

Fire-resistant cable installation

Above suspended fire protection ceilings

How building materials and
components react to fire
Tested to DIN 4102

BSS Fire protection systems

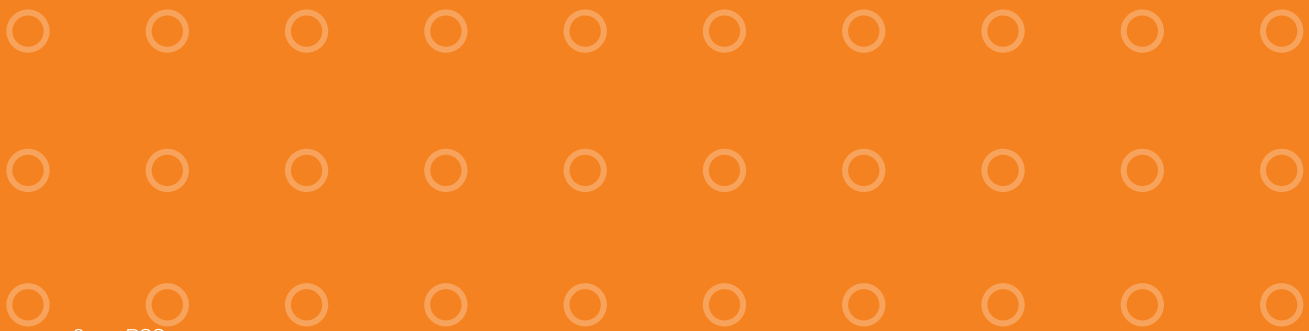


Tested for
MLAR

OBO
BETTERMANN

Safe as houses

OBO fire protection in false ceilings



We have thought of everything – because there can be no weak links in the fire protection chain

OBO has been producing fire protection systems for electrical installations for many years. In accordance with the requirements of statutory regulations and legal provisions, all systems have been tested and approved to applicable fire protection standards. As safety is becoming an ever more prevalent issue, legislators are continuing the now familiar trend of setting out more and more specifications for fire protection. The validity of these specifications extends to electrical installations, and proof of such compliance must be provided. Options for fire-resistant cable installation above suspended fire protection ceilings do of course also fall within the scope of such specifications.

MLAR (guidelines for the fire protection requirements to be met by cable systems in Germany)

The latest version of MLAR, published in March 2000, has been adopted in currently enforceable construction law in all German states.

This has led to the introduction of a number of important changes affecting electrical installations. With few exceptions, open cable installations may no longer be used in escape routes and emergency exits.

Options for cable installation in escape routes and emergency exits

In escape routes and emergency exits, electrical lines must be installed as follows:

- Individually, fully embedded in plaster or in wall channels covered with a layer of plaster
- In fire protection ducts, e.g. OBO BSK
- Above suspended ceilings

Requirements to be met when installing cables in false ceilings

Suspended fire protection ceilings, tested and approved for fire loads from above, ensure that false ceilings are protected against fire. In the event of the cables installed catching fire, escape routes and emergency exits can still be used.

However, it must be ensured that the ceiling does not become subject to additional mechanical load in the event of fire. In the event of fire in a false ceiling, the latter must not come down or bow. This requirement is also applicable to all other installations, e.g. sanitary services, ventilation.

Options for cable installation in false ceilings

In principle, there are two methods for installing cables in false ceilings:

- Function maintenance installation systems to DIN 4102 Part 12
- Installation systems tested and approved specifically for this type of application

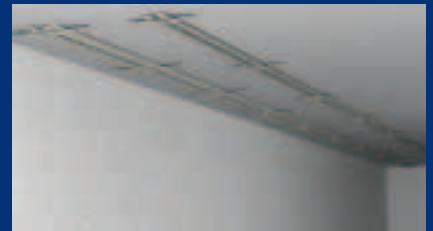
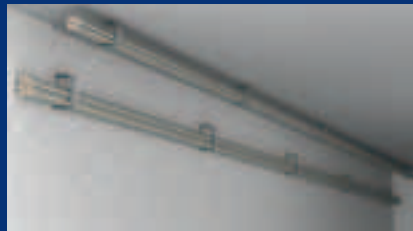
If function maintenance systems are used in conjunction with standard insulated cables and lines, all installation parameters must remain unaffected, in order to avoid invalidating test certificates proving compliance. However, these installation parameters are not entirely satisfactory for cable installation in practice.

