retainer in the cable tray types RKSM, MKS and SKS.

### Hold-down clamp for separating retainer fastening

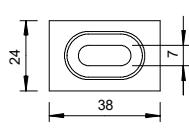


Type	Pack. pcs	Weight kg/100 pcs.	Item No.
KS GR A2	30	0.830	6062282

V2A Stainless steel, A2

Hold-down clamp for fastening separating retainer in mesh cable trays.

### Hold-down clamp



Type	Pack. pcs	Weight kg/100 pcs.	Item No.
GKT 38 A2	20	2.200	6017045

V2A Stainless steel, A2

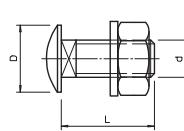
Clamp for fastening barrier strip in mesh cable trays.

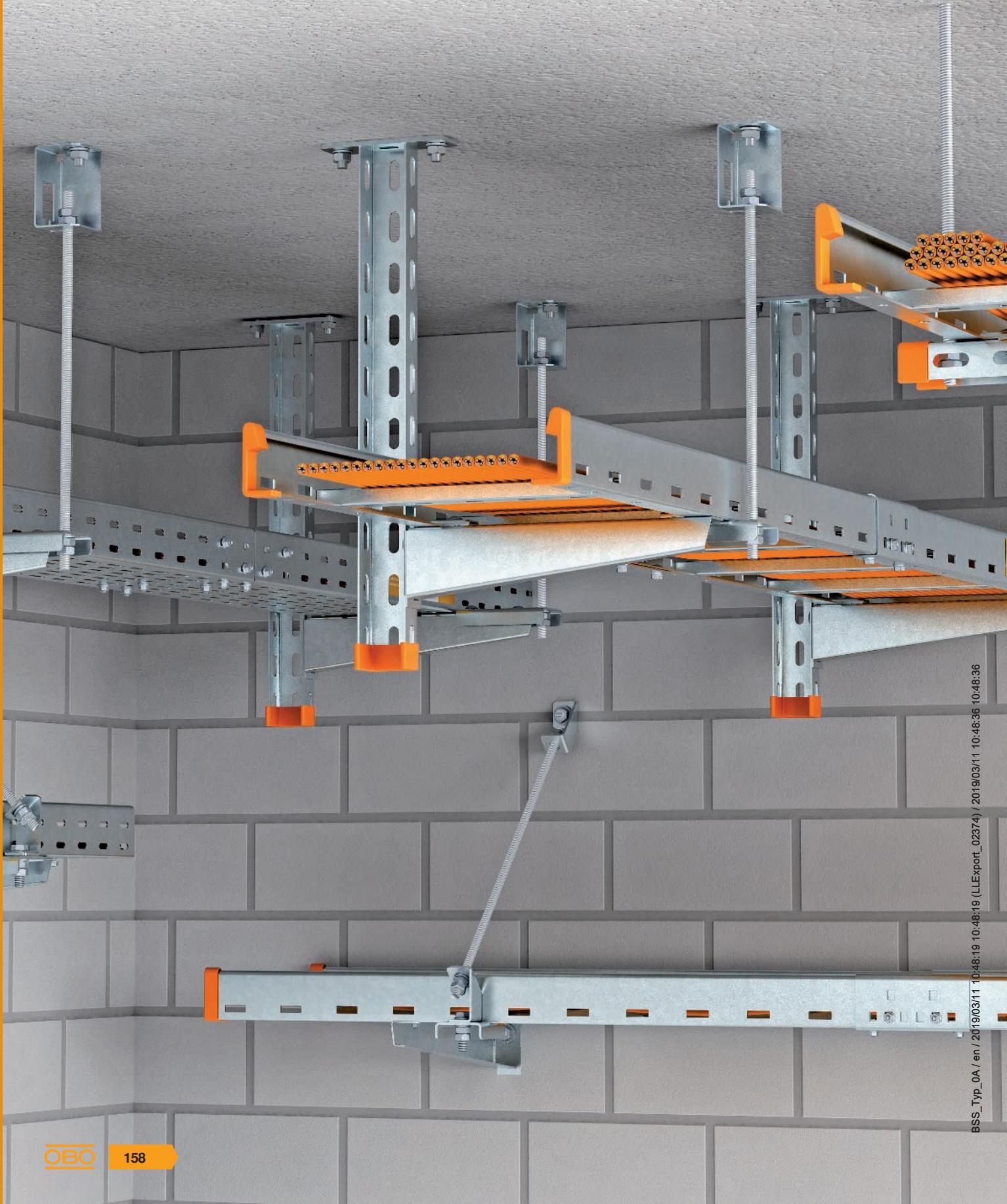
## Truss-head bolt with nut and washer

Type	Dimension mm	Dimen- sion L mm	Dimen- sion D mm	Dimen- sion d mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>FRS 6x12 A2</b>	M 6 x 12	12	13.5	6	100	0.760	<b>6406521</b>

V2A Stainless steel, A2

Truss-head bolt with square neck including washer and hexagonal nut.





# Maintaining electrical function – standard support structures, vertical ladders – strain relief

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**System description, vertical ladders**

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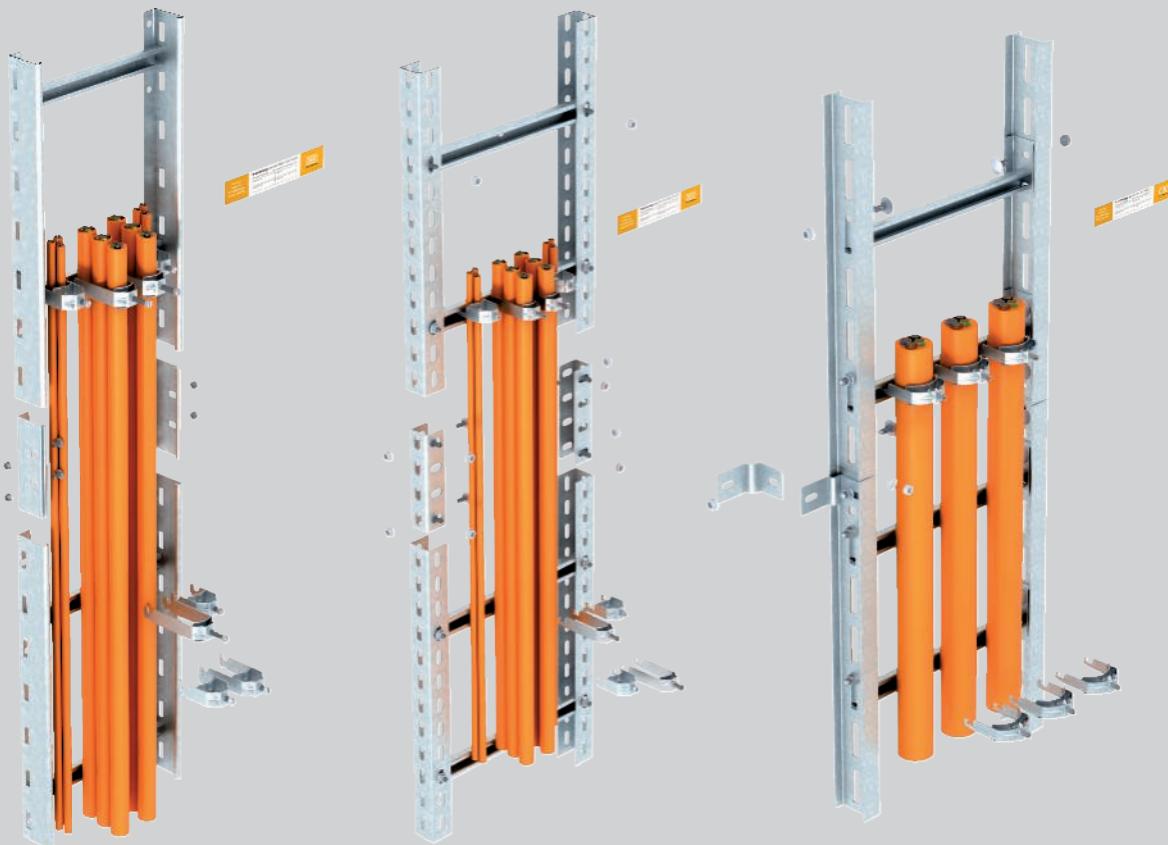
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**Products**

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## Vertical ladders

### System description



Vertical ladders of type LM, type SLM and type SLS fulfil all the requirements of DIN 4102 Part 12 as a standard support structure for the maintenance of electrical functionality classes E30, E60 and E90. They are available in the widths 200 to 400 mm (type LG) and in the widths 400 to 600 mm (type SLM and type SLS). The vertical ladders are made up of straight profiles with riveted or screwed rungs. The rung spacing is 30 mm.

The vertical ladders are fastened directly to the wall through the ladder rails (type LG and type SLM) or

with fastening brackets (type SLS) at a spacing of maximum 1.2 m. Mounting of screwed-on connectors is approved and they can be positioned freely. The cables must be fastened on each rung with clamp clips with a riveted metal pressure sleeve. Mounting of the strain relief, type ZSE90..., is approved for storey heights of more than 3.5 m. The vertical ladder need not be interrupted as the strain relief is mounted via the continuous vertical ladder.

## Vertical ladders

### Installation principle



Direct mounting of the vertical ladder on solid walls.



Joint connection with screwed-on connector.



Fastening of the cables, either individually or as a bundle with clamp clips.



Direct mounting of the rising section on solid walls.



Joint design with screwed-on connector.



Installation of the cables with clamp clips, also possible in the case of multiple assignment.



Direct mounting of the vertical ladder on solid walls.



Mounting with screwed-on fastening brackets.



Cable installation with clamp clips on the rungs of the vertical ladder.

Classification according to DIN 4102 Part 12

E30

E60

E90

## Vertical ladders

### Proof

#### Maintenance of electrical functionality system according to DIN 4102 Part 12

<b>Routing type</b>	Standard support system
<b>Proof</b>	Surveyor's report no. GS 3.2/17-436-3
<b>Maintenance of electrical functionality classes</b>	E30 to E90
<b>Testing standard</b>	DIN 4102 Part 12
<b>Material version</b>	Galvanised steel

Note:

The surveyor's report is only valid in conjunction with valid general construction test certificates of a testing office for the appropriate installed cable type.

#### Mounting parameters, light-duty vertical ladder (type LG)

<b>Fastening spacing</b>	max. 1.2 m
<b>Cable load</b>	max. 20 kg/m
<b>Rung distance</b>	30 cm
<b>Width</b>	max. 400 mm
<b>Suitable clamp clip</b>	Type 2056 M ...
<b>Individual cable diameter</b>	Unlimited
<b>Quantity of cables on bundling</b>	max. 3
<b>Cable diameter on bundling</b>	max. 25 mm

#### Mounting parameters, heavy-duty vertical ladder (type SLM)

<b>Fastening spacing</b>	max. 1.2 m
<b>Cable load</b>	max. 20 kg/m
<b>Rung distance</b>	30 cm
<b>Width</b>	max. 600 mm
<b>Suitable clamp clip</b>	Type 2056 UM ...
<b>Individual cable diameter</b>	Unlimited
<b>Quantity of cables on bundling</b>	max. 3
<b>Cable diameter on bundling</b>	max. 25 mm

#### Mounting parameters, industrial vertical ladder (type SLS)

<b>Fastening spacing</b>	max. 1.2 m
<b>Cable load</b>	max. 20 kg/m
<b>Rung distance</b>	30 cm
<b>Width</b>	max. 600 mm
<b>Suitable clamp clip</b>	Type 2056 UM ...
<b>Individual cable diameter</b>	Unlimited
<b>Quantity of cables on bundling</b>	max. 3
<b>Cable diameter on bundling</b>	max. 25 mm



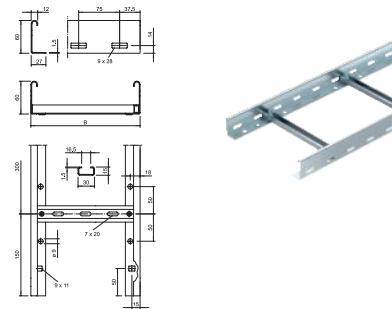
## Cable ladder LG 60, 3 m VS

Type	Width mm	Rail thickness mm	Length mm	Rung spacing mm	Dimension B mm	Pack. m	Weight kg/100 m	Item No.
LG 620 VS 3 FS	200	1.5	3000	300	200	3	281.700	6208538
LG 630 VS 3 FS	300	1.5	3000	300	300	3	306.000	6208541
LG 640 VS 3 FS	400	1.5	3000	300	400	3	330.000	6208544
LG 620 VS 6 FS	200	1.5	6000	300	200	6	269.750	6208627
LG 630 VS 6 FS	300	1.5	6000	300	300	6	293.380	6208630
LG 640 VS 6 FS	400	1.5	6000	300	400	6	317.083	6208633

St Steel

FS Strip-galvanised

Cable ladder with perforated side rail of side height 60 mm with riveted C profile frames, open in an upwards direction (VS version).



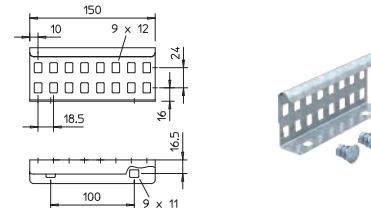
## Straight connector

Type		Pack. pcs	Weight kg/100 pcs.	Item No.
LVG 60 FS		10	22.000	6208840

St Steel

FS Strip-galvanised

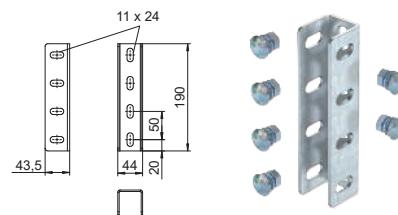
Straight connector as external connector to connect cable ladders and fittings with a side height of 60 mm and continuous rail perforation.



## U support connector

Type		Pack. pcs	Weight kg/100 pcs.	Item No.
VUS 5 FT		10	44.000	6018505

U support connector to connect US 5 supports.



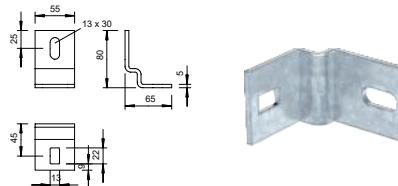
## Mounting angle BW 80

Type		Pack. pcs	Weight kg/100 pcs.	Item No.
BW 80 55 FT		10	32.900	6019528

St Steel

FT Hot-dip galvanised

Mounting angle for mounting IS 8 supports on the wall.



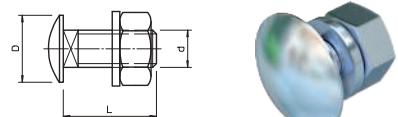
## Truss-head bolt with nut and washer

Type	Dimension mm	Dimension L mm	Dimension D mm	Dimension d mm	Pack. pcs	Weight kg/100 pcs.	Item No.
FRS 8x25 F	M 8 x 25	25	20	8	50	2.300	6406998
FRS 12x25 F	M12 x 25	25	30	12	10	6.400	6406254

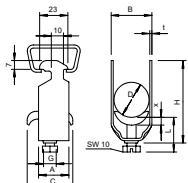
St Steel

F Hot-dip galvanised

Truss-head bolt with square neck. With washer and hexagonal nut.



## Clamp clip, single, metal pressure trough



Type	Clamping range D mm	Pack. pcs	Weight kg/100 pcs.	Item No.
2056 M 12 FT	8 - 12	100	3.200	1156004
2056 M 16 FT	12 - 16	100	3.500	1156012
2056 M 22 FT	16 - 22	100	4.400	1156020
2056 M 28 FT	22 - 28	100	6.100	1156039
2056 M 34 FT	28 - 34	100	7.700	1156047
2056 M 40 FT	34 - 40	100	8.600	1156055
2056 M 46 FT	40 - 46	100	9.600	1156063
2056 M 52 FT	46 - 52	100	10.400	1156071
2056 M 58 FT	52 - 58	100	13.100	1156098
2056 M 64 FT	58 - 64	100	14.500	1156101
2056 M 70 FT	64 - 70	50	16.100	1156128
2056 M 76 FT	70 - 76	25	18.300	1156136
2056 M 82 FT	76 - 82	25	19.100	1156144
2056 M 90 FT	82 - 90	25	23.300	1156152
2056 M 100 FT	90 - 100	25	24.500	1156160

St Steel

FT Hot-dip galvanised

Suitable for all C profile rails with slot width 16–17 mm.

Clip, bolt and pressure trough made of hot-dip galvanised steel.

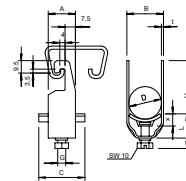
## Dimensions

D mm	A mm	B mm	C mm	G	t mm	x mm	H mm	L mm
8-12	23	16	30	M6	1.5	3.5	40	32.5
12-16	23	20	30	M6	1.5	3.5	44	32.5
16-22	23	27	30	M6	1.5	4.5	50	46.5
22-28	23	33	30	M6	2	4.5	58	46.5
28-34	23	39	35	M8	2	5	66	44
34-40	23	45	35	M8	2	5	72	44
40-46	23	51	35	M8	2	5	79	44
46-52	23	57	35	M8	2	5	86	44
52-58	23	64	35	M8	2.5	5	93	44
58-64	23	70	35	M8	2.5	5	99	56
64-70	25	76	35	M8	2.5	5	106	56
70-76	25	82	40	M8	2.5	5	114	56
76-82	25	88	40	M8	2.5	5	121	56
82-90	25	97	40	M8	3	5	130	56
90-100	25	107	40	M8	3	5	140	56



## Clamp clip, single, metal pressure trough

Type	Clamping range D mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>2056U M 12 FT</b>	8 - 12	100	3.300	<b>1158007</b>
<b>2056U M 16 FT</b>	12 - 16	100	3.520	<b>1158015</b>
<b>2056U M 22 FT</b>	16 - 22	100	3.960	<b>1158023</b>
<b>2056U M 28 FT</b>	22 - 28	100	5.890	<b>1158031</b>
<b>2056U M 34 FT</b>	28 - 34	100	7.650	<b>1158058</b>
<b>2056U M 40 FT</b>	34 - 40	100	8.360	<b>1158066</b>
<b>2056U M 46 FT</b>	40 - 46	100	10.890	<b>1158074</b>
<b>2056U M 52 FT</b>	46 - 52	100	11.660	<b>1158082</b>
<b>2056U M 58 FT</b>	52 - 58	100	14.740	<b>1158090</b>
<b>2056U M 64 FT</b>	58 - 64	100	15.730	<b>1158104</b>
<b>2056U M 70 FT</b>	64 - 70	50	18.200	<b>1158112</b>
<b>2056U M 76 FT</b>	70 - 76	25	20.600	<b>1158120</b>



St Steel

FT Hot-dip galvanised

Suitable for all C profile rails with slot width 18 mm and 22 mm.

