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**Damper
within fire resistant F30 -
F90 suspended ceilings**



Installation into suspended ceilings

Another operational area is a classified suspended ceiling into which outlets shall be incorporated.

In order to make a statement on this matter, we have examined the test methods and test certificates for classified suspended ceilings. We established that air outlets are not allowed to be mounted into classified suspended ceilings (*table 1*).

This table is an excerpt from a test certificate for classified suspended ceilings. Especially clause 6.3.2 shall be considered: The classification of the suspended ceilings according to *DIN 4102* is only valid, if no air-conditioning devices or other components have been incorporated into the suspended ceilings. A built-in lamp according to clause 2.2.1 and the annexes 1 and 3 does not affect the classification. Several discussions with different testing institutes have shown that the opinions about the test arrangement differ. Then there was a new problem (*figure 2*).

The floors have different fire loads, i.e. fire load from above, hence from the floor void, and from below, from the corridor, or fire load from above and below. As a general application for the dampers was searched and it can never be predicted in practice, from which side the fire load will occur, a classified suspended ceiling F30 was chosen for a fire load from above and from below, so that the damper and the air outlet will also be exposed to the fire load from above and from below. The resistance time F30 for the classified suspended ceiling has been chosen, as the interior work mainly requires F30.

- 6 Special provisions according to clause 8.9 of DIN 4102 Part 2, edition 1977.
 - 6.1 The classification of the suspended ceiling according to DIN 4102 is only valid for self-supporting suspended ceilings that are exposed to fire from the supplement floor and not to a fire load from below. For this purpose the tests according to DIN 4102 Part 2 shall be carried out.
 - 6.2 The classification of the suspended ceiling according to DIN 4102 is only valid, if the uncovered floor and supporting component parts are of at least the same fire resistance class.
 - 6.3 The classification of the suspended ceiling according to DIN 4102 is only valid, if
 - 6.3.1 the suspended ceiling is installed between walls (masonry or concrete) having the same class of fire resistance;
 - 6.3.2 no air-conditioning devices or other components are incorporated into the suspended ceiling - a built-in lamp according to clause 2.2.1 and annexes 1 and 3 does not affect the classification;
 - 6.3.3 the suspended ceiling - even during the exposure to fire - is only loaded by its own weight.
- Cables, bundles of cables, cable lines or the like, as well as pipes, ducts and other installations shall be fastened to the load-bearing floor system (uncovered floor) with non-combustible building materials, so that the suspended ceiling is not loaded during the classification period.

Table 1. Excerpt from a test certificate of a classified suspended ceiling

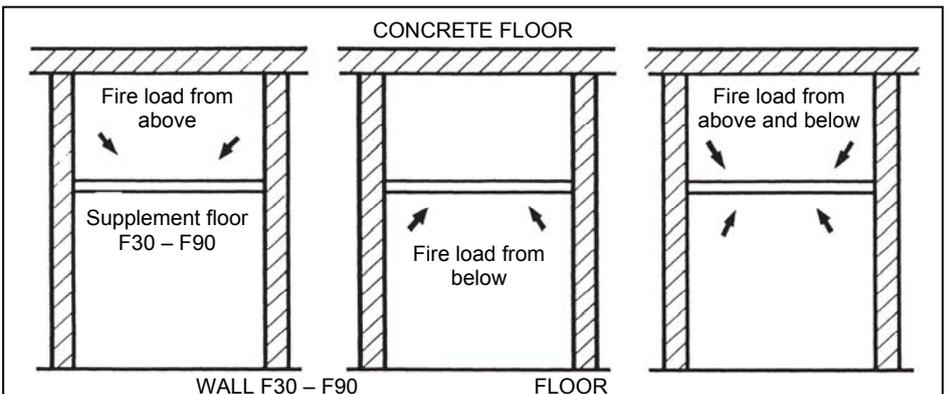


Figure 2. Drawing of the different test requirements

According to the principles of construction and testing, independent suspended ceilings F30-F90, i.e. independently classified suspended ceilings, are referred to as "dampers".

To avoid the testing of all different types of suspended ceilings, test floors according to table 1 have been chosen. This means that the suspended ceilings listed in table 1 cover all similar floor constructions.

Table 1 does not apply to suspended ceilings of metal, because in case of fire they react differently than suspended ceilings of mineral materials. A fire engineered individual attestation shall therefore be made for suspended ceilings of metal.

Suspended ceiling	Structure	Fire resistance class	Exposure to fire from
A	Laid-in construction	F30	below/above
B	Laid-in construction	F90	below
C	Laid-in construction	F90	above
D	Screw-fixed/smoothed	F30	below/above
E	Screw-fixed/smoothed	F90	below
F	Screw-fixed/smoothed	F90	above

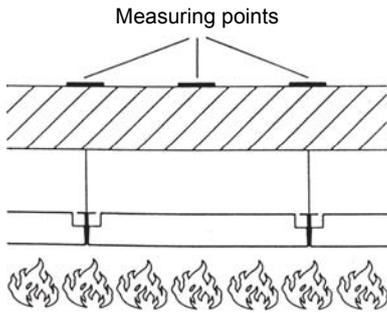
Table 1

Suspended ceilings that are classified together with an uncovered floor

In this case the suspended ceiling is installed, in order to improve the fire resistance of the load-bearing floor (thus only fulfils together with this floor the required fire resistance time).

Such a suspended ceiling only fulfils its fire engineered function in cases where no considerable fire loads are applied to the supplement floor. Past experience has shown that a fire load of 7 kWh/m², which is dispersed as uniformly as possible, can be considered as negligible.

Flames at the bottom side of the floor

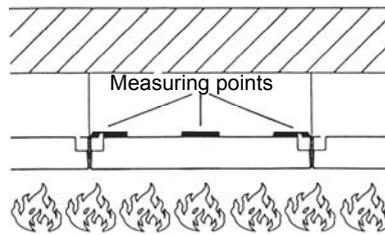


»together with the uncovered floor«

Suspended ceiling that is classified by itself

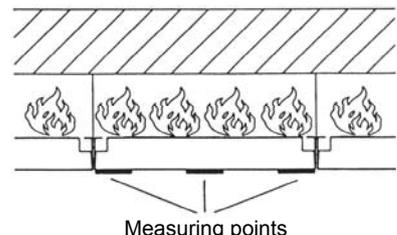
If the supporting floor by itself meets the fire requirement and if »considerable« fire loads (e.g. all kinds of ducts) are situated within the floor void, against which the occupants e.g. within a commonly used corridor that serves as escape route shall be protected, the suspended ceiling shall have an independent fire resistance time from »above« (fire within the floor void) and from »below« (e.g. fire entering the corridor).

