

Screed-flush duct systems

Technical information



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Solutions for tomorrow's buildings

Screed-flush duct systems are the perfect solution for routing cables in dry-cleaned rooms. They allow quick and easy access to the cables while still protecting them from physical influences. They consist of several parts to provide suitable solutions for a variety of different requirements and circumstances.

Our range of screed-flush systems includes the UEBS duct, the CHALI brush duct and the UBK heavy-duty duct. Whether for an office or industrial hall, the product range of PUK is sure to have the right system for your needs.

CHALI

Screed-flush brush duct



Benefits

- VDE-certified due to coverable brush cable outlet
- Compensates for construction tolerances
- Free-standing installation without any screed contact ensures reliable impact sound decoupling
- Easy installation and replacement of installation devices
- Maintains barrier-free access
- Individual room design improves quality of life
- Low space requirements for electrical installations

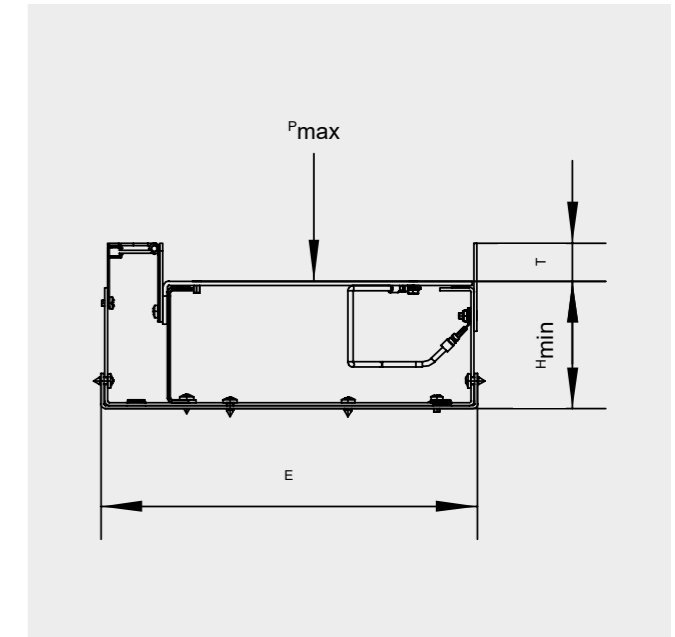
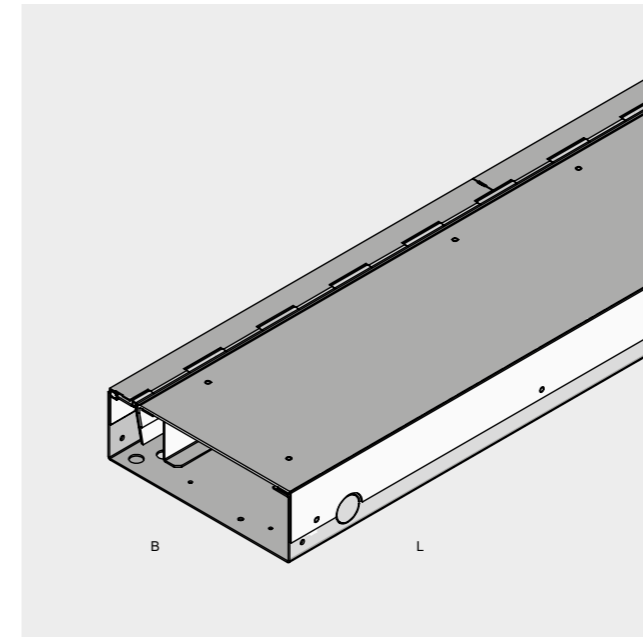
Areas of application

CHALI is a coverable brush outlet that is suitable for a wide range of applications and VDE-certified use in offices and public buildings. The cable outlet flap allows the duct to be securely closed when no cables are in use. The height-adjustable edges mean it can be used with floor coverings up to 25 mm thick.



Technical building equipment

Technical data



Type	H _{min} mm	B mm	L mm	T mm	E mm	P _{max} kN	IP _g	IP _n	G kg
CHALI 85-25S	85	255	2000	25	260	3.0	20	30	33.05

H_{min}: Minimum installation height | B: Width | L: Length | T: Depth | E: Installation dimension | P_{max}: Maximum permissible load | IP_g: IP protection class when in use | IP_n: IP protection class when unused | G: Weight



System over- view

The new screed-flush CHALI brush duct unlocks its full potential when used in offices and public buildings. This coverable brush outlet allows the duct to be installed right across interior spaces in compliance with VDE certification. The brush outlet lets you connect electrical equipment at any point along the duct, giving you maximum flexibility in arranging your premises. The built-in device holders ensure that the appropriate connections are available at the place of use.

Installation components



UBEBTR
Separating strip



UBEBGT
Device carrier fixture



UBEBES
Variable end part



UBEBV
CHALI connector



UBDSLFL
Levelling support

Application examples



An open-plan office requires the workstations to be arranged in a flexible manner that permits the workspace to be rearranged in the future. To this end, 8 m of brush duct will be laid along the floor-to-ceiling glass wall. A total of eight workstations arranged in pairs opposite one another will have access to the power and data network.

Customer requirements

- 8 m duct
- 250 mm wide
- 125 mm floor structure
- Laminate floor covering
- Dry-cleaned



An overview of all products for the screed-flush CHALI brush duct can be found in our price list.

Example order

- 4 x CHALI 85-25S
Screed-flush brush duct
- 6 x UBEBV 85-25S
CHALI connectors
- 20 x UBDSLFL 60
M10 levelling supports
- 2 x UBEBES 85-25S
Variable end parts
- 4 x UBEBTR 85S
Separating strips
- 6 x UBEBGT
Device carrier fixtures
- 4 x UG45
Pre-assembled mounting boxes
with plug-in connector system
- 2 x UGETD-3 226
Device carriers for data
connections

UEBS

Screed-flush duct system



Benefits

- Versatile applications, whether in standard configuration, as impact sound variant or for EMC cable routing
- Permanent access to cables for easy retrofitting
- Spatial flexibility thanks to installation units
- Rubber seal for use in damp-cleaned rooms
- Barrier-free underfloor cable routing

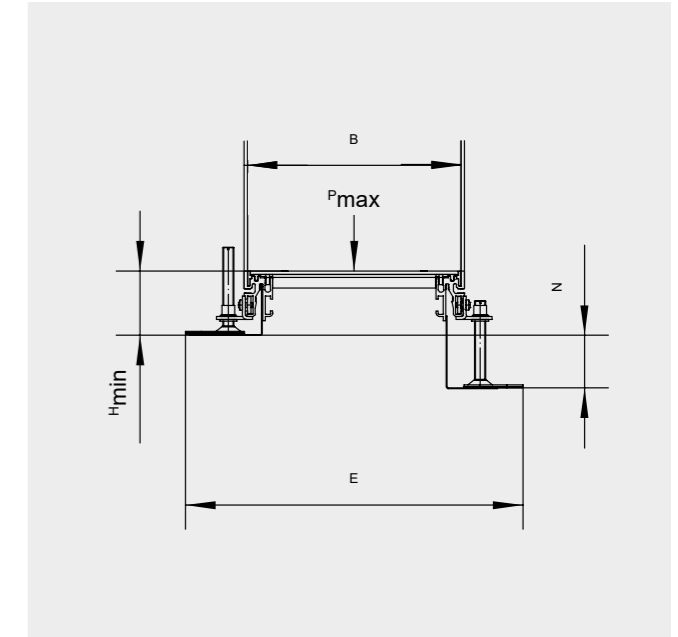
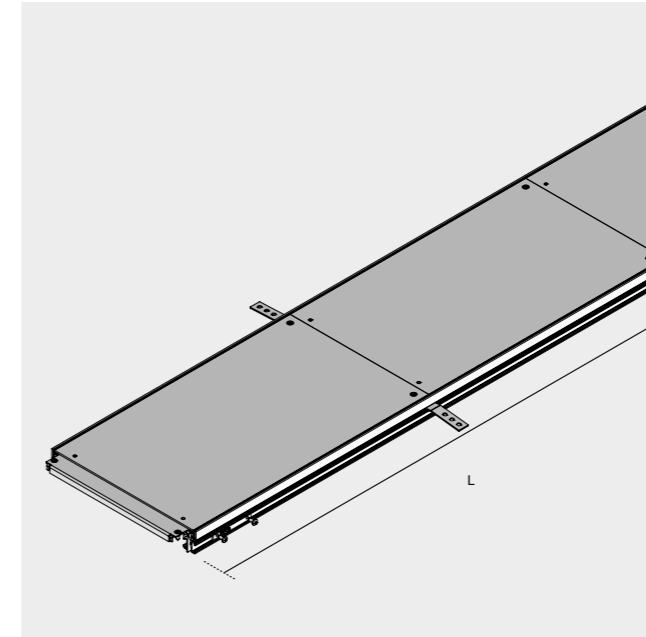
Areas of application

The UEBS duct system is the ideal equipment choice for rooms that are used in a variety of ways and where keeping technical equipment up to date is very important. The installation units can be easily retrofitted and flexibly positioned so they can be modernised as needed without foregoing the advantages of an underfloor system.



