

### Clamp4Fire



Fig 1 – KKM 15



Fig 2 – KKM 30



Fig 3 – KKM 70

#### 1. Basis For Evaluation

This fire protection report is based upon the following documents:

- Model building regulation (MBO), version November 2002, changed by decision of the German Development Ministers' Conference dated 25.09.2020.
- Muster-Leitungsanlagen-Richtlinie MLAR, version February 2015, changed by decision of the German Development Ministers' Conference dated 03.09.2020)
- DIN 4102-2 (issue September 1977), fire behaviour of building materials and building components – building components (terms, requirements and testings).
- General construction test certificates for suspended ceiling constructions
- Test report No. 3054/1495-Mu- from IBMB Braunschweig dated 22.03.2005.
- Test report No. 3350/6899-Mu- from IBMB Braunschweig dated 10.03.2006.
- Various fire tests for electrical function maintenance according to DIN 4102-12 (issue November 1998, fire behaviour of building materials and building components – maintenance of electrical function of cable systems, requirements and testings)

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## 2. Fire Protection Requirements

**Clamp4Fire** is designed to assist with compliance with the latest Fire Regulations BS7671:2018 amendment 3 and IET Wiring Regulations 18<sup>th</sup> Edition.

According to section 3.1.1 of the "Muster-Richtlinie über brandschutztechnische Anforderungen an Leitungsanlagen" (MLAR), cable systems may only be installed in escape and rescue routes if they can be used as an escape route for a sufficient length of time in the event of a fire. One way of ensuring this requirement is to install the cable systems above suspended ceilings classified for fire protection. These suspended ceilings must be classified in the appropriate fire resistance class for both fire exposure from above and below. There is no special fire protection requirement for the cables installed above the suspended ceilings with regard to their properties in the event of fire. However, section 3.5.3 of the MLAR specifies the following basic requirement for the fastening of the installations carried out.

*The special requirements with regard to the fireproof fastening of the cables laid in the area between the storey ceilings and suspended ceilings must be observed.*

The following requirements apply to the installation of cables in the event of a fire:

- The grouped supports must be made of a non-combustible material.
- The cables must not fall on the ceiling structure.
- The deformation of the grouped supports must be kept so low that they do not sag on the suspended ceiling structure.
- The sagging of the cables in the event of fire must remain so low that they are not falling onto the suspended ceiling structure.

In addition, the following basic fire protection requirements must be met when installing lines:

- Fire-protection-approved fastening material must be used to fasten the grouped supports under the ceiling and on the wall.
- The clamps to be used for the installation of cables are to be installed under the floor ceiling or on the wall with fasteners that have been proven in terms of fire protection – Fix4Fire is recommended for use in conjunction with the Clamp4Fire installation.

The fixings to be used must have been fire tested within a European Certified Test House or hold a European Technical Assessment (ETA). The fixings must be installed in accordance with the specifications from the respective approval.

If the approval does not contain any information on the fire behaviour of the anchor, the suitability of the anchor can alternatively be verified by appropriate fire protection evidence, e.g. testing by a recognized test centre.

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### 3. Description

Clamp4fire is a one-piece cable bracket made of sheet steel with a special locking technology on the front. The weight of the inserted cables and lines secures the closure against unintentional opening. The mounting brackets can be mounted under the ceiling or on the wall. (See Fig 1 to 3)

### 4. Mechanical Stability

The aim of the tests was to obtain information on the mechanical behaviour and stability of the grouped supports when exposed to fire for 30 or 90 minutes. Steel weights were suspended in the grouped supports to simulate cable loading during the tests. The grouped supports were subjected to the following mechanical loads during the test (see Table 1)

Type	Testing Duration	Load [N]
KKM 15	90 minutes	20
KKM 30	90 minutes	35
KKM 70	30 minutes	120
	90 minutes	80

Table 1: Weight Load of the grouped supports

The testing furnace was heated up over a period of 30 or 90 minutes in accordance with the standard temperature-time curve (ETK) of DIN 4102-2 The test reports E and F listed in section 1 "Basis for assessment" contain a description of the tests performed.