D mm	A mm	B mm	C mm	G	t mm	x mm	H mm	L mm
8-12	20	16	34	M6	1.5	5	42	34
12-16	20	20	34	M6	1.5	5	46	34
16-22	20	27	34	M6	1.5	5	53	34
22-28	20	33	34	M6	2	5	59	34
28-34	20	39	34	M8	2	5.5	67	37.5
34-40	20	45	34	M8	2	5.5	73	37.5
40-46	20	51	40	M8	2	5.5	79	37.5
46-52	20	57	40	M8	2	6.5	85	38.5
52-58	23	64	40	M8	2.5	6.5	91	38.5
58-64	23	70	40	M8	2.5	6.5	97	38.5
64-70	23	76	40	M8	2.5	6.5	103	38.5
70-76	25	82	40	M8	2.5	6.5	110	45.5

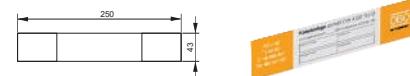
## Dimensions

## Identification plate for function maintenance

Type	Language	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>KS-E EN</b>	English	10	0.600	<b>7205432</b>

PVC Polyvinylchloride

Self-adhesive identification plate for approved cable system labelling for maintenance of electrical function as required by DIN 4102 part 12.



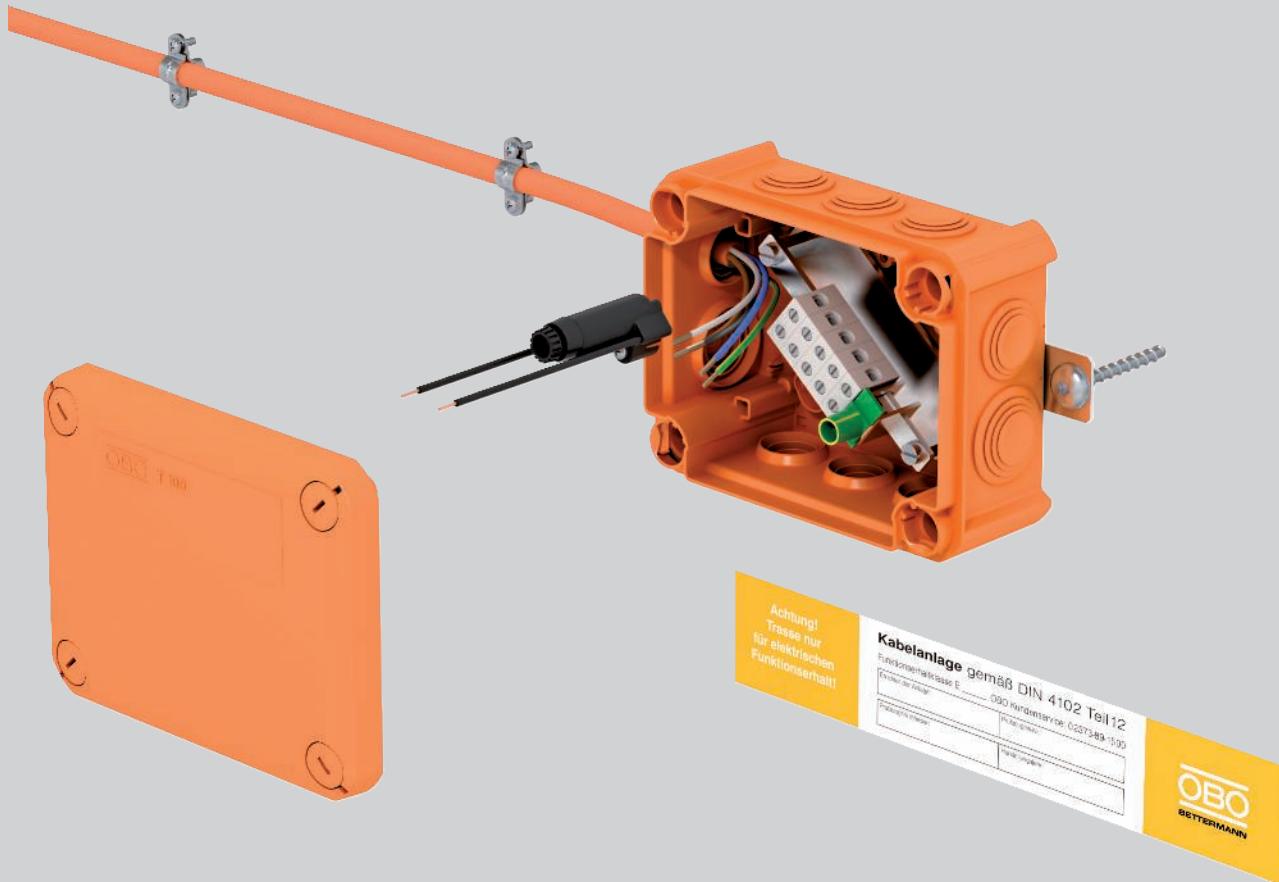


## Maintaining electrical function - Junction boxes, individual routing, pipes and metal duct

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## Junction box, FireBox

### System description



Junction boxes of the FireBox series are available for connecting and branching safety cables. These are equipped with a high-temperature-resistant connection unit with ceramic terminals and offer terminal areas of 0.5 mm<sup>2</sup> to 16 mm<sup>2</sup> of copper cross-section. The T series FireBoxes possesses all the benefits of thermoplastic cable junction boxes. These include the high IP protection rating of up to IP66 and the maximum impact resistance of up to IK10 and a high resistance to breakage. Boxes with soft plug-in seals or closed variants are available. Here, the cable glands can be located freely. Fastening either takes place on the out-

er straps or through the box base with fire protection bolt ties. The high-temperature-resistant terminals are pre-mounted on the connection unit. The protective conductor terminal is connected to the support clamp, meaning that covers of the metal parts are not required. The FireBox is tested and approved as a connection socket for maintenance of electrical functionality to DIN 4102 Part 12 with the classes E30, E60 and E90. A separate fuse holder allows protection of a branch.

# Junction box, FireBox

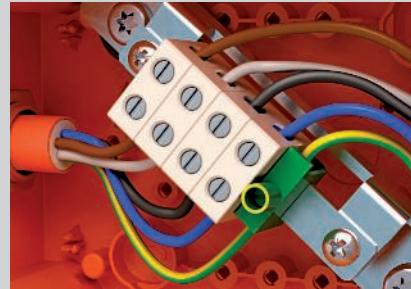
## Installation principle



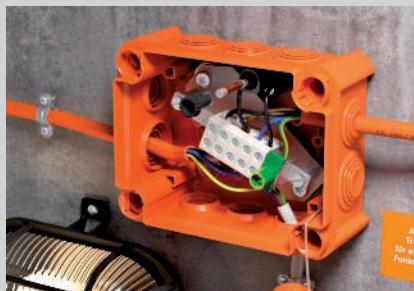
Fully installed FireBox with identification plate.



FireBox mounting with mounting plate on cable tray.



Version with 4 terminals and protective conductor terminal for power cables.



Cable entry with plug-in seals.



Mounting with fire protection bolt tie through the clamp and base of the FireBox.



Quick lid mounting through 90° rotation of the corner screws.

Classification according to DIN 4102 Part 12

**E30**

**E60**

**E90**

### System description

<b>Routing type</b>	Thermoplastic junction box with high-temperature-resistant connection unit						
<b>Test certificate no.</b>	P-MPA-E-08-016 in conjunction with the surveyor's report 210005956-6 and GS 3-2/13-370-1						
<b>Maintenance of electrical functionality classes</b>	E30 to E90						
<b>Testing standard</b>	DIN 4102 Part 12						

### Approved data

#### Clamping capacity of the ceramic terminals

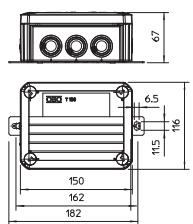
	0.5 mm <sup>2</sup>	1.5 mm <sup>2</sup>	2.5 mm <sup>2</sup>	4 mm <sup>2</sup>	6 mm <sup>2</sup>	10 mm <sup>2</sup>	16 mm <sup>2</sup>
4 mm <sup>2</sup>	6	4	2	2	-	-	-
6 mm <sup>2</sup>	8	6	2	2	2	-	-
10 mm <sup>2</sup>	-	8	6	4	2	2	-
16 mm <sup>2</sup>	-	10	8	4	4	2	2

The data in the general construction test certificates of the materials testing office of North Rhine-Westphalia, Erwitte, applies.

Always indicate the item number when ordering.

## FireBox with plug-in seal and external fastening

### FireBox T100ED with external fastening



Type	Nominal cross-section mm <sup>2</sup>	Number of terminals	Entries	Pack. pcs	Weight kg/100 pcs.	Item No.
T 100 ED 6-5 A	6	5	8x M25 2x M32	1	38.500	7205540

PP Polypropylene

Halogen-free junction box with pre-mounted, soft plug-in seals, approved for maintaining electrical functionality according to DIN 4102 Part 12. Maintenance of electrical functionality to classes E30 to E90.

Colour: Pastel orange.

Fully mounted connection unit made of high temperature-resistant special ceramic and labelled protective conductor terminal. Supplied with 2 MMS 6x50 fire protection screw ties for anchorless fastening on the external straps.

Power cable nominal cross-sections: 1.5 to 10 mm<sup>2</sup> depending on the type, data cables with 0.8 mm wire Ø. Several rigid copper wires with smaller cross-sections per terminal possible. High protection rating IP66, impact resistance class IK08.

Details on the cable types and manufacturers can be found in the general construction test certificate of the material testing institute NRW, Erwitte.

**FireBox T350ED for data technology with external fastening**

Type	Nominal cross-section mm <sup>2</sup>	Number of terminals	Entries	Pack. pcs	Weight kg/100 pcs.	Item No.
T 350 ED 4-28 AD	4	28	16x M32 8x M40	1	163.000	7205590

PP Polypropylene

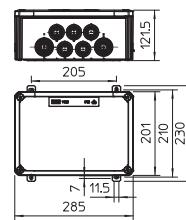
Halogen-free junction box as small data distributor with pre-mounted, soft plug-in seals, approved for the maintenance of electrical functionality according to DIN 4102 Part 12. Maintenance of electrical functionality to classes E30 to E90.

Colour: Pastel orange.

Fully mounted connection unit made of high temperature-resistant special ceramic and labelled protective conductor terminals. Supplied with 4 MMS 6x50 fire protection screw ties for anchorless fastening on the external straps.

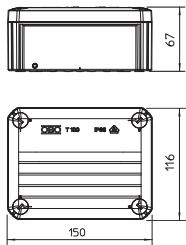
For data cables with wire Ø 0.8 mm. Up to 6 rigid copper wires (0.5 mm<sup>2</sup>) possible on each terminal. High protection rating IP66, impact resistance class IK06.

Details on the cable types and manufacturers can be found in the general construction test certificate of the material testing institute NRW, Erwitte.



## FireBox, closed version

### FireBox T100E with internal fastening



Type	Nominal cross-section mm <sup>2</sup>	Number of terminals	Entries	Pack. pcs	Weight kg/100 pcs.	Item No.
T 100 E 4-5	4	5	—	1	27.400	7205510

PP Polypropylene

Halogen-free junction box, approved for the maintenance of electrical functionality according to DIN 4102 Part 12. Maintenance of electrical functionality to classes E30 to E90.

Colour: Pastel orange.

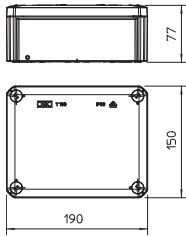
Including pre-mounted connection unit made of high temperature-resistant special ceramic and labelled protective conductor terminal. Supplied with fire protection screw ties for anchorless fastening.

Power cable nominal cross-sections: 1.5 to 4 mm<sup>2</sup>, data cables with 0.8 mm wire Ø. Maximum of two 1.5 mm<sup>2</sup> rigid copper cables per terminal (remove wire protection).

High protection rating IP66, impact resistance class IK07.

Details on the cable types and manufacturers can be found in the general construction test certificate of the material testing institute NRW, Erwitte.

### FireBox T160E with internal fastening



Type	Nominal cross-section mm <sup>2</sup>	Number of terminals	Entries	Pack. pcs	Weight kg/100 pcs.	Item No.
T 160 E 10-5	10	5	—	1	48.700	7205524

PP Polypropylene

Halogen-free junction box, approved for the maintenance of electrical functionality according to DIN 4102 Part 12. Maintenance of electrical functionality to classes E30 to E90.

Colour: Pastel orange.

Including pre-mounted connection unit made of high temperature-resistant special ceramic and labelled protective conductor terminal. Supplied with fire protection screw ties for anchorless fastening.

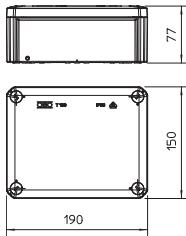
Nominal cross-sections of the power cable: 10 or 16 mm<sup>2</sup>

A maximum of 2 rigid copper cables of 2.5 mm<sup>2</sup> or 4 mm<sup>2</sup> per terminal (remove wire protection).

High protection rating IP66, impact resistance class IK06.

Details on the cable types and manufacturers can be found in the general construction test certificate of the material testing institute NRW, Erwitte.

### FireBox T160E for data technology with internal fastening



Type	Nominal cross-section mm <sup>2</sup>	Number of terminals	Entries	Pack. pcs	Weight kg/100 pcs.	Item No.
T 160 E 4-8D	4	8	—	1	46.500	7205520

PP Polypropylene

Halogen-free junction box, approved for the maintenance of electrical functionality according to DIN 4102 Part 12. Maintenance of electrical functionality to classes E30 to E90.

Colour: Pastel orange.

Including pre-mounted connection unit made of high temperature-resistant special ceramic with fire protection screw ties for anchorless fastening.

Nominal cross-section: data cables with 0.8 mm wire Ø.

High protection rating IP66, impact resistance class IK06.

Details on the cable types and manufacturers can be found in the general construction test certificate of the material testing institute NRW, Erwitte.

Type	Thread	Shipping box pcs	Pack. pcs	Weight kg/100 pcs.	Item No.
V-TEC VM20+ OR	M20 x 1,5   100		10	1.106	7205660

PA Polyamide

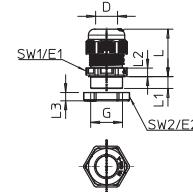
Robust cap nut cable gland with metric connecting thread to IEC 423, including pre-mounted lock-nut.

For high tightness requirements. Strain relief, wringing protection and tightness over the whole clamping area. Sealing ring made of polychloroprene/acrylonitrile butadiene rubber. Moulded shaped sealing lip on intermediate support, no connection thread sealing ring required.

VDE-tested according to DIN EN 50262, protection rating IP68 at 5 bar for 1 hr.

For maintenance of electrical function according to DIN 4102 Part 12 in connection with the junction boxes of the FireBox T series.

Colour: Pastel orange.



#### Dimensions

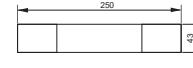
G	D	SW1	E1	SW2	E2	L min.	L max.	L1	L2	L3
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
M20 x 1.5	6-13	24	27	24	27	23.5	30.5	9	5	6

#### Identification plate for function maintenance

Type	Language	Pack. pcs	Weight kg/100 pcs.	Item No.
KS-E EN	English	10	0.600	7205432

PVC Polyvinylchloride

Self-adhesive identification plate for approved cable system labelling for maintenance of electrical function as required by DIN 4102 part 12.





## Grip M grouped support System description



Cable routing with metal grouped supports is approved as a cable-specific routing type for the maintenance of electrical functionality classes E 30, E 60 and E 90 according to DIN 4102 Part 12. The collecting clamps used are made of sheet steel and can be opened and closed easily without the use of tools. To allow simple cable insertion, the supports can remain open during cable routing. Grouped supports for wall

and ceiling mounting are suitable. Depending on the tested cables and the grouped supports used for the tests, fastening spacings of maximum 0.8 m and a cable assignment of up to 6 kg/m are permitted. The instructions of the various cable manufacturers should be complied with.

## Grip M grouped support Installation principle



Horizontal wall and ceiling mounting.



Mounted grouped support 2031 M 15.



Easy insertion the cables in the opened grouped support.

Classification according to DIN 4102 Part 12

E30

E60

E90

### System description

Routing type	Cable-specific support construction
Test certificate no. M15/M30/M70	P-MPA-E-09-007
Test certificate no. M15/M30	P-3846/9913-MPA BS
Maintenance of electrical functionality classes	E30 to E90
Testing standard	DIN 4102 Part 12

### Approved data

Type	Fastening spacing	Cable assignment, max.
2031 M15	0.5 m	1.1 kg
2031 M30	0.5 m	2.5 kg
2031 M70	0.8 m	6.0 kg

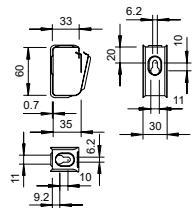
With regard to the fastening distance and cable assignment, deviating values are possible, depending on the test certificates of the cable manufacturers.