Technical building equipment

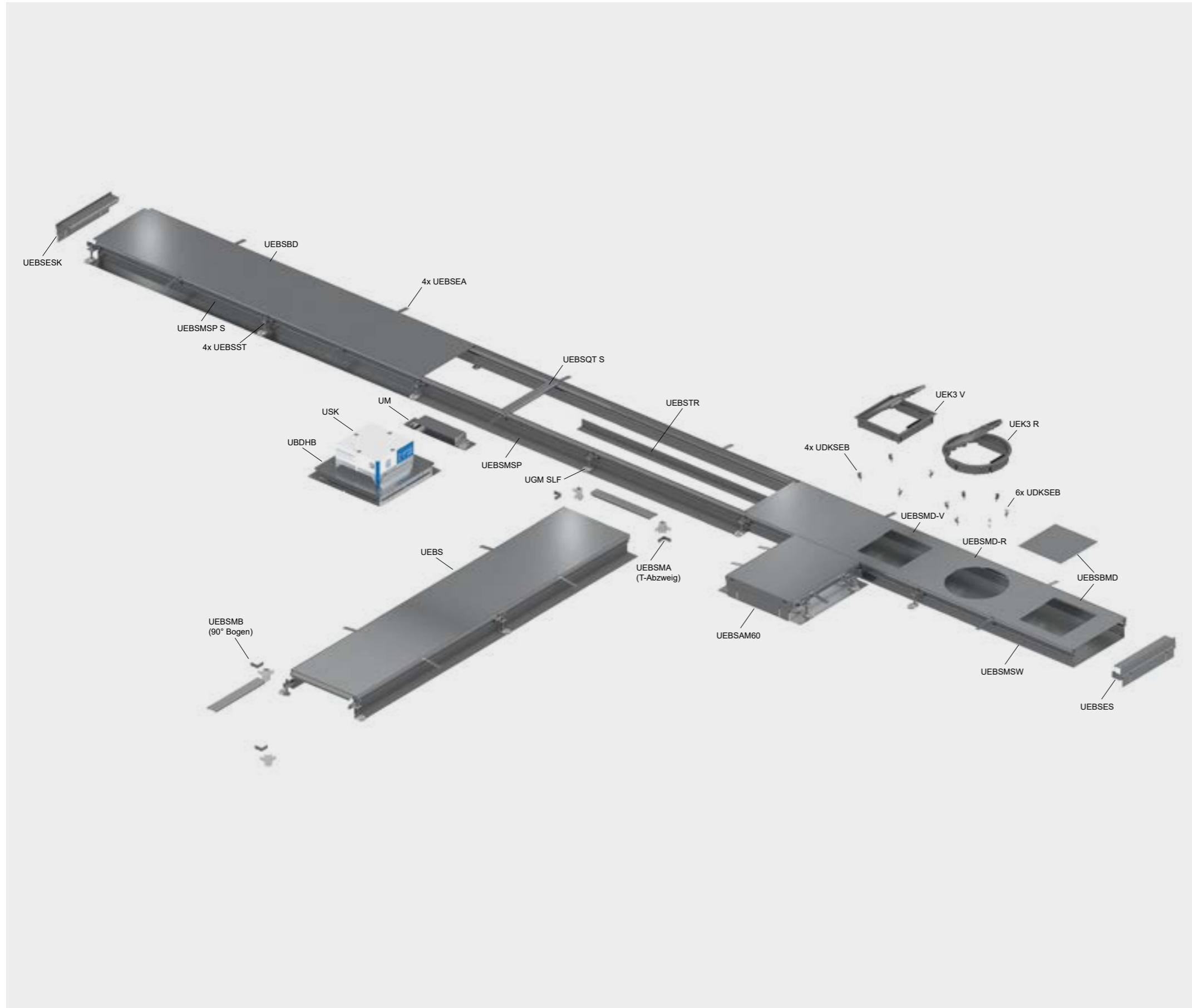
Technical data



Duct (L: Length: 2000 mm, H_{min}: Installation height: 60 mm, N: Levelling range: +90 mm, protection class: IP 30 when unused, max. load capacity 3 kN)

Type	B mm	E mm	G kg
UEBS 20S	200	400	15.14
UEBS 30S	300	500	20.30
UEBS 40S	400	600	25.46
UEBS 50S	500	700	30.86

B: Width | E: Installation dimension | G: Weight



System overview

The UEBS screed-flush duct system is designed to meet a wide range of requirements in dry-cleaned rooms. Its modular composition means that it not only fulfils standard requirements, but can also be used for buildings with increased impact sound requirements and for EMC installations. The structural design of the UEBS duct system makes it a versatile and reliable choice for interiors exposed to office traffic loads. The removable covers mean you can always access the cables and give you maximum flexibility in positioning the installation units. The standard system consists of a duct, two side walls, a floor pan and four levelling supports.

Installation components



UEBSMSP
Side walls



UEBSMSW
Floor pan



UEBSST
Levelling support



UEBSMD
Assembly cover



UEBSES
End part



UEBSTR
Separating strip



UGM-SLF
Subsonic noise sleeve socket for levelling support

Application examples

An office area of approx. 180 m² is being fitted with a screed-flush duct system 400 mm wide. The workstations will be supplied with power and data lines via ten quadrangular units. A total of 42 m of duct will be routed through the room for the project.

Customer requirements

- 42 m duct
- 400 mm wide
- 100 mm floor structure
- 10 quadrangular installation units, dry-cleaned

Example order

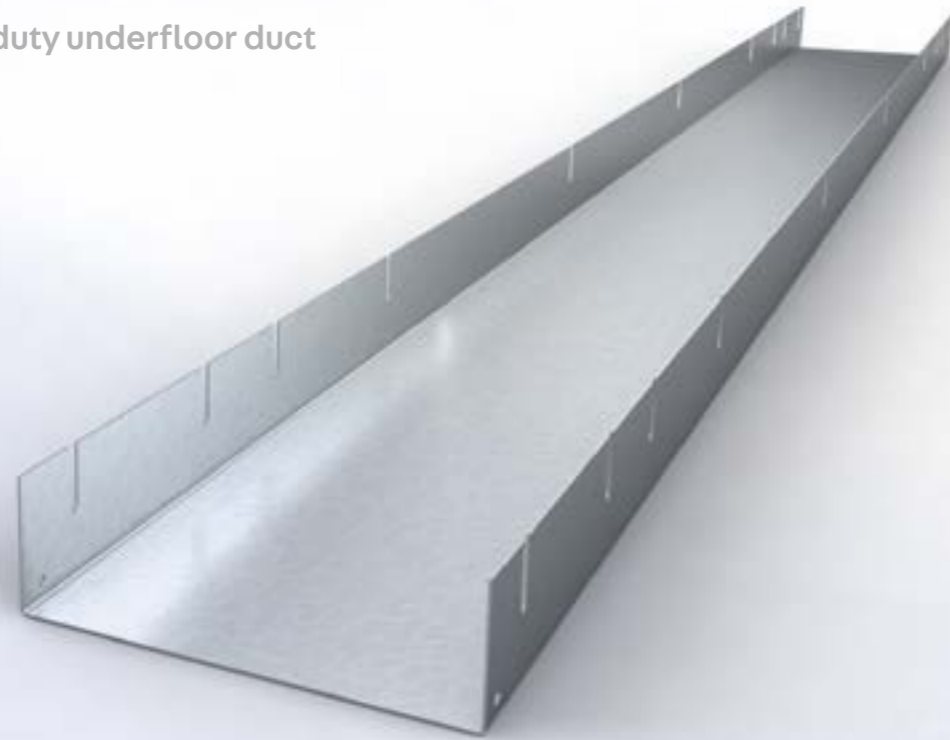
- 21 x **UEBS 40S**
Screed-flush, heavy-duty under-floor duct
- 21 x **UEBSMSP 60S**
Side profiles
- 21 x **UEBSTR**
Separating strips
- 105 x **UEBSST 80S**
Levelling supports
- 10 x **UEBSMD-260V 40S**
Assembly covers with square openings
- 2 x **UEBSES 60-40S**
End parts
- 10 x **UEK3-V-S**
Plastic installation units, square
- 40 x **UDKSEB**
Claws for installation unit



An overview of all products for the UEBS screed-flush underfloor duct can be found in our price list.

UBK

Screed-flush, heavy-duty underfloor duct



Benefits

- Cables safely protected in the floor
- Different live load levels possible
- Easy access for repairs or retrofits
- Variable height due to combination of separate side profiles and floor pan
- Barrier-free underfloor cable routing

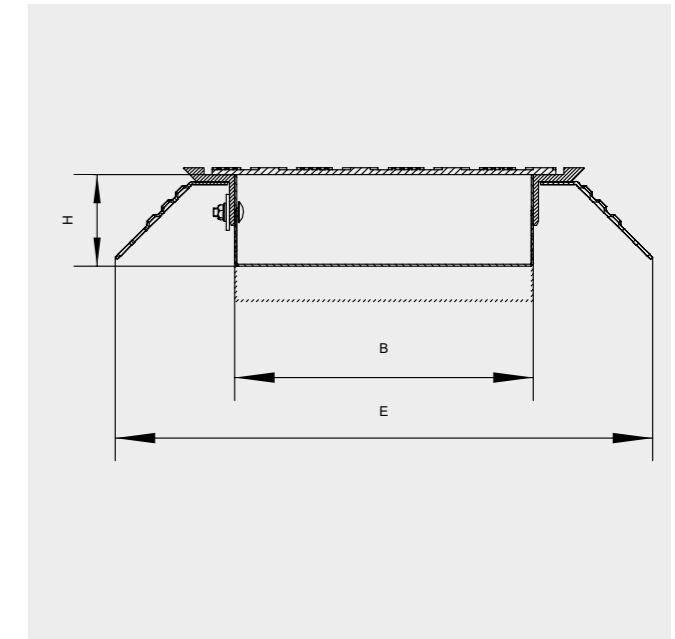
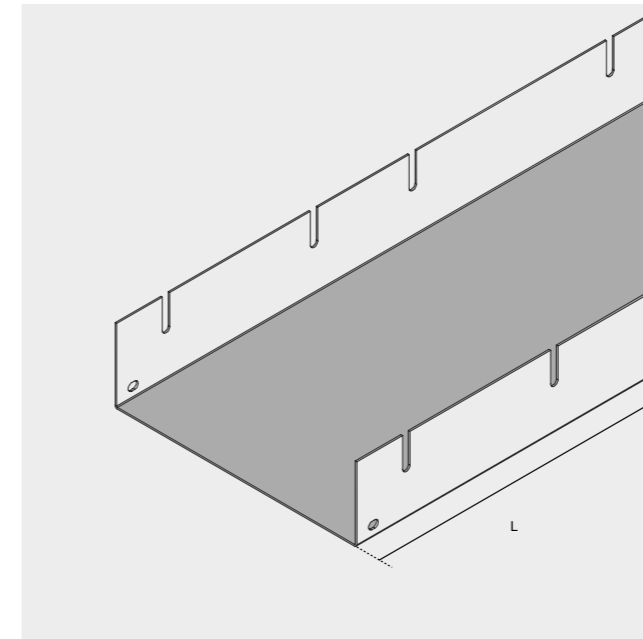
Areas of application

The UBK system has been specially designed for industrial requirements and is a robust and reliable choice for all production halls where cables need to be laid without creating a tripping hazard or restricting transport routes.