Flames at the bottom side of the floor



»from below independent«

Flames from the floor void



»from above independent«

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Air plenum box

LB

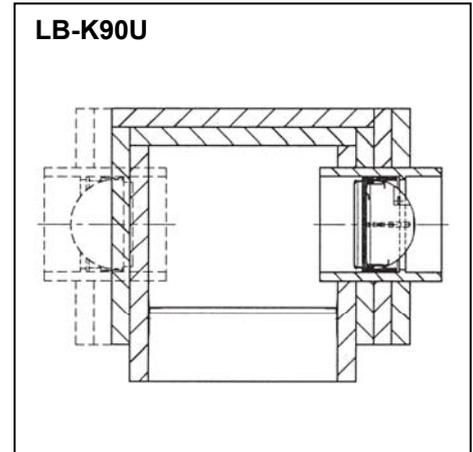
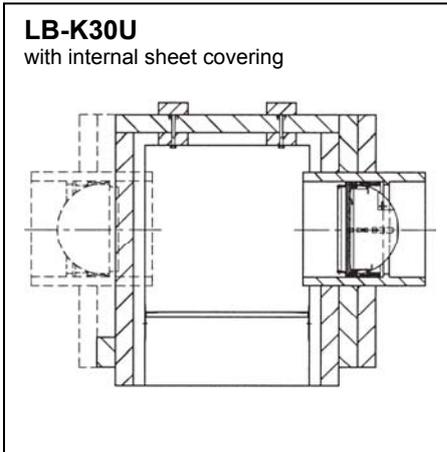
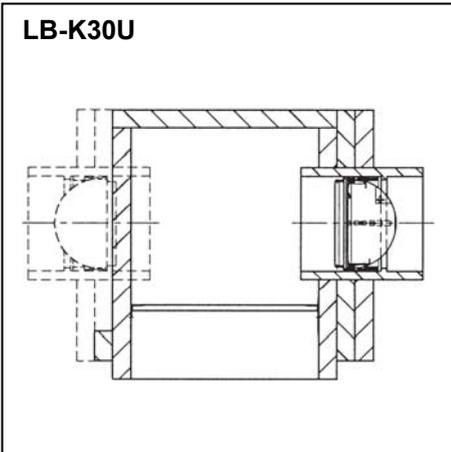
Test certificate Z-41.3-336

Cubiform damper

BW

Test certificate Z-41.3-335

Summary and ordering example



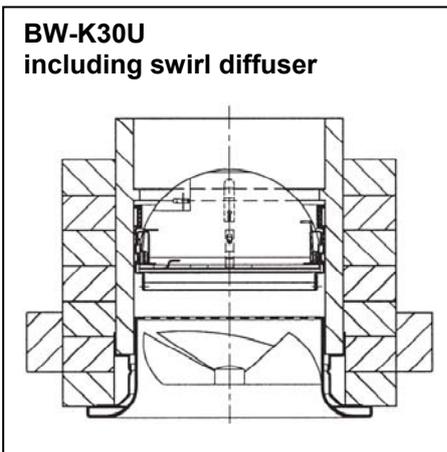
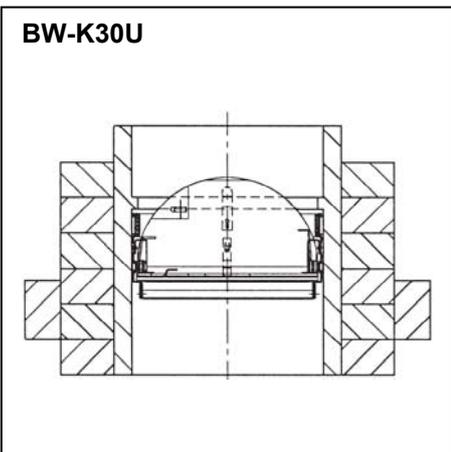
Ordering example:
LB-K30U-B/100/2/X/MS-E

- Accessories (optional):
 - MS-E - electrical limit switch
 - NP - male-male connector
- X = thickness and type of roof
- 2 = inlet spigot including damper, opposed or staggered by 90°
- NW 100/125/160 and 200
- B = internal sheet metal covering or e.g. clean room diffuser
- Resistance class
 - K30U
 - K90U

See pages 188 to 190

Note:
 All LB air plenum boxes can be supplied with one or two inlet spigots including damper. Please state swirl diffuser or ceiling mounted diffuser separately.

Note for the installation of a LB-K30U into metal panel ceilings:
 The installation of the LB-K30U has not been tested in this floor. If this should be necessary, a screwed and smoothed moulding of gypsum cardboard plates F30 can be used in this area of the metal floor, which in turn complies with the test certificate no. Z-41.3-336.



Ordering example:
BW-K30U/100/X/SD/NP

- Accessory:
 - NP - Connector
- SD or DA swirl diffuser in special design
- X = thickness or type of floor
- NW 100/125/160 and 200 mm
- Resistance class K30U

See pages 191 to 194

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**Air plenum box
LB-K30U**

Test certificate Z-41.3-336

Resistance time K30U with
BEK-K90 or BR-K90 damper

Installation into fire resistant
suspended F30 ceilings

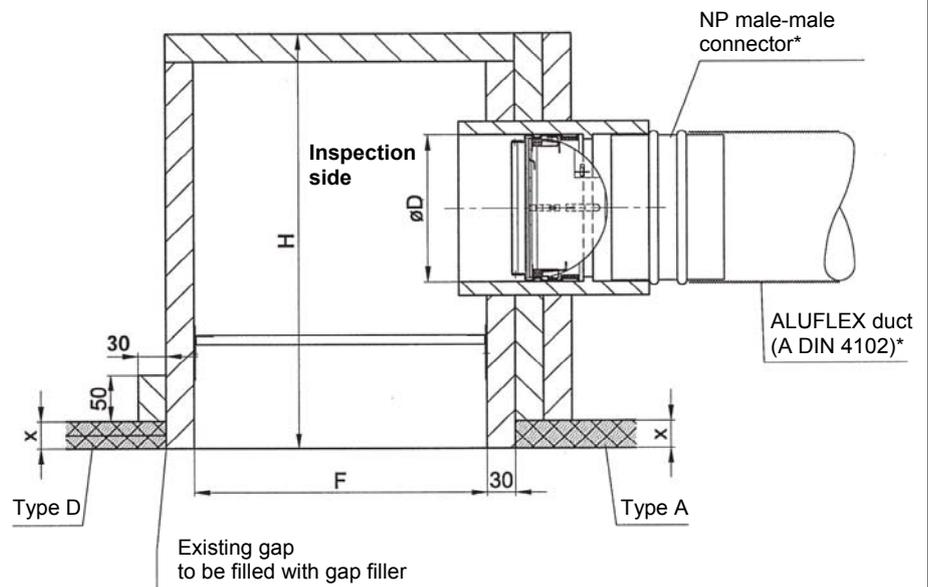
Dimensions

H	Ø D
350	100
	125
450	160
	200

F min. = 0,054 m²
F max. = 0,354 m²

All dimensions between
F min. = 0,054 m² and
F max. = 0,354 m²
can be manufactured.