Tested and approved installation options by OBO Bettermann

OBO Bettermann has carried out fire testing based on the requirements of DIN 4102 in order to make possible practical options for cable installation in false ceilings.

The following solutions have been tested and approved:

- Wall-mounting and ceiling-mounting cable support systems
- Type 2031 M/15 and type 2031 M/30 grouped support for wall and ceiling mounting
- Type 2023 M and type 2034 M metal pressure clips for ceiling mounting



Stable and strong

OBO cable support systems



OBO cable support systems for false ceilings

In Germany, there is no single test standard for the use of cable support systems above suspended fire protection ceilings. OBO's installation systems were therefore tested based on the requirements of DIN 4102 under a fire load of 30 minutes' duration.

The following requirements were tested:

- Stability of the installation system
- Distortion of the installation system

System description

The tested and approved installation system comprises cable trays with a rail height of 60 mm and widths up to a maximum of 600 mm. Cable trays are connected by making a special screwed joint. The system can be mounted on a suspension system or on a wall.

The suspension system comprises a support to which a bracket is connected. In the event of wall mounting, this bracket is fixed directly to the wall.

In order to prevent the bracket tip bending, it must be fitted with a threaded rod protector (vertical to the ceiling). For this purpose, a suitable connection angle is screwed into the bracket tip.

The threaded rod can be fixed to the ceiling with a fire protection bracket or directly in a female anchor.

Cable loads

Every 100 mm of tray width can support a cable load of up to 15 kg/m. This value applies for both types of cable tray used. This results in the following maximum possible cable occupations under a fire load of 30 minutes' duration, determined by the various tray widths.

Tray width	Cable occupation
200 mm	Max. 30 kg/m
300 mm	Max. 45 kg/m
400 mm	Max. 60 kg/m
500 mm	Max. 75 kg/m
600 mm	Max. 90 kg/m

Distortions

As the cable load placed on the cable trays in the event of fire leads to distortion, these distortions must be taken into account when specifying the distances between the cable trays and the suspended ceiling.

This results in the following cable tray distortion rates at maximum possible cable occupation, determined by the various tray widths.

Tray type	Tray width	Distortion
MKS 620	200 mm	80 mm
MKS 630	300 mm	125 mm
MKS 640	400 mm	170 mm

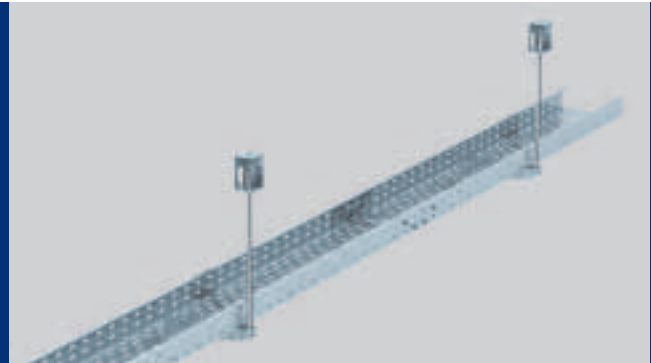
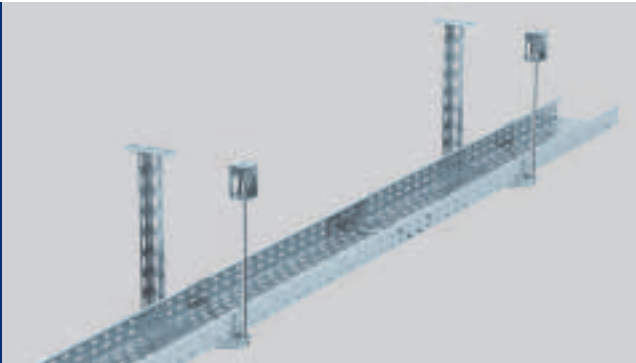
System limits