In industrial sectors

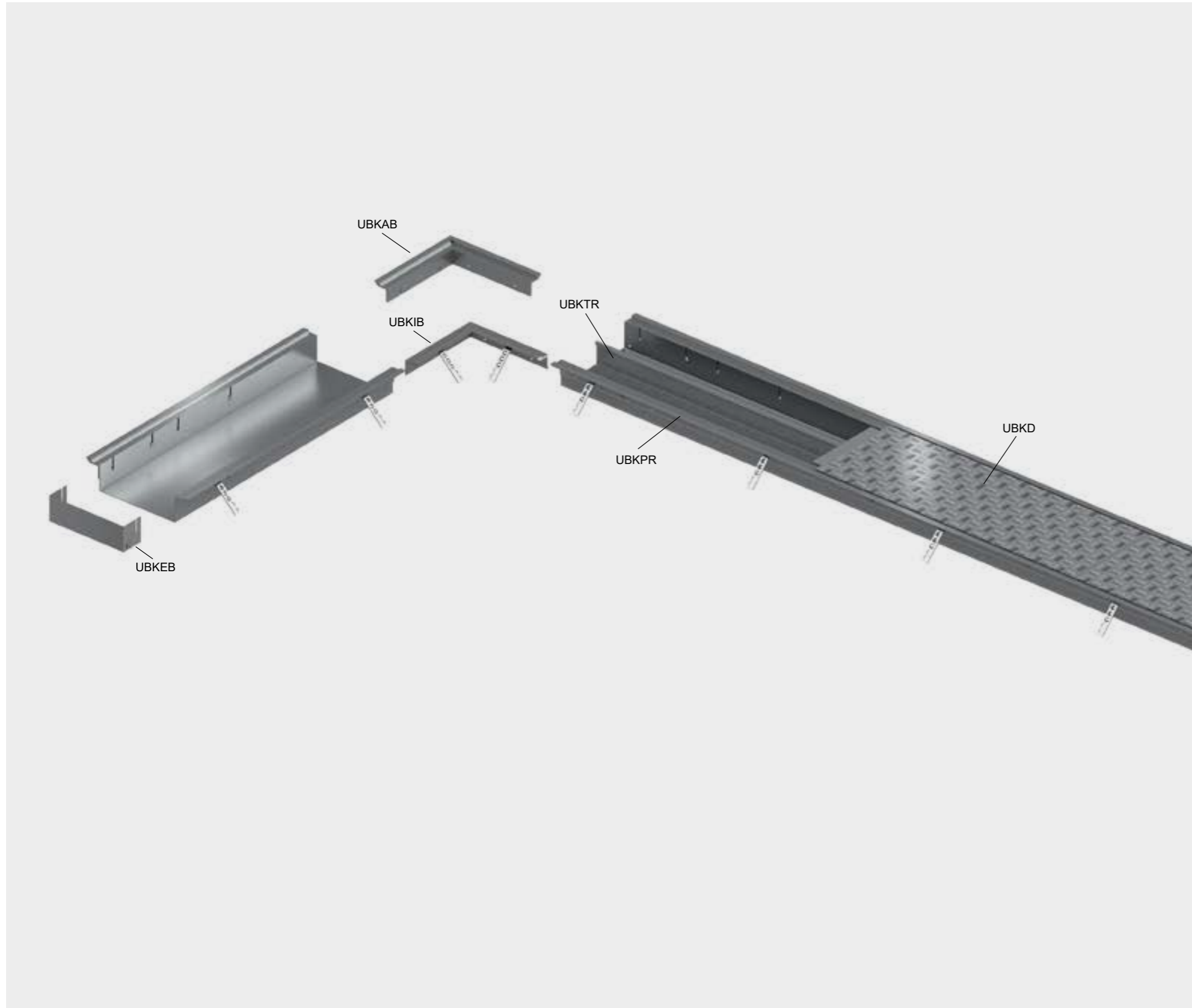
Technical data



Duct (L: Length: 3000 mm)

Type	H mm	B mm	E mm	G kg
UBK 100-20S	90	194	450	17.20
UBK 100-30S	90	294	550	21.90
UBK 100-40S	90	394	650	26.90
UBK 135-20S	125	194	450	18.80
UBK 135-30S	125	294	550	25.20
UBK 135-40S	125	394	650	30.00
UBK 170-20S	160	194	450	23.80
UBK 170-30S	160	294	550	28.50
UBK 170-40S	160	394	650	33.30

H: Height | B: Width | E: Installation dimension | G: Weight



System over- view

The UBK heavy-duty floor duct system is used for installing cables safely on industrial sites. The system is designed for high live loads, so industrial trucks can drive over it safely. The flexible duct openings give you easy access to the cables for any necessary repairs or retrofits.

Installation components



UBKPR
Side profiles



UBKD
Dummy cover



UBKTR
Separating strip



UBKEB
End part

Application examples

Machines in a production hall are to be supplied with separate power circuits without affecting the freedom of movement of employees and industrial trucks. The installed system must also withstand the live loads that occur in daily usage. To create this system, 24 m of duct will be laid along the production line.

Customer requirements

- 24 m duct
- 300 mm wide
- 140 mm floor structure
- 2 compartments
- Live loads: 10 kN

Example order

- 8 x **UBK 135-30S**
Screed-flush,
heavy-duty underfloor duct
- 16 x **UBKPR 8F**
Side profiles
- 24 x **UBKD8 35F**
Dummy covers
- 2 x **UBKEB 135-30 S**
End pieces
- 8 x **UBKTR 135S**
Separating strips
- 24 x **UBKDB8 35**
Spacers



An overview of all products for the **UBK** screed-flush, heavy-duty duct can be found in our price list.

Planning notes

Planning-relevant issues

1. Floor structure

- Height from bare concrete to top of screedmm
- Floor covering thicknessmm
- Total floor structuremm
- Screed thicknessmm

2. System resilience

- Office traffic loads
- Heavy loads

3. Floor covering

- Carpet
- Linoleum
- Parquet
- Other:.....

4. Shape of the installation units

- Round
- Square

5. Fittings

- Number of powered devices installed: units.
- Number of data technology devices installed: units.

Installation requirements

On-site requirements

The following requirements must be met before an underfloor duct system can be properly installed:

- Approved dimensioned installation plan specifying the location of all installation parts
- Project bill of materials listing the materials to be used
- Floor construction and flooring documents
- A broom-clean, approved slab within the construction tolerances according to DIN 18202 (see appendix 2).
- Accurate benchmarks as reference points for the

Screed work

General information:

The following points are essential to ensure successful installation:

- The duct system must be sealed before applying the screed
- The system elements must be firmly anchored to the slab
- The installed duct system must not be walked on or otherwise subjected to stress
- Loads can only be applied to the duct system once the screed has hardened and the area must be cordoned off while curing.
- Screed deformations and shrinkages must be taken into account in advance
- Screed types and minimum screed thickness must be complied with according to DIN 185602 (see appendix 1). This specifies a screed thickness of at least 40 mm over the duct for office and work areas with a surface load of up to 2 kN/m²
- For higher loads, correspondingly thicker screeds must be applied in accordance with DIN 18560
- The duct system itself has been loaded and tested with a point load of 750 N in accordance with the standard
- When using self-levelling screeds, all standard openings <7 mm must be professionally masked off

appropriate screed thickness

- Information on traffic loads, fire protection measures and impact noise behaviour
- The assembly area must be free of rubble and foreign materials
- The area must be well protected against weather and moisture
- Minimum installation depth and floor care of installation units must be specified

CHALI system

- It is essential to use insulation strips to decouple the duct system from the screed as it is a decoupled and free-standing system

UEBS / UBK system

- There must be a firm bond between the duct system and screed
- The side profiles must be filled in with screed
- Ensure that the screed is well compacted and flush in the area of the screed-flush duct to prevent any unevenness or cracks in the screed later on.
- You must not use insulation strips to decouple the duct system from the screed, as this may result in the screed or duct being damaged or the floor covering cracking. Expansion joints between the screed and screed-flush channels can lead to deformations of the duct and reduce the stability and load-bearing capacity of the entire system.

Duct system application

The underfloor system must comply with the requirements of DIN EN 50085. The duct system must be installed on the slab according to the assembly instructions and in compliance with the technical information. The screed-flush duct system requires a minimum floor thickness of 60 mm.

Including the duct system in protective measures

- All metallic parts of the entire duct system must be included in the protective measures
- According to the VDE, all conductive parts of the duct system must be included in the equipotential bonding arrangement. This is done at the transition points of the components by welding, riveting, making a firm pressure connection using screw connectors or using flexible earthing conductors.
- The electrical duct system must not be used as an equipotential bonding conductor
- The duct system must be included in the equipotential bonding arrangement of the entire system during the electrical installation work
- When laid over expansion joints, care must be taken to ensure that connections between the components are flexible

The declared linear impedance for the UEBS screed-flush duct system is 0.0005 ohms per metre.

Floor coverings

When selecting flooring materials, consider that underfloor installation systems are subject to the effects of live loads and must be classified by means of test loads of 500 N to 15,000 N in accordance with DIN EN 500 85. Dynamic deflections of up to 6 mm and permanent deformations of up to 3 mm are permitted.

Flatness specifications for finished floors must be complied with according to DIN 18202 tab. 3 line 3.

Appendix 1: Excerpt from DIN 18560-2:2009-09

Table 1: Nominal thicknesses and flexural tensile strength or hardness of unheated screeds on insulation layers for vertical live loads $\leq 2 \text{ kN/m}^2$

Screed type	Bending strength class or hardness class according to DIN EN 13813	Nominal screed thickness in mm with compressibility of the insulation layer ^{c,d} $\leq 5 \text{ mm}^b$	Confirmation test of flexural strength $\beta\text{BZ N/mm}^2$		Penetration depth mm	
			Smallest single value	Average value	At $22 \pm 1^\circ\text{C}$	At $40 \pm 1^\circ\text{C}$
Calcium sulphate self-levelling screed (CAF)	F4	≥ 35	≥ 3.5	≥ 4.0	-	-
	F5	≥ 35	≥ 4.5	≥ 5.0	-	-
	F7	≥ 35	≥ 6.5	≥ 7.0	-	-
Calcium sulphate screed (CA)	F4	≥ 45	≥ 2.0	≥ 2.5	-	-
	F5	≥ 40	≥ 2.5	≥ 3.5	-	-
	F7	≥ 35	≥ 3.5	≥ 4.5	-	-
Poured asphalt	IC10	≥ 25	-	-	≤ 1.0	≤ 4.0
	ICH 10	≥ 35	-	-	≤ 1.0	≤ 2.0
Synthetic resin screed	F7	≥ 35	≥ 4.5	≥ 5.5	-	-
Magnesium screed MA	F4	≥ 45	≥ 2.0	≥ 2.5	-	-
	F5	≥ 40	≥ 2.5	≥ 3.5	-	-
	F7	≥ 35	≥ 3.5	≥ 4.5	-	-
Cement screed CT	F4	≥ 45	≥ 2.0	≥ 2.5	-	-
	F5	≥ 40	≥ 2.5	≥ 3.5	-	-

A. For insulation layers $\leq 40 \text{ mm}$, the screed thickness can be reduced by 5 mm for calcium sulphate, synthetic resin, magnesium and cement screeds. The minimum thickness must not be

less than 30 mm (except poured asphalt).

