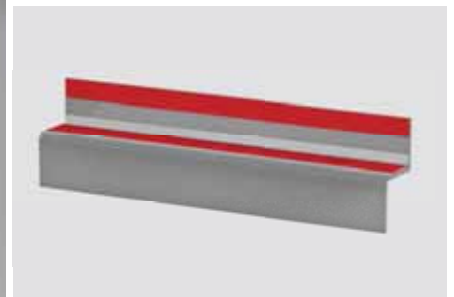


High Performance Sound Insulation Products

Technical Product Information



- Tested in accordance with DIN 7396
- Excellent impact sound insulation values
- High load capacity, with non-reinforced elastomeric bearings
- Concrete grey colour to match the prefabricated elements, easier processing of the finishing works

HP-ISI 04/23-EN

Leviat, the home of

Leviat®

A CRH COMPANY

We imagine, model and make engineered products and innovative construction solutions that help turn architectural visions into reality and enable our construction partners to build better, safer, stronger and faster.

Leviat is a world leader in connecting, fixing, lifting and anchoring technology.

From the build of new schools, hospitals, homes and infrastructure, to the repair and maintenance of heritage structures, our engineering skills are making a difference around the world.

We provide technical design assistance at every stage of a project, from initial planning to installation and beyond.

Our technical support services range from simple product selection through to the development of a fully customised project-specific design solution.

Every promise we make locally, has the commitment and dedication of our global team behind it. We employ almost 3,000 people at 60 locations across North America, Europe and Asia-Pacific, providing an agile and responsive service worldwide.

Leviat, a CRH company, is part of the world's leading building materials business.

Leviat, the home of

Ancon®

Aschwanden

Connolly

HALFEN

HELIFIX

ISEDIO

MB MeadowBurke

MODERSOHN®
Stainless Steel

MOMENT

PLAKA

scaldex

thermomass®



High performance impact sound insulation products

For peaceful and quiet staircases

HALFEN ISI – The new generation of high performance impact sound insulation products

Noise pollution can significantly affect the quality of life in residential buildings and performance in office buildings. Noise pollution caused by impact sound

in insufficiently insulated staircases is particularly unpleasant. We offer reliable solutions for staircases with our new high performance and reliable products.

HBB impact sound insulation boxes, HTF impact sound insulation elements and CRET-TS vertical impact sound insulation dowels.

Outstanding impact sound insulation values!

- Effective and permanent decoupling of the landing slabs or the stairs from adjacent residential elements
- Excellent impact sound insulation values, tested in accordance with DIN 7396
- The requirements of superior acoustic comfort according to DIN 4109-5 are far exceeded
- The highest requirements of the VDI or DEGA guidelines can be met

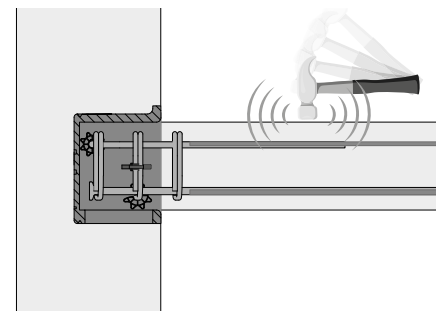
Easy and safe installation on-site / at the precast factory

HALFEN HBB Impact sound insulation boxes are applied as point supports for the landing slabs, either precast or poured in-situ.

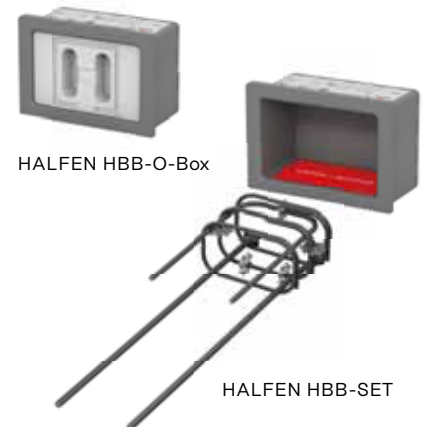
- One standard box size, suitable for all landing slab heights
- Very sturdy box
- One standard prefabricated HALFEN HBB-Rebar-cage-VVH for all landing slab heights and for all HBB-boxes
- Test report S-WUE/220241, LGA Würzburg - Germany, in accordance with EC2, guarantees the total reliability of the solution

HALFEN HTF Impact sound insulation elements for effective and permanent acoustic decoupling of the prefabricated staircase from the landing

- Designed with a light grey color to match the precast concrete elements
- Light and robust materials
- Fitted adhesive strips with protective foil with convenient tab to enable easy removal.
- Heavy-duty profiled, non-reinforced elastomeric bearings



Impact sound insulation



HALFEN HBB-O-Box

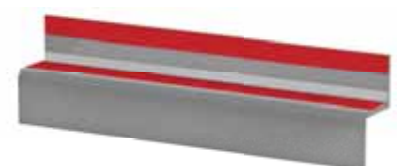
HALFEN HBB-SET



HALFEN HTF-B



Aschwanden CRET-TS dowel



HALFEN HTF-T

High performance impact sound insulation products

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High performance impact sound insulation products

Introduction

Scientifically verified and tested

In structural engineering, the demands on noise insulation are steadily increasing – on one hand through legislation and codes, and on the other hand from building owners themselves.

In response, our innovative and qualitatively superior load transmission elements are being consistently optimized. Consequently, in close collaboration with several institutes and based on normalised test procedures, noise insulating bearings and anchors have been developed. These products are the result of extensive studies of building acoustics.

A wide variety of insulation materials were investigated at a wide range of excitation frequencies to determine their vibration and structure-borne noise damping properties – with regard to extended service life of the materials used.

Outstanding quality

In addition to its high-level structural properties, the new Leviat acoustic product range exhibits enhanced noise reduction characteristics. Outstanding features are the use of new, select-grade materials and their completely innovative

design. As a result, they enable the straightforward and efficient acoustic insulation of structural elements. Quality assurance is fundamental to safety and trust, and consequently a cornerstone of the success of any product.

The design, scheduling, procurement and quality control of our acoustic products are conducted in strict accordance with our ISO 9001 compliant internal management system.

Increased needs of modern society

Thanks to ongoing advances in technology, there are a steadily increasing number of products on offer that reduce noise emission levels. At the same time, however, people are exposed to a greater diversity of sources of noise. Moreover, our modern society longs for peace and quiet. Consequently, inhabitants are ever less willing to simply accept the intrusion of noise and are demanding better levels of protection against it. In addition, sound insulation also takes on greater importance because of high-density building. Building owners are relaying these demands to planners.

This greater need for noise reduction, reflected in the most stringent requirements of building codes, demands a continuing increase in the improvement of insulation against external noise. However, with lower external noise levels comes a heightened perception of unwelcome internal noise. For this reason, not only the transmission of airborne noise from one internal room to another, but also the transmission of structure-borne and impact noise is of considerable significance.

Impact noise is generated by people walking, whereby the floor is deformed locally. Sound waves are created that propagate through the building structure and cause other structural elements to oscillate.