Span:	Max. 1.5 m
Width of cable trays:	
Type MKS 6	200 mm
	300 mm
	400 mm
Type SKS 6	200 mm
	300 mm
	400 mm
	500 mm
	600 mm
No. of layers:	1 layer

Tray type	Tray width	Distortion
SKS 620	200 mm	65 mm
SKS 630	300 mm	95 mm
SKS 640	400 mm	130 mm
SKS 650	500 mm	160 mm
SKS 660	600 mm	190 mm

Safety in detail

Equipment required



Equipment required per suspension point:

Component	Number	Type
Support	1	US 5 K...
Fire protection bolt anchor	2	FAZ 12/10
Bracket	1	AW 30F/...
Spacer	1	DSK 45
Hexagon head bolt (complete)	1	12530/90
Cable tray	1	MKS 6.../ SKS 6...
Connector (complete)	2	RWWL 60
Joint plate (complete)	1	SSLB...
Truss-head bolt (complete)	5	FRS B 6 x 12
Truss-head bolt (complete)	1	FRS B 6 x 20
Threaded rod	1	2078 M12

Ceiling mounting with fire protection bracket

Fire protection bracket	1	BSB
Fire protection anchor	1	FAZ 12/10
Hexagon nut	4	934 M12
Washer	2	966/12

Ceiling mounting with female anchor

Fire protection anchor	1	FZEA 14 x 40
Hexagon nut	2	934 M12
Washer	1	966/12

Equipment required per suspension point:

Component	Number	Type
Bracket	1	AW 30F/...
Fire protection anchor or	1	FAZ 12/10 or
Fire protection anchor bolt	1	MMS 10x80
Cable tray	1	MKS 6.../ SKS 6...
Connector (complete)	2	RWWL 60
Joint plate (complete)	1	SSLB...
Truss-head bolt (complete)	5	FRS B 6 x 12
Truss-head bolt (complete)	1	FRS B 6 x 20
Threaded rod	1	2078 M12

Ceiling mounting with fire protection bracket

Fire protection bracket	1	BSB
Fire protection anchor	1	FAZ 12/10
Hexagon nut	4	934 M12
Washer	2	966/12

Ceiling mounting with female anchor

Fire protection anchor	1	FZEA 14 x 40
Hexagon nut	2	934 M12
Washer	1	966/12

Ordering data

Cable support systems



U support				
Type	Length mm	Pack qty	Weight kg/100	Art. no.
US 5 K/020	200	1	100.000	6341 52 7
US 5 K/030	300	1	125.000	6341 53 5
US 5 K/040	400	1	150.000	6341 54 3
US 5 K/050	500	1	175.000	6341 55 1
US 5 K/060	600	1	200.000	6341 57 8
US 5 K/070	700	1	225.000	6341 58 6
US 5 K/080	800	1	255.000	6341 59 4
US 5 K/090	900	1	280.000	6341 60 8
US 5 K/100	1000	1	300.000	6341 61 6
US 5 K/110	1100	1	330.000	6341 62 4
US 5 K/120	1200	1	360.000	6341 63 2



Bracket				
Type	Length mm	Pack qty	Weight kg/100	Art. no.
AW 30F/21	210	20	42.000	6417 02 7
AW 30F/31	310	20	63.000	6417 04 3
AW 30F/41	410	20	93.000	6417 07 8
AW 30F/51	510	10	137.000	6417 09 4
AW 30F/61	610	10	167.000	6417 11 6