B. For poured asphalt screeds, the compressibility of the insulation layers must not exceed 3 mm.

C. The surface hardness of xylolite screeds must be at least SH 30 according to DIN EN 13813.

D. For higher compressibility ($\leq 10 \text{ mm}$), the nominal screed thickness must be increased by 5 mm.

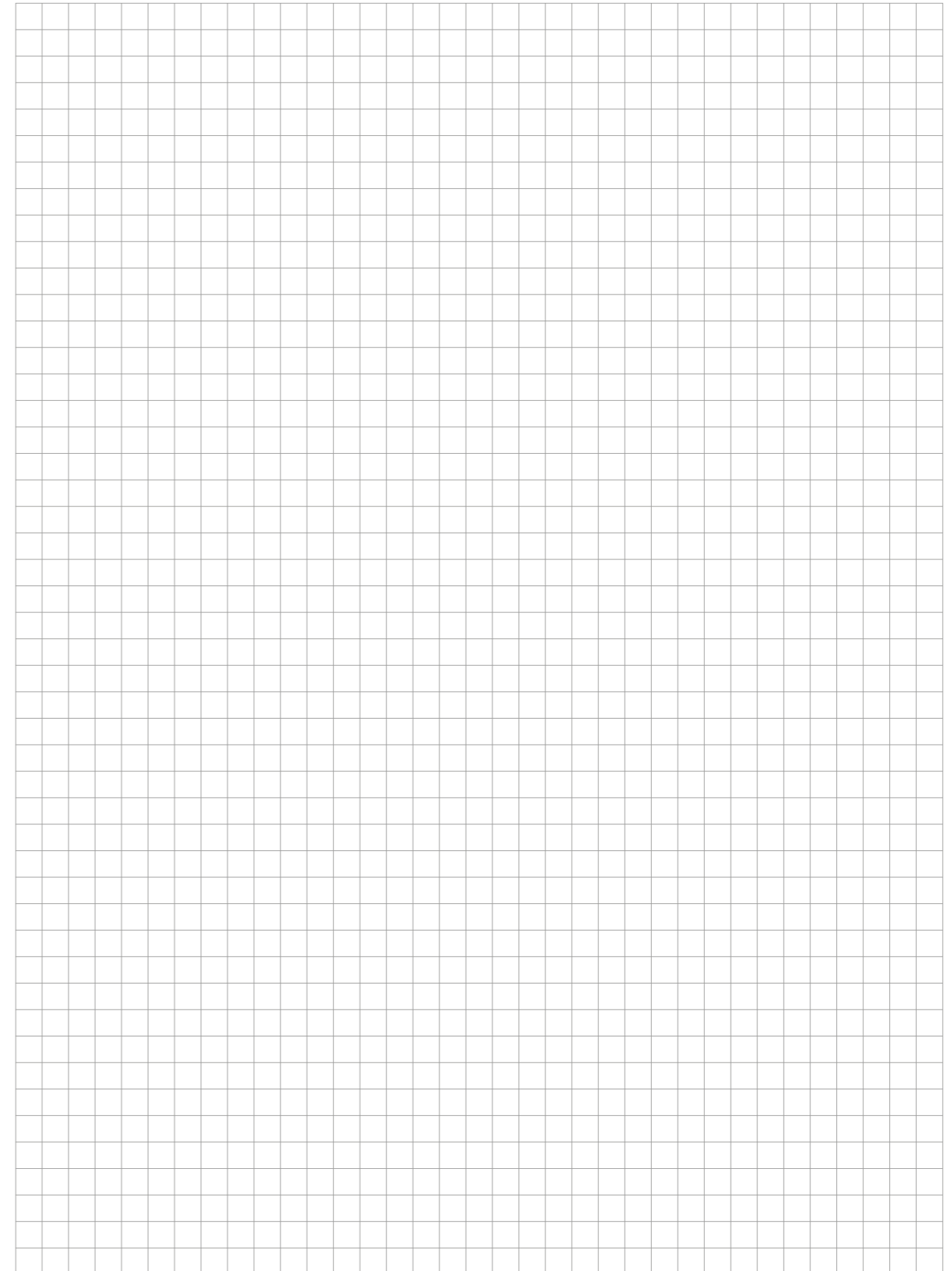
Appendix 2: Excerpt from DIN 18202

Table 3: Flatness tolerances

Column	1	2	3	4	5	6
Row	Reference	Depth gauges as limit values in mm for test point spacings in m up to				
		0.1	1 ¹⁾	4 ¹⁾	10 ¹⁾	15 ²⁾
1	Non-surface-finished topsides of ceilings, concrete subbases and subfloors	10	15	20	25	30
2	Non-surface-finished topsides of ceilings, concrete subbases and subfloors with more stringent requirements, e.g. to accommodate floating screeds, industrial floors, tiles, flags and composite screeds. Fully finished surfaces for simple purposes, e.g. in storerooms, cellars	5	8	12	15	20
3	Surface-finished floors, e.g. plain screeds, screeds for receiving floor coverings; floor coverings, tiled coverings, trowelled and bonded coverings	2	4	10	12	15
4	As row 3, but with more stringent requirements	1	3	9	12	15
5	Non-surface-finished walls and undersides of slabs	5	10	15	25	30
6	Surface-finished walls and undersides of ceilings, e.g. plastered walls, wall coverings, suspended ceilings	3	5	10	20	25
7	As row 6, but with more stringent requirements	2	3	8	15	20

¹⁾ Intermediate values are to be taken from figures 1 and 2 and rounded to whole millimetres.

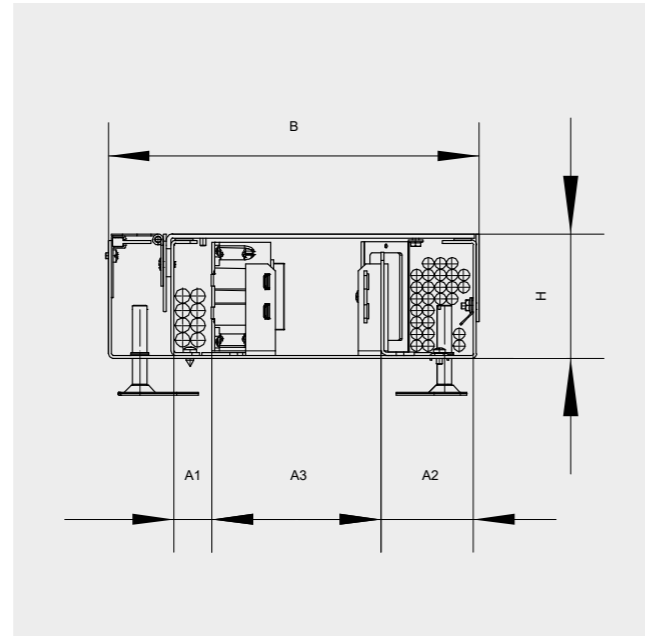
²⁾ The flatness tolerances in column 6 also apply to test point spacings over 15 m. C. Reproduced with the permission of DIN Deutsches Institut für Normung e. V. The last-issued version of the DIN standard must be applied and can be obtained from Beuth Verlag GmbH, Burggrafenstrasse 6, 10787 Berlin, Germany.



Laying cables in ducts

The cable volume must be determined as a basis for your plans. The cross-sections of the selected, commercially available types of cables are average values. Calculations are based on a maximum duct fill factor of 60%. The installation position of the device holders can reduce the area of the duct available for routing cables. The reduction in cross-section must be taken into account. See DIN VDE 0100/0298 for the current rating

CHALI screed-flush brush duct



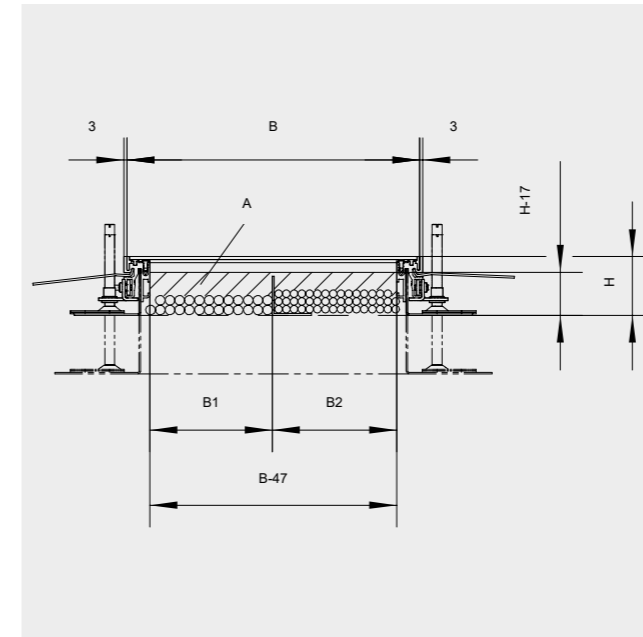
Width (B1, B2, B3: 76 mm)

Article number	H mm	H -11 mm	B -49 mm	A1 cm ²	A2 cm ²	A3 cm ²	B mm	B1 / power line 3 x 2.5 mm		B2 / Cat.6 data line		B3 / power line (reserve/ cable duct) 3 x 2.5 mm ²	
								Number of dia. 10 mm	NQ cm ²	Number dia. 8 mm	NQ cm ²	Number of dia. 8 mm	NQ cm ²
CHALI 85-25S	85	74	203	19	32	99	200	12	1	30	0.64	59	1