### 5. Fire Protection Evaluation

The following can be deduced from the documented test results regarding the mechanical stability of the KKM xx grouped supports installed in the area between the storey ceilings and the fire protection designed suspended ceilings

#### 5.1. Mechanical Stability

The tests have shown that the grouped supports do not fail mechanically under a fire load of

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30 or 90 minutes. They did not open during the tests. Corresponding installation parameters (installation distance, cable assignment) can be derived from the proven load-bearing capacity of the grouped supports under a fire load of 30 or 90 minutes.

Details of the respective installation parameters can be found in annexes 1 and 2 of this datasheet. The special requirements regarding the use of suitable anchors must be observed (see section 2).

### 5.2. Minimum Distance to the Suspended Ceiling

Depending on the mounting distance of the grouped supports, a minimum distance "a" (see fig.4) must be maintained between the top of the suspended ceiling and the lower edge of the grouped supports.

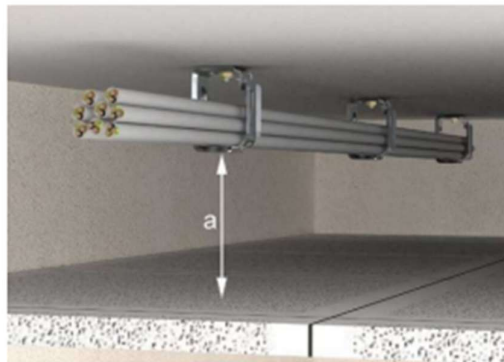


Fig. 4: Minimum distance „a“

This minimum distance "a" is the result of two effects that add up due to the fire load.

#### a) Deformation of the Grouped Supports

During ceiling installation, the grouped supports deform almost symmetrically. The clamp body is slightly elongated (see Fig 5). During wall mounting, the grouped supports deform asymmetrically. The front part of the clamp body is pulled downwards by the mechanical load, while the part of the clamp body located directly on the wall hardly deforms at all (see Fig 6).

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*Fig. 5: Deformation during ceiling mounting*



*Fig 6: Deformation during wall mounting*

### b) Sagging of the Installed Cables

Due to the thermal expansion of the copper wires of the cables, the cables sag at the end of the respective fire load. This sagging of the cables is independent of whether many or only a few cables are installed in a grouped support. It is almost solely because of the thermal expansion of the copper in combination with the mounting distance of the installed grouped supports.

In addition, the cables sag due to the mechanical load on the copper wires. This effect applies to the cables installed at the bottom of the clamp body. However, this sag should be regarded as relatively small, as the upper cables cannot bend the lower cables downwards indefinitely.

The sag of the installed cables to be considered is therefore made up of two different influences and can be clearly determined in the numerous fire tests carried out for function maintenance in accordance with DIN 4102-12 (see Fig 7).



*Fig. 7: Sagging cables after a fire load of 90 minutes*

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It should also be noted that a further influence on the sagging of the installed cables after the fire load already occurs during the installation of the cables. In general, they already have a certain sag before a possible fire occurs. If this sag is very large, it must also be considered regarding the required minimum distance "a" between the top of the suspended ceiling and the lower edge of the grouped supports.

If the minimum distances between the cable support system and the suspended ceiling specified in annexes 1 and 2 are observed, it is ensured that during a fire load of 30, 60 and 90 minutes neither the grouped supports nor the installed cables are sagging to the suspended ceiling or subjecting it to a mechanical load.

## 6. Summary

Based on the summarized mounting parameters in accordance with annexes 1 and 2 and if the minimum distances to the suspended ceiling is maintained, it is ensured that the suspended ceiling is only loaded by its own weight when there is a fire load of 30, 60 and 90 minutes according to DIN 4102 as it is required (see Section 2).

## 7. Special Notes

This fire protection statement only applies if:

- the grouped supports are attached to storey ceilings made from concrete / reinforced concrete or porous concrete.
- the grouped supports are attached to solid walls made from masonry, concrete / reinforced concrete or porous concrete.
- a proof of fire protection for a minimum of 30 / 60 / 90 minutes for the storey ceilings or solid walls available.
- To be used in conjunction with Fix4Fire screws or fire-tested M6 anchors.