Spacer			
Type	Pack qty	Weight kg/100	Art. no.
DSK 45	25	19.000	6416 50 0



Hexagon head bolt				
Type	Dim. mm	Pack qty	Weight kg/100	Art. no.
SKS 10x90	M 10 x 90	20	8.000	6418 25 2




Fire protection bracket			
Type	Pack qty	Weight kg/100	Art. no.
BSB	1	41.000	6418 19 8



MKS cable tray			
Type	Width mm	Weight kg/100	Art. no.
MKS 620	200	225.600	6055 20 6
MKS 630	300	281.000	6055 30 3
MKS 640	400	348.300	6055 40 0

Stock length 3000 mm, sheet thickness 1 mm



SKS cable tray			
Type	Width mm	Weight kg/100	Art. no.
SKS 620	200	356.800	6056 20 2
SKS 630	300	421.500	6056 29 6
SKS 640	400	522.400	6056 40 7
SKS 650	500	650.300	6056 50 4
SKS 660	600	726.600	6056 60 1


Stock length 3000 mm, sheet thickness 1.5 mm



Angle connector				
Type	Side height mm	Pack qty	Weight kg/100	Art. no.
RWWL 60	60	10	17.500	6067 11 5



SSLB joint plate				
Type	Width mm	Pack qty	Weight kg/100	Art. no.
SSLB 200	200	20	17.900	7070 21 3
SSLB 300	300	20	27.600	7070 21 7
SSLB 400	400	20	37.300	7070 22 1
SSLB 500	500	20	46.900	7070 22 5
SSLB 600	600	20	56.600	7070 23 3




Truss-head bolt				
Type	Dimensions mm	Pack qty	Weight kg/100	Art. no.
FRS B 6 x 12	M6 x 12	100	0.990	6406 12 2
FRS B 6 x 20	M6 x 20	100	1.137	6406 20 3




Threaded rod				
Type	Thread	Pack qty	Weight kg/100	Art. no.
2078 M12	M12	1000	1.000	3141 30 6

Length: 1000 mm



Hexagon nut				
Type	Thread	Pack qty	Weight kg/100	Art. no.
DIN 934	M12	100	1.730	3400 12 3



Washer				
Type	Thread	Pack qty	Weight kg/100	Art. no.
966	M12	100	0.627	3402 12 6




Bolt anchor				
Type	Thread	Pack qty	Weight kg/100	Art. no.
FAZ 12/10	M12	20	10.400	3498 65 4

Approval no. ETA-00-0001




Drive-in tie bolt				
Type	Thread	Pack qty	Weight kg/100	Art. no.
FZEA 14 x 40	M12	50	2.750	3492 09 5



General purpose masonry drill				
Type	Drill Ø mm	Pack qty	Weight kg/100	Art. no.
FZUB 14 x 40	14	1	12.500	3492 39 7



Drive-in mandrel				
Type	Pack qty	Weight kg/100	Art. no.	
FZED 14 x 40	10	25.000	3492 69 9	

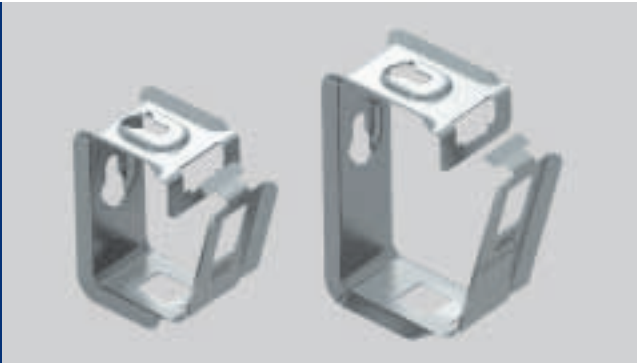


Fire protection anchor bolt				
Type	Dimensions mm	Pack qty	Weight kg/100	Art. no.
MMS 10 x 80	10 x 80	50	3.800	3498 12 3

Approval no. Z-21.1-1549

Strong and durable

OBO grouped supports



The mechanical stability of OBO GRIP type 2031 M/15 and type 2031 M/30 grouped supports was tested in accordance with DIN 4102 under a fire load of 90 minutes' duration.