During mounting, ensure that the closure of the grouped support is located at the side.

Always indicate the item number when ordering.

## Grouped supports and pressure clips

### GRIP "M" 15



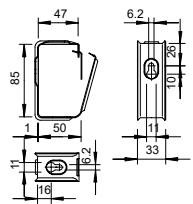
Type	No. of conductors	Shipping box	Pack. pcs	Weight kg/100 pcs.	Item No.
2031 M 15 FS	15	50	50	3.700	2207028

St Steel

FS Strip-galvanised

Metal cable tidy for high mechanical stability, even in case of fire. Suitable for safe mounting above fire protection ceilings. Also approved as a cable-specific variant for the maintenance of electrical function to DIN 4102 part 12. For wall and ceiling mounting. Lock can be opened without tools. Detailed information on the approved routing variants can be found in the appropriate testing documentation.

### GRIP "M" 30



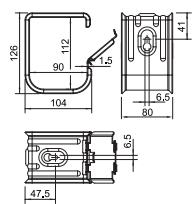
Type	No. of conductors	Shipping box	Pack. pcs	Weight kg/100 pcs.	Item No.
2031 M 30 FS	30	25	25	6.200	2207036

St Steel

FS Strip-galvanised

Metal cable tidy for high mechanical stability, even in case of fire. Suitable for safe mounting above fire protection ceilings. Also approved as a cable-specific variant for the maintenance of electrical function to DIN 4102 part 12. For wall and ceiling mounting. Lock can be opened without tools. Detailed information on the approved routing variants can be found in the appropriate testing documentation.

### GRIP "M" 70



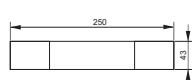
Type	No. of conductors	Shipping box	Pack. pcs	Weight kg/100 pcs.	Item No.
2031 M 70 FS	70	10	10	34.500	2207060

St Steel

FS Strip-galvanised

Metal cable tidy for high mechanical stability, even in case of fire. Suitable for safe mounting above fire protection ceilings. Also approved as a cable-specific variant for the maintenance of electrical function to DIN 4102 part 12. For wall and ceiling mounting. Lock can be opened without tools. Detailed information on the approved routing variants can be found in the appropriate testing documentation.

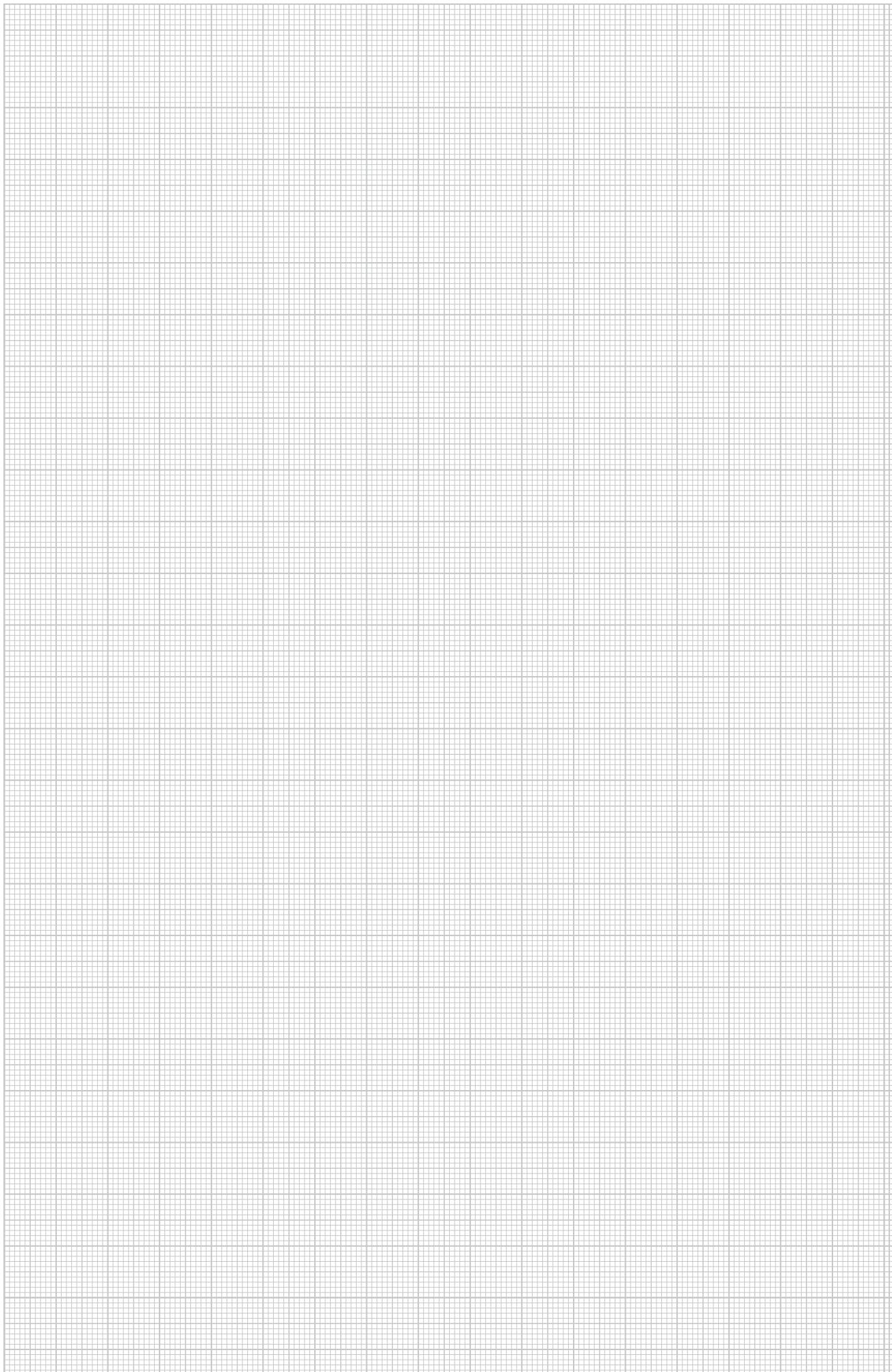
### Identification plate for function maintenance



Type	Language	Pack. pcs	Weight kg/100 pcs.	Item No.
KS-E EN	English	10	0.600	7205432

PVC Polyvinylchloride

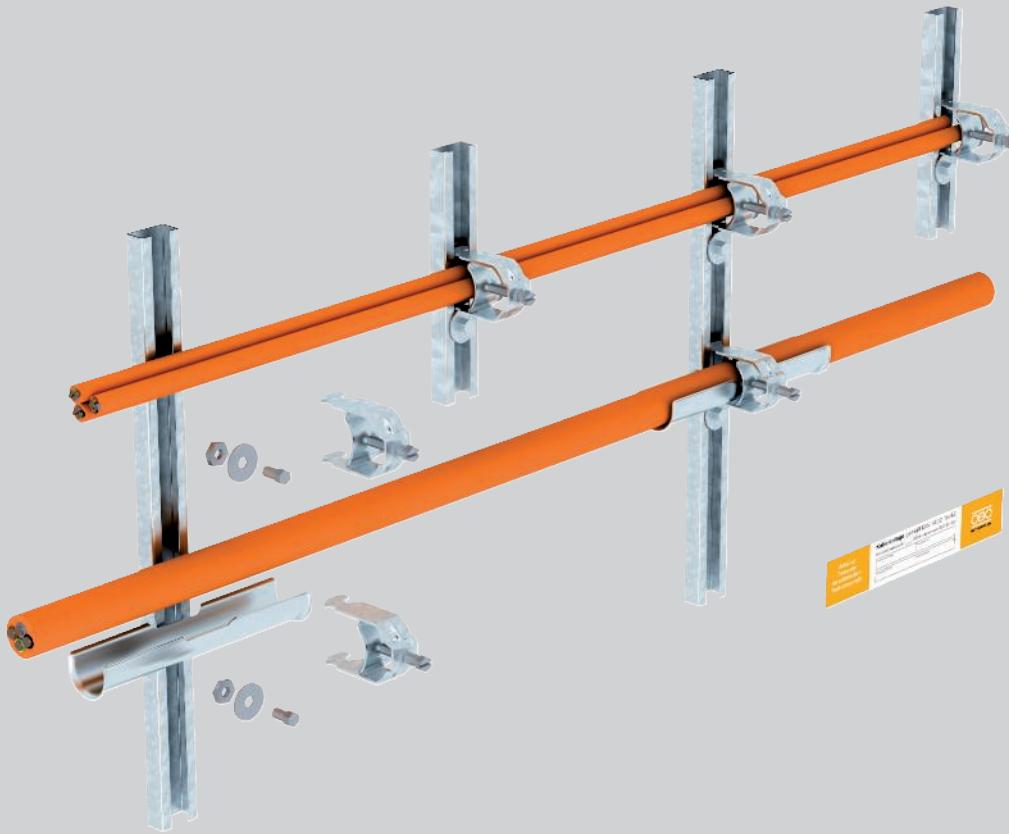
Self-adhesive identification plate for approved cable system labelling for maintenance of electrical function as required by DIN 4102 part 12.





## Clamp clips with profile rails

### System description



The routing types with clamp clips fulfil all the requirements of DIN 4102 Part 12 as a standard support structure for the maintenance of electrical functionality classes E30 and E90. Mounting as a cable-specific routing type is possible, depending on the specifications of the cable manufacturer. The clamp clips can be used for horizontal cable routing on walls and ceilings and vertical routing on walls. The clamp clips are made of sheet steel with a riveted metal pressure

trough. Long troughs made of galvanised sheet steel can be used to increase the support area for the cables. These are inserted loosely between the cables and the metal pressure troughs of the clamp clips. Bundling of up to three cables in a clamp clip is possible. The individual diameter of the bundled cables may not exceed 25 mm. If only individual cables are installed, then there is no limit to the cable diameter.

# Clamp clips with profile rails

## Installation principle



Horizontal mounting with clamp clips and long troughs on the wall and under the ceiling.



Horizontal cable mounting with clamp clips on the wall.



Horizontal cable mounting with clamp clips under the ceiling.



Vertical cable mounting with clamp clips on the wall.



Installation of the cables, either individually or as a bundle.



Effective support measure with ZSE90 strain relief.

Classification according to DIN 4102 Part 12

E30

E60

E90

### System description

<b>Routing type</b>	Standard support structure Cable-specific support construction
<b>Surveyor's report no.</b>	3038/625/11-3-CM (standard)
<b>Maintenance of electrical functionality classes</b>	E30 to E90
<b>Testing standard</b>	DIN 4102 Part 12

### Approved data

<b>Rail fastening distance, max.</b>	0.3 m (without long trough) as standard support structure
<b>Rail fastening distance, max.</b>	0.6 m (with long trough) as standard support structure
<b>Max. anchor spacing in rail</b>	0.25 m
<b>Max. individual cable diameter</b>	62 mm with long trough, 100 mm without long trough
<b>Max. cable bundle</b>	3x Ø 25 mm as standard support structure
<b>Cable-specific</b>	Cable types and mounting parameters dependent on the cable manufacturer

#### Standard routing type:

The data of the surveyor's report applies, together with a valid, general construction test certificate of a materials testing institute for the cable type to be used.

#### Cable-specific routing type:

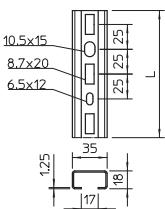
A general construction test certificate of a materials testing institute for the cable type to be used is sufficient as proof.

With regard to the fastening distance and cable assignment, the details from the appropriate test certificate must be taken into account.

Always indicate the item number when ordering.

## Profile rails and clamp clips

### CM3518 profile rail, slot 17 mm, perforated



Type	Length mm	Dimension W x H mm	Material thickness mm	Dimension L mm	Pack. m	Weight kg/100 m	Item No.
CML3518P1000FS	1000	35 x 18	1.25	1000	1	71.000	1104497
CML3518P2000FS	2000	35 x 18	1.25	2000	2	71.000	1104500

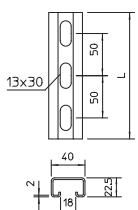
St Steel

FS Strip-galvanised

Light-duty profile rail, perforated, slot width 17 mm.

#### Dimensions

### MS4022 mounting rail, heavy-duty, slot 18 mm, perforated



Type	Length mm	Dimension W x H mm	Material thickness mm	Dimension L mm	Pack. m	Weight kg/100 m	Item No.
MS4022P2000FT	2000	40 x 22.5	2	2000	10	152.500	1121979

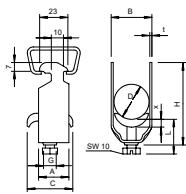
St Steel

FT Hot-dip galvanised

Heavy-duty C profile rail for individual installation of support constructions, e.g. for cable trays or as a panel for switchgear cabinets. Can also be used for cable routing, in conjunction with clamp clips with a U foot.

#### Dimensions

### Clamp clip, single, metal pressure trough



Type	Clamping range D mm	Pack. pcs	Weight kg/100 pcs.	Item No.
2056 M 12 FT	8 - 12	100	3.200	1156004
2056 M 16 FT	12 - 16	100	3.500	1156012
2056 M 22 FT	16 - 22	100	4.400	1156020
2056 M 28 FT	22 - 28	100	6.100	1156039
2056 M 34 FT	28 - 34	100	7.700	1156047
2056 M 40 FT	34 - 40	100	8.600	1156055
2056 M 46 FT	40 - 46	100	9.600	1156063
2056 M 52 FT	46 - 52	100	10.400	1156071
2056 M 58 FT	52 - 58	100	13.100	1156098
2056 M 64 FT	58 - 64	100	14.500	1156101
2056 M 70 FT	64 - 70	50	16.100	1156128
2056 M 76 FT	70 - 76	25	18.300	1156136
2056 M 82 FT	76 - 82	25	19.100	1156144
2056 M 90 FT	82 - 90	25	23.300	1156152
2056 M 100 FT	90 - 100	25	24.500	1156160

St Steel

FT Hot-dip galvanised

Suitable for all C profile rails with slot width 16–17 mm.

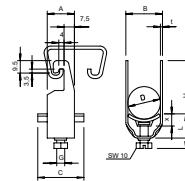
Clip, bolt and pressure trough made of hot-dip galvanised steel.

#### Dimensions

D mm	A mm	B mm	C mm	G	t mm	x mm	H mm	L mm
8-12	23	16	30	M6	1.5	3.5	40	32.5
12-16	23	20	30	M6	1.5	3.5	44	32.5
16-22	23	27	30	M6	1.5	4.5	50	46.5
22-28	23	33	30	M6	2	4.5	58	46.5
28-34	23	39	35	M8	2	5	66	44
34-40	23	45	35	M8	2	5	72	44
40-46	23	51	35	M8	2	5	79	44
46-52	23	57	35	M8	2	5	86	44
52-58	23	64	35	M8	2.5	5	93	44
58-64	23	70	35	M8	2.5	5	99	56
64-70	25	76	35	M8	2.5	5	106	56
70-76	25	82	40	M8	2.5	5	114	56
76-82	25	88	40	M8	2.5	5	121	56
82-90	25	97	40	M8	3	5	130	56
90-100	25	107	40	M8	3	5	140	56

## Clamp clip, single, metal pressure trough

Type	Clamping range D mm	Pack. pcs	Weight kg/100 pcs.	Item No.
2056U M 12 FT	8 - 12	100	3.300	1158007
2056U M 16 FT	12 - 16	100	3.520	1158015
2056U M 22 FT	16 - 22	100	3.960	1158023
2056U M 28 FT	22 - 28	100	5.890	1158031
2056U M 34 FT	28 - 34	100	7.650	1158058
2056U M 40 FT	34 - 40	100	8.360	1158066
2056U M 46 FT	40 - 46	100	10.890	1158074
2056U M 52 FT	46 - 52	100	11.660	1158082
2056U M 58 FT	52 - 58	100	14.740	1158090
2056U M 64 FT	58 - 64	100	15.730	1158104
2056U M 70 FT	64 - 70	50	18.200	1158112
2056U M 76 FT	70 - 76	25	20.600	1158120



St Steel

FT Hot-dip galvanised

Suitable for all C profile rails with slot width 18 mm and 22 mm.

D mm	A mm	B mm	C mm	G	t mm	x mm	H mm	L mm
8-12	20	16	34	M6	1.5	5	42	34
12-16	20	20	34	M6	1.5	5	46	34
16-22	20	27	34	M6	1.5	5	53	34
22-28	20	33	34	M6	2	5	59	34
28-34	20	39	34	M8	2	5.5	67	37.5
34-40	20	45	34	M8	2	5.5	73	37.5
40-46	20	51	40	M8	2	5.5	79	37.5
46-52	20	57	40	M8	2	6.5	85	38.5
52-58	23	64	40	M8	2.5	6.5	91	38.5
58-64	23	70	40	M8	2.5	6.5	97	38.5
64-70	23	76	40	M8	2.5	6.5	103	38.5
70-76	25	82	40	M8	2.5	6.5	110	45.5

## Dimensions

## Slide nut

Type	Dimen- sion L mm	Dimen- sion B mm	Dimen- sion H mm	Pack. pcs	Weight kg/100 pcs.	Item No.
ACMSN M6 ZL	26	16.5	4	100	1.740	1147056

St Steel

ZL Zinc scale

Slide nut for use with CM3015, CM3518 and AM3518 profile rails



Type	Dimen- sion L mm	Dimen- sion B mm	Dimen- sion H mm	Pack. pcs	Weight kg/100 pcs.	Item No.
MS40SN M6 ZL	35	17	10	50	3.750	1147106

St Steel

ZL Zinc scale

Slide nut for use with MS4022 profile rail



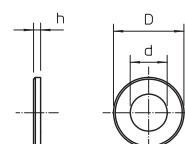
Type	Dimen- sion D mm	Dimen- sion d mm	Dimen- sion h mm	Pack. pcs	Weight kg/100 pcs.	Item No.
DIN440 7 F	22	6.6	2	100	0.550	6408702

St Steel

FT Hot-dip galvanised

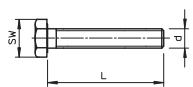
Washer of particularly large outer diameter.