Installation into fire resistant suspended F30 ceilings as a F30 floor, screwed and smoothed, table on page 186, type D or as a laid-in floor, table on page 186, type A



* not part of the scope of delivery

X = according to the required board thickness of the floor. Please state when ordering.

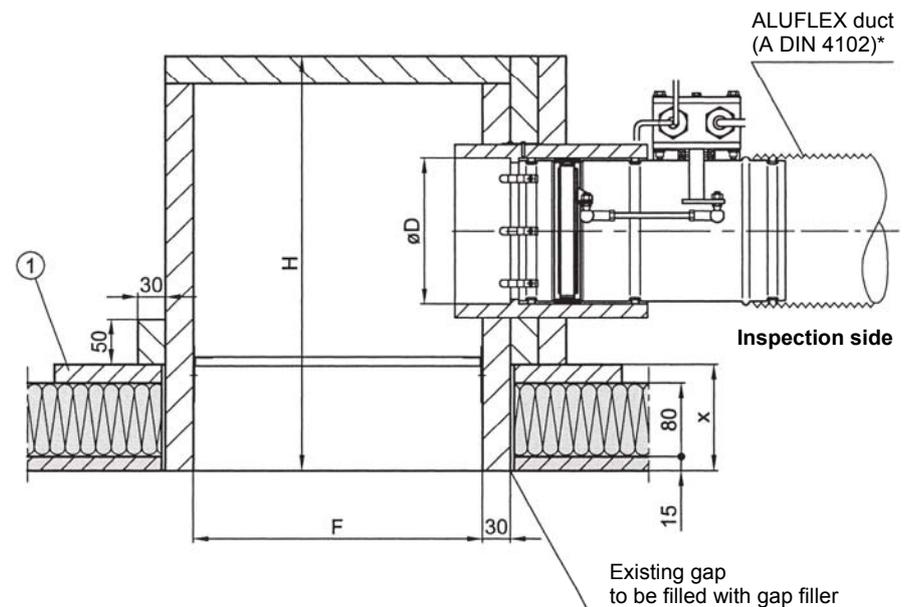
Damper

**LB-K30 with BR-K30
LB-K90 with BR-K90**

Test certificate
Z-41.3-336 / Z-41.3-649

Resistance time K30U / K90U

LB-K30U installed into a OWAcoustic F30 Duo floor as a laid-in floor, table on page 186, type A



* not part of the scope of delivery

X = according to the required board thickness of the floor. Please state when ordering.

① surrounding PROMATECT-H frame, 20 mm thick and 120 mm wide. Scope of delivery from Strulik or by the installer.

Note:

The air velocity of ≤ 8 m/s shall not be exceed for ventilation reasons.

Mounting: see page 195
Maintenance: see page 170

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**Air plenum box
LB-K30U**

with a sheet metal covering
Test certificate Z-41.3-336

Resistance time K30U with
BEK-K90 or BR-K90 damper

Installation into fire resistant
suspended F30 ceilings

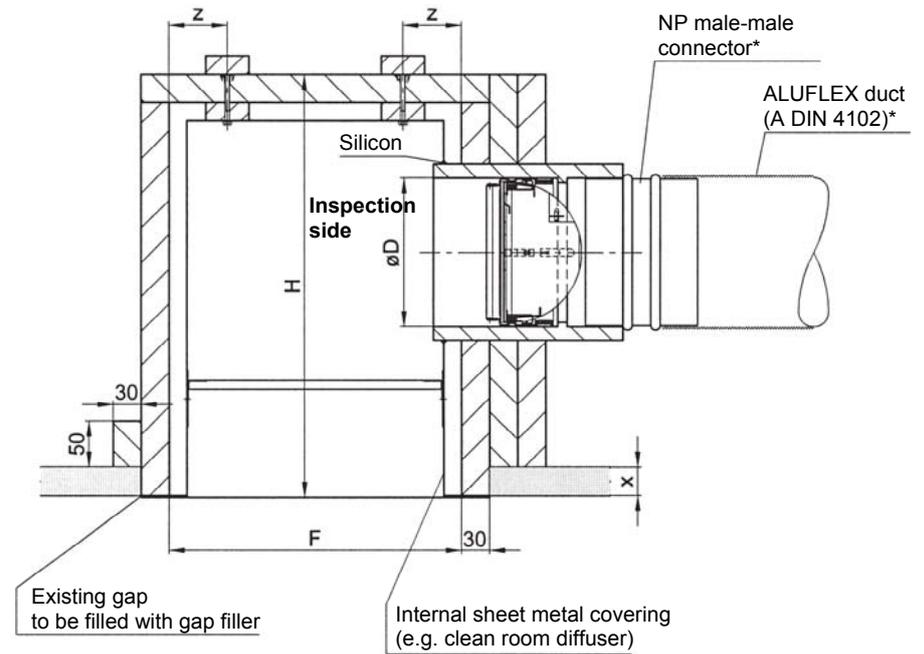
Dimensions

H	Ø D	z
350	100	60
	125	
450	160	100
	200	

F min. = 0,054 m²
F max. = 0,354 m²

All dimensions between
F min. = 0,054 m² and
F max. = 0,354 m²
can be manufactured.

Installation into fire resistant suspended F30 ceilings as a F30 floor,
screwed and smoothed, table on page 186, type D



* not part of the scope of delivery

X = according to the required board thickness of the floor. Please state when ordering.

**Air plenum box
LB-K90U**

Test certificate Z-41.3-336

Resistance time K90U with
BEK-K90 or BR-K90 damper

Installation into fire resistant
suspended F90 ceilings

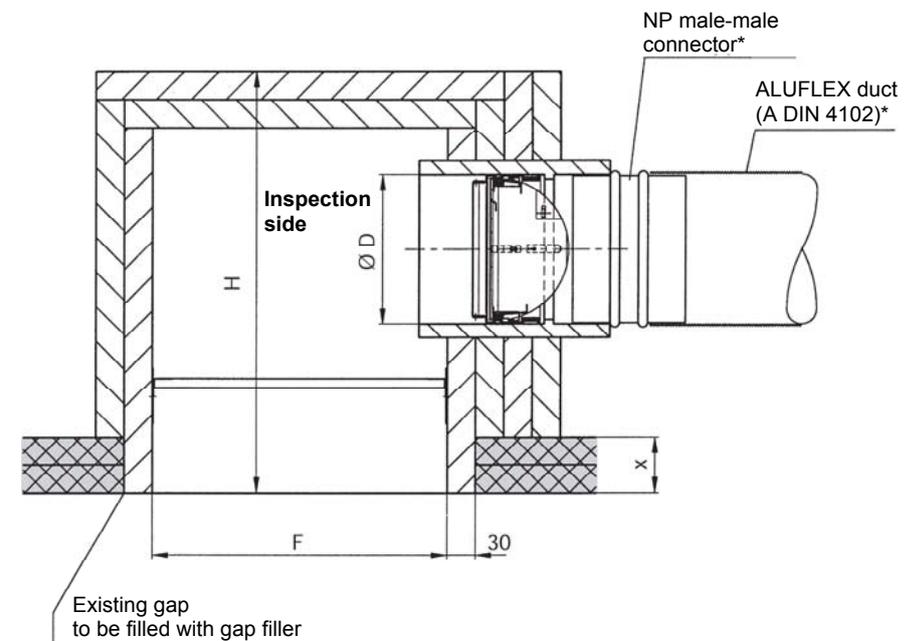
Dimensions

H	Ø D
350	100
	125
450	160
	200

F min. = 0,054 m²
F max. = 0,354 m²

Mounting: see page 195
Maintenance: see page 170

LB-K30U installed into a OWAcoustic F30 Duo floor as a laid-in floor,
table on page 186, type A



* not part of the scope of delivery

X = according to the required board thickness of the floor. Please state when ordering.