From these oscillations radiate sound waves that are audible as impact noise. Hence, the vibration decoupling of building elements is extremely important. It allows the propagation of structure-borne and impact noise to be reduced and – depending on the acoustic quality of the isolation – the radiated structure-borne noise to be significantly lowered or even completely eliminated.

Efficiency and installation

In addition to the selection of high-quality products, the professional installation and application of these products are crucial. Unlike other physical processes such as heat transmission, even the smallest structure-borne sound bridge can significantly reduce the impact noise insulation effect, or at worst, cancel it entirely. This is because even a modest amount of energy is sufficient to acoustically excite building elements.

There is no need for extensive transmission points; the existence of a small, rigid bridge is enough to trigger the effect. To avoid creating structure-borne sound bridges during construction work, installation instructions are available for every type of Leviat acoustic product.

Text by: Prof. Dr. Ing. Urs Bopp SIA/VDI, FHNW School of Engineering and Prof. Dr. sc. math. Marcel Steiner, FHNW School of Engineering

The acoustic quality of homes and buildings is increasingly an important consideration in new construction and renovation projects. Meeting performance requirements is a better choice than facing failure and repair costs in the event of inadequate sound insulation. Good noise control in construction, also known as building acoustics, is based on correct detailing, reliable execution and the application of the right building materials and solutions.

This is a comprehensive and complex matter in which **Leviat** can be a specialised partner in your project. **Leviat** has extensive knowledge and solutions in the field of building acoustics.

These building acoustic solutions have already been successfully applied in a wide variety of projects.



High performance impact sound insulation products

Introduction

Measurement and evaluation procedure

In June 2016 a standardised test method for the acoustical designation of decoupling elements for heavy stairs was introduced in DIN 7396:2016 for the first time. This standard defines design variables, the measurement configuration and how the measurements are performed and evaluated.

For the acoustical characterisation of decoupling elements for heavy stairs, the standard defines two methods for decoupled landing supports and decoupled stair supports:

- the **difference** in impact sound pressure level ΔL^* and
- the **reduction** in impact sound pressure level ΔL .

To differentiate between decoupled landing support and decoupled stair support, the acoustical designation is prefixed by "landing" or "stair" suffixed at the symbol (L or ΔL).

The following description is limited to the acoustic testing of the decoupled landing support.

In both test methods (difference in impact sound pressure level of the landing and reduction in impact sound pressure level of the landing), the

decoupled landing is measured in the same way: the landing is excited with a standard tapping machine and the transmitted sound pressure level in the adjacent reception area is measured for every one-third octave frequency.

The measured one-third octave level is converted to a standardised receiving room and correspondingly denoted as normalised impact sound pressure level of the landing $L_{n,landing}$.

Reference measurement

The difference between the two test methods lies in the way the reference measurement is performed. In the test method for determining the **difference** in impact sound pressure level, the landing is rigidly installed in the reference wall, the landing is excited with the standard tapping machine and the impact sound level is then measured in the adjacent receiving room as the normalised impact sound pressure level of the reference landing $L_{n0,landing}$.

In the test method for determining the **reduction** in impact sound pressure level, no landing is installed in the reference wall for the reference measurement. The reference wall is excited directly with an electromagnetic tapping machine and the

impact sound level is then measured in the adjacent receiving room as the normalised impact sound pressure level of the wall $L_{n0,wall}$.

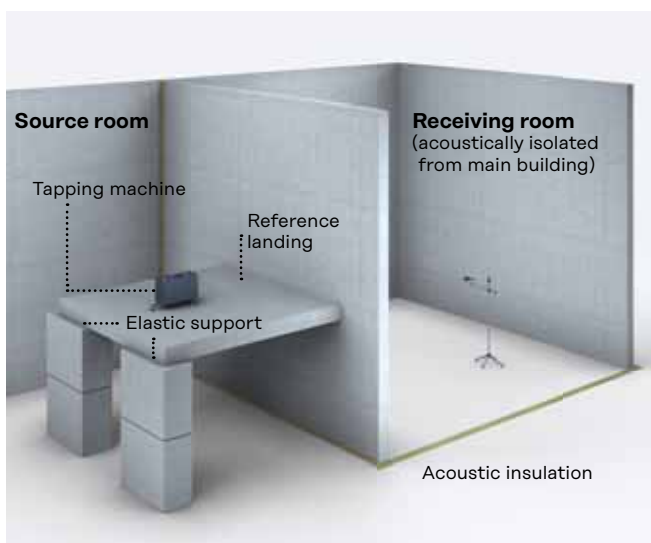
The difference between the measurement with excitation on the rigidly installed landing and on the decoupled landing (with sound-reducing measure) is calculated for every one-third octave frequency and denoted as the **difference in impact sound pressure level of the landing**:

$$\Delta L^*_{landing} = L_{n0,landing} - L_{n,landing}$$

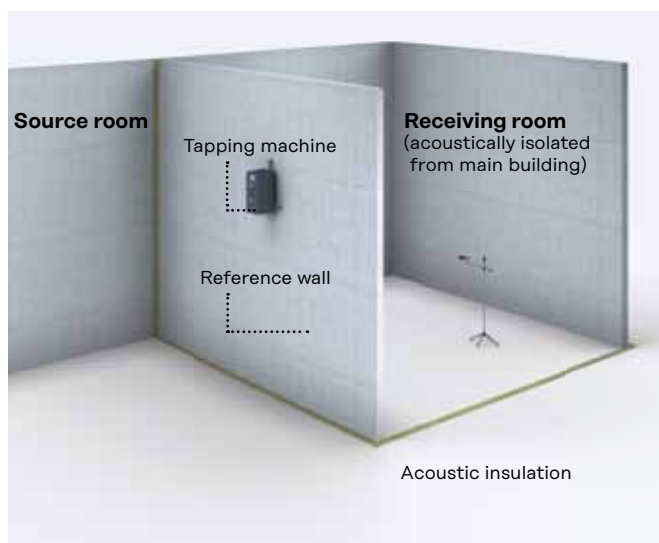
The difference between the measurement with excitation on the reference wall and on the decoupled landing (with sound-reducing measure) is calculated for every one-third octave frequency and denoted as the reduction in impact sound pressure level:

$$\Delta L_{landing} = L_{n0,wall} - L_{n,landing}$$

This leads to numerical values of the reduction in impact sound pressure level of the landing $\Delta L_{landing}$ being higher than those of the difference in impact sound pressure level of the landing $\Delta L^*_{landing}$.



Schematic diagram of the measurement of the weighted normalised impact sound pressure level of the landing where the reference stair landing is rigidly installed



Schematic diagram of the measurement of the normalised impact sound pressure level of the reference wall

High performance impact sound insulation products

Introduction

Single value

For a simpler characterisation of the acoustic effects of the decoupled support, DIN 7396:2016 requires a single value to be calculated in accordance with DIN EN ISO 717-2. The reference floor method is used for this purpose, where the values of the difference in impact sound pressure level of the landing $\Delta L^*_{\text{landing}}$ (or the reduction in impact sound pressure level of the landing $\Delta L_{\text{landing}}$) in the frequency range between 100 Hz and 3150 Hz are subtracted from a curve, defined in the standard, of a "boundless" reference floor. This is used to determine the curve of a "reference floor with sound insulation measure".