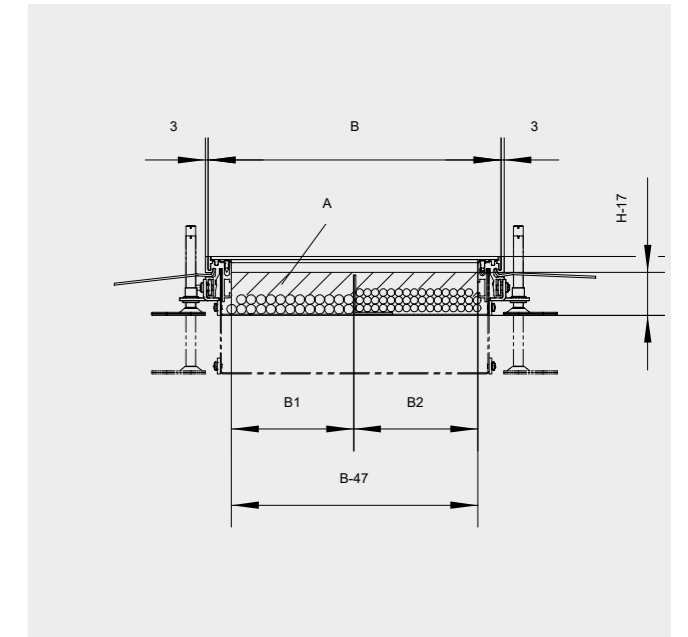
H: Height | B: Width | A: Cross section | NQ: Useful cross section

UEBS and UEBSMSW screed-flush duct with side profiles and floor pan

Screed-flush duct with side profiles
UEBS



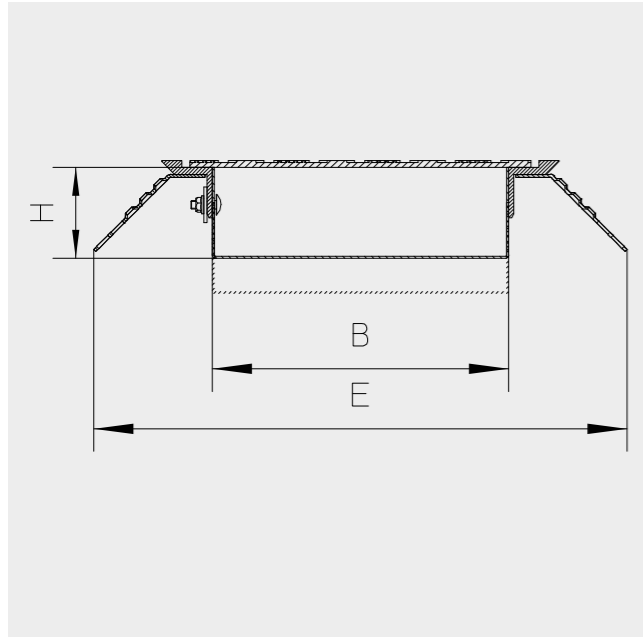
Screed-flush duct with floor pan
UEBSMSW



Article number	H mm	H -17 mm	B -47 mm	A cm ²	B mm	B1 mm	B2 mm	B1 / power line 3 x 2.5 mm ²		B2 / data line, Cat.6	
								Number dia. 10 mm	NQ cm ²	Number dia. 8 mm	NQ cm ²
UEBS (MSW) 60-20S	60	43	153	65.36	200	76	76	20	1	31	0.64
	80	63	153	95.76	200	76	76	29	1	45	0.64
	100	83	153	126.16	200	76	76	38	1	60	0.64
	150	133	153	202.16	200	76	76	61	1	96	0.64
UEBS (MSW) 60-30S	60	43	253	108.36	300	126	126	33	1	51	0.64
	80	63	253	158.76	300	126	126	48	1	75	0.64
	100	83	253	209.16	300	126	126	63	1	99	0.64
UEBS (MSW) 60-40S	60	43	353	151.36	400	176	176	46	1	71	0.64
	80	63	353	221.76	400	176	176	67	1	105	0.64
	100	83	353	292.16	400	176	176	88	1	138	0.64
	150	133	353	468.16	400	176	176	141	1	221	0.64
UEBS (MSW) 60-50S	60	43	353	194.36	400	176	176	46	1	71	0.64
	80	63	353	284.76	400	176	176	67	1	105	0.64
	100	83	353	375.16	400	176	176	88	1	138	0.64
	150	133	353	601.16	400	176	176	141	1	221	0.64

H: Height | B: Width | A: Cross section | NQ: Useful cross section

UBK screed-flush, heavy-duty duct



B1 / power line
3x 2.5 mm²

B2 / Cat.6 data line

Article number	H mm	H -17 mm	B-47 mm	A cm²	B mm	B1 mm	B2 mm	Number Dia. 10 mm	Useful cross section cm²	Number of dia. 8 mm	Useful cross section cm²
UBK 100-20S	100	90	190	171.00	200	95	95	51	1	80	0.64
UBK 100-30S	120	110	190	209.00	200	95	95	63	1	98	0.64
UBK 100-40S	100	90	290	261.00	300	145	145	78	1	122	0.64
UBK 135-20S	120	110	290	319.00	300	145	145	96	1	150	0.64
UBK 135-30S	100	90	390	351.00	400	195	195	105	1	165	0.64
UBK 135-40S	120	110	390	429.00	400	195	195	129	1	201	0.64
UBK 170-20S	135	125	190	237.50	200	95	95	71	1	112	0.64
UBK 170-30S	155	145	190	275.50	200	95	95	83	1	129	0.64
UBK 170-40S	135	125	290	362.50	300	145	145	109	1	170	0.64
UBK 170-20S	155	145	290	420.50	300	145	145	126	1	197	0.64
UBK 170-30S	135	125	390	487.50	400	195	195	146	1	229	0.64
UBK 170-40S	155	145	390	565.50	400	195	195	170	1	265	0.64
UBK 170-20S	170	160	190	304.00	200	95	95	91	1	143	0.64
UBK 170-30S	205	195	190	370.50	200	95	95	111	1	174	0.64
UBK 170-40S	170	160	290	464.00	300	145	145	139	1	218	0.64
UBK 170-20S	205	195	290	565.50	300	145	145	170	1	265	0.64
UBK 170-30S	170	160	390	624.00	400	195	195	187	1	293	0.64
UBK 170-40S	205	195	390	760.50	400	195	195	228	1	357	0.64

H: Height | B: Width | A: Cross section | NQ: Useful cross section

Impact noise behaviour

Sound insulation when using underfloor duct systems

The requirements for sound insulation in buildings are regulated by DIN 4109. The aim is to minimise noise pollution. The best way to achieve this is to acoustically decouple the slab, the duct system and the screed by using isolation layers. Floating screeds can also be used to acoustically isolate the floor. Otherwise, structure-borne sound excitation is transmitted directly via the slab. In this case, footfall noise can only be reduced by installing soft, elastic floor coverings.

Measurement procedure for underfloor duct systems

The impact sound behaviour of the screed-flush and screed-covered systems is measured between two rooms positioned one above the other with structure-borne flank transmission. Measurements are conducted in a footfall sound test facility according to DIN 52210-2 or DIN EN ISO 10140 and the tests themselves comply with DIN EN ISO 140-7 or DIN EN ISO 16283-2.

A standard tapping machine is used as a sound source in the transmitter room. The noise is generated by tapping both on the screed and directly on the duct or installation unit. We work exclusively with testing laboratories that comply with DIN EN ISO/IEC 17025.

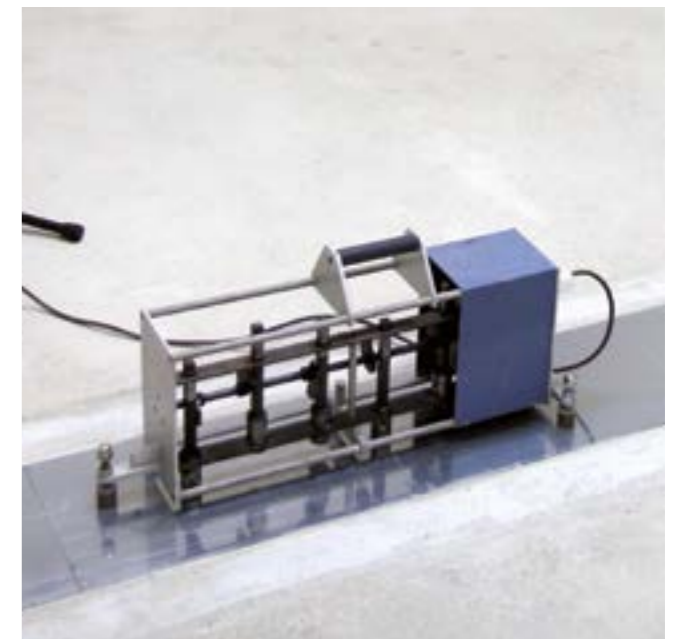
The received levels are determined using a real-time analyser and rotating microphone. The standard impact sound level $L_{n,W}$ is calculated as the characteristic value of the component being assessed taking into account the volume and the reverberation time.