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**Air plenum box
LB-K30U**

Test certificate Z-41.3-336

Resistance time K30U with
BEK-K90 or BR-K90 damper

Installation into fire resistant
suspended metal F30 ceilings
from DIPLING

Dimensions

H	Ø D
350	100
	125
450	160
	200

F min. = 0,054 m²
F max. = 0,354 m²

X = according to the required board
thickness of the floor.
Please state when ordering.

- ① Surrounding PROMATECT-H frame
20 mm thick and 120 mm wide (scope
of delivery from Strulik or by the
installer)
- ② Slotted bad 20 x 1,5 mm or nonius
suspension of the ceiling
- ③ Angle section 40 x 25 x 0,7 mm by the
installer of DIPLING
- ④ Nonius suspension of the ceiling

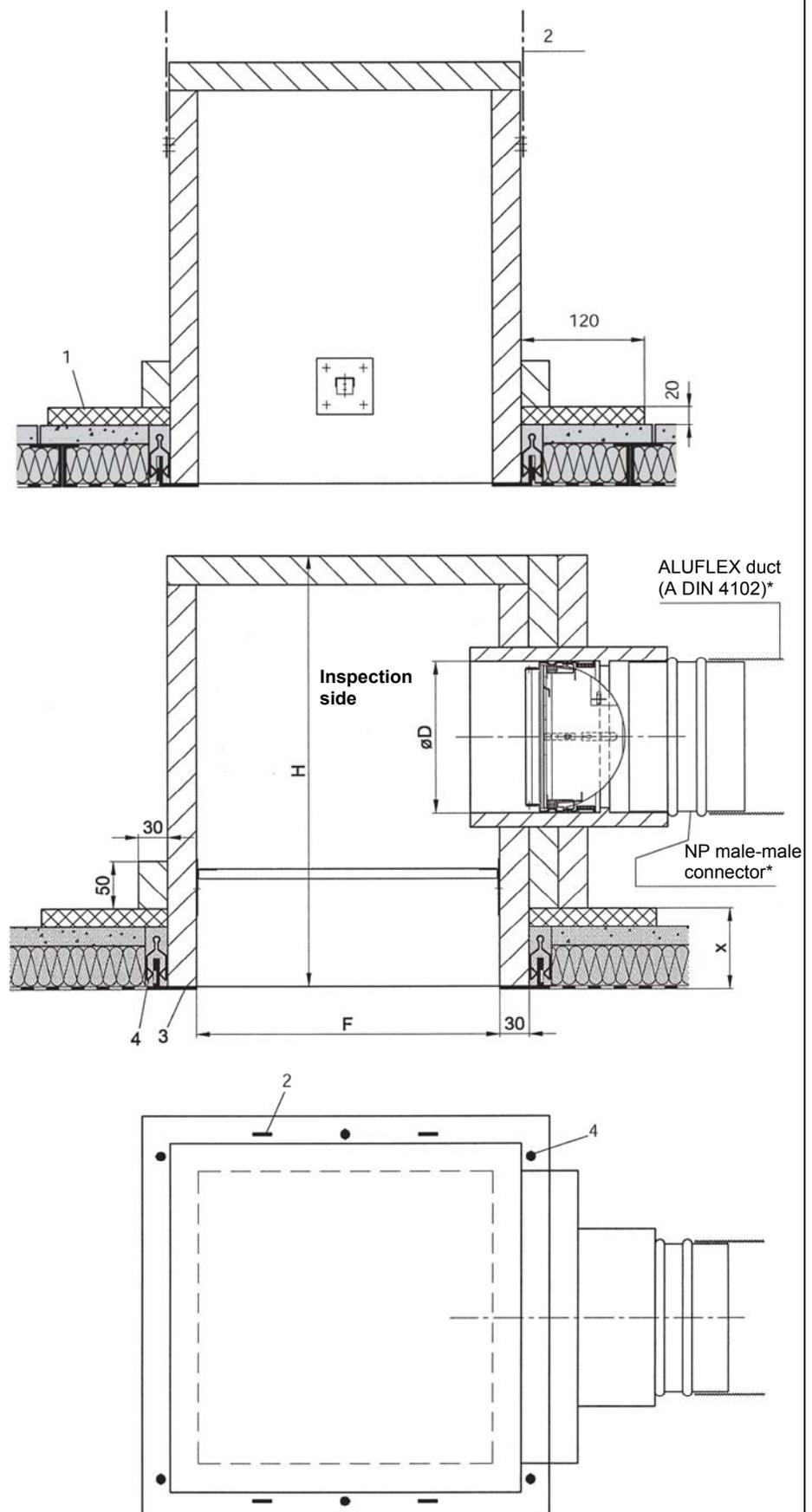
* not part of the scope of delivery

**Test certificate of the DIPLING
floor**

III.1-81169
35-81255
35-81331
Tested at the FMPA in Stuttgart

**Mounting: see page 195
Maintenance: see page 170**

**Installation into fire resistant suspended F30 metal ceilings from
DIPLING**



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**Cubiform damper
BW-K30U**

Test certificate Z-41.3-335

Resistance time K30U

Installation into fire resistant
suspended F30 ceilings

Dimensions BW-K30U

∅ D	Z [□]	H	h
100	240	ca. 210	6 x 30 = 180
125			
160	320	ca. 210	6 x 30 = 180
200			

Standard dimensions in mm; all further drawings in this style.