## Large washer



## Profile rails and clamp clips

### Hexagonal bolt ISO 4017



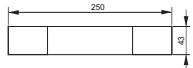
Type	Thread	Dimension mm	Dimension L mm	Dimension d mm	SW mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>HHS M6x16 G</b>	M6	M6 x 16	16	6	10	100	0.494	<b>3156141</b>

St Steel

G Electrogalvanised

Hexagonal bolt to ISO 4017 with metric thread

### Identification plate for function maintenance



Language

Type

**KS-E EN** | English

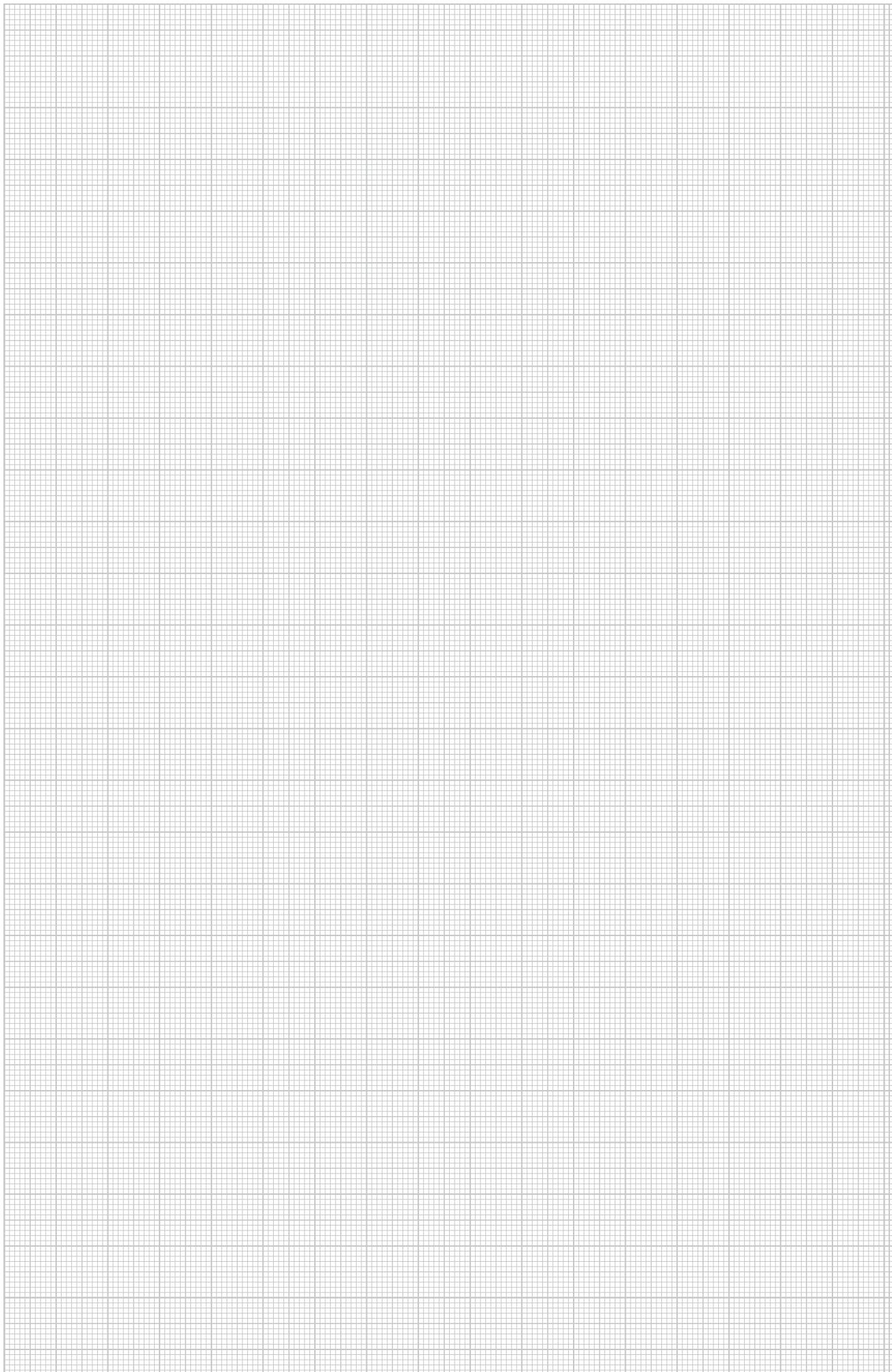
PVC Polyvinylchloride

Pack. Weight

pcs kg/100 pcs.

**7205432**

Self-adhesive identification plate for approved cable system labelling for maintenance of electrical function as required by DIN 4102 part 12.



## Screw-in spacer clips

### System description



The routing types with single clips fulfil all the requirements of DIN 4102 Part 12 as a standard support structure for the maintenance of electrical functionality classes E 30, E 60 and E 90. In addition, mounting of the single clips as a cable-specific routing type is possible, depending on the specifications of the cable manufacturer. The screw-in spacer clips can be used for horizontal cable routing on walls and ceilings and vertical routing on walls. The closed screw-in spacer clips are made of galvanised sheet steel. Mounting is

carried out either by pushing through the slots of the clips or by screwing onto a fire protection anchor with threaded tip M6. Bundling of up to three cables together in a single clamp clip is possible for mounting as a standard support structure. The individual diameter of the bundled cables may not exceed 25 mm. There is no limit to the diameter of installed individual cables with screw-in spacer clips.

## Screw-in spacer clips

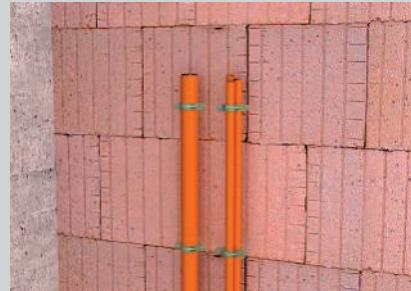
### Installation principle



Horizontal cable mounting on the wall.



Mounting under the ceiling.



Vertical cable installation as individual and bundle routing on the wall.



Bundled cable routing under the ceiling.



Effective support measure with ZSE90 strain relief.

Classification according to DIN 4102 Part 12

E30

E60

E90

#### System description

<b>Routing type</b>	Standard support structure Cable-specific support construction
<b>Surveyor's report no.</b>	3038/625/11-3-CM (standard)
<b>Maintenance of electrical functionality classes</b>	E30 to E90
<b>Testing standard</b>	DIN 4102 Part 12

#### Approved data

<b>Max. fastening spacing</b>	0.3 m as standard support structure
<b>Max. individual cable diameter</b>	63 mm
<b>Max. cable bundle</b>	3x Ø 25 mm
<b>Cable-specific</b>	Cable types and mounting parameters dependent on the cable manufacturer

#### Standard routing type:

The data of the surveyor's report applies, together with a valid, general construction test certificate of a materials testing institute for the cable type to be used.

#### Cable-specific routing type:

A general construction test certificate of a materials testing institute for the cable type to be used is sufficient as proof.

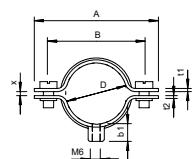
With regard to the fastening distance and cable assignment, the details from the appropriate test certificate must be taken into account.

Always indicate the item number when ordering.



## Screw-in spacer clips

### Cable and pipe spacer clip 732 with threaded connection



Type	Clamping range D mm	Pack. pcs	Weight kg/100 pcs.	Item No.
732 6 GTP	5 - 6	100	1.160	1360051
732 8 GTP	7 - 8	100	1.310	1360086
732 10 GTP	9 - 10	100	1.360	1360108
732 12 GTP	10.5 - 12	100	1.460	1360124
732 14 GTP	12.5 - 14	100	1.480	1360140
732 15 GTP	13.5 - 15	100	1.530	1360159
732 16 GTP	14.5 - 16	100	1.590	1360167
732 18 GTP	16.5 - 18	100	1.620	1360183
732 20 GTP	18.5 - 20	50	1.730	1360205
732 22 GTP	20 - 22	50	1.780	1360221
732 24 GTP	22 - 24	50	1.840	1360248
732 26 GTP	24 - 26	50	1.920	1360264
732 28 GTP	26 - 28	50	2.840	1360280
732 30 GTP	28 - 30	50	3.040	1360302
732 33 GTP	31 - 33	25	3.120	1360337
732 35 GTP	33 - 35	25	3.280	1360353
732 38 GTP	36 - 38	25	3.490	1360388
732 40 GTP	38 - 40	25	3.600	1360396
732 42 GTP	40 - 42	25	3.840	1360426
732 45 GTP	43 - 45	25	3.990	1360450
732 48 GTP	46 - 48	25	4.040	1360485
732 50 GTP	48 - 50	25	4.160	1360507
732 60 GTP	58 - 60	25	4.960	1360604
732 63 GTP	61 - 63	25	5.000	1360639

St Steel

GTP Electrogalvanised, transparently passivated

Mounting with screw-in spacer clips. Spacer clips and screw-in spacer clips are available in various materials: in V2A stainless steel, in electrogalvanised, hot-dip galvanised steel or in aluminium. Fastening can take place with bolt ties or angler anchors and Sprint screws. Depending on the design, the clips can be "shot" using a bolt-firing tool or nail device.

#### Dimensions

D mm	A mm	B mm	x mm	b1 mm	t1 mm	t2 mm	M
5-6	35	23	1	8	1	1.25	M5 x 10
7-8	34	22	1	8	1	1.25	M5 x 10
9-10	36	24	1	8	1	1.25	M5 x 12
10.5-12	38	26	1.5	8	1	1.25	M5 x 12
12.5-14	40	28	1.5	8	1	1.25	M5 x 12
13.5-15	41	29	1.5	8	1	1.25	M5 x 12
14.5-16	42	30	1.5	8	1	1.25	M5 x 12
16.5-18	44	32	1	8	1	1.25	M5 x 12
18.5-20	46	34	1.5	8	1	1.25	M5 x 12
20-22	48	36	2	8	1	1.25	M5 x 12
22-24	50	38	2	8	1	1.25	M5 x 12
24-26	52	40	2	8	1	1.25	M5 x 12
26-28	59	45	2	8.5	1.5	1.5	M5 x 12
28-30	61	47	2	8.5	1.5	1.5	M5 x 12
31-33	64	50	2	8.5	1.5	1.5	M5 x 12
33-35	66	52	2	8.5	1.5	1.5	M5 x 12
36-38	69	55	2	8.5	1.5	1.5	M5 x 12
38-40	71	57	2	8.5	1.5	1.5	M5 x 12
40-42	73	59	2	8.5	1.5	1.5	M5 x 12
43-45	76	62	2	8.5	1.5	1.5	M5 x 12
46-48	79	65	2	8.5	1.5	1.5	M5 x 12
48-50	81	67	2	8.5	1.5	1.5	M5 x 14
58-60	91	77	2	8.5	1.5	1.5	M5 x 14
61-63	94	80	2	9.2	1.5	1.5	M5 x 14

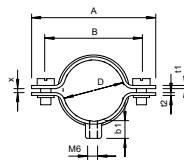
## Cable and pipe spacer clip 732 with threaded connection V4A

Type	Clamping range D mm	Pack. pcs	Weight kg/100 pcs.	Item No.
732 6 A4	5 - 6	100	1.364	1360644
732 8 A4	7 - 8	100	1.376	1360646
732 10 A4	9 - 10	100	1.467	1360648
732 12 A4	10.5 - 12	100	1.622	1360650
732 14 A4	12.5 - 14	100	1.710	1360652
732 15 A4	13.5 - 15	100	1.791	1360654
732 16 A4	14.5 - 16	100	1.845	1360656
732 18 A4	16.5 - 18	100	1.889	1360658
732 20 A4	18.5 - 20	50	1.960	1360660
732 22 A4	20 - 22	50	1.999	1360662
732 24 A4	22 - 24	50	2.062	1360664
732 26 A4	24 - 26	50	2.083	1360666
732 28 A4	26 - 28	50	2.923	1360668
732 30 A4	28 - 30	50	3.047	1360670
732 33 A4	31 - 33	25	3.186	1360672
732 38 A4	36 - 38	25	3.453	1360676
732 40 A4	38 - 40	25	3.554	1360678
732 42 A4	40 - 42	25	3.650	1360680
732 45 A4	43 - 45	25	3.810	1360682
732 48 A4	46 - 48	25	3.972	1360684
732 50 A4	48 - 50	25	4.045	1360686
732 60 A4	58 - 60	25	4.582	1360688
732 63 A4	61 - 63	25	4.712	1360690

V4A Stainless steel, A4

Mounting with screw-in spacer clips. Spacer clips and screw-in spacer clips are available in various materials: in V2A stainless steel, in electrogalvanised, hot-dip galvanised steel or in aluminium. Fastening can be take place with bolt ties or Angler anchors and Sprint screws.

Depending on the design, the clips can be "shot" using a bolt-firing tool or nail device.

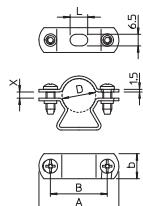


D mm	A mm	B mm	x mm	b1 mm	t1 mm	t2 mm	M
5-6	35	23	1	9.8	1	1.25	M5 x 10
7-8	34	22	1	9.8	1	1.25	M5 x 10
9-10	36	24	1	9.8	1	1.25	M5 x 12
10.5-12	38	26	1.5	9.8	1	1.25	M5 x 12
12.5-14	40	28	1.5	9.8	1	1.25	M5 x 12
13.5-15	41	29	1.5	9.8	1	1.25	M5 x 12
14.5-16	42	30	1.5	9.8	1	1.25	M5 x 12
16.5-18	44	22	1.5	9.8	1	1.25	M5 x 12
18.5-20	46	34	1.5	9.8	1	1.25	M5 x 12
20-22	48	36	2	9.8	1	1.25	M5 x 12
22-24	50	38	2	9.8	1	1.25	M5 x 12
24-26	52	40	2	10	1	1.25	M5 x 12
26-28	59	45	2	10	1.5	1.5	M5 x 12
28-30	61	47	2	10	1.5	1.5	M5 x 12
31-33	64	50	2	10	1.5	1.5	M5 x 12
36-38	69	55	2	10	1.5	1.5	M5 x 12
38-40	71	57	2	10	1.5	1.5	M5 x 12
40-42	73	59	2	10	1.5	1.5	M5 x 12
43-45	76	62	2	10	1.5	1.5	M5 x 12
46-48	79	65	2	10	1.5	1.5	M5 x 12
48-50	81	67	2	10	1.5	1.5	M5 x 14
58-60	91	77	2	10	1.5	1.5	M5 x 14
61-63	94	80	2	10	1.5	1.5	M5 x 14

## Dimensions

## Screw-in spacer clips

### Cable and pipe spacer clip 733



Clamping range D mm

Type	Clamping range D mm	Pack. pcs	Weight kg/100 pcs.	Item No.
733 21 G	19 - 21	50	2.730	1361201
733 23 G	21 - 23	50	2.870	1361236
733 29 G	24 - 29	50	3.480	1361295
733 38 G	30 - 38	25	4.040	1361384
733 48 G	39 - 48	25	4.810	1361481
733 54 G	48 - 54	25	5.800	1361511
733 61 G	53 - 61	20	6.370	1361619
733 63 G	63	20	6.940	1361635
733 19 FT	17 - 19	50	2.500	1361097
733 21 FT	19 - 21	50	2.730	1361100
733 23 FT	21 - 23	50	2.870	1361103
733 29 FT	24 - 29	50	3.480	1361106
733 38 FT	30 - 38	25	4.040	1361109
733 48 FT	39 - 48	25	4.810	1361112
733 54 FT	48 - 54	25	5.400	1361117
733 61 FT	53 - 61	20	6.100	1361115
733 63 FT	63	20	7.250	1361118

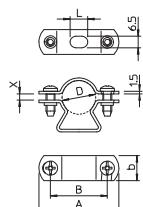
St Steel

G Electrogalvanised FT Hot-dip galvanised

#### Dimensions

D mm	A mm	B mm	L mm	b mm	x mm
19-21	50	37	10	14	2
21-23	52	39	10	14	2.5
24-29	58	42	10	16	7
30-38	70	54	10	16	10
39-48	80	64	14	16	12.5
48-54	86	68	14	18	7.5
53-61	96	78	14	18	10
63	101	83	18	16	3
17-19	45	32	10	14	3.5
19-21	50	37	10	14	2
21-23	52	39	10	14	2.5
24-29	58	42	10	16	7
30-38	70	54	10	16	10
39-48	80	64	14	16	12.5
48-54	86	68	14	18	7.5
53-61	96	78	14	18	10
63	101	83	18	16	3

### Cable and pipe spacer clip 733 V2A



Clamping range D mm

Type	Clamping range D mm	Pack. pcs	Weight kg/100 pcs.	Item No.
733 19 A2	17 - 19	50	2.800	1362038
733 21 A2	19 - 21	50	2.740	1362046
733 23 A2	21 - 23	50	2.800	1362054
733 29 A2	24 - 29	50	3.475	1362062
733 38 A2	30 - 38	25	4.500	1362070
733 48 A2	39 - 48	25	5.200	1362089
733 54 A2	48 - 54	25	5.800	1362097
733 61 A2	53 - 61	20	6.800	1362100