This "curve of the reference floor with sound insulation measure" is compared with a reference curve (see illustration of the weighted impact sound pressure level of the landing using the reference floor method).

The reference curve is vertically offset in steps of 1 dB until the sum of the differences between the impact sound level and the reference curve in the one-third octaves in which the impact sound pressure levels are higher than the

reference curve is less than 32 dB. The level value of the offset reference curve at 500 Hz is then equivalent to the weighted normalised impact sound pressure level of the landing $L_{n,w,\text{landing}}$.

The weighted **difference** in impact sound pressure level of the landing is then denoted by:

$$\Delta L^*_{w,\text{landing}} = L_{n,r,0,w} - L_{n,w,\text{landing}}$$

where $L_{n,r,0,w}$ is the weighted normalised impact sound pressure level of the "boundless" reference floor. The weighted **reduction** in impact sound pressure level of the landing is determined analogously.

What DIN 7396:2016 denotes as the weighted reduction in impact sound pressure level of the landing $\Delta L_{w,\text{landing}}$ is the new acoustic measure. It can be used as the input variable for the theoretical forecast of impact sound transmission in accordance with DIN EN 12354-2.

To enable a comparison with earlier

product parameters, it is also possible to calculate the weighted difference in impact sound pressure level $\Delta L^*_{n,w}$ without using the reference floor method. In this case the curve of the normalised impact sound pressure level of the reference landing ($L_{n0,w,\text{landing}}$) is used instead of the normalised curve of an "unfinished" reference floor.

As described above, the reference curve is shifted both for the curve of the measured normalised impact sound pressure level of the rigidly installed landing and for the curve of the measured normalised impact sound pressure level of the decoupled landing ($L_{n,w,\text{landing}}$). The difference in the sound pressure levels of the two correspondingly shifted reference curves at 500 Hz is the weighted difference in impact sound pressure level $\Delta L^*_{n,w}$ (see illustration of the weighted difference in impact sound pressure level of the landing without applying the reference floor method):

$$\Delta L^*_{n,w} = L_{n0,w,\text{landing}} - L_{n,w,\text{landing}}$$

Designation	Type	$\Delta L^*_{w,\text{stairs}} / \Delta L^*_{w,\text{landing}}$ [dB]	$\Delta L_{w,\text{stairs}} / \Delta L_{w,\text{landing}}$ [dB]	$\Delta L^*_{n,w}$ [dB]	Compressive deformation [mm]
HBB-Box	V / OV	≥ 26 ^①	≥ 35 ^①	≥ 29 ^①	2.4 ^①
	VV / OVV	≥ 26 ^①	≥ 35 ^①	≥ 29 ^①	2.4 ^①
	VVH / OVVH	≥ 26	≥ 35	≥ 29	2.4
HTF-T	T0	≥ 28	≥ 28	≥ 33	2.4
	T1	≥ 29	≥ 31	≥ 34	2.2
	T2	≥ 27	≥ 29	≥ 31	2.7
HTF-B	B0	≥ 28 ^②	≥ 28 ^②	≥ 33 ^②	2.4 ^②
	B1	≥ 28	≥ 30	≥ 33	2.1
	B2	≥ 27	≥ 28	≥ 31	2.8

① value taken from HBB-VVH ② value taken from HTF-T0

Notations

$\Delta L^*_{w,\text{stairs}}$	Weighted difference in impact sound pressure level of the stairs in accordance with DIN 7396:2016 applying the reference floor method
$\Delta L^*_{w,\text{landing}}$	Weighted difference in impact sound pressure level of the landing in accordance with DIN 7396:2016 applying the reference floor method
$\Delta L_{w,\text{stairs}}$	Weighted reduction in impact sound pressure level of the stairs in accordance with DIN 7396:2016
$\Delta L_{w,\text{landing}}$	Weighted reduction in impact sound pressure level of the landing in accordance with DIN 7396:2016
$\Delta L^*_{n,w}$	Weighted difference in impact sound pressure level in accordance with / based on DIN 7396:2016 without applying the reference floor method

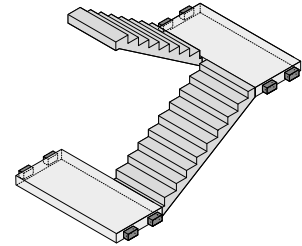
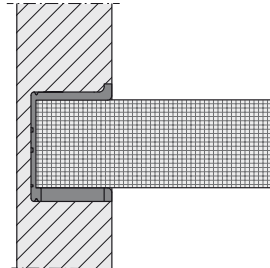
HALFEN HBB-Box – Impact sound insulation box for landing slabs

Product Overview



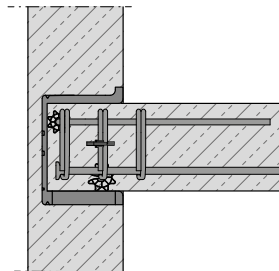
HBB-Box – for precast landing slabs

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HBB-Rebar-cage-VVH

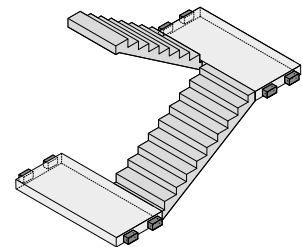
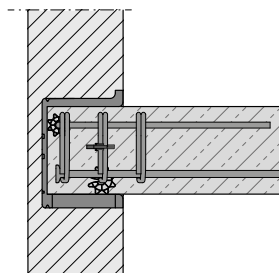
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HBB-Rebar-cage-VVH reduces the complexity and the installation time of on-site production of the corbel reinforcement. A type test is available for this application.

HBB-O-Box – for in-situ landing slabs

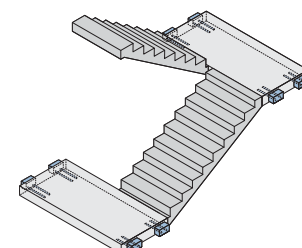
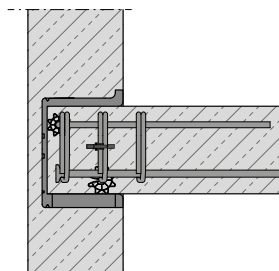
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HBB-SET