Dimensions BW-K30U-SD (DA)

∅ D	Z [□]	H ₁	h ₁
100	240	261	7 x 30 = 210
125		273	
160	320	295	8 x 30 = 240
200		320	9 x 30 = 270

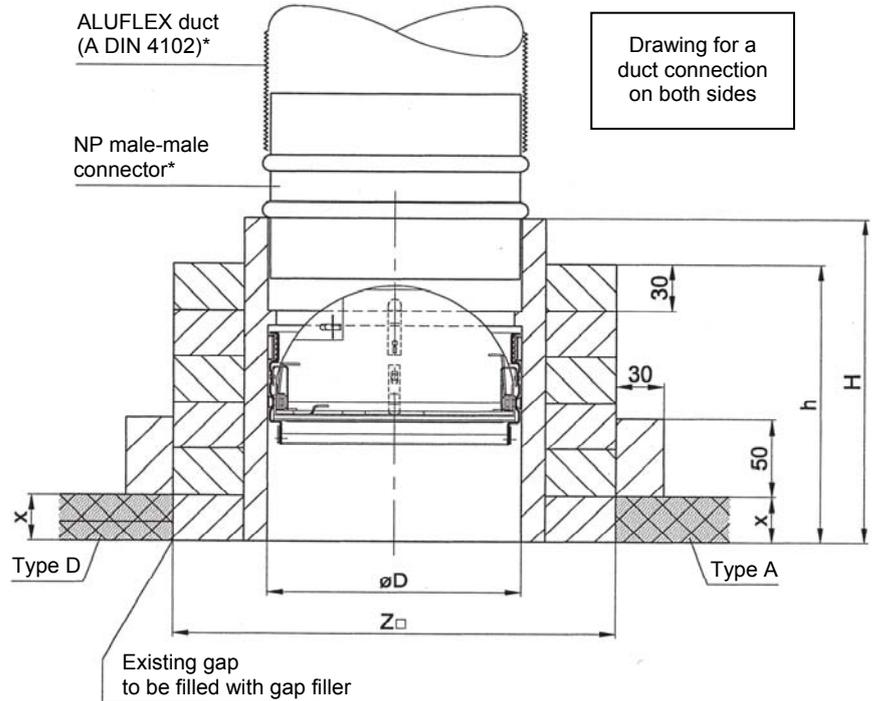
Please state the requested type of swirl diffuser (SD or DA) when ordering.

Note:

The air velocity of ≤ 8 m/s shall not be exceeded for ventilation reasons. If there are duct connections on both sides, then these shall always be flexible by means of ALUFLEX ducts (A DIN 4102).

Mounting: see page 195
Maintenance: see page 170

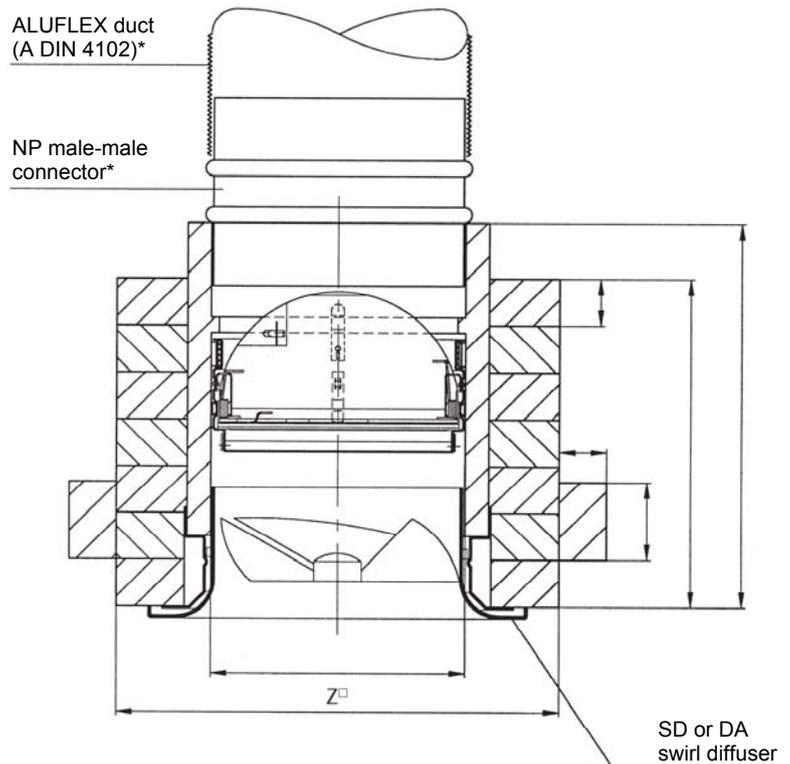
Installation into fire resistant suspended F30 ceilings as a F30 floor, screwed and smoothed, table on page 186, type D or as a laid-in floor, table on page 186, type A



* not part of the scope of delivery
X = according to the required board thickness of the floor. Please state when ordering.

Example of application: BW-K30U-D

All cubiform dampers are also available together with a swirl diffuser. In this case the dimension h changes into h₁ and H changes into H₁.



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**Cubiform damper
BW-K30U**

Test certificate Z-41.3-335

Resistance time K30U

Installation into fire resistant
suspended metal F30 ceilings
from DIPLING

Dimensions

Ø D	Z [□]
100	240
125	240
160	320
200	320

⊗ minimum section within the metal panel
(BW resting on a metal panel)