The impact sound reduction ΔL_W is calculated as the difference between the standard impact sound level of a ceiling with and without floor coverings. The impact sound reduction must be effective enough to ensure that the maximum standard impact sound level stipulated for office buildings is not exceeded. The standard impact sound level values required for office buildings are defined as follows:

$L_{n,W} \leq 53$ dB (DIN 4109)

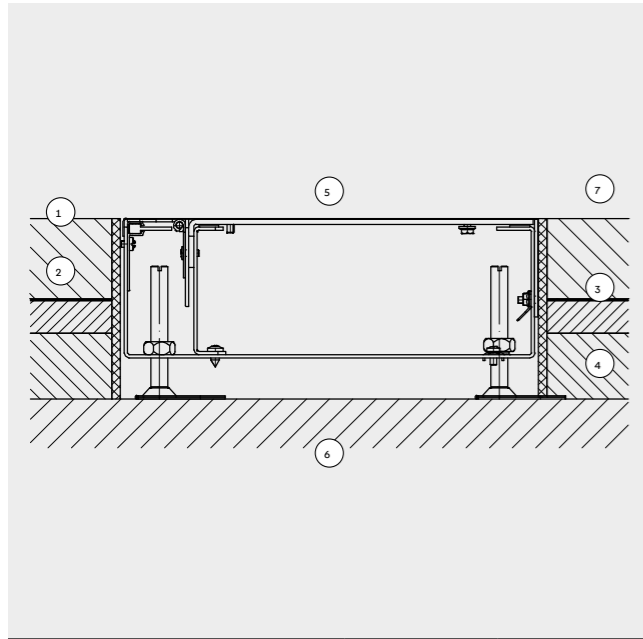
More stringent impact sound level requirements (recommendations)

$L_{n,W} \leq 46$ dB (DIN 4109)



CHALI tests

CHALI brush duct



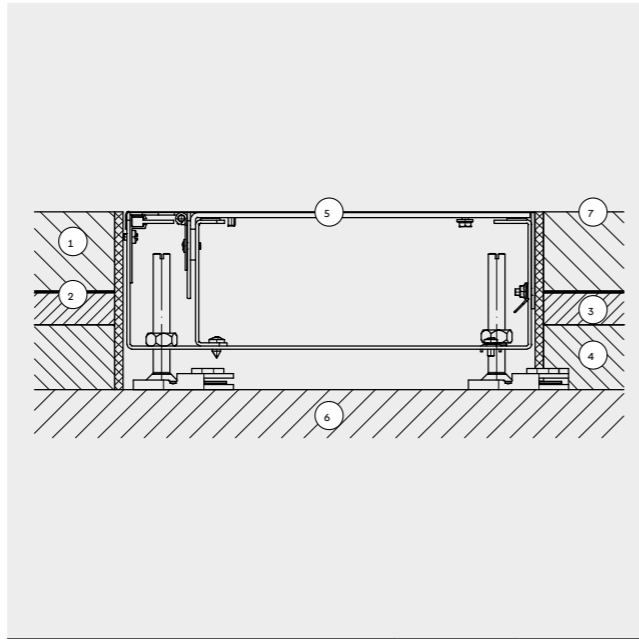
Test setup

ΔL_w (dB)
mm

$L^*_{n,w}$ (dB)
kN/m

Brush duct installed in floating screed, sound excitation on screed	25	51
Brush duct installed in floating screed, sound excitation on screed with textile floor covering	35	45
Brush duct installed in floating screed, sound excitation on screed with laminate	29	47

CHALI brush duct with rubber bushing



Test setup

ΔL_w (dB)
mm

$L^*_{n,w}$ (dB)
kN/m

Brush duct installed in floating screed, sound excitation on duct, decoupled by rubber bushing	27	50
Brush duct installed in floating screed, sound excitation on duct with textile floor covering, decoupled by rubber bushing	29	47
Brush duct installed in floating screed, sound excitation on duct with laminate flooring, decoupled by rubber bushing	26	49
Brush duct installed in floating screed, sound excitation on screed, decoupled by rubber bushing	25	51
Brush duct installed in floating screed, sound excitation on screed with textile floor covering, decoupled by rubber bushing	32	45
Brush duct installed in floating screed, sound excitation on screed with laminate flooring, decoupled by rubber bushing	30	47

Results

The measurement results show that screed-flush brush duct can meet the sound insulation requirement of 53 dB for ceilings in office buildings. Therefore, underfloor systems can be installed in the floating screed of a ceiling without any concerns regarding impact sound behaviour.

Acoustic excitation can be carried out on the screed itself or directly on the duct if carpet or laminate flooring will be installed. The system meets the normal sound insulation requirements even when tested without any floor covering. Decoupling the duct system via a rubber bushing further reduces impact sound by at least 1 dB.

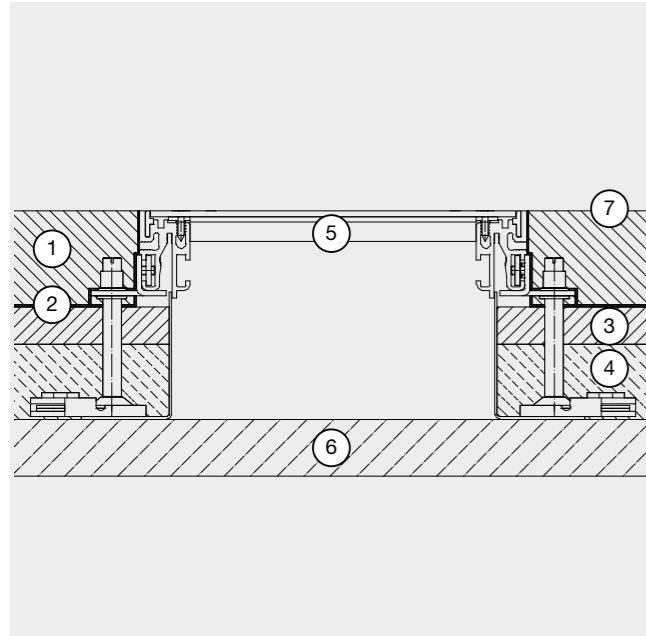
The system achieves sound insulation level II according to VDI 4100 (improved impact sound protection).

Structure

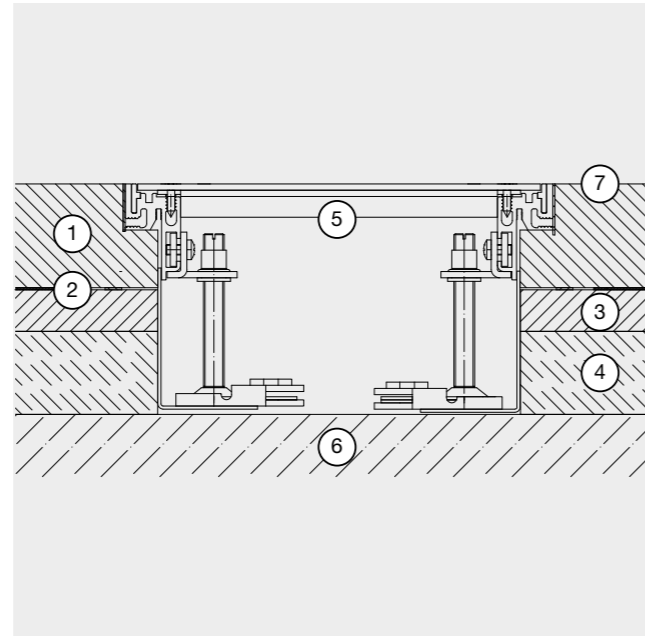
1. 50-mm cement screed
2. 1-mm membrane
3. 20-mm impact sound insulation panel
4. 40-mm thermal insulation panel
5. Screed-flush brush duct CHALI
6. 140-mm slab
7. Floor covering (carpet: 6 mm, laminate: 8 mm)

UEBS tests

UEBS duct plus external levelling



UEBS duct plus internal levelling



Test setup

ΔL_w (dB)
mm

$L^*_{n,w}$ (dB)
kN/m

Duct system installed in floating screed, sound excitation on screed and duct	28	53
Duct system installed in floating screed, sound excitation on screed and duct with linoleum flooring	33	48
Duct system installed in floating screed, sound excitation on screed and duct with textile floor covering	40	41

Test setup

ΔL_w (dB)
mm

$L^*_{n,w}$ (dB)
kN/m

Duct system installed in floating screed, sound excitation on screed and duct without decoupling	28	53
Duct system installed in floating screed, sound excitation on screed and duct, decoupled by rubber bushing	29	52
Duct system installed in floating screed, sound excitation on screed and duct, suspended decoupling without levelling supports	30	51

Results

The measurement results show that screed-flush underfloor systems can meet the sound insulation requirement of 53 dB for ceilings in office buildings. Therefore, underfloor systems can be installed in the floating screed of a ceiling without any concerns regarding impact sound behaviour.

Acoustic excitation can be carried out on the screed itself or directly on the duct if linoleum or carpet flooring will be installed. The system meets the normal sound insulation requirements even when tested without any floor covering. Decoupling the duct system with internal levelling using rubber bushings further reduces impact sound by up to 1 dB. Decoupling the system completely by subsequently removing the levelling supports can reduce the impact sound by up to 2 dB.

Structure

1. 50-mm cement screed
2. 1-mm membrane
3. 20-mm impact sound insulation panel
4. 40-mm thermal insulation panel
5. Screed-flush UEBS duct
6. 160-mm slab
7. Carpet / linoleum floor covering

Protection classes and floor care

General standard requirements

For underfloor electrical installation duct systems, protection class testing is regulated by EN 60529 and the type of floor care is regulated by DIN EN 50085. The installation unit is tested in used and unused states to determine its protection class. The respective state is shown separately. All duct systems and installation units must at least comply with protection class IP 20 both when in use and when unused. In addition to the declaration of protection class, all cable exit openings must be at least 10 mm above the floor surface when in use if the floor is wet-cleaned.

Technical notes



Marking

All PUK installation units are marked as follows in accordance with DIN EN:



Dry-cleaning

Floor cleaning and / or maintenance method using liquid-free or low-liquid processes to prevent liquid pooling on or soaking the floor coverings.



Data sheets

The protection classes when unused / in use and the application range of the floor care are specified for all components of the PUK system in the data sheets in accordance with the classified tests according to DIN EN 50085.

It distinguishes between rooms whose floors are cared for using dry, damp and wet cleaning methods.

The various floor care application areas correspond to the definitions used by the building cleaning trade. The protection classes are stated in accordance with the IP rating.



Application notes

The underfloor system is not suitable for outdoor use in accordance with DIN EN 50085.



Dry-care

According to the IP protection classes specified in the data sheets, the plastic installation units guarantee protection against contact and ingress of water in accordance with the requirements of DIN EN 50085. DIN EN 50085 presupposes a minimum requirement of IP 20.

The underfloor electrical installation can only be reliably protected from harmful effects in standard use if the instructions given above are observed.

Protection class details according to classification

International protection (IP) code letter		Second code digit – protection against ingress of water	
First code digit – protection against ingress of solid objects of water			
Scope of protection		Scope of protection	
0	No protection against contact or ingress of objects	0	No protection against ingress of water
1	Protection against large-area contact with hands, protection against ingress of objects dia. ≥ 50 mm	1	Protection against dripping water, droplets falling vertically
2	Protection against contact with fingers, protection against objects dia. ≥ 12.5 mm	2	Protection against dripping water at any angle up to 15° from the vertical
3	Protection against contact with tools, wires or similar dia. ≥ 2.5 mm, protection against ingress of objects dia. ≥ 2.5 mm	3	Protection against sprayed water from any angle up to 60° from the vertical
4	Protection against contact with tools, wires or similar dia. ≥ 1 mm, protection against ingress of objects dia. ≥ 1 mm Protection against sprayed water from any direction	4	Protection against sprayed water from any direction
5	Protection against contact, protection against ingress of dust Protection against water jets from any angle	5	Protection against water jets from any angle
6	Complete protection against contact, protection against ingress of dust	6	Protection against strong water jets from any angle
		7	Protection against ingress of water in case of temporary immersion
		8	Protection against ingress of water in case of continuous immersion

Types of cleaning as defined in the building cleaning standards

Damp mopping

Definition: Mopping to bind dust in a single pass using cleaning textiles dampened with water or cleaning agents to remove loose, fine dirt and, to a lesser extent, coarse dirt.