Description

OBO GRIP grouped supports have been used in cable installation for many years. In this respect, the use of the metal supports for function maintenance is a specific application in terms of fire protection. Proof of the stability of OBO grouped supports made from sheet steel for ceiling and wall mounting can now also be provided.

For cable occupation, the grouped supports can be opened easily at the front, with no need for additional tools. Once the cables have been installed, the grouped supports can be closed just as easily, without having to use a tool. The design of the fastening and the weight of the installed cables prevent unintentional opening following installation.

Load-bearing capacity

For fire testing in accordance with DIN 4102, proof of stability was calculated for the following load-bearing capacities under a fire load of 90 minutes' duration.

The values are relevant for wall and ceiling mounting respectively.

Type	Load-bearing capacity
2031 M/15	Max. 2.0 kg
2031 M/30	Max. 3.5 kg

Cable occupation

The possible cable occupation based on load-bearing capacity is significantly higher than the theoretical cable occupation. This is based on occupation with NYM lines 3 x 1.5 mm² or on cables and lines 9 mm in diameter. Type 2031 M/15 and type 2031 M/30 grouped supports can hold 15 and 30 of these lines respectively.

Based on installation clearance, the following cable weights are possible.

Installation clearance	Possible cable weight	
	Type 2031 M/15	Type 2031 M/30
40 cm	5.00 kg/m	875 kg/m
50 cm	4.00 kg/m	7.00 kg/m
60 cm	3.33 kg/m	5.83 kg/m
70 cm	2.86 kg/m	5.00 kg/m
80 cm	2.50 kg/m	4.38 kg/m

Ordering data

Grouped support

The table below lists approximate dimensions and weights of a number of cables and lines for calculating cable weight.

Cable type	Cable ø	Weight
NYM 3 x 1.5 mm ²	8.2 mm	0.135 kg/m
NYM 5 x 1.5 mm ²	9.5 mm	0.190 kg/m
J-Y(St)Y 2 x 2 x 0.6 mm ²	5.0 mm	0.030 kg/m
J-Y(St)Y 10 x 2 x 0.6 mm ²	9.0 mm	0.110 kg/m

Mounting

The stability of the grouped support under fire load can only be assured if the mounting under the ceiling or on the wall is able to deflect the loads reliably. Anchors tested and approved in accordance with fire protection regulations should therefore be used to mount grouped supports. A variety of products are available for the different types of mounting surface.

Concrete surface:

- OBO fire protection anchor type FNA 6 x 30/5 or type FNA 6 x 30 M6/5
- OBO fire protection anchor bolt type MMS 6 x 50

Stone-type brickwork

Solid sand-lime brick, perforated sand-lime brick or solid brick:

- OBO fire protection anchor bolt type MMS 6 x 50



Grip M	Pack	Weight	Art. no.
Type	qty	kg/100	
2031 M/15	50	3.700	2207 02 8



Grip M	Pack	Weight	Art. no.
Type	qty	kg/100	
2031 M/30	25	6.200	2207 03 6



Fire protection anchor	Pack	Weight	Art. no.
Type	qty	kg/100	
FNA 6 x 30	100	1.400	3498 42 5
Thread: M6/5M6			
Drilled hole depth: 45 mm, drill ø: 6 mm			
Approval no. Z-21.1-606			



Fire protection anchor	Pack	Weight	Art. no.
Type	qty	kg/100	
FNA 6 x 30/5	100	1.120	3498 46 8
Head ø: 15 mm			
Drilled hole depth: 45 mm, drill ø: 6 mm			
Approval no. Z-21.1-606			



Fire protection anchor bolt	Pack	Weight	Art. no.
Type	qty	kg/100	
MMS 6 x 50	100	0.960	3498 10 7
Dimensions: 6 x 50 mm			
Drilled diameter: 5 mm			

New and nifty

OBO metal pressure clips



For OBO “type 2033 M” and “type 2034 M” metal pressure clips, testing in accordance with DIN 4102 proved mechanical stability under a fire load of 30 minutes’ duration. The test was carried out for ceiling mounting only.