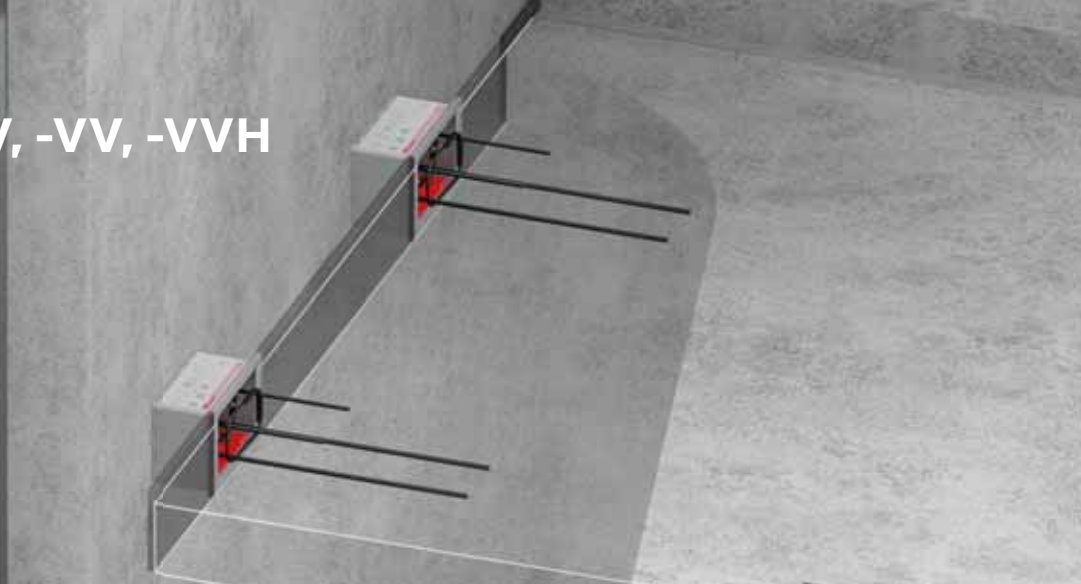
HBB-Box with HBB-Rebar-cage-VVH

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HALFEN HBB-V, -VV, -VVH

1
HALFEN
HBB



2
HALFEN
HTF-T

Material specifications and test certificates

Stair landing	Precast concrete element
Wall	In-situ cast concrete or masonry
Available sizes	A single size for landing slabs with a minimum slab thickness of 160 mm
Available types	HBB-V / -VV / -VVH Box for loads applied in all directions
	Weighted impact sound level difference, in accordance with DIN 7396. Testing at maximum permissible dead load, Test report 91383-01
HBB-VVH	$\Delta L^*_{w,landing} \geq 26$ dB
Fire protection	Fire protection of the components up to R90 in accordance with certified fire protection properties, expert report no. GA-2022/110-Nau
Type test	Test report S-WUE/220241, LGA Würzburg - Germany
Bearing	Closed-cell, foamed polyurethane (PUR), B2 class according to EN 13501-1 / DIN 4102, microcellular closed-cell EPDM, B2 class in accordance with EN 13501 -1 / DIN 4102 Approval no. Z-16.32-519, DIBt Berlin
Materials	Plastic foam, building material class B2 in accordance with EN 13501 -1 / DIN 4102.



HALFEN HBB-V Impact sound insulation box for precast landing slabs

3
HALFEN
HTF-B

4
Aschwanden
CRET-TS-SET

5
HALFEN
HTPL

The HALFEN HBB-V / -VV / -VVH Boxes are designed for precast landing slabs. One standard size is used for all landing heights.

The HBB boxes contribute to an effective acoustic decoupling of the landing from the wall. The high impact sound insulation effect has been tested in accordance with DIN 7396.

HALFEN HBB-Boxes can be easily slid over the corbel before installing the precast landing slab. The corbel is manufactured in advance in the precast concrete factory to suit the inner dimensions of the HBB-Box.

6
HALFEN
HTT

Ordering example



Type description

- ① Product brand
- ② Product designation
- ③ Designation of the box type

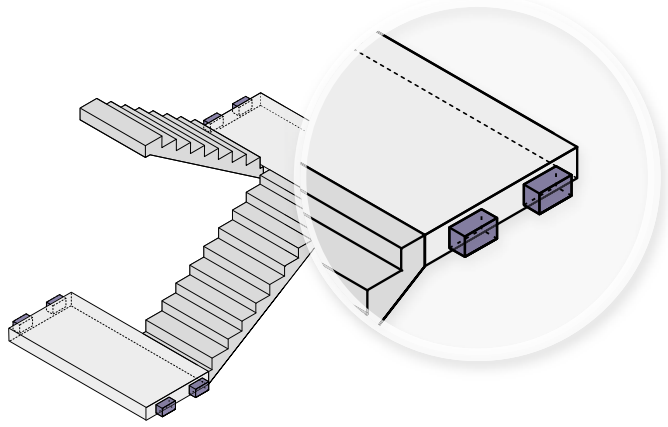
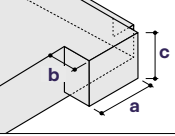
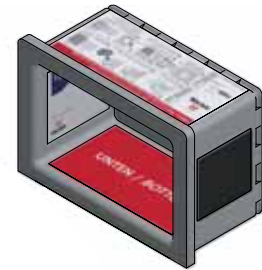
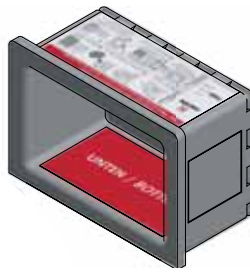


Figure: Application of the HBB-Box

HBB – Impact sound insulation box for precast landing slabs

HALFEN HBB – Product description

Designation	Article number	Concrete corbel dimensions $a \times b \times c$ [mm]	Load direction		
			+ $V_{Rd,v}$	- $V_{Rd,v}$	$\pm V_{Rd,h}$
HBB-V	0970.070-0001	 252 × 152 × 158	●	○	○
HBB-VV	0970.070-0002		●	●	○
HBB-VVH	0970.070-0003		●	●	●



HBB-V

for vertical loads
incl. HBB-V Box and bottom bearing pad

HBB-VV

for additional loads
in vertical upward direction
incl. HBB-VV Box; bottom and
upper bearing pads

HBB-VVH

for additional loads in vertical upward
direction and horizontal loads
incl. HBB-VVH Box; bottom, upper and
side bearings pads

Top and side view of HBB-Box

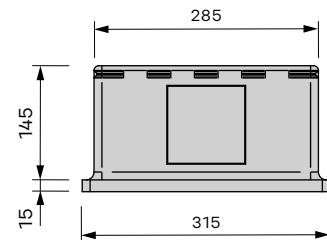
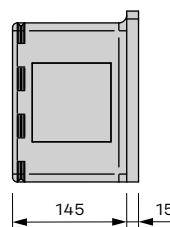
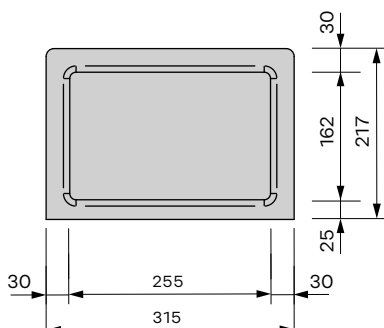


Figure: HBB-V, front view

Figure: HBB-V, vertical cross section

Figure: HBB-V, horizontal cross section

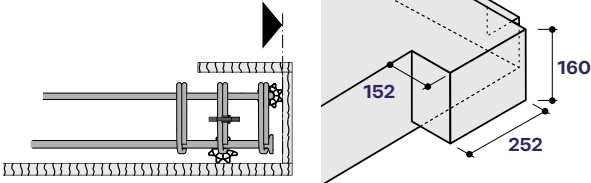
1	HALFEN HBB
2	HALFEN HTF-T
3	HALFEN HTF-B
4	Achswanden CRET-TS-SET
5	HALFEN HTPL
6	HALFEN HTT

HALFEN HBB-V / -VV / -VVH

Installation instructions – Precast landing

1
HALFEN
HBB

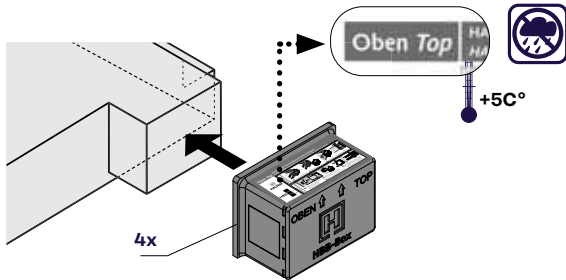
1



- Install the HBB-Rebar-cage-VVH and the reinforcement in the precast factory in accordance with the structural engineer's specifications. Pour the concrete for the landing slab. The dimensions of the corbels [mm] have to be observed.