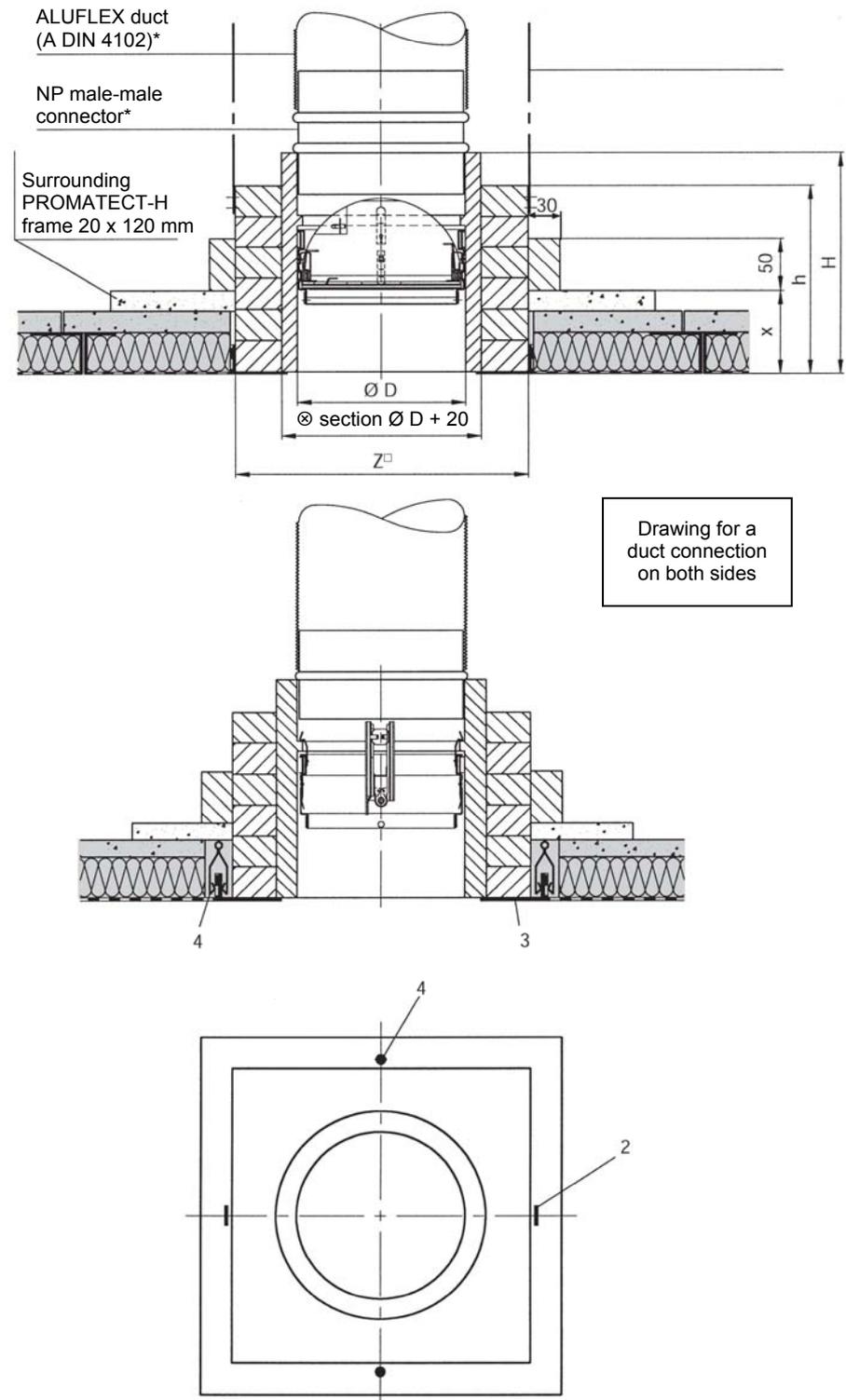
- ① Surrounding PROMATECT-H frame 20 mm thick and 120 mm wide (scope of delivery from Strulik or by the installer)
- ② Slotted bad 20 x 1,5 mm or nonius suspension of the ceiling
- ③ Angle section 40 x 25 x 0,7 mm by the installer of DIPLING
- ④ Nonius suspension of the ceiling

Note:

The air velocity of ≤ 8 m/s shall not be exceeded for ventilation reasons. If there are duct connections on both sides, then these shall always be flexible by means of ALUFLEX ducts (A DIN 4102).

Mounting: see page 195
Maintenance: see page 170

Installation into fire resistant suspended F30 metal ceilings from DIPLING



Drawing for a duct connection on both sides

* not part of the scope of delivery

X = according to the required board thickness of the floor. **Please state when ordering.**

Test certificate of the DIPLING floor

III.1-81169:
35-81255
35-81331
Test at the FMFA in Stuttgart

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**Cubiform damper
BW-K30U**

Test certificate Z-41.3-335

Resistance time K30U

Installation into fire resistant
suspended metal F30 ceilings

Dimensions

Ø D	Z [□]
100	240
125	
160	320
200	

⊗ minimum section within the metal panel
(BW resting on a metal panel)

Test certificate of the floors

85098	TU Braunschweig
85355	TU Braunschweig
85970	TU Braunschweig
851169	TU Braunschweig
86813	TU Braunschweig
3596/3677	TU Braunschweig
1086/3574	TU Braunschweig
2047/3412	TU Braunschweig
8448/998	TU Braunschweig
8606/2378	TU Braunschweig
8449/1008	TU Braunschweig
3305/2889	TU Braunschweig
3704/5271	TU Braunschweig
3432/3042	TU Braunschweig
3881/4602	TU Braunschweig
3466/3643	TU Braunschweig
3278/4602	TU Braunschweig
III. 1-81169/Wi/Br.	TU Braunschweig
35-81255	TU Braunschweig
35-81331	TU Braunschweig
3633/5071	TU Braunschweig
3823/5340	TU Braunschweig
P-7425/6336	MPA Braunschweig