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Grouped Support  
Type KKM xx

Suspended  
ceiling

S = see tables      a = see tables

### Fire Load 30 Minutes

Mounting Spacing S [cm]	Cable Assignment [kg/m]	Minimum Distance a [mm]
<b>Grouped Support Type KKM 15</b>		
max. 60 cm <sup>1</sup>	max. 3,3	min. 80
61 – 80 cm <sup>2</sup>	max. 2,5	min. 100
<b>Grouped Support Type KKM 30</b>		
max. 60 cm <sup>1</sup>	max. 5,8	min. 80
61 – 80 cm <sup>2</sup>	max. 4,3	min. 100
<b>Grouped Support Type KMM 70</b>		
max. 60 cm <sup>1</sup>	max. 20	min. 80
61 – 80 cm <sup>2</sup>	max. 15	min. 100

### Fire Load 60 / 90 Minutes

Mounting Spacing S [cm]	Cable Assignment [kg/m]	Minimum Distance a [mm]
<b>Grouped Support Type KKM 15</b>		
max. 60 cm <sup>1</sup>	max. 3,3	min. 100
61 – 80 cm <sup>2</sup>	max. 2,5	min. 120
<b>Grouped Support Type KKM 30</b>		
max. 60 cm <sup>1</sup>	max. 5,8	min. 100
61 – 80 cm <sup>2</sup>	max. 4,3	min. 120
<b>Grouped Support Type KKM 70</b>		
max. 60 cm <sup>1</sup>	max. 13	min. 100
61 – 80 cm <sup>2</sup>	max. 10	min. 120

<sup>1</sup> The sag of the installed cables in cold condition may not be greater than 3 cm

<sup>2</sup> The sag of the installed cables in cold condition may not be greater than 5 cm

**Minimum distance to fire protection ceiling  
Grouped support type KKM xx  
Ceiling mounting**

**Annex 1**  
to the fire protection report  
250220-03-KKM dated 20.02.2025

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S = see tables      a = see tables

**Fire Load 30 Minutes**

Mounting Spacing S [cm]	Cable Assignment [kg/m]	Minimum Distance a [mm]
<b>Grouped Support Type KKM 15</b>		
max. 60 cm <sup>1</sup>	max. 3,3	min. 100
61 – 80 cm <sup>2</sup>	max. 2,5	min. 120
<b>Grouped Support Type KKM 30</b>		
max. 60 cm <sup>1</sup>	max. 5,8	min. 110
61 – 80 cm <sup>2</sup>	max. 4,3	min. 130
<b>Grouped Support Type KKM 70</b>		
max. 60 cm <sup>1</sup>	max. 20	min. 120
61 – 80 cm <sup>2</sup>	max. 15	min. 140

**Fire Load 60 / 90 Minutes**

Mounting Spacing S [cm]	Cable Assignment [kg/m]	Minimum Distance a [mm]
<b>Grouped Support Type KKM 15</b>		
max. 60 cm <sup>1</sup>	max. 3,3	min. 120
61 – 80 cm <sup>2</sup>	max. 2,5	min. 140
<b>Grouped Support Type KKM 30</b>		
max. 60 cm <sup>1</sup>	max. 5,8	min. 130
61 – 80 cm <sup>2</sup>	max. 4,3	min. 150
<b>Grouped Support Type KKM 70</b>		
max. 60 cm <sup>1</sup>	max. 13	min. 140
61 – 80 cm <sup>2</sup>	max. 10	min. 160

<sup>1</sup> The sag of the installed cables may not be greater than 3 cm  
<sup>2</sup> The sag of the installed cables may not be greater than 5 cm

<b>Minimum distance to fire protection ceiling</b> Grouped support type KKM xx Ceiling mounting	<b>Annex 2</b> to the fire protection report 250220-03-KKM dated 20.02.2025
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