2
HALFEN
HTF-T

2

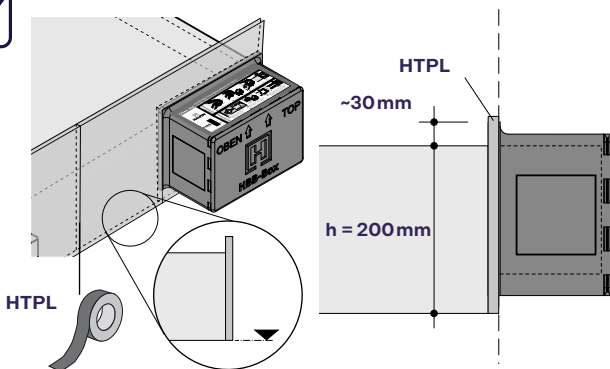


- Attach the HBB-Boxes to the corbels on the construction site. Check the correct orientation of the box!

3
HALFEN
HTF-B

4
Aschwanden
CRET-TS-SET

3

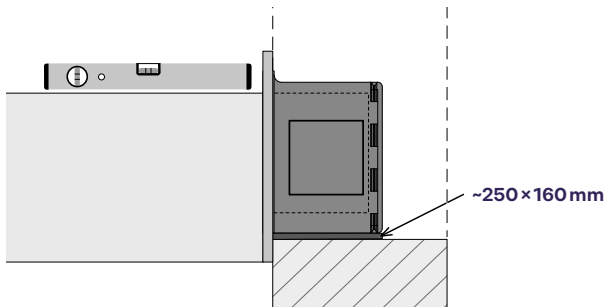


- Attach HTPL mats vertically to the sides of the landing slab. Ensure the surfaces are dust free. The total (required) height of the HTPL mats is the height of the landing slab plus approximately 30 mm. Seal the butt joints in the HTPL mats with adhesive tape.

5
HALFEN
HTPL

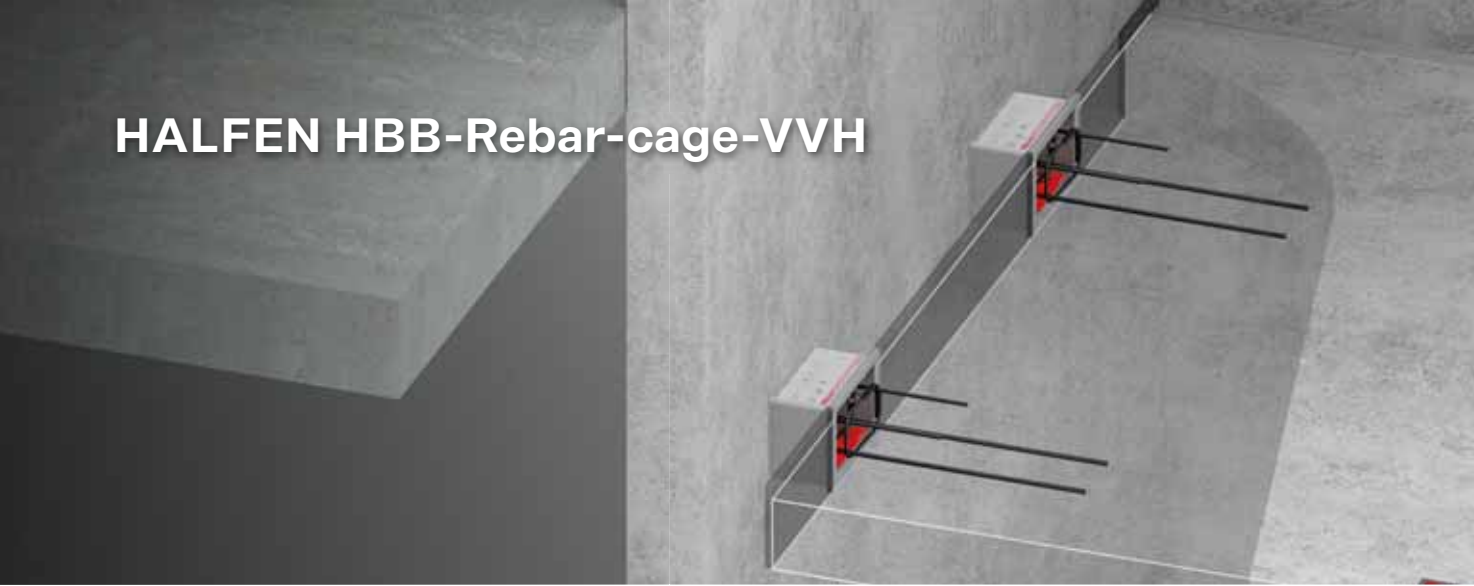
6
HALFEN
HTT

4



- Place the landing slab on the wall. Ensure the slab is level. Use pressure plates to secure the position of the landing slab, e.g. made of steel, approximately 250 x 160 mm. Fix and secure the HBB-Box in the wall.

HALFEN HBB-Rebar-cage-VVH



1
HALFEN
HBB

Material specifications and test certificates

Rebar cage	Reinforcement steel B500
Type test	Test report S-WUE/220241, LGA Würzburg - Germany
Available sizes	A single size for landing slabs from 160mm thickness
Available types	A single type for all load directions
Fire protection	Fire resistance rating: R90 in accordance with EN 1992-1-2, table 5.8



HALFEN HBB-Rebar-cage-VVH

2
HALFEN
HTF-T

3
HALFEN
HTF-B

The prefabricated HALFEN HBB-Rebar-cage-VVH is easy to install. This element is available for all slab thicknesses and HBB-Box types. It transfers loads in all directions.

Because of the optimised reinforcement layout without additional, on-site stirrups, the construction process can be accelerated.

The type tested load capacities ensure planning reliability. An additional bracket design can therefore be omitted.