V2A Stainless steel, A2

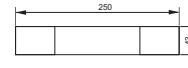
#### Dimensions

D mm	A mm	B mm	L mm	b mm	x mm
17-19	45	32	10	14	3.5
19-21	50	37	10	14	2
21-23	52	39	10	14	2.5
24-29	58	42	10	16	7
30-38	70	54	10	16	10
39-48	80	64	14	16	12.5
48-54	86	68	14	18	7.5
53-61	96	78	14	18	10

## Identification plate for function maintenance

Language	Pack.	Weight	
Type <b>KS-E EN</b>   English	pcs	kg/100 pcs.	<b>Item No.</b>
PVC Polyvinylchloride	10	0.600	<b>7205432</b>

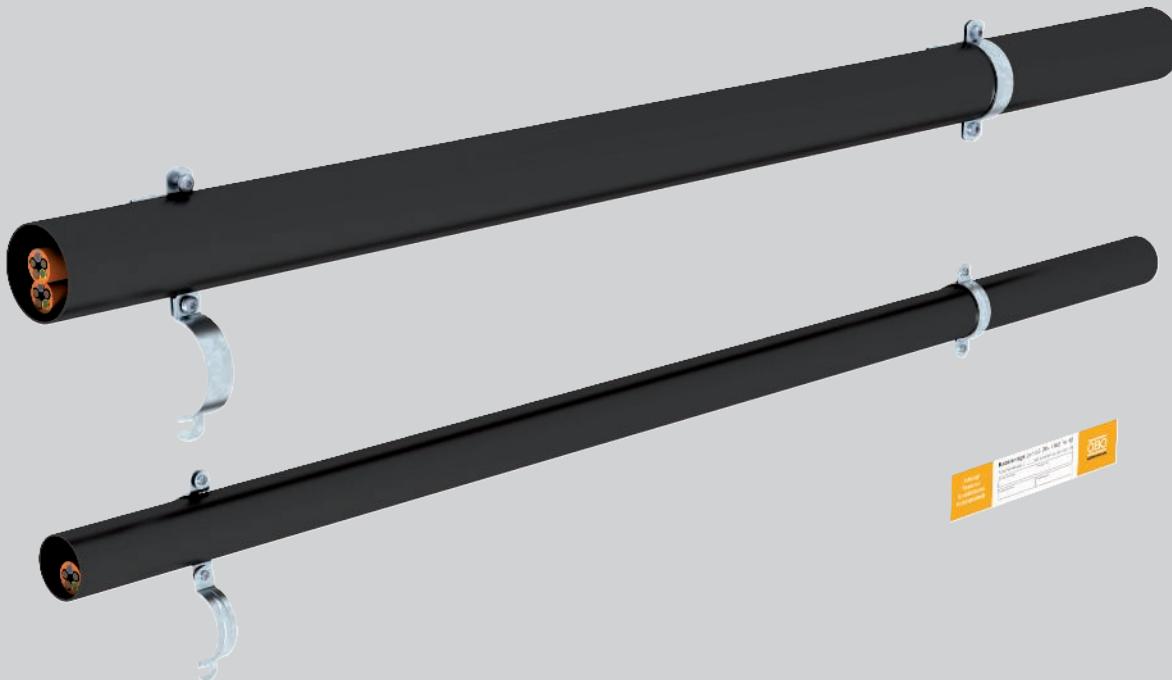
Self-adhesive identification plate for approved cable system labelling for maintenance of electrical function as required by DIN 4102 part 12.





## Cable routing in pipes

### System description



Cable routing in the steel pipe, in combination with clamp clips or with screw-in spacer clips, fulfils the requirements of DIN 4102 Part 12 as a cable-specific routing type for the maintenance of electrical functionality classes E 30, E 60 and E 90. The steel pipes may be routed horizontally on the wall or under the ceiling and offer additional mechanical protection of the installed cables. Sheet steel clamp clips are used

together with a riveted metal pressure sleeve and the appropriate profile rails, or closed screw-in spacer clips made of galvanised sheet steel. Refer to the available test certificates of the cable manufacturer for the maximum possible dimensions of the pipes, the maximum fastening spacing of the clips and the number of cables to be run in the pipe.

# Cable routing in pipes

## Installation principle



Ceiling mounting with screw-in spacer clip and clamp clip.



Horizontal wall mounting with screw-in spacer clip and clamp clip.



Space-saving installation of multiple pipes next to one another with clamp clips.



Insertion into the screw-in spacer clip by hooking the cover under the screw.



Multiple assignment according to the data of the test reports.

Classification according to DIN 4102 Part 12

E30

E60

E90

### System description

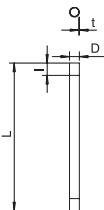
<b>Routing type</b>	Cable-specific support construction
<b>Maintenance of electrical functionality classes</b>	E30 to E90
<b>Testing standard</b>	DIN 4102 Part 12

### Approved data

<b>Cable-specific</b>	Cable types and mounting parameters dependent on the cable manufacturer
The data in the general construction test certificates applies.	

## Pipes

### Electrogalvanised steel pipe, with thread



5 | 5 | 5 | 7 | 1

Type	Thread	Dimen- sion D mm	Dimen- sion L mm	Dimen- sion I mm	Dimen- sion t mm	Pack. m	Weight kg/100 m	Item No.
<b>SM16W G</b>	M16x1,5	16	3000	13	1.3	30	50.390	2046861
<b>SM20W G</b>	M20x1,5	20	3000	13	1.5	30	66.667	2046862
<b>SM25W G</b>	M25x1,5	25	3000	18	1.5	30	92.290	2046863
<b>SM32W G</b>	M32x1,5	32	3000	18	1.5	21	120.000	2046864
<b>SM40W G</b>	M40x1,5	40	3000	20.5	1.5	15	151.450	2046865
<b>SM50W G</b>	M50x1,5	50	3000	25	1.5	15	190.000	2046866
<b>SM63W G</b>	M63x1,5	63	3000	25	1.7	9	287.700	2046867

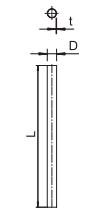
St Steel

G Electrogalvanised

Electrical installation pipe according to EN 61386-1 with threaded ends to EN 60423 for mechanical protection of cables.

With burr-free inner wall. One coupling is already screwed onto each pipe.

### Armoured steel pipe without thread, electrogalvanised



4 | 4 | 5 | 7 | 1

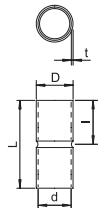
Type	Dimen- sion D mm	Dimen- sion L mm	Dimen- sion t mm	Pack. m	Weight kg/100 m	Item No.
<b>S16W G</b>	16	3000	1	30	37.000	2046840
<b>S20W G</b>	20	3000	1	30	44.700	2046841
<b>S25W G</b>	25	3000	1.2	30	70.400	2046842
<b>S32W G</b>	32	3000	1.2	21	91.200	2046843
<b>S40W G</b>	40	3000	1.2	15	139.700	2046844
<b>S50W G</b>	50	3000	1.2	15	176.000	2046845
<b>S63W G</b>	63	3000	1.2	9	223.000	2046846

St Steel

G Electrogalvanised

Electrical installation pipe without threaded ends according to EN 61386-1 for mechanical protection of cables. With burr-free inner wall.

### Armoured steel pipe connection sleeve without thread, electrogalvanised



5 | 5 | 5 | 7 | 1

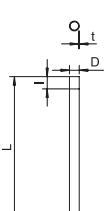
Type	Dimen- sion D mm	Dimen- sion d mm	Dimen- sion L mm	Dimen- sion I mm	Dimen- sion t mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>SV16W G</b>	18.6	16.6	50	25	1	25	2.400	2046854
<b>SV20W G</b>	23.1	20.7	60	30	1.2	50	4.000	2046855
<b>SV25W G</b>	28.1	25.7	60	30	1.2	50	5.200	2046856
<b>SV32W G</b>	35.2	32.8	70	35	1.2	50	7.200	2046857
<b>SV40W G</b>	43.8	43.8	80	40	1.5	25	13.200	2046858
<b>SV50W G</b>	54	51	100	50	1.5	10	20.000	2046859
<b>SV63W G</b>	67	64	100	50	1.5	5	28.000	2046860

St Steel

G Electrogalvanised

Accessory part: plug-in sleeve for the connections between electrical installation pipes. With burr-free inner wall.

### Hot-dip galvanised steel pipe, with thread



5 | 5 | 5 | 7 | 1

Type	Thread	Dimen- sion D mm	Dimen- sion L mm	Dimen- sion I mm	Dimen- sion t mm	Pack. m	Weight kg/100 m	Item No.
<b>SM16W FT</b>	M16x1,5	16	3000	13	1.3	30	54.000	2046533
<b>SM20W FT</b>	M20x1,5	20	3000	13	1.5	30	79.000	2046534
<b>SM25W FT</b>	M25x1,5	25	3000	18	1.5	30	99.000	2046535
<b>SM32W FT</b>	M32x1,5	32	3000	18	1.5	21	130.000	2046536
<b>SM40W FT</b>	M40x1,5	40	3000	20.5	1.5	15	164.000	2046537
<b>SM50W FT</b>	M50x1,5	50	3000	25	1.5	15	206.000	2046538
<b>SM63W FT</b>	M63x1,5	63	3000	26	1.8	9	324.700	2046540

St Steel

FT Hot-dip galvanised

Electrical installation pipe according to EN 61386-1 with threaded ends to EN 60423 for mechanical protection of cables.

With burr-free inner wall. Corrosion protection class 4 (high). One coupling is already screwed onto each pipe.

## Hot-dip galvanised steel pipe, without thread

Type	Dimen- sion D mm	Dimen- sion L mm	Dimen- sion t mm	Pack. m	Weight kg/100 m	Item No.
S16W FT	16	3000	1	30	37.000	2046593
S20W FT	20	3000	1	30	44.700	2046594
S25W FT	25	3000	1.2	30	70.400	2046595
S32W FT	32	3000	1.2	21	91.200	2046596
S40W FT	40	3000	1.2	15	139.700	2046597
S50W FT	50	3000	1.2	15	176.000	2046598
S63W FT	63	3000	1.2	9	223.000	2046599

St Steel

FT Hot-dip galvanised

Electrical installation pipe without threaded ends according to EN 61386-1 for mechanical protection of cables. With burr-free inner wall. Corrosion protection class 4 (high).



4 | 4 | 5 | 7 | 1

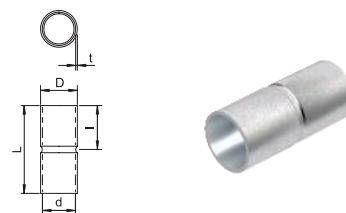
## Hot-dip galvanised steel sleeve, without thread

Type	Dimen- sion D mm	Dimen- sion d mm	Dimen- sion L mm	Dimen- sion I mm	Dimen- sion t mm	Pack. pcs	Weight kg/100 pcs.	Item No.
SV16W FT	18.6	16.6	50	25	1	25	2.200	2046620
SV20W FT	23.1	20.7	60	30	1.2	50	3.200	2046621
SV25W FT	28.1	25.7	60	30	1.2	50	5.600	2046622
SV32W FT	35.2	32.8	70	35	1.2	50	7.800	2046623
SV40W FT	43.8	40.8	80	40	1.5	25	14.400	2046624
SV50W FT	54	51	100	50	1.5	10	22.000	2046625
SV63W FT	67	63	100	50	1.5	5	28.000	2046626

St Steel

FT Hot-dip galvanised

Accessory part: plug-in sleeve for the connections between electrical installation pipes. With burr-free inner wall.



## Identification plate for function maintenance

Type	Language	Pack. pcs	Weight kg/100 pcs.	Item No.
KS-E EN	English	10	0.600	7205432
PVC	Polyvinylchloride			

Self-adhesive identification plate for approved cable system labelling for maintenance of electrical function as required by DIN 4102 part 12.





## LKM cable trunking

### System description



Cable routing with metal cable trunking, type LKM, is approved as a cable-specific routing type for the maintenance of electrical function classes E 30, E 60 and E 90 according to DIN 4102 Part 12. The trunking may be routed horizontally on the wall or under the ceiling and offer additional mechanical protection of the installed cables. This installation variant is also used if, for reasons of appearance, open routing of

the cables with the maintenance of electrical function is not wanted. A retaining clamp is available as an installation aid for the trunking type LKM60100. This prevents cables from falling out in the case of wall and ceiling mounting. When cable installation has been completed, the trunking cover is locked onto the trunking base.

# LKM cable trunking

## Installation principle



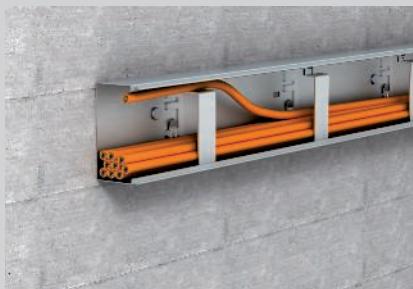
Horizontal wall and ceiling mounting.



Routing of power, data or fire alarm cables in the trunking, type LKM60100.



Tidy routing of data and fire alarm cables in the trunking, type 20030.



Retaining clamps locked into the base as installation aid for wall mounting.



Retaining clamps as mounting aid for the insertion of cables for ceiling mounting.



Closing of the trunking by simple locking of the lid onto the trunking base.

Classification according to DIN 4102 Part 12

E30

E60

E90

### System description

Routing type	Cable-specific support construction
Test certificate no.	P-MPA-E-11-008
Maintenance of electrical functionality classes	E30 and E90
Testing standard	DIN 4102 Part 12

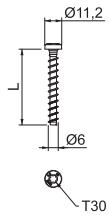
### Approved data

Type	Cable types	Fastening spacing	Cable load
LKM 20030	Data cable	max. 40 cm	max. 0.3 kg/m
LKM 60100	Power cable	max. 49 cm	max. 3.0 kg/m

The data in the general construction test certificates for the appropriate cable type applies.

## LKM cable routing duct

### Fire protection screw tie



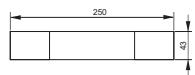
Type	Dimension mm	Anchor length mm	Bore hole Ø mm	Head Ø mm	Screw system	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>MMS-plus 6X50</b>	6 x 50	50	5	11.2	Torx	100	1.000	<b>3498108</b>
<b>MMS-plus 6X35</b>	6 x 50	50	5	11.2	Torx	100	0.900	<b>3498103</b>

St Steel

G Electrogalvanised

Fire protection bolt tie with pan head for direct installation without additional anchors. Drive T30, drill hole 5 mm. Tested anchor according to ETAG 001 - Part 3. Fire resistance class to R120 for concrete and masonry.