Description

The new spring-loaded stainless steel clips are a logical addition to the range of plastic pressure clips. They combine simple options for cable installation under ceilings with adherence to requirements for stability in the event of fire.

Metal pressure clips are suitable for the installation of cables and lines with a maximum diameter of 10 mm. Cables can be installed from both sides (simply slide them underneath the lip of the clip). A tool is not required to actually install the cables. The edges of the clips are set at an angle in order to avoid damaging the cables.

Pressure clips are available in two different sizes. These sizes support the installation of the following numbers of NYM 3 x 1.5 mm² cables, for example.

- Type 2033 M: 16 cables (2 x 8)
- Type 2034 M: 10 cables (2 x 5)

Load-bearing capacity

Fire testing under a fire load of 30 minutes’ duration proved mechanical stability for ceiling mounting.

The pressure clips may therefore be used subject to observance of the following installation parameters:

Requirement	Type 2033 M	Type 2034 M
Cable occupation	2 x max. 8 cables	2 x max. 5 cables
Cable diameter	Max. 10 mm	Max. 10 mm
Weight of individual cable	Max. 0.230 kg/m	Max. 0.230 kg/m
Fixing spacing	Max. 50 cm	Max. 60 cm

Ordering data

Pressure clip

Cable occupation

In order to provide as clear an impression as possible of possible cable occupation, the following table lists examples of the approximate dimensions and weights of a number of cables and lines.

Cable type	Cable ø	Weight
NYM 3 x 1.5 mm ²	8.2 mm	0.135 kg/m
NYM 5 x 1.5 mm ²	9.5 mm	0.190 kg/m
J-Y(St)Y 2 x 2 x 0.6 mm ²	5.0 mm	0.030 kg/m
J-Y(St)Y 10 x 2 x 0.6 mm ²	9.0 mm	0.110 kg/m

Mounting

In order to deflect the applied load, anchors tested and approved in accordance with fire protection regulations should be used to mount pressure clips.

The OBO type MMS 6 x 50 fire protection anchor bolt, which can be mounted without an additional anchor, is both suitable and has been approved for mounting underneath concrete ceilings.



Pressure clip

Type	Pack qty	Weight kg/100	Art. no.
2033 M	25	2.310	2204 00 0
2034 M	50	1.860	2204 01 0

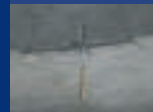


Fire protection anchor bolt

Type	Dimensions mm	Pack qty	Weight kg/100	Art. no.
MMS 6 x 50	6 x 50	100	0.960	3498 10 7

Drilled hole diameter: 5 mm

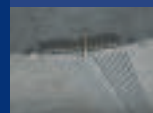
Mounting of pressure clips without anchors using OBO's MMS anchor bolt



Drill hole, fix pressure clip in place



Screw in anchor bolt (without additional anchor)