4
Aschwanden
CRET-TS-SET

5
HALFEN
HTPL

Ordering example

HALFEN HBB - Rebar-cage - VVH



Type description

- ❶ Product brand
- ❷ Product designation
- ❸ Description
- ❹ Designation of the type

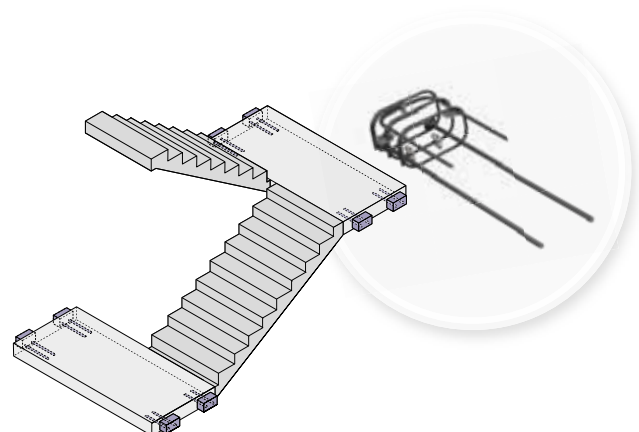


Figure: Application of the HBB-Rebar-cage

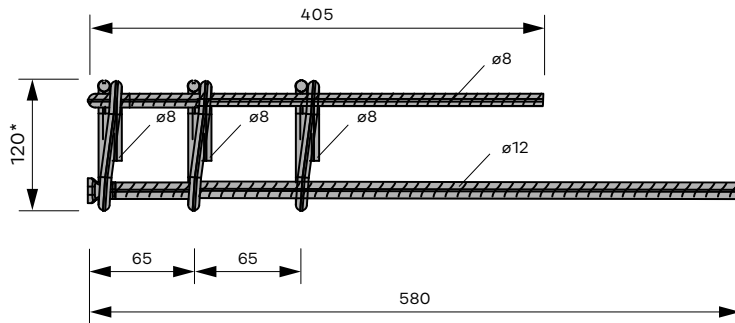
6
HALFEN
HTT

HALFEN HBB-Rebar-cage-VVH

HALFEN HBB-Rebar-cage-VVH – Product description

Designation	Article number	d [mm]	max. load [kN] for C ≥20/25		
			+V _{Rd,v}	-V _{Rd,v}	±V _{Rd,h}
HBB-Rebar-cage-VVH	0970.020-0101	≥160	77.0 kN	16.0 kN	16.0 kN

Cross-section HBB-Rebar-cage-VVH



*landing slab thickness of $h \geq 160$ mm

all dimensions in [mm]

Figure: HBB-Rebar-cage-VVH, cross-section

Connecting reinforcement

Cross-section – Connecting reinforcement HBB-V/OV

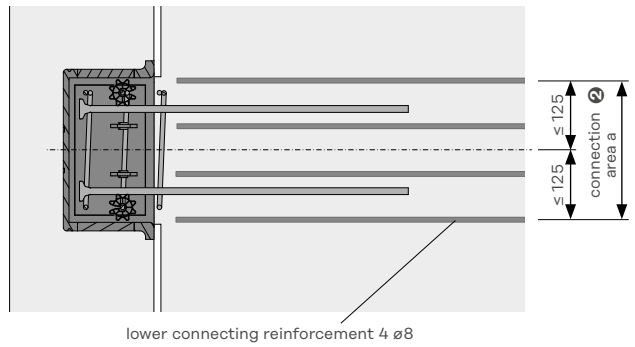
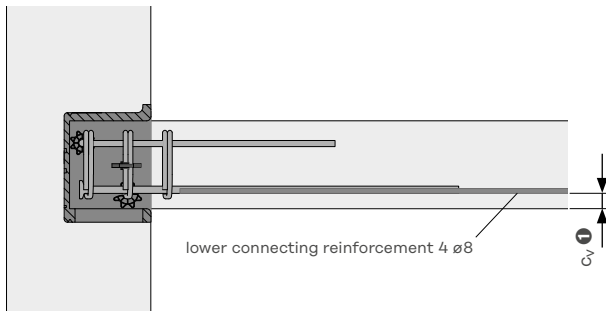


Figure: HBB-V/OV horizontal cross-section

Cross-section – Connecting reinforcement HBB-VV/OVV / HBB-VVH/OVVH

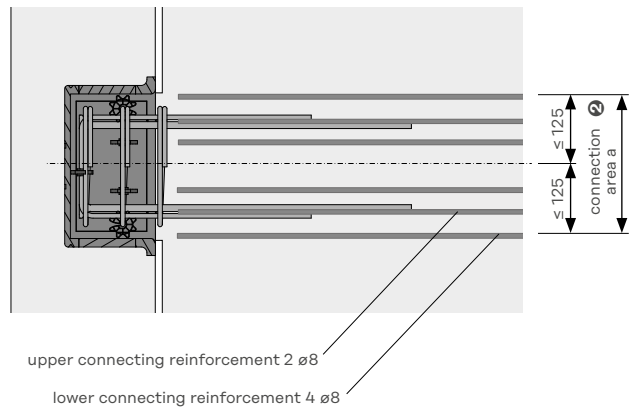
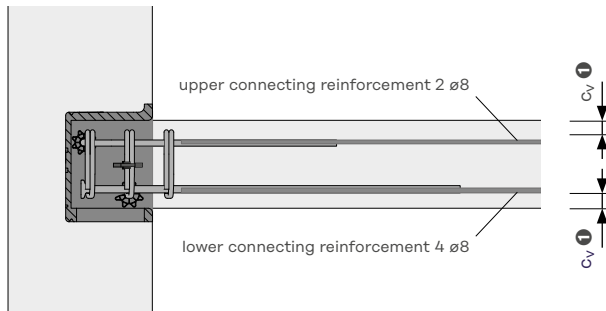
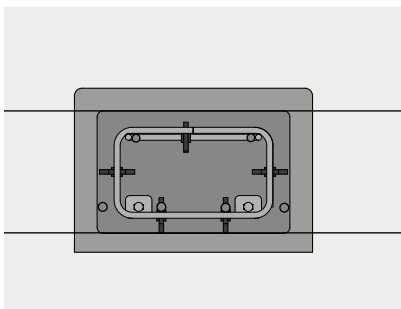


Figure: HBB-VV/OVV and HBB-VVH/OVVH vertical cross-section

Figure: HBB-VV/OVV and HBB-VVH/OVVH horizontal cross-section

all dimensions in [mm]

Front view – Connecting reinforcement HBB-VV/OVV / HBB-VVH/OVVH



① c_v in accordance with static specifications for R90 / F90 $c \geq 30$ mm

② In the connection area a, the required connection reinforcement in the lower layer is 2.01 cm². This can be realised by 4 Ø8 mm as shown.

Alternatively, welded fabric panels or a combination of bars and welded fabric can be used. In this case, congested reinforcement is to be avoided.