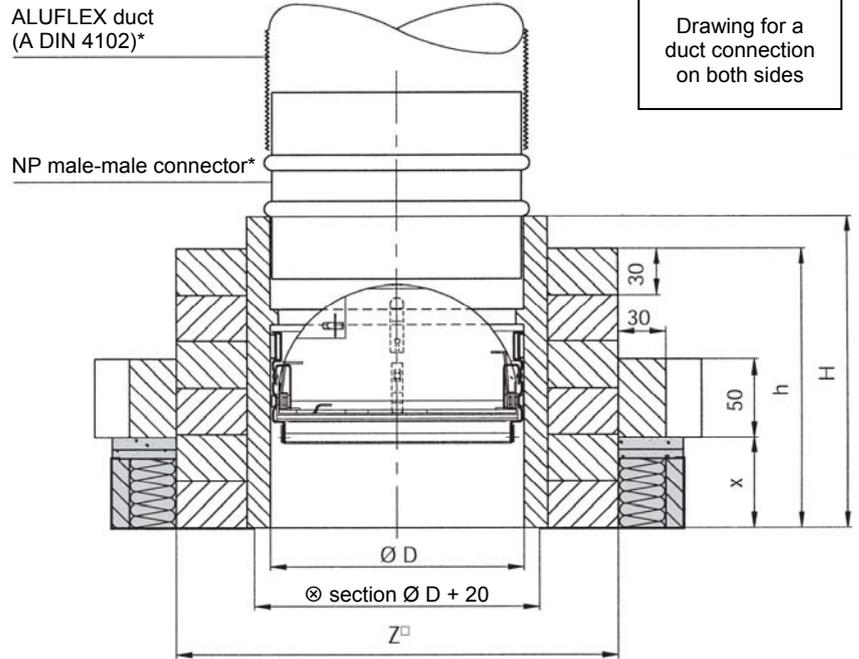
Expert's opinion

263 TU Braunschweig

Certificate

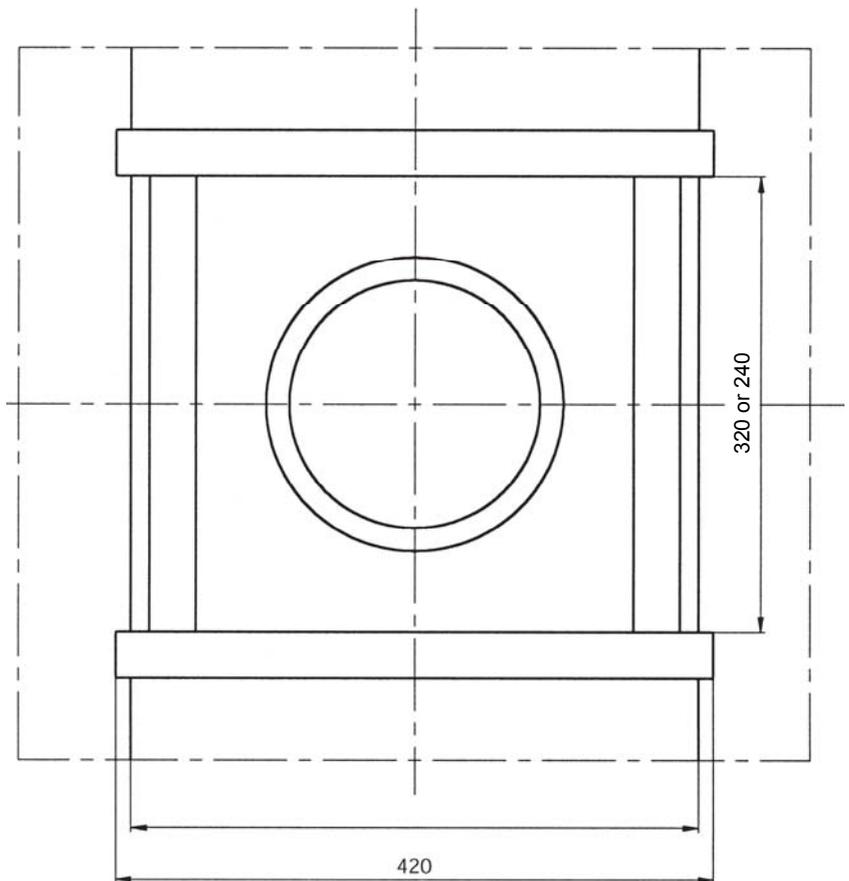
009 TU Braunschweig

**Installation into fire resistant suspended F30 metal ceilings from
DIPLING**



* not part of the scope of delivery

X = according to the required board thickness of the floor. **Please state when ordering.**



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**Cubiform damper
BW-K30U**

Test certificate Z-41.3-335

Resistance time K30U

Installation example:
OWAcoustic F30 DUO floor
and BSE

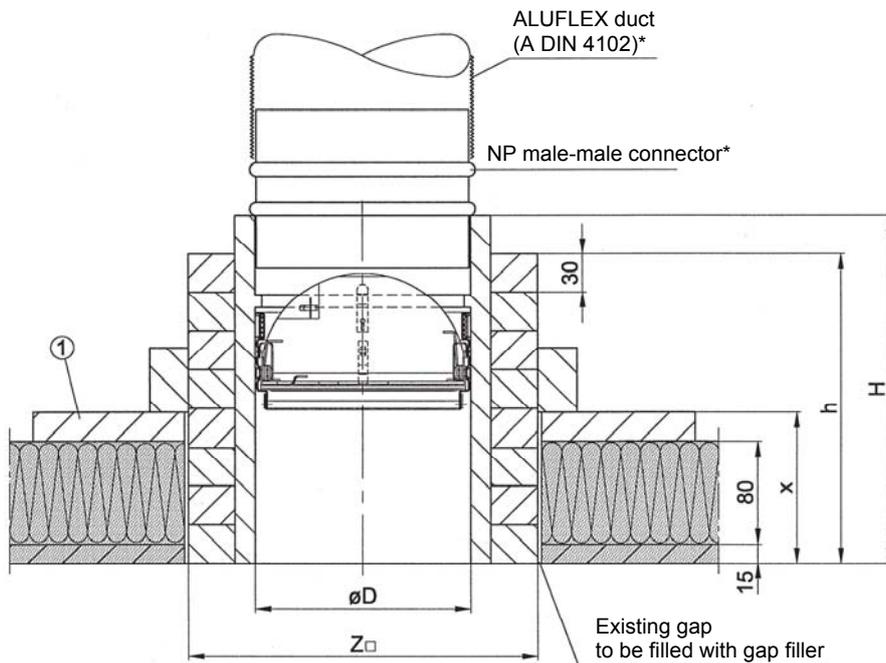
**Dimensions
BW-K30U for F30 DUO**

Ø D	Z [□]
100	240
125	240
160	320
200	320

① Surrounding PROMATECT-H frame 20 mm thick and 120 mm wide (scope of delivery from Strulik or by the installer)

X = according to the required board thickness of the floor. **Please state when ordering.**

Installation example: BW-K30U within a OWAcoustic F30 DUO floor as a laid-in floor, table on page 186, type A



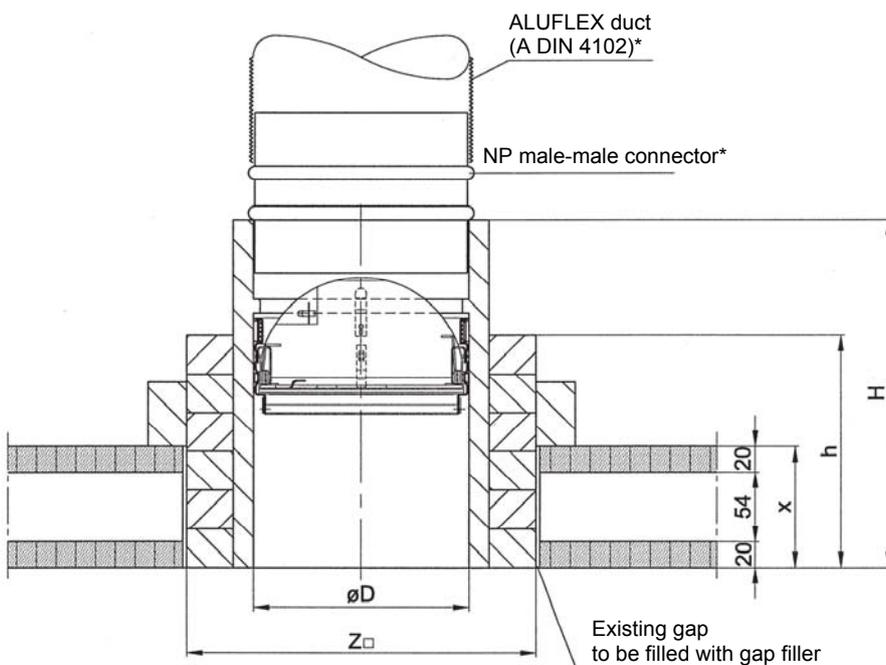
* not part of the scope of delivery

**Dimensions
BW-K30U for BSE30**

Ø D	Z [□]
100	240
125	240

X = according to the required board thickness of the floor. **Please state when ordering.**

Installation example: BW-K30U within a OWAcoustic floor BSE30 (self-supporting) without suspension of the cubiform damper



* not part of the scope of delivery

Note:

Both drawings are for the connection with ducts on both sides. On request, also available with a SD or DA swirl diffuser.