Surface is free from coarse dirt and fine dirt that has collected on it.

Comments / Notes: Only smooth floor coverings should be cleaned using the damp mopping method.

Objective / result:

Load-bearing capacity of the systems

Heavy load testing according to standard DIN EN 50085

The European standard DIN EN 50085-2-2 specifies a uniform test procedure for underfloor, heavy-duty installation systems for loads up to 15 kN:

- Central axial force applied by a circular steel plate with a diameter of 130 mm
- During the test, the system being tested must have a maximum dynamic deflection of 6 mm
- After the test, the system being tested may have a maximum permanent deformation of 3 mm

Heavy-duty systems are tested and certified according to DIN EN 50085. As the DIN EN 50085 standard only covers loads up to 15 kN, an in-house test rig was set up at the Berlin plant. This allows us to conduct realistic and application-oriented tests of the load limits of heavy-duty installation systems up to 35 kN.

The type and thickness of the floor covering has a significant effect on the load-bearing capacity. The thicker the floor covering, the lower the risk of cracking. It is both necessary and helpful from the user's point of view to specify a load of up to 20 kN as a reference value. As this option is not currently covered by the DIN EN 50085 standard, we specify a factory-tested maximum load of 20 kN.

Testing the load capacity

All components and applications can be tested on the test rig in line with DIN EN 50085. When testing the products in line with their applications and with or without floor coverings, dynamic and static deformation values of the test specimen are recorded using computer software and logged in the form of a diagram and a manufacturer's certificate.

We always conduct an additional test on a factory test rig to ensure the greatest possible safety when using our heavy-duty systems in various applications. This defines individual, practical maximum limit values for the various load classes.

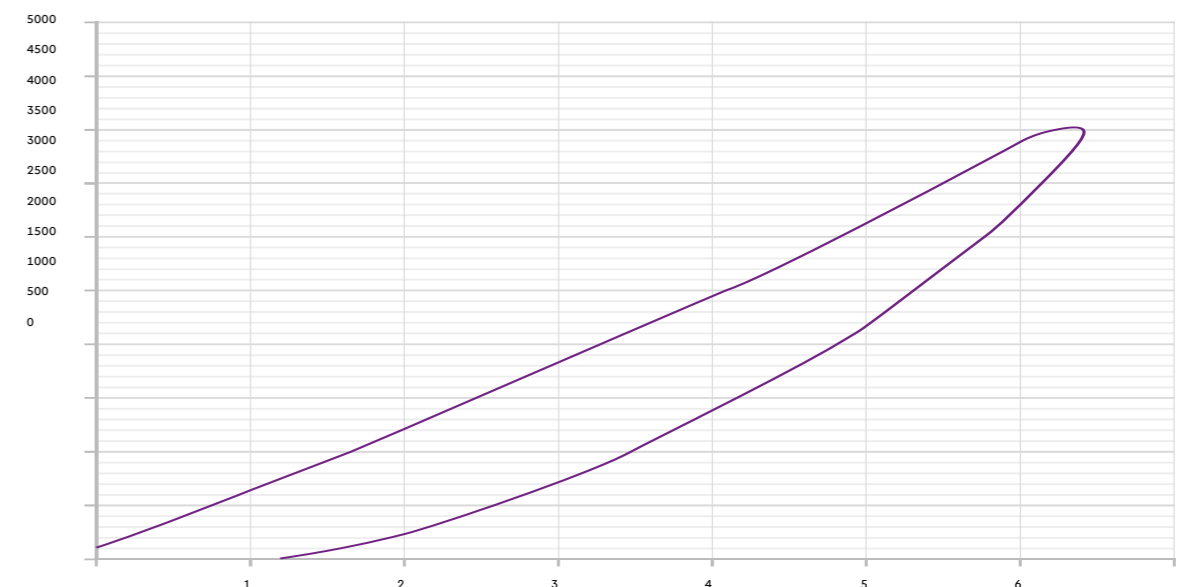
Upon request, we would be happy to test your chosen floor covering in combination with our underfloor systems.



CHALI 85-25S test log table

Test	No. (VDE 0604 xx.x.xxx)	Sample mm	Load N	Initial load N	Maximum deformation mm	Permanent deformation mm
	Load test for installation 10.5.102	50x50	Normal load	25		
			Overload			
X	Normal installation unit (force applied over a small area 10.5.103)	Dia. 13.3	Normal load 3000	50	4.8	1.3
			Overload 3800		5.9	
X	Heavy loads (force applied over a large area 10.5.104)	Dia. 130	Rating 1 Normal load 5000 N	200	3.9	0.2
			Rating 2 Normal load		200	
			Overload			

CHALI 85-25S load test for low loads



Installation depths

General requirements

For underfloor electrical installation duct systems, the thickness of the floor structure essentially determines the space available to install the installation unit, mounting box and installation device.

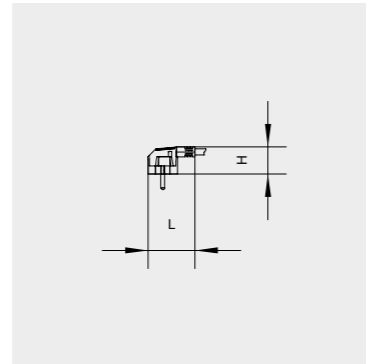
It must be possible to close the cover or the cassette when in use to meet the minimum requirements of protection class IP 20 according to DIN EN 50085. These factors are used to calculate the minimum installation height required for the system when using angled and straight plugs for data or power technology.

Technical notes

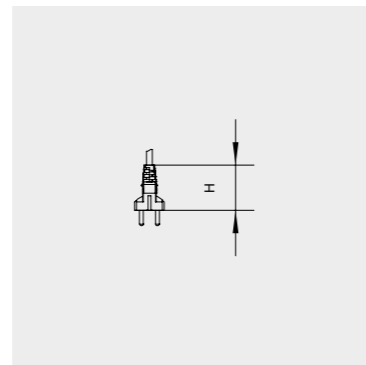
The minimum installation depths determined by us refer to the minimum dimensions of commercially available plugs for power technology indicated in the figures.

The installed mounting boxes or device supports can be lowered in steps by up to 30 mm by using snap-in ladders in the corresponding plastic installation units. This presupposes that sufficient space is available under the installation unit and is not blocked by power cables or data technology cables.

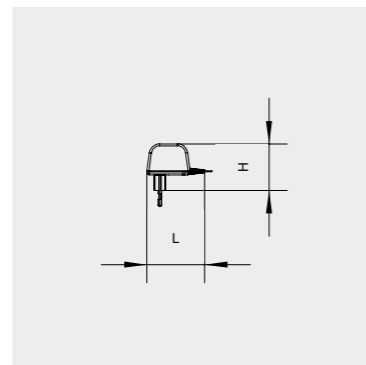
Minimum installation depths of system components



Angled plug
 Height = 33 mm
 Length = 58 mm



Straight plug
 Height = 55 mm

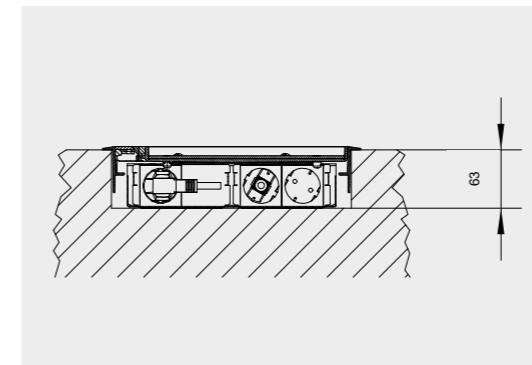


Mains adaptor
 Height = 58 mm
 Length = 71 mm

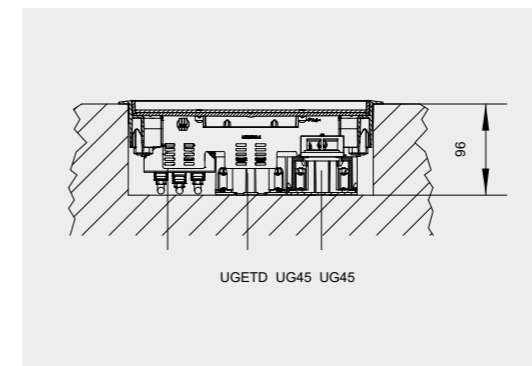
UEKD2/UEK3 plastic installation units

The floor covering depth of the covers of plastic installation units refers to carpet coverings up to 10 mm thick. The minimum installation depths shown refer to square and round plastic installation units.

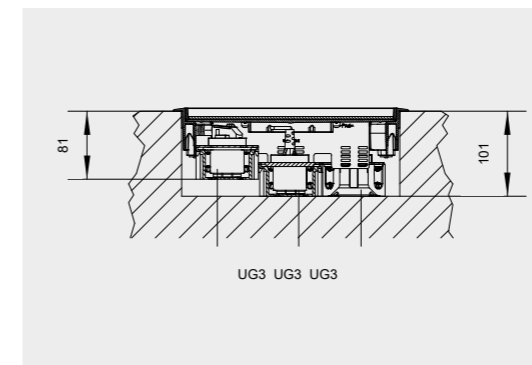
When using the UAMF-4-1 226 cover plate, there is an additional height of 5 mm between the mounting box and the cover of the unit.