Rebar cage for landing corbel

Application in precast concrete factory

Formwork for a corbel in the precast plant – variants

1
HALFEN
HBB

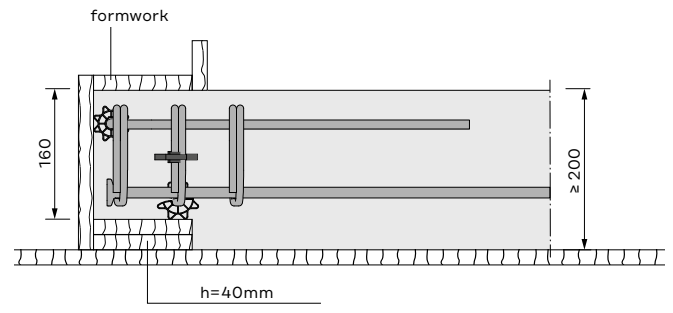
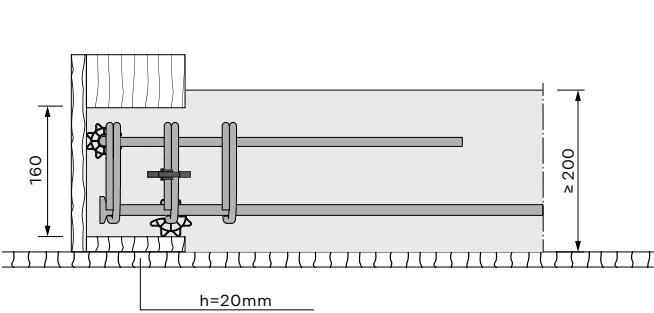
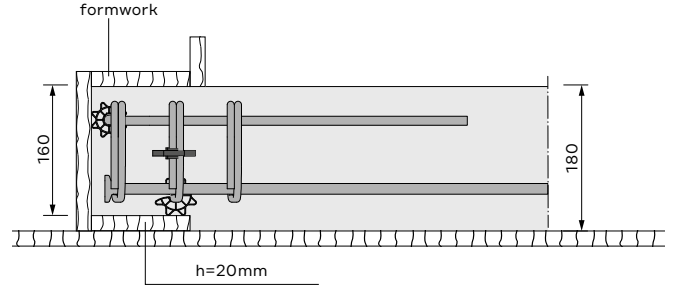
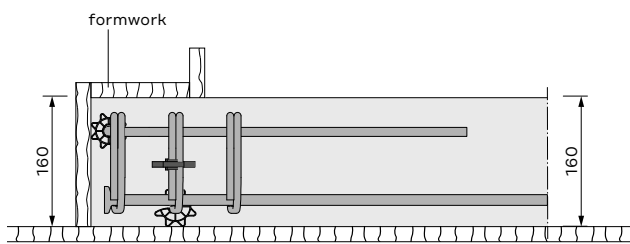
2
HALFEN
HTF-T

3
HALFEN
HTF-B

4
Aschwanden
CRET-TS-SET

5
HALFEN
HTPL

6
HALFEN
HTT





- 1 HALFEN HBB
- 2 HALFEN HTF-T
- 3 HALFEN HTF-B
- 4 Aschwanden CRET-TS-SET
- 5 HALFEN HTPL
- 6 HALFEN HTT

Material specifications and test certificates

Stair landing	In-situ cast concrete
Wall	In-situ cast concrete or masonry
Available sizes	A single type for landing slabs from 160 mm thickness
Available types	HBB-OV, -OVV, -OVVH Box for various load directions, all with filler

Weighted impact sound level difference, in accordance with DIN 7396. Testing at maximum permissible dead load, Test report 91383-01

HBB-VVH	$\Delta L^*_{w,landing} \geq 26$ dB
Fire protection	Fire protection of the components up to R90 in accordance with certified fire protection properties, expert report no. GA-2022/110-Nau
Type test	Test report S-WUE/220241, LGA Würzburg - Germany
Bearing	Closed-cell, foamed polyurethane (PUR), B2 class according to EN 13501-1 / DIN 4102, microcellular closed-cell EPDM, B2 class in accordance with EN 13501 -1 / DIN 4102 Approval no. Z-16.32-519, DIBt Berlin
Materials	Plastic foam, building material class B2 in accordance with EN 13501 -1 / DIN 4102.
Filler	Polystyrene



HALFEN HBB V Impact sound box for cast-in-situ landing slabs

HALFEN HBB-OV, -OVV and -OVVH boxes with filler for in-situ concrete platforms are available in a single size for all slab thicknesses. The HBB boxes isolate acoustically the landing slabs from the wall. The high impact sound insulation

effect has been tested in accordance with DIN 7396. When installing HBB-boxes in masonry walls, the polystyrene filler ensures the box keeps its shape while the surrounding masonry is completed.

When installing in reinforced concrete walls, the filler is fixed to the formwork using the special nails supplied. The HBB-box is then installed flush with the formwork over the recess filler.

Ordering example

HALFEN HBB - OVVH



Type description

- ❶ Product brand
- ❷ Product designation
- ❸ In-situ concrete application
- ❹ Designation of the box type

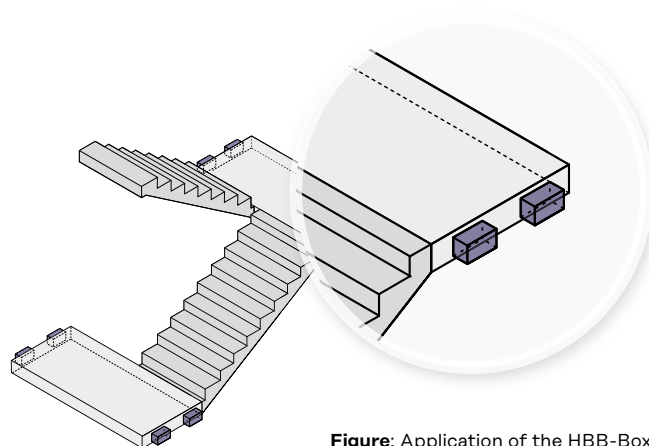
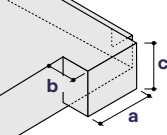
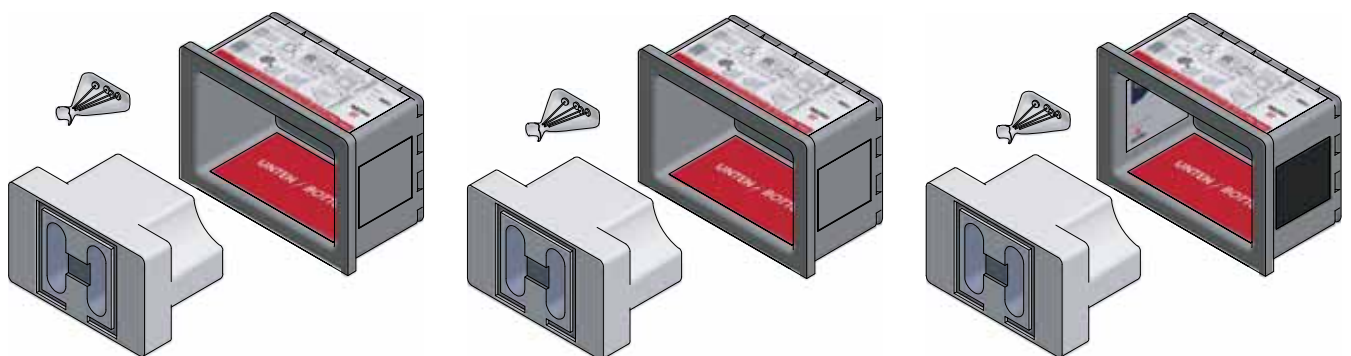