### Identification plate for function maintenance

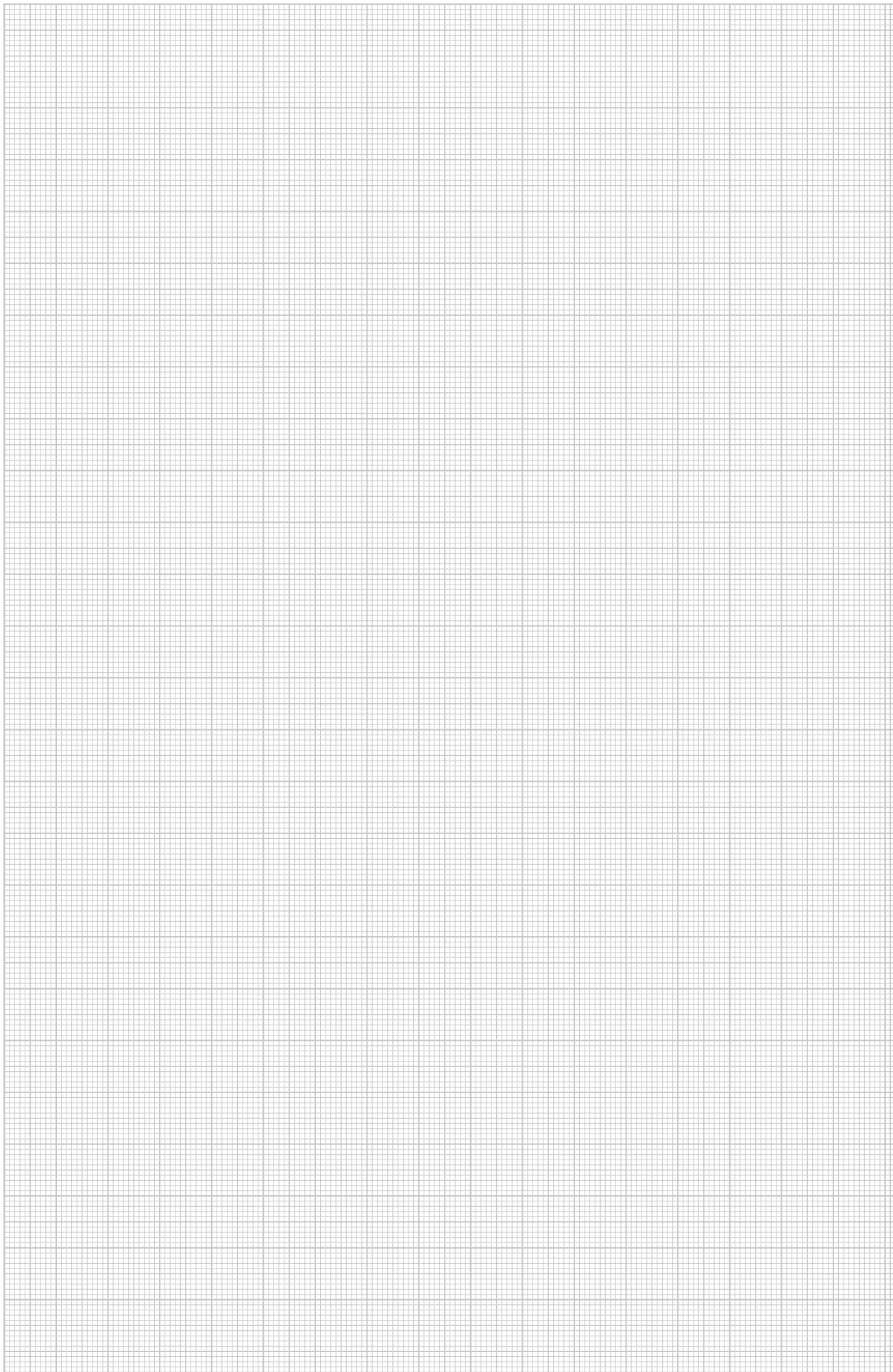


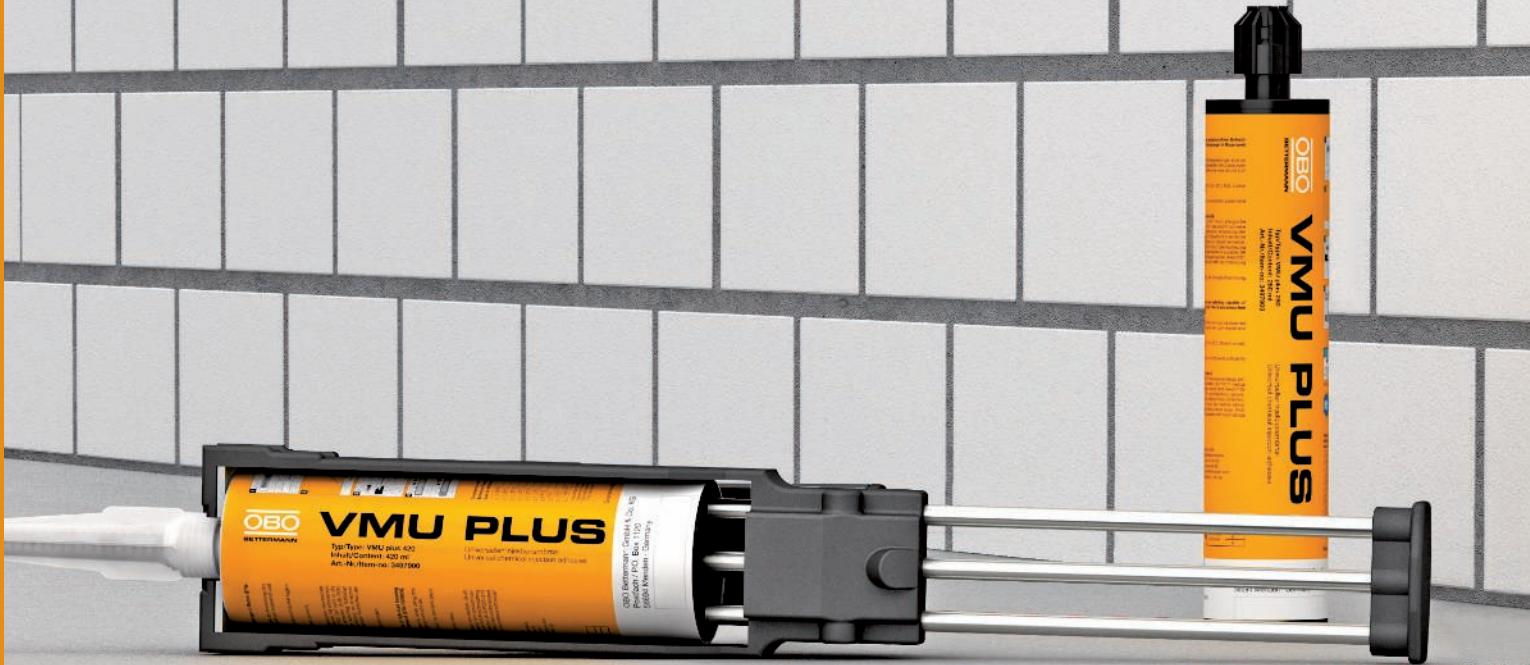
Language

Type	Language	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>KS-E EN</b>	English	10	0.600	<b>7205432</b>

PVC Polyvinylchloride

Self-adhesive identification plate for approved cable system labelling for maintenance of electrical function as required by DIN 4102 part 12.





## Anchorings

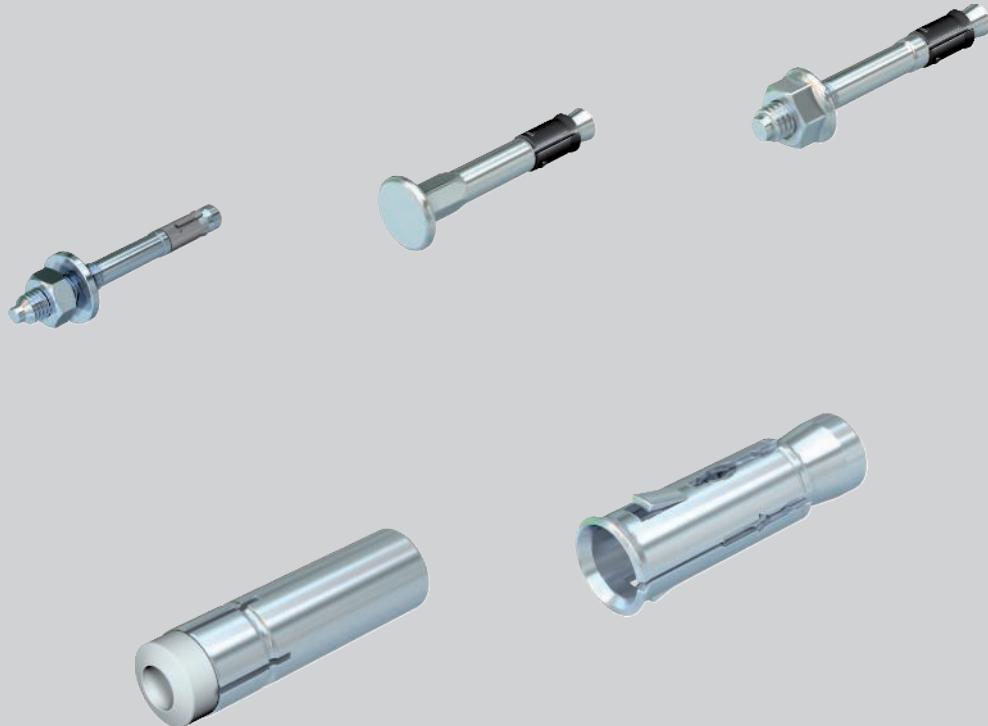
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<b>System description, metal spreading anchor</b>	200
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## Metal spreading anchor

### System description



Anchoring



OBO Bettermann's metal spreading anchors for mounting in concrete components were tested for fire protection. Appropriate proofs are available for the tests carried out. Depending on the fire resistance length (up to 120 minutes), a maximum load capacity was determined when anchored in concrete. This load data is contained in the appropriate European Techni-

cal Assessments and appropriate test documentation. Although the load capacity of the anchors during a fire is below the load capacity when cold, this load capacity is completely sufficient for fireproof fastening of the different routing types. Special metal spreading anchors are offered for false ceilings.

## Metal spreading anchor Installation principle



Nail tie, type N 6, with thread end.



Nail tie, type N-K 6, with flat head.



Bolt tie, type BZ.



Bolt tie, type BZ-IG.



Hollow core anchor, Easy type.

Classification according to proof of application

R30      R60      R90      R120

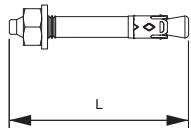
### System description

<b>Anchoring type</b>	Anchor with spreading metal cone
<b>Fire resistance classes</b>	To R120 according to European Technical Assessment ETA
<b>Substrate</b>	Concrete

The data of the approval documents and any fire testing reports apply

## Metal spreading anchor

### Nail anchor N with thread



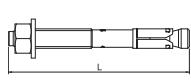
Type	Thread	Bore hole Ø mm	Bore hole depth mm	Clamping range mm	Dimension L mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>N 6-5-10/49</b>	M6	6	40	5 - 10	49	100	1.160	<b>3498396</b>

St Steel

G Electrogalvanised

The nail anchor N can be used for multiple fastenings of non-load-bearing systems and in cracked and non-cracked concrete, thereby combining the benefits of a bolt tie with even easier mounting. The nail tie only needs to be hammered into the drill hole. It is not necessary to apply torque subsequently. When the load occurs, the nail tie spreads itself and bolts itself in the drill hole.

### Bolt tie BZ



Type	Thread	Dimension L mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>BZ10-100-120/180</b>	M10	180	25	10.320	<b>3498342</b>
<b>BZ 12-15-35/110</b>	M12	110	25	10.320	<b>3498350</b>

St Steel

G Electrogalvanised

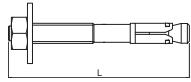
Wedge anchor BZ for the anchoring of medium-duty to heavy-duty loads, both in cracked and non-cracked concrete. It combines high approved loads with small edge distances and axial spacings.

European technical approval ETA-99/0010, including characteristic values under fire exposure to fire resistance R 120.

Proof of suitability in the case of seismic impacts, categories C1 and C2.

Shock approval by the Federal Office for Civil Protection in Bern, Switzerland.

### Bolt tie BZ-U



Type	Thread	Dimension L mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>BZ-U 8-10-21/75</b>	M8	75	50	3.460	<b>3498320</b>
<b>BZ-U 8-30-41/95</b>	M8	95	50	4.010	<b>3498326</b>
<b>BZ-U 10-10-30/90</b>	M10	90	50	6.720	<b>3498334</b>
<b>BZ-U10-30-50/110</b>	M10	110	25	7.900	<b>3498340</b>

St Steel

G Electrogalvanised

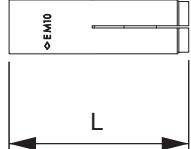
Bolt tie BZ for the anchoring of medium-duty to heavy-duty loads, both in cracked and non-cracked concrete. It combines high approved loads with small edge distances and axial spacings.

European technical approval ETA-99/0010, including characteristic values under fire exposure to fire resistance R 120.

Proof of suitability in the case of seismic impacts, categories C1 and C2.

Shock approval by the Federal Office for Civil Protection in Bern, Switzerland.

### Drop-in anchor E



Type	Thread	Bore hole Ø mm	Bore hole depth mm	Dimension L mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>E M 6x30</b>	M6	8	30	30	100	0.840	<b>3492900</b>
<b>E M 8x40</b>	M8	10	40	40	100	1.490	<b>3492910</b>
<b>E M 10x40</b>	M10	12	40	40	50	2.140	<b>3492920</b>
<b>E M 12x50</b>	M12	15	50	50	50	4.420	<b>3492930</b>

St Steel

G Electrogalvanised

The drop-in anchor E can be used for single fixings in non-cracked concrete as well as for multiple fixings in cracked concrete of non-load-bearing systems.

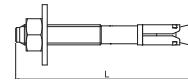
The setting tool is placed onto the anchor sleeve thereby creating a visible mark which confirms the correct installation. Through the controlled expansion, the necessary axial spacings and edge distances are decreased significantly.

**Bolt tie BZ-U**

Type	Thread	Dimension L	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>BZ-U8-10-21/75A4</b>	M8	75	50	3.460	<b>3498322</b>
<b>BZU10-10-30/90A4</b>	M10	90	50	6.740	<b>3498336</b>

V4A Stainless steel, A4

Wedge anchor BZ for the anchoring of medium-duty to heavy-duty loads, indoors and outdoors, both in cracked and non-cracked concrete. It combines high approved loads with small edge distances and axial spacings.

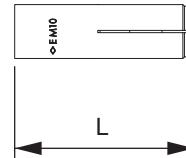
**Drop-in anchor E A4**

Type	Thread	Bore hole Ø	Bore hole depth	Dimension L	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>E M 8x40 A4</b>	M8	10	40	40	50	1.490	<b>3492912</b>
<b>E M 10x40 A4</b>	M10	12	40	40	50	2.160	<b>3492922</b>
<b>E M 12x50 A4</b>	M12	15	50	50	50	4.380	<b>3492932</b>

V4A Stainless steel, A4

The drop-in anchor E can be used for single fixings in non-cracked concrete as well as for multiple fixings in cracked concrete of non-load-bearing systems.

The setting tool is placed onto the anchor sleeve thereby creating a visible mark which confirms the correct installation. Through the controlled expansion, the necessary axial spacings and edge distances are decreased significantly.



## Bolt tie

### System description



Anchoring



OBO Bettermann's fire protection bolt ties were fire-tested according to ETAG 001 Part 3. The maximum load capacity, depending on fire resistance periods of up to 120 minutes, was determined for different types of solid masonry. These values are documented in the appropriate test certificates. Taking the occurring loads for the maintenance of electrical function application and for false ceiling mounting into account, the

determined load capacities for the different masonry types are absolutely sufficient. The fire protection bolt ties are screwed directly into the drill hole. There is no need for an additional anchor. No spreading forces develop and mounting near masonry edges is not required. The bolt tie is equally suitable for cracked concrete in ceilings.

## Bolt tie Installation principle



Version with truss head and T drive.



Version with large truss head and T drive.



Version with hexagonal head.



Version as shaft tie with M6 threaded tip.



Version with countersunk cone head and T drive.

Classification according to proof of application

F30

F60

F90

F120

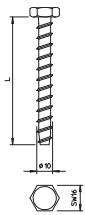
### System description

<b>Anchoring type</b>	Spread-free connection with self-tapping thread
<b>Fire resistance classes</b>	To F120 according to general building inspectorate approval
<b>Substrate</b>	Concrete Masonry: Solid calcareous limestone brick, porous calcareous limestone brick, full brick

The data of the approval documents and any fire testing reports apply

## Bolt tie

### MMS hex



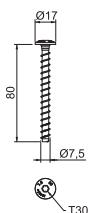
Type	Dimension mm	Dimension L mm	Dimension Ø mm	Bore Ø mm	Pack. pcs	Weight kg/100 pcs.	Item No.
MMS-plus 10x80	10 x 80	80	8	13	25	4.000	3498124
MMS-plus 10x100	10 x 100	100	8	13	25	4.800	3498159

St Steel

G Electrogalvanised

Fire protection bolt tie with hexagonal head for direct mounting without additional anchor. WAF 13, drill hole 8 mm. Tested anchor according to ETAG 001 - Part 3. Fire resistance class to R120 for concrete and masonry.

## Bolt tie



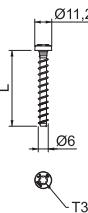
Type	Dimension mm	Anchor length mm	Bore hole Ø mm	Head Ø mm	Screw system	Pack. pcs	Weight kg/100 pcs.	Item No.
MMS-plus 7.5X80	7.5 x 80	80	6	13.2	Torx	50	1.600	3498272

St Steel

G Electrogalvanised

Fire protection bolt tie with pan head for direct mounting without anchors. Drive T40, drill hole 6 mm. Tested anchor according to ETAG 001 - Part 3. Fire resistance class to R120 for concrete and masonry.

## Fire protection screw tie



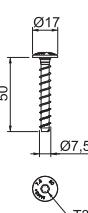
Type	Dimension mm	Anchor length mm	Bore hole Ø mm	Head Ø mm	Screw system	Pack. pcs	Weight kg/100 pcs.	Item No.
MMS-plus 6X50	6 x 50	50	5	11.2	Torx	100	1.000	3498108
MMS-plus 6X35	6 x 50	50	5	11.2	Torx	100	0.900	3498103

St Steel

G Electrogalvanised

Fire protection bolt tie with pan head for direct installation without additional anchors. Drive T30, drill hole 5 mm. Tested anchor according to ETAG 001 - Part 3. Fire resistance class to R120 for concrete and masonry.

## Fire protection screw tie



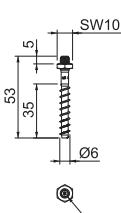
Type	Dimension mm	Anchor length mm	Bore hole Ø mm	Head Ø mm	Screw system	Pack. pcs	Weight kg/100 pcs.	Item No.
MMS-plus 7.5X50	7.5 x 50	50	6	17	Torx	100	1.500	3498261

St Steel

G Electrogalvanised

Fire protection bolt tie with large pan head for direct mounting without additional anchors. Drive T30, drill hole 6 mm. Tested anchor according to ETAG 001 - Part 3. Fire resistance class to R120 for concrete and masonry.