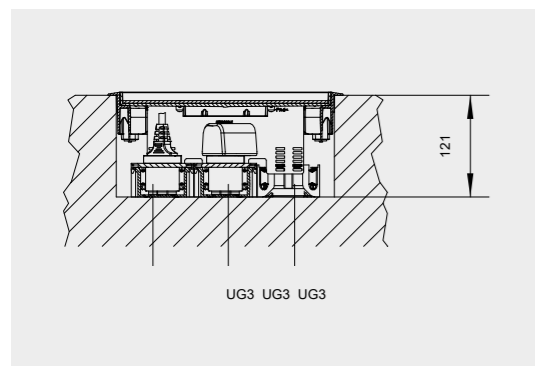
- UEK3 | Installation unit
- UGE3 VRK 4 | Mounting box insert
- UGEE 1 UST S | Device panel
- UGEE 2 UST S | Device panel
- UST45 1 | Socket, single
- Angled plug
- Straight plug
- UST45 2 | Socket, double



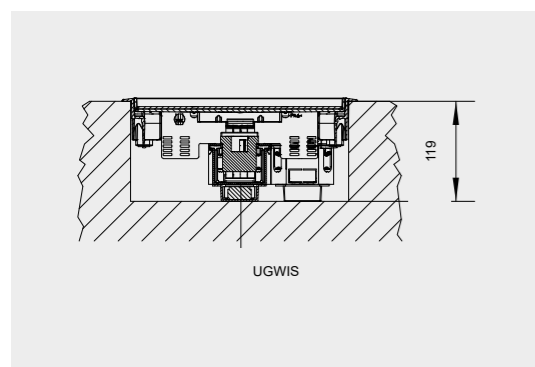
- UEK3 | Installation unit
- UGEA3 | Snap-in ladder set (UGEA3-50-S)
- UG45 | Mounting box
- UGETD | Device carrier
- UA B 226 | Cover plate
- UDAP45 KS | Data cover
- UDEP RMSC 3 | Installation board
- UDAEUM | Data connection module



- UEK3 | Installation unit
- UGEA3 | Snap-in ladder set (UGEA3-50-S)
- UG3 | Mounting box
- UAM 2 | Cover plate
- UST45 2 | Socket, double
- Angled plug
- Mains adaptor



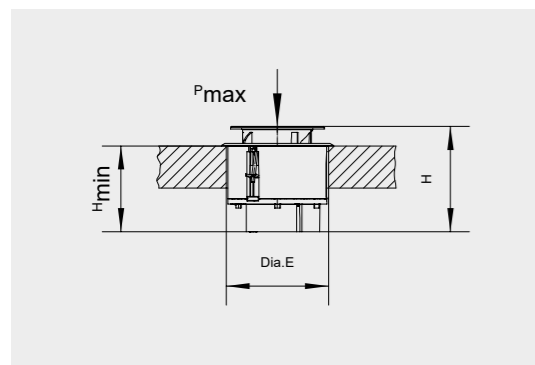
- UEK3 | Installation unit
- UGEA3 | Snap-in ladder set (UGEA3-80-S)
- UG3 | Mounting box
- UAM 2 | Cover plate
- UST45 2 | Socket, double
- Straight plug
- Mains adaptor



- UEK3 | Installation unit
- UGEA3 | Snap-in ladder set (UGEA3-50-S)
- UGWISFILS | Mounting box with RCCB switch

BODO single outlet

These images show the installation depths of the BODO product group. The structural height of the **BODO T** is 23 mm, **BODO N** is 37 mm and the **BODO NAT** is 70 mm.



- BODO T | Single outlet with floor socket, dry-cleaned

Fire protection

General information

The fire behaviour of building materials and components is regulated by DIN 4102-9. Part 9 regulates fire testing of cable penetration insulation. DIN 4102 does not stipulate fire resistance properties. These are stipulated in the building regulations of the German federal states and in other directives, such as industrial construction guidelines. If a fire resistance rating is prescribed for a wall, cables may only be routed through it if there is no risk of fire propagation or precautions have been taken against this. With regard to the use of electrical installation duct systems, this means that if fire protection walls are crossed, they must then be sealed against fire and flue gas.

Model conduit systems directive (MLAR)

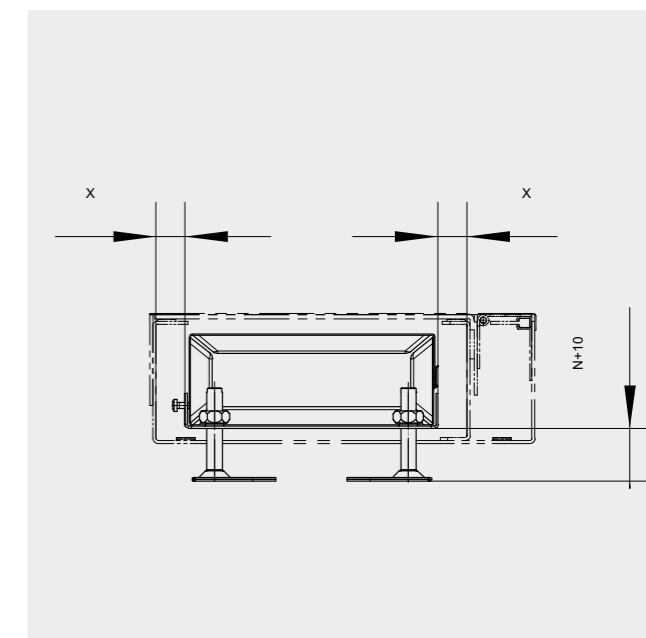
Point 3.5.6 of the MLAR guidelines on fire protection behaviour states the following: "Underfloor ducts flush with or covered by screed for the installation of cables must have a top cover of non-combustible building materials in necessary stairwells, in rooms between necessary stairwells and exits to the outside and into necessary corridors. They shall have no openings, except for inspection openings or revision openings in necessary corridors with tightly sealed closures made of non-combustible building materials." It is vital that hollow floors have at least 30 mm of screed above underfloor ducts.

Wichmann cable penetration insulation

Using the approved Wichmann cable penetration seal system prevents fire from being transmitted through installation openings in fire protection walls for a fire resistance duration of 90 minutes. The partition consists of a box containing fire protection packages that begin to expand at a temperature of 100°C in case of fire. Proper installation and handling must be observed in accordance with the relevant national technical approval.

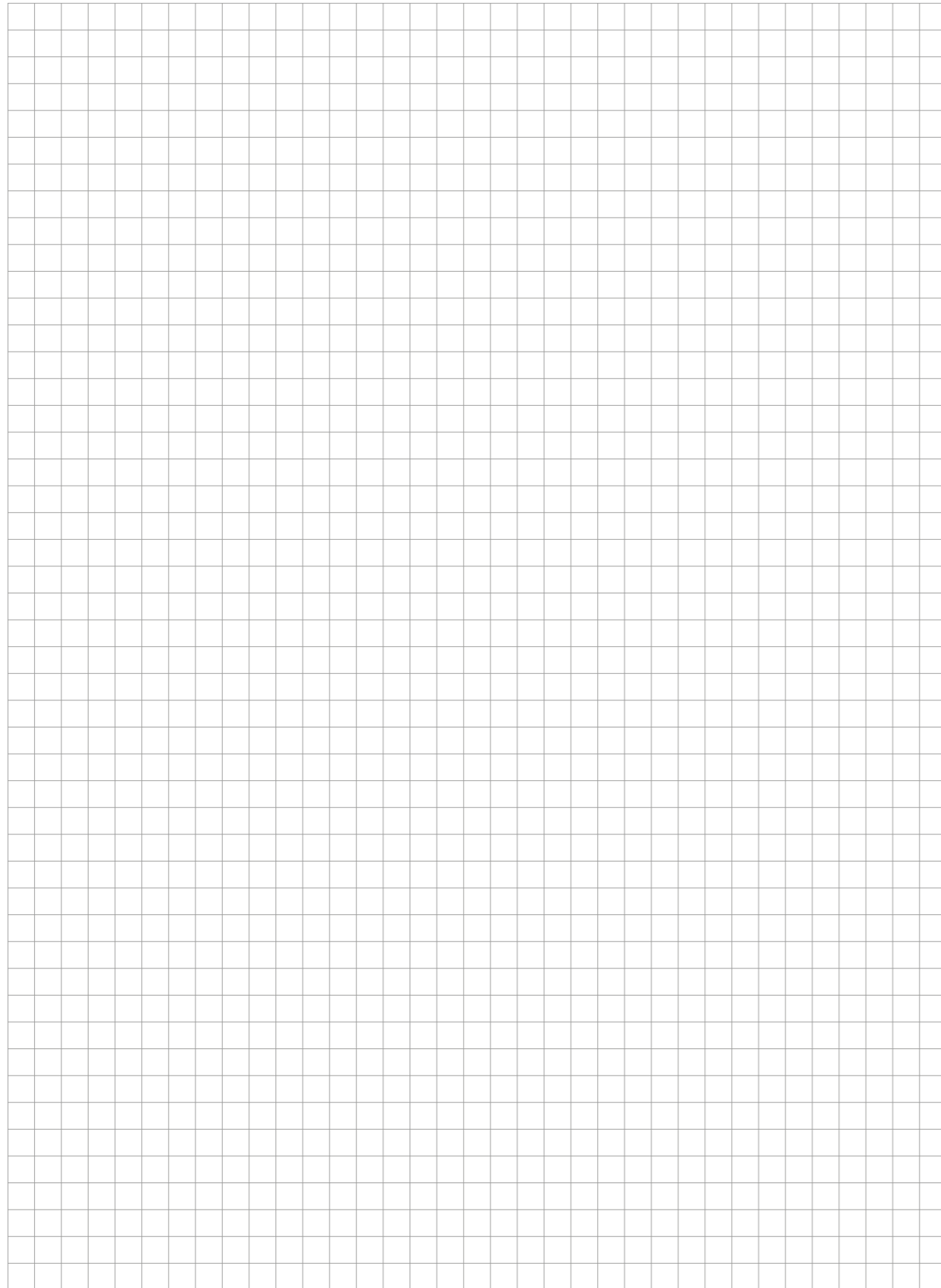
This results in the following advantages when used in duct systems:

- Use of an open partition in the fire protection wall
- Separate flue gas seal in the floor box
- Easy assembly and subsequent installation
- The duct system can be installed within the thermal and impact sound insulation



System requirements

- Test standard: DIN 4102-9
- Fire resistance class: S90
- Approval: Z-19.15-202
- Proof of usability: Approval with manufacturer's certificate



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PohlCon GmbH

Nobelstrasse 51
12057 Berlin, Germany

T +49 30 68 283 - 04
F +49 30 68 283 - 383

www.pohlcon.com