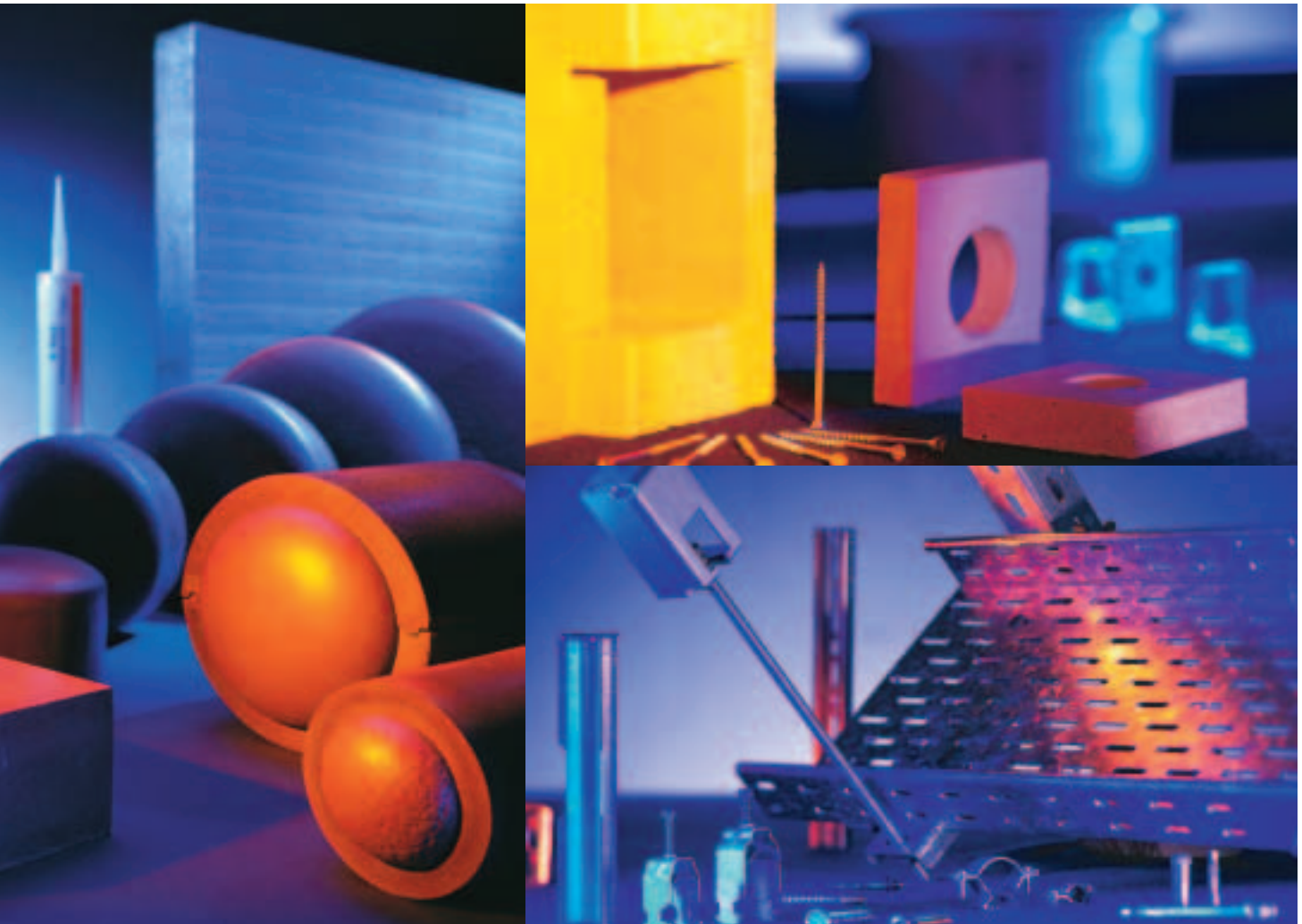


Install cables/lines – all done!

Tested and approved: OBO fire protection systems

Preventive fire protection is an essential aspect of safety in buildings. Ensuring that the electrical installation is designed correctly is decisive in this respect. The OBO range includes:

- Cable insulations with building supervisory authority approval for sealing openings in walls and ceilings delimiting fire areas
- Fire protection ducts for cable installation in escape routes and emergency exits as well as for function maintenance of electrical cable installations in the event of fire
- Installation systems for the installation of cables and lines with integrated function maintenance



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