Mounting: see page 195
Maintenance: see page 170

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Air plenum box

LB

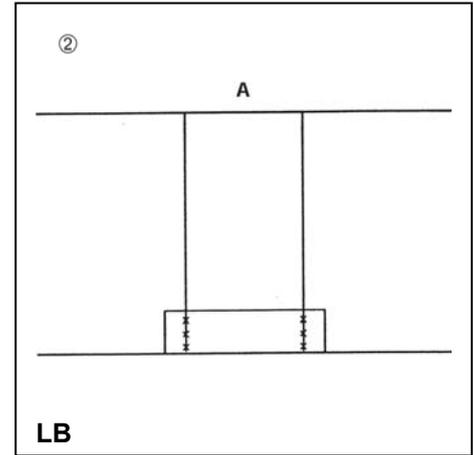
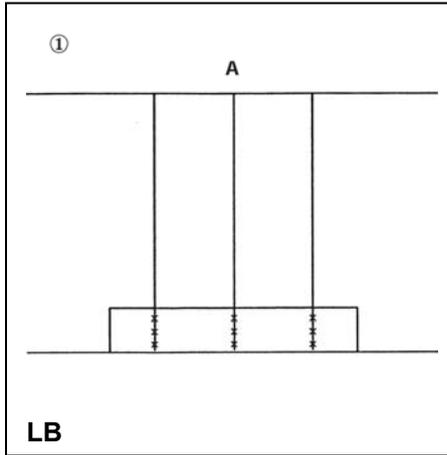
Test certificate Z-41.3-336

Cubiform damper

BW

Test certificate Z-41.3-335

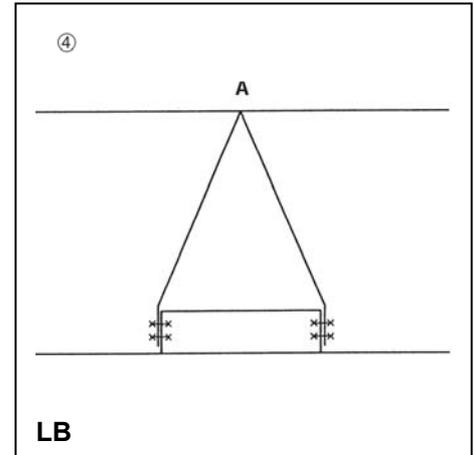
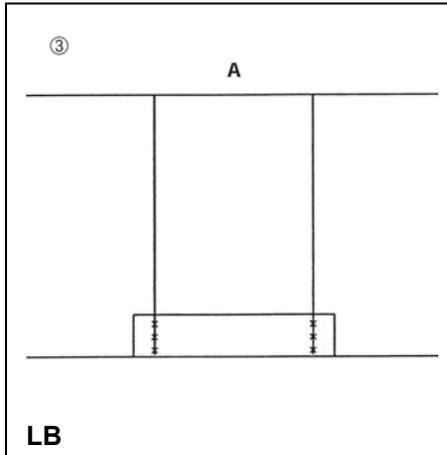
Suspension and weight



When dimensioning the hangers (slotted band), the load of 6 N/mm² shall not be exceeded.

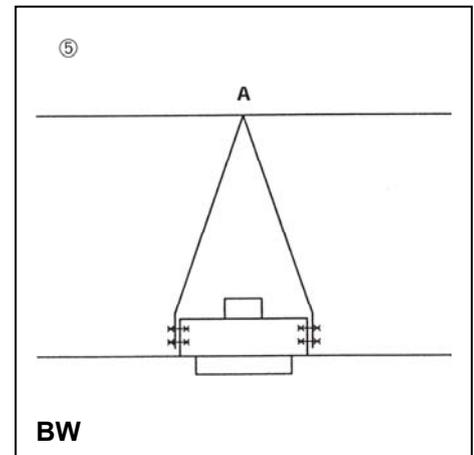
It is recommended to use the same hangers as for a suspended ceiling, e.g.

- ① Air plenum box
1600 x 220 x 450 mm (length x width x height), 6 hangers in each case with 3 screws 4 x 30 for quick mounting
- ② Air plenum box
1600 x 220 x 350 mm (length x width x height), 4 hangers in each case with 3 screws 4 x 30 for quick mounting
- ③ Air plenum box
595 x 595 x 450 mm (length x width x height), 4 hangers in each case with 3 screws 4 x 30 for quick mounting
- ④ Air plenum box
300 x 300 x 350 mm (length x width x height), 2 double hangers in each case with 2 screws 4 x 30 for quick mounting and 1 fixing arrangement for the ceiling
- ⑤ Cubiform damper
320 x 320 x 240 mm (length x width x height), 1 double hanger in each case with 2 screws 4 x 30 for quick mounting and 1 fixing arrangement for the ceiling



A = Steel dowels = M8 shall be used. They shall be inserted twice as deep as required by the test certificate – at least however 6 cm deep –, if the test certificate does not state otherwise. The calculated tensile load shall not exceed 500 N per dowel; compare DIN 4102 Part 4 (3/1981), clause 7.3 and 7.5.

Note: For the calculation of the hangers and weight of the hangers, add the weight of the LB or BW.



Weight in kg
including swirl diffuser

NW	Type	BW-K30U
100		~ 8
125		~ 8
160		~ 13
200		~13

Weight of the LB-K30U in kg
without ceiling diffuser

L/B	H	NW	kg
300/300	350	1 x 100 or 125	~ 15
450/450	450	1 x 160 or 200	~ 22
500/500	350	2 x 125	~ 22
595/595	450	2 x 160	~ 30
595/595	450	2 x 200	~ 32

Weight of the LB-K90U in kg
without ceiling diffuser

L/B	H	NW	kg
300/300	350	1 x 100 or 125	~ 26
450/450	450	1 x 160 or 200	~ 41
500/500	350	2 x 125	~ 39
595/595	450	2 x 160	~ 55
595/595	450	2 x 200	~ 57

Tender Text

Item	Description	Unit Piece	Unit price EUR	Total EUR
	<p>Cubiform damper with test certificate Z-41.3-335</p> <p>For the installation into fire resistant and tested suspended F30 ceilings as a laid-in floor or as a screwed and smoothed floor and as a suspended metal ceiling.</p> <p>Flames from above and below. For supply and exhaust air, suitable for a swirl or ball diffuser. Comprising a calcium silicate housing and a BEK damper, completely mounted with a connecting frame for the fastening to the ceiling.</p> <p>Technical data:</p> <p>Diameter / external dimensions</p> <p><input type="checkbox"/> DN 100 / 240[□]</p> <p><input type="checkbox"/> DN 125 / 240[□]</p> <p><input type="checkbox"/> DN 160 / 320[□]</p> <p><input type="checkbox"/> DN 200 / 320[□]</p> <p>Temperature of activation: 72 °C</p> <p>Air volume: _____ m³/h</p> <p>Noise level: L_{WA} _____ dB</p> <p>Manufacturer: Strulik</p> <p>Type: BW-K30U</p> <p>Accessories:</p> <p>Electrical limit switch Type: MS-E</p> <p>Swirl diffuser Type: SD or DA</p>			