## MMS-ST with thread

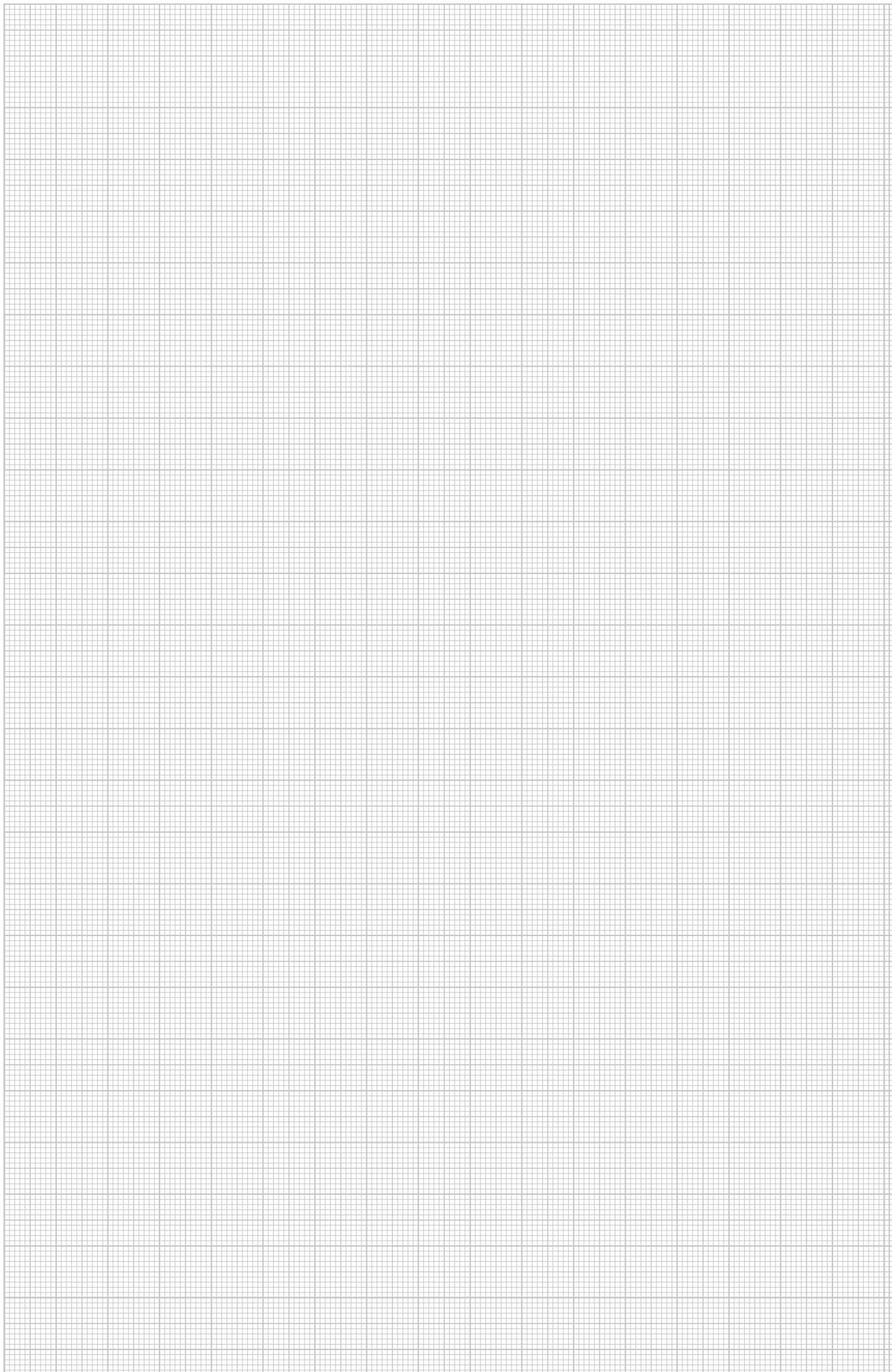


Type	Dimension mm	Anchor length mm	Bore hole Ø mm	Thread Ø mm	SW mm	Pack. pcs	Weight kg/100 pcs.	Item No.
MMS-plus ST 6x55	6x55	60	5	M6	10	100	1.030	3498264

St Steel

G Electrogalvanised

Fire protection bolt tie with M6 thread and hexagonal head for direct mounting without additional anchors. WAF 10, drill hole 5 mm. Tested anchor according to ETAG 001 - Part 3. Fire resistance class to R120 for concrete and masonry.



## Wood screws

### System description



Wood is a combustible material and, as with steel constructions, wooden components are firstly only suitable under certain conditions for the fastening of fire-tested electrical installations. Coatings and panelling are also used in the constructions, in order to achieve a fire resistance class at all. However, if there is a fire, wood has a very good property: When burning, an insulated layer is created which delays further combustion. The wooden component must be dimensioned in such a way that failure of the carrying capacity cannot occur at an early stage. The combustion rates are a standard means for calculating the required wood cross-section, depending on the desired fire resistance class. The combustion rates depend

on the type of wood and the moisture content of the wood. Taking the combustion rates into account, various cable support systems for electrical safety systems with the maintenance of electrical functionality classes E30 and E60 can be fastened to wooden components. Wood screws with a suitable steel cross-section and sufficient embedment depth are used for fastening. The long screws drill deep into the cross-section of the wooden beam, ensuring a secure hold of the mounted support systems, despite burning. Various mounting variants are documented in a fire protection survey.

## Wood screws

### Installation principle



Bracket mounting on the side of the wooden beam with rear fire protection plate.



Suspended support mounting under the wooden beam with rear fire protection plate.



Cable routing with single clips and in the pipe, at the side on the wooden beam.



Cable routing with grouped support on the side on the wooden beam.



Mounting of the OBO FireBox on a wooden beam.



Vertical cable routing with rails and clips on a wooden beam.

Classification according to proof of application

E30

E60

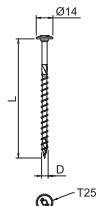
#### System description

<b>Anchoring type</b>	Self-tapping wood screw
<b>Maintenance of electrical functionality classes</b>	E30 to E60
<b>Substrate</b>	Supporting components, that close off or do not close off rooms, (walls, ceiling or supports) made of solid wood
<b>Proof of application</b>	Surveyor's report of Ingenieurbüro für Brandschutz von Bauarten, IBB
<b>Certificate number</b>	GA-2016/034-Mey

The data in the named proofs of applicability applies

## Wood screw

### Flange head-screw HT 6



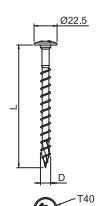
Type	Dimen- sion D mm	Dimen- sion L mm	Head Ø mm	Screw system	Pack. pcs	Weight kg/100 pcs.	Item No.
HT 6x60 TD	6	60	14	Torx	200	0.850	3498130
HT 6x80 TD	6	80	14	Torx	100	0.110	3498132
HT 6x100 TD	6	100	14	Torx	100	0.130	3498134
HT 6x120 TD	6	120	14	Torx	100	0.150	3498136

St Steel

G Electrogalvanised

Self-tapping wood screw for fireproof fastening of cable systems for the maintenance of electrical function according to DIN 4102 Part 12 on supporting wooden structures. The flange head shape allows installation without an additional washer.

### Flange head-screw HT 10



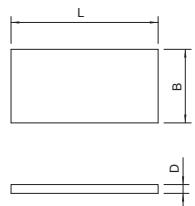
Type	Dimen- sion D mm	Dimen- sion L mm	Head Ø mm	Screw system	Pack. pcs	Weight kg/100 pcs.	Item No.
HT 10x80 TD	10	80	22.5	Torx	50	0.310	3498140
HT 10x100 TD	10	100	22.5	Torx	50	0.370	3498142
HT 10x120 TD	10	120	22.5	Torx	50	0.430	3498144
HT 10x140 TD	10	140	22.5	Torx	50	0.490	3498146

St Steel

G Electrogalvanised

Self-tapping wood screw for fireproof fastening of cable systems for the maintenance of electrical function according to DIN 4102 Part 12 on supporting wooden structures. The flange head shape allows installation without an additional washer.

### Fire protection plate



Type	Dimen- sion L mm	Dimen- sion B mm	Dimen- sion D mm	Pack. pcs	Weight kg/100 pcs.	Item No.
GLB-P1	600	120	20	1	100.000	7205470
GLB-P2	600	120	30	1	150.000	7205472

Glass-fibre lightweight concrete

Fire protection plate (material class A1) as effective panelling measure for fastening on supporting wooden components for the maintenance of electrical function according to DIN 4102 Part 12. Made of fibreglass light concrete which is resistant to water and frost.



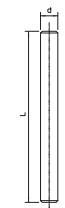
**Threaded rod**

Type	Thread	Dimension d mm	Dimension L mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>TR M8 1M G</b>	M8	8	1000	10	30.000	<b>3141128</b>
<b>TR M10 1M G</b>	M10	10	1000	10	49.000	<b>3141209</b>
<b>TR M12 1M G</b>	M12	12	1000	10	62.000	<b>3141306</b>

S Steel

G Electrogalvanised

Threaded rod to DIN 976.

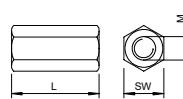
**Connection sleeve**

Type	Thread	Dimension L mm	SW mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>CSTR M8 G</b>	M8	24	13	50	1.880	<b>6410081</b>
<b>CSTR M10 G</b>	M10	30	17	50	4.150	<b>6410103</b>
<b>CSTR M12 G</b>	M12	40	19	25	7.000	<b>6410111</b>

S Steel

G Electrogalvanised

Connection sleeve with continuous internal thread.

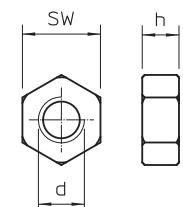
**Hexagonal nut DIN 934**

Type	Thread	SW mm	Dimension h mm	Dimension d mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>HN M8 G</b>	M8	13	6.8	8	100	0.474	<b>3400085</b>
<b>HN M10 G</b>	M10	17	8.4	10	100	1.084	<b>3400107</b>
<b>HN M12 G</b>	M12	19	10.8	12	100	1.730	<b>3400123</b>

S Steel

G Electrogalvanised

Hexagonal nut to DIN 934 with metric thread.

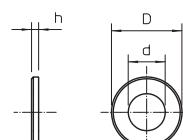
**Washer**

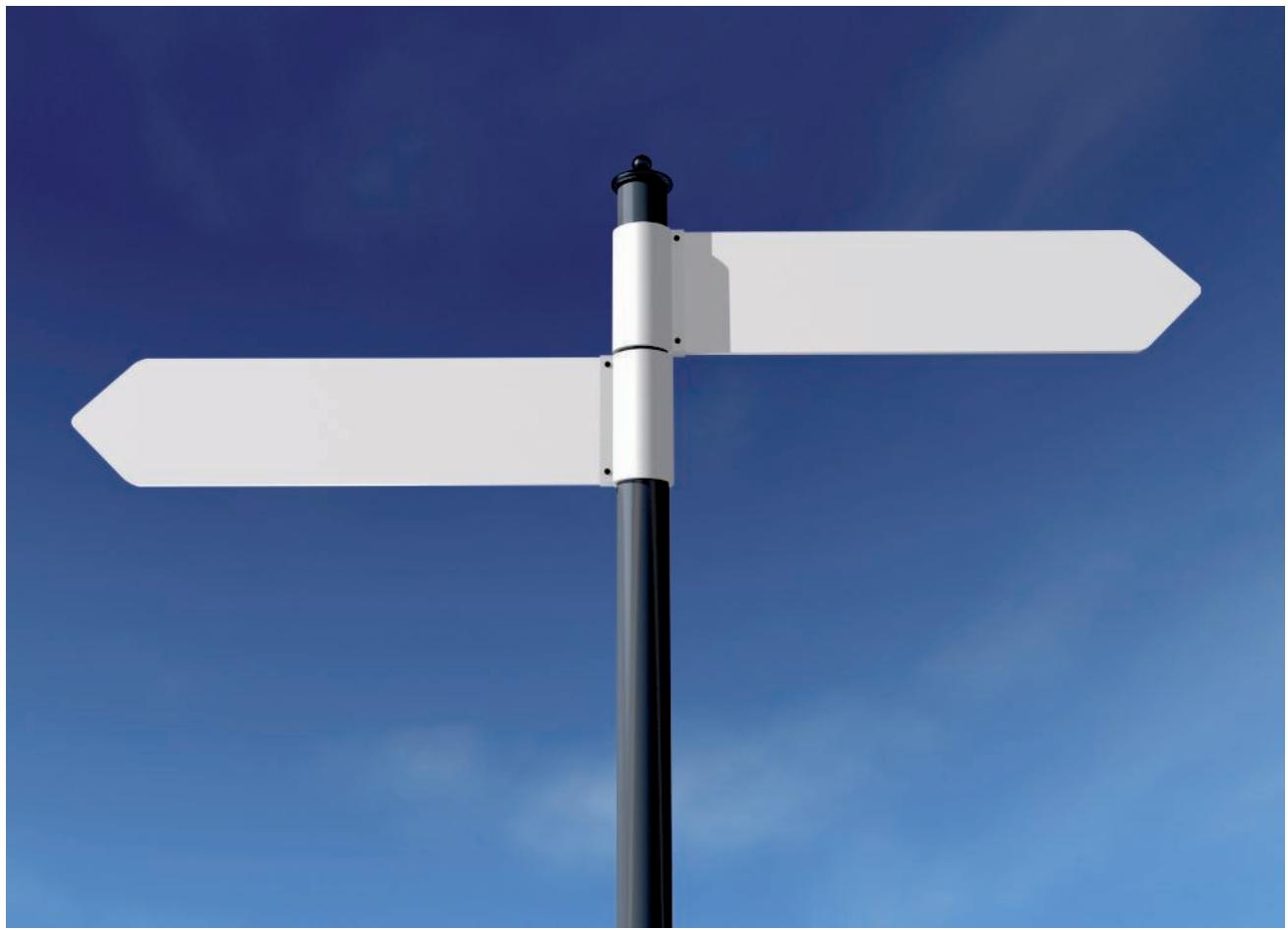
Type	Thread	Dimension d mm	Dimension D mm	Dimension h mm	Pack. pcs	Weight kg/100 pcs.	Item No.
<b>WS M8 D16 G</b>	M8	8.4	16	1.6	100	0.214	<b>3402088</b>
<b>WS M10 D20 G</b>	M10	10.5	20	2	100	0.408	<b>3402096</b>
<b>WS M12 D24 G</b>	M12	13	24	2.5	100	0.627	<b>3402126</b>

S Steel

G Electrogalvanised

Washer according to DIN 125, shape A, for universal use.







## Directories



### Numeric directory

214



### Type listing

216



GTIN	Art. no.	Page													
	/100 pc.			/100 pc.			price/100			/100 pc.			/m		
5000792	<b>1003038</b>	108	5114734	<b>1360140</b>	186	5781431	<b>2046534</b>	192	5300434	<b>3402223</b>	103	5390879	<b>6047611</b>	58	
5000853	<b>1003046</b>	108	5114796	<b>1360159</b>	186	5781448	<b>2046535</b>	192				5903895	<b>6047612</b>	136	
5000914	<b>1003054</b>	108	5114857	<b>1360167</b>	186	5781486	<b>2046536</b>	192	6411962	<b>3492900</b>	202	5706083	<b>6047613</b>	154	
5000976	<b>1003062</b>	108	5114918	<b>1360183</b>	186	5781493	<b>2046537</b>	192	6411979	<b>3492910</b>	202	5706113	<b>6047614</b>	154	
5001034	<b>1003070</b>	108	5114970	<b>1360205</b>	186	5781509	<b>2046538</b>	192	6411986	<b>3492912</b>	203	5391203	<b>6047638</b>	58	
5001096	<b>1003089</b>	108	5115038	<b>1360221</b>	186	5781547	<b>2046540</b>	192	6411993	<b>3492920</b>	202	5903932	<b>6047639</b>	136	
5001157	<b>1003097</b>	108	5115090	<b>1360248</b>	186	5782148	<b>2046593</b>	193	6412006	<b>3492922</b>	203	5706144	<b>6047640</b>	154	
5001218	<b>1003100</b>	108	5115151	<b>1360264</b>	186	5782155	<b>2046594</b>	193	6412013	<b>3492930</b>	202	5706175	<b>6047641</b>	154	
5001270	<b>1003119</b>	108	5115212	<b>1360280</b>	186	5782162	<b>2046595</b>	193	6412020	<b>3492932</b>	203	5391210	<b>6047654</b>	58	
5001331	<b>1003127</b>	108	5115274	<b>1360302</b>	186	5782209	<b>2046596</b>	193				5903949	<b>6047655</b>	136	
5001393	<b>1003135</b>	108	5115335	<b>1360337</b>	186	5782216	<b>2046597</b>	193	6651290	<b>3498103</b>	18	5706182	<b>6047656</b>	154	
5001454	<b>1003178</b>	108	5115397	<b>1360353</b>	186	5782223	<b>2046598</b>	193				5706199	<b>6047657</b>	154	
5001515	<b>1003194</b>	108	5115458	<b>1360388</b>	186	5782261	<b>2046599</b>	193	6559657	<b>3498108</b>	18	5391227	<b>6047689</b>	58	
5001577	<b>1003208</b>	108	5115519	<b>1360396</b>	186				6559626	<b>3498124</b>	206	5903956	<b>6047690</b>	136	
5001638	<b>1003216</b>	108	5115571	<b>1360426</b>	186	5782384	<b>2046620</b>	193	6563920	<b>3498130</b>	210				
5001690	<b>1003232</b>	108	5115632	<b>1360450</b>	186	5782391	<b>2046621</b>	193	6563937	<b>3498132</b>	210	5829553	<b>6059000</b>	58	
5566892	<b>1003259</b>	108	5115694	<b>1360485</b>	186	5782407	<b>2046622</b>	193	6563944	<b>3498134</b>	210	5829942	<b>6059004</b>	58	
5001751	<b>1003283</b>	108	5115755	<b>1360507</b>	186	5782445	<b>2046623</b>	193	6563951	<b>3498136</b>	210	5829959	<b>6059006</b>	58	
5566953	<b>1003321</b>	108	5115878	<b>1360604</b>	186	5782452	<b>2046624</b>	193	6563968	<b>3498140</b>	210	5829966	<b>6059008</b>	58	
5001812	<b>1003356</b>	108	5569114	<b>1360639</b>	186	5782469	<b>2046625</b>	193	6563975	<b>3498142</b>	210	5832485	<b>6059456</b>	58	
5001874	<b>1003372</b>	108	5912378	<b>1360644</b>	187	5782490	<b>2046626</b>	193	6563982	<b>3498144</b>	210	5832508	<b>6059460</b>	58	
5001935	<b>1003402</b>	108	5912385	<b>1360646</b>	187		price/100		6563999	<b>3498146</b>	210	5832546	<b>6059462</b>	58	
5002055	<b>1003461</b>	108	5912392	<b>1360648</b>	187	5924647	<b>2046840</b>	192	6559633	<b>3498159</b>	206	5832553	<b>6059464</b>	58	
			5912408	<b>1360650</b>	187	5924654	<b>2046841</b>	192	6559664	<b>3498261</b>	18	5832560	<b>6059466</b>	58	
	price/100		5912415	<b>1360652</b>	187	5924661	<b>2046842</b>	192	6559671	<b>3498264</b>	206	5832591	<b>6059468</b>	58	
5694458	<b>1104497</b>	180	5912422	<b>1360654</b>	187	5924678	<b>2046843</b>	192	6559640	<b>3498272</b>	108				
5038771	<b>1104500</b>	180	5912439	<b>1360656</b>	187	5924685	<b>2046844</b>	192	6411818	<b>3498320</b>	39	5694441	<b>6062025</b>	156	
			5912446	<b>1360658</b>	187	5924692	<b>2046845</b>	192	6411825	<b>3498322</b>	203	5694489	<b>6062033</b>	63	
5050230	<b>1121979</b>	180	5912453	<b>1360660</b>	187	5924708	<b>2046846</b>	192	6411832	<b>3498326</b>	202	5694540	<b>6062068</b>	63	
			5912460	<b>1360662</b>	187				6411856	<b>3498334</b>	202	5694557	<b>6062084</b>	156	
			5912477	<b>1360664</b>	187	5924784	<b>2046854</b>	192	6411863	<b>3498336</b>	203				
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5686217	<b>1122902</b>	62	5912491	<b>1360668</b>	187	5924807	<b>2046856</b>	192	6411887	<b>3498342</b>	202	5694625	<b>6062282</b>	63	
6255726	<b>1122904</b>	62	5912507	<b>1360670</b>	187	5924814	<b>2046857</b>	192	6411894	<b>3498350</b>	202	5694656	<b>6062284</b>	144	
5894117	<b>1122906</b>	62	5912514	<b>1360672</b>	187	5924821	<b>2046858</b>	192	6411948	<b>3498396</b>	39				
	price/100		5912538	<b>1360676</b>	187	5924838	<b>2046859</b>	192							
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5686224	<b>1122910</b>	62	5912583	<b>1360680</b>	187		price/100		6101771	<b>6001078</b>	155	5694724	<b>6067970</b>	144	
5686262	<b>1122918</b>	61	5912590	<b>1360682</b>	187	5924852	<b>2046861</b>	192	6858552	<b>6001442</b>	60				
5686279	<b>1122920</b>	61	5912606	<b>1360684</b>	187	5924869	<b>2046862</b>	192	6858613	<b>6001446</b>	60	5889502	<b>6068914</b>	59	
5697541	<b>1122923</b>	61	5912637	<b>1360686</b>	187	5924876	<b>2046863</b>	192	6858675	<b>6001448</b>	60	5889526	<b>6068918</b>	59	
5686293	<b>1122924</b>	61	5912644	<b>1360688</b>	187	5924883	<b>2046864</b>	192	6858736	<b>6001450</b>	60	5889533	<b>6068920</b>	59	
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5698098	<b>1122964</b>	62				5924906	<b>2046866</b>	192							
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			5029861	<b>1361106</b>	188	5808992	<b>2086018</b>	102	7261436	<b>6016855</b>	60	5890522	<b>6068942</b>	137	
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6489398	<b>1147106</b>	181	5029885	<b>1361112</b>	188	5809593	<b>2086036</b>	102							
			5254348	<b>1361115</b>	188	5809777	<b>2086042</b>	102	6446896	<b>6018505</b>	163				
						5809777	<b>2086042</b>	102							
5062714	<b>1156004</b>	164	5615651	<b>1361117</b>	188	5474135	<b>2091607</b>	102	5881674	<b>6041080</b>	154	5064022	<b>6208538</b>	163	
5062776	<b>1156012</b>	164	5254386	<b>1361118</b>	188	5809890	<b>2086048</b>	102	5881698	<b>6041084</b>	154	5064053	<b>6208541</b>	163	
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5062899	<b>1156039</b>	164	5116172	<b>1361236</b>	188							5064251	<b>6208627</b>	163	
5062950	<b>1156047</b>	164	5116233	<b>1361295</b>	188	5474135	<b>2091607</b>	102	5881674	<b>6041080</b>	154	5064268	<b>6208630</b>	163	
5063018	<b>1156055</b>	164	5116295	<b>1361384</b>	188	5931690	<b>2091615</b>	102	5881698	<b>6041084</b>	154	5064299	<b>6208633</b>	163	
5063070	<b>1156063</b>	164	5116356	<b>1361481</b>	188	5931751	<b>2091623</b>	102	5881704	<b>6041086</b>	154				
5063131	<b>1156071</b>	164	5116417	<b>1361511</b>	188	5931812	<b>2091631</b>	102	5881810	<b>6041130</b>	58	5065555	<b>6208840</b>	163	
5063193	<b>1156098</b>	164	5116479	<b>1361619</b>	188	5931874	<b>2091658</b>	102	5881834	<b>6041134</b>	58				
5063254	<b>1156101</b>	164	5116530	<b>1361635</b>	188	5474197	<b>2091666</b>	102	5881841	<b>6041136</b>	58	5677932	<b>6220139</b>	138	
5063315	<b>1156128</b>	164				5474791	<b>2091674</b>	102	588						

GTIN	Art. no.	Page	GTIN	Art. no.	Page	GTIN	Art. no.	Page
	/pc.			/100 pc.				/m
6187638	<b>6339298</b>	141	6202218	<b>6410081</b>	211	6532513	<b>7216600</b>	79
6187690	<b>6340016</b>	141	6202270	<b>6410103</b>	143	6532520	<b>7216601</b>	79
6187751	<b>6340032</b>	141	6202331	<b>6410111</b>	64	6532537	<b>7216602</b>	80
6187812	<b>6340059</b>	141		/pc.		6532551	<b>7216603</b>	80
6187874	<b>6340075</b>	141	6202812	<b>6416500</b>	61	6532568	<b>7216604</b>	81
6187935	<b>6340091</b>	141	6894253	<b>6416504</b>	142	6532544	<b>7216605</b>	81
6187997	<b>6340113</b>	141	6202874	<b>6416519</b>	142	6532575	<b>7216606</b>	83
6188055	<b>6340148</b>	141				6532582	<b>7216607</b>	83
6188116	<b>6340164</b>	141		/100 pc.		6532599	<b>7216608</b>	82
6188178	<b>6340180</b>	141	6437474	<b>6418250</b>	144	6532605	<b>7216609</b>	82
6188239	<b>6340199</b>	141	6518470	<b>6418252</b>	63	6532612	<b>7216610</b>	84
6188291	<b>6340202</b>	141	6204434	<b>6418287</b>	144	6532629	<b>7216611</b>	84
6188352	<b>6340210</b>	141	6204496	<b>6418295</b>	144	6532636	<b>7216612</b>	88
6188413	<b>6340229</b>	141	6204557	<b>6418317</b>	144	6532643	<b>7216613</b>	85
6188475	<b>6340237</b>	141		/pc.		6532650	<b>7216614</b>	86
6188536	<b>6340245</b>	141	6204731	<b>6418554</b>	143	6532667	<b>7216615</b>	87
6188659	<b>6340261</b>	141	6204793	<b>6418570</b>	143	6532674	<b>7216616</b>	86
6188710	<b>6340288</b>	141	6204854	<b>6418597</b>	143	6532681	<b>7216617</b>	87
6188772	<b>6340296</b>	141				6532711	<b>7216620</b>	88
6959006	<b>6340881</b>	140	6206599	<b>6419704</b>	143	6532728	<b>7216621</b>	89
6959068	<b>6340903</b>	140					/m	
6959129	<b>6340911</b>	140	6662531	<b>6420608</b>	142	6532209	<b>7216630</b>	90
6959181	<b>6340938</b>	140	6662593	<b>6420610</b>	142		/pc.	
6601752	<b>6340946</b>	140	6662654	<b>6420612</b>	142	6532216	<b>7216631</b>	85
6043927	<b>6340950</b>	140	6207190	<b>6420680</b>	142	6532223	<b>7216632</b>	96
6044047	<b>6340954</b>	140	6207251	<b>6420710</b>	142	6532230	<b>7216633</b>	90
6044160	<b>6340958</b>	140	6207312	<b>6420745</b>	142	6532247	<b>7216634</b>	91
6284177	<b>6340962</b>	140				6532254	<b>7216635</b>	91
6437597	<b>6340966</b>	140	6079971	<b>7070205</b>	59	6532261	<b>7216636</b>	92
6437658	<b>6340970</b>	140	6094882	<b>7070213</b>	59	6532278	<b>7216637</b>	92
			6094943	<b>7070217</b>	59	6532285	<b>7216638</b>	94
6536771	<b>6341527</b>	61	6095001	<b>7070221</b>	59	6532292	<b>7216639</b>	94
6536719	<b>6341535</b>	61	6095063	<b>7070225</b>	59	6532308	<b>7216640</b>	93
6536658	<b>6341543</b>	61	6095186	<b>7070233</b>	59	6532315	<b>7216641</b>	93
6536597	<b>6341551</b>	61				6532322	<b>7216642</b>	95
6536535	<b>6341558</b>	61	6231072	<b>7083106</b>	59	6532339	<b>7216643</b>	95
6536474	<b>6341586</b>	61	6231195	<b>7083203</b>	59	6532346	<b>7216644</b>	100
6536412	<b>6341594</b>	61	6231256	<b>7083300</b>	59	6532353	<b>7216645</b>	97
6536351	<b>6341608</b>	61	6231317	<b>7083408</b>	59	6532360	<b>7216646</b>	97
6536290	<b>6341616</b>	61	6231379	<b>7083505</b>	59	6532377	<b>7216647</b>	98
6536238	<b>6341624</b>	61	6231492	<b>7083602</b>	59	6532384	<b>7216648</b>	99
6536177	<b>6341632</b>	61	6983728	<b>7083618</b>	137	6532391	<b>7216649</b>	98
			6982943	<b>7083626</b>	137	6532407	<b>7216650</b>	99
6221776	<b>6342302</b>	139	6982882	<b>7083630</b>	137	6532445	<b>7216654</b>	100
6222018	<b>6342304</b>	139	6024254	<b>7083634</b>	137	6532452	<b>7216655</b>	101
6222070	<b>6342306</b>	139						
6222315	<b>6342308</b>	139	6651887	<b>7203165</b>	18			
6222377	<b>6342310</b>	139	6475513	<b>7203170</b>	124			
6222438	<b>6342312</b>	139						
6222490	<b>6342314</b>	139	5725695	<b>7205429</b>	19			
6223510	<b>6342316</b>	139	6561810	<b>7205430</b>	19			
6223572	<b>6342318</b>	139	5811688	<b>7205432</b>	109			
6224470	<b>6342351</b>	139	6564002	<b>7205470</b>	210			
6224531	<b>6342353</b>	139	6564019	<b>7205472</b>	210			
6224593	<b>6342355</b>	139	5930143	<b>7205510</b>	172			
6224654	<b>6342357</b>	139	5930150	<b>7205520</b>	172			
6224715	<b>6342359</b>	139	5930167	<b>7205524</b>	172			
6224777	<b>6342362</b>	139	5993100	<b>7205540</b>	170			
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MSL4141P1000FT	5698081	1122962	62	S40W G	5924685	2046844	192
MSL4141P3000FS	5698159	1122972	62	S50W FT	5782223	2046598	193
MSL4141P3000FT	5698098	1122964	62	S50W G	5924692	2046845	192
N 6-5-10/49	6411948	/100 pc.		S63W FT	5782261	2046599	193
N 6-5-10/49	6411948	3498396	39	S63W G	5924708	2046846	192
		3498396	202				
RAAM 610 A2	5878797	/pc.					
RAAM 610 FS	5878568	6041270	154	RAAM 610 A2	5878797	/100 pc.	
RAAM 610 FS	5878568	6041230	59	SKS 10x80 F	6437474	6418250	144
RAAM 610 FT	5878698	6041230	136	SKS 10x90 F	6518470	6418252	63
RAAM 620 A2	5878810	6041250	136	SKS 10x90 F	6518470	6418252	144
RAAM 620 A2	5878810	6041275	154	SKS 12x100 F	6204496	6418295	144
RAAM 620 FS	5878582	6041234	59	SKS 12x110 F	6204557	6418317	144
RAAM 620 FS	5878582	6041234	136	SKS 12x80 F	6204434	6418287	144
RAAM 620 FT	5878742	6041254	136				
RAAM 630 A2	5878827	6041277	154				
RAAM 630 FS	5878629	6041236	59	RAAM 630 A2	5878827	/m	
RAAM 630 FS	5878629	6041236	136	SKSM 610 FS	5832485	6059456	58
RAAM 630 FT	5878759	6041257	136	SKSM 620 FS	5832508	6059460	58
RAAM 640 FS	5878636	6041238	59	SKSM 630 FS	5832546	6059462	58
RAAM 640 FS	5878636	6041238	136	SKSM 640 FS	5832553	6059464	58
RAAM 640 FT	5878766	6041259	136	SKSM 650 FS	5832560	6059466	58
RAAM 650 FS	5878643	6041240	59	SKSM 660 FS	5832591	6059468	58
RAAM 660 FS	5878681	6041242	59				
RBM 45 610 A2	5881674	6041080	154	SM16W FT	5781424	price/100	
RBM 45 620 A2	5881698	6041084	154	SM16W G	5924852	2046861	192
RBM 45 630 A2	5881704	6041086	154	SM20W FT	5781431	2046534	192
RBM 90 610 A2	5881957	6041180	154	SM20W G	5924869	2046862	192
RBM 90 610 FS	5881810	6041130	58	SM25W FT	5781448	2046535	192
RBM 90 610 FS	5881810	6041130	136	SM25W G	5924876	2046863	192
RBM 90 610 FT	5881889	6041150	136	SM32W FT	5781486	2046536	192
RBM 90 620 A2	5878322	6041184	154	SM32W G	5924883	2046864	192
RBM 90 620 FS	5881834	6041134	58	SM40W FT	5781493	2046537	192
RBM 90 620 FS	5881834	6041134	136	SM40W G	5924890	2046865	192
RBM 90 620 FT	5881902	6041154	136	SM40W G	5924890	2046865	192
RBM 90 630 A2	5878339	6041186	154	SM50W FT	5781509	2046538	192
RBM 90 630 FS	5881841	6041136	58	SM50W G	5924906	2046866	192
RBM 90 630 FS	5881841	6041136	136	SM63W FT	5781547	2046540	192
RBM 90 630 FT	5881919	6041156	136	SM63W G	5924913	2046867	192
RBM 90 640 FS	5881858	6041138	58				
RBM 90 640 FS	5881858	6041138	136	SSLB 100 FS	6079971	/pc.	
RBM 90 640 FT	5881926	6041158	136	SSLB 200 FS	6094882	7070205	
RBM 90 650 FS	5881865	6041140	58	SSLB 300 FS	6094943	7070213	
RBM 90 660 FS	5881872	6041142	58	SSLB 400 FS	6095001	7070217	
		/m		SSLB 500 FS	6095063	7070221	
RKSM 610 A2	5706083	6047613	154	SSLB 600 FS	6095186	7070225	
RKSM 610 A4	5706113	6047614	154				
RKSM 610 FS	5390879	6047611	58	SV16W FT	5782384	/100 pc.	
RKSM 610 FS	5390879	6047611	136	SV16W G	5924784	2046620	
RKSM 610 FT	5903895	6047612	136	SV20W FT	5782391	2046854	
RKSM 620 A2	5706144	6047640	154	SV20W G	5924791	2046855	
RKSM 620 A4	5706175	6047641	154	SV25W FT	5782407	2046622	
RKSM 620 FS	5391203	6047638	58	SV25W G	5924807	2046856	
RKSM 620 FS	5391203	6047638	136	SV32W FT	5782445	2046623	
RKSM 620 FT	5903932	6047639	136	SV32W G	5924814	2046857	
RKSM 630 A2	5706182	6047656	154	SV40W FT	5782452	2046624	
RKSM 630 A4	5706199	6047657	154				
RKSM 630 FS	5391210	6047654	58				
RKSM 630 FS	5391210	6047654	136				
RKSM 630 FT	5903949	6047655	136				
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SV63W FT	5782490	2046626	193	US 5 K 30 FT	6536719	6341535	140
SV63W G	5924845	2046860	192	US 5 K 40 FT	6536658	6341543	61
			/pc.	US 5 K 40 FT	6536658	6341543	140
T 100 E 4-5	5930143	7205510	172	US 5 K 50 FT	6536597	6341551	61
T 100 ED 6-5 A	5993100	7205540	170	US 5 K 50 FT	6536597	6341551	140
T 160 E 10-5	5930167	7205524	172	US 5 K 60 FT	6536535	6341578	61
T 160 E 4-8D	5930150	7205520	172	US 5 K 60 FT	6536535	6341578	140
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TR M10 1M G	5253396	3141209	116	US 5 K 90 FT	6536351	6341608	61
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TSG 60 FS	5694540	6062068	63	US 7 50 FT	6187874	6340075	141
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US 3 60 FS	6222377	6342310	139	US 7 K 150 FT	6187331	6339239	141
US 3 70 FS	6222438	6342312	139	US 7 K 160 FT	6187393	6339247	141
US 3 80 FS	6222490	6342314	139	US 7 K 170 FT	6187454	6339255	141
US 3 90 FS	6223510	6342316	139	US 7 K 180 FT	6187515	6339263	141
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