Figure: Application of the HBB-Box

HALFEN HBB-OV / -OVV / -OVVH

HALFEN HBB-OV – Dimensions and load bearing capacities

Designation	Article number	Concrete corbel dimensions $a \times b \times c$ [mm]	Load direction		
			+V _{Rd,v}	-V _{Rd,v}	±V _{Rd,h}
HBB-OV	0970.020-0101	 252 × 152 × 158	●	○	○
HBB-OVV	0970.020-0102		●	●	○
HBB-OVVH	0970.020-0103		●	●	●



HBB-OV

for vertical loads
incl. HBB-V Box and bottom bearing pad;
filler and four nails

HBB-OVV

for additional loads
in vertical upward direction
incl. HBB-VV Box; bottom and
upper bearing pads; filler and four nails

HBB-OVVH

for additional loads in vertical upward
direction and horizontal loads
incl. HBB-VVH Box; bottom, upper and
side bearings pads; filler and four nails

Impact sound insulation box for in-situ landing slabs

HALFEN HBB-Box as a permanent formwork variant

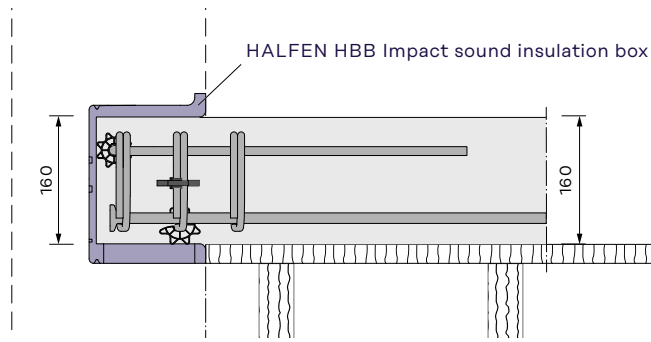


Figure: Application of HBB-box for slab thickness 160 mm

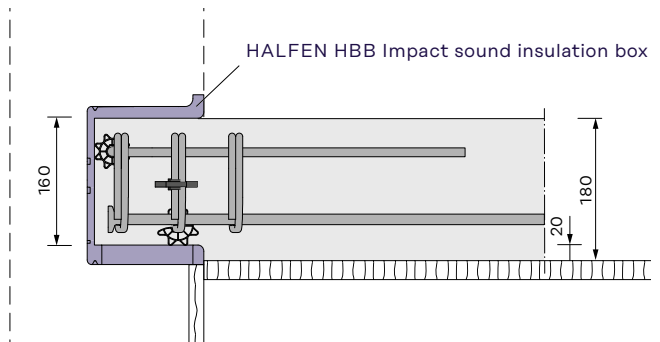


Figure: Application of HBB-box for slab thickness 180 mm with a 20 mm downward step

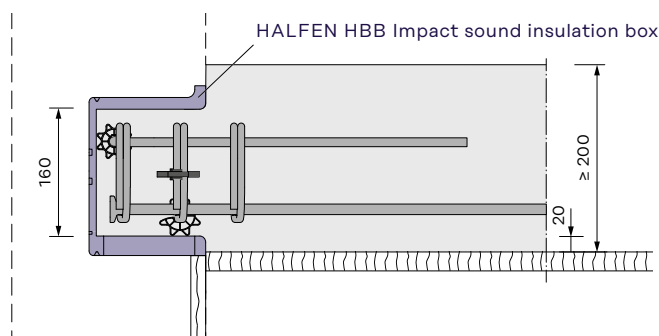


Figure: Application of HBB-box for slab thickness ≥ 200 mm with a 20 mm downward step, additional formwork on top

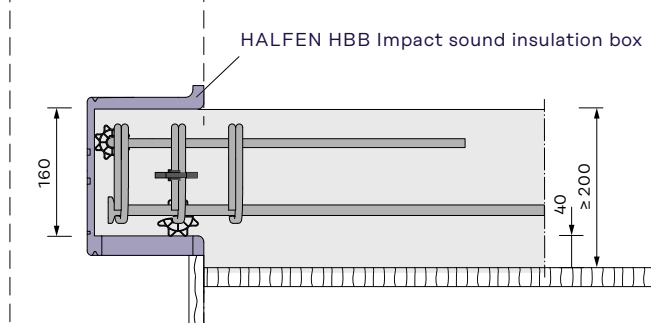


Figure: Application of HBB-box for slab thickness ≥ 200 mm with a 40 mm downward step.

Cast-in-situ concrete landing – cross-section showing HBB-Box

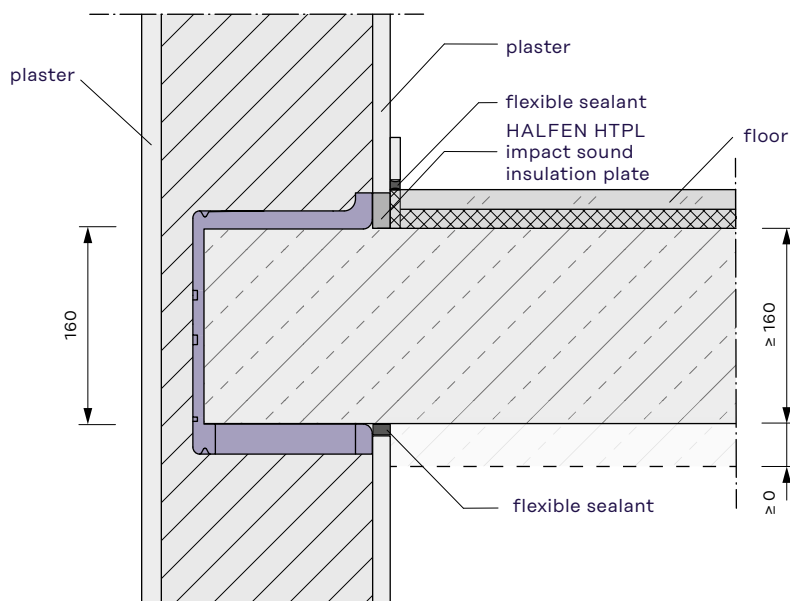


Figure: HBB-Box cross section

all dimensions in [mm]

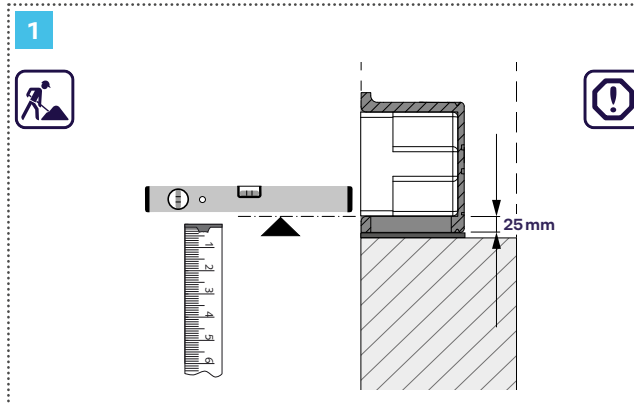
1	HALFEN HBB
2	HALFEN HTF-T
3	HALFEN HTF-B
4	Aschwanden CRET-TS-SET
5	HALFEN HTPL
6	HALFEN HTT

HALFEN HBB-OV / -OVV /-OVVH

Installation steps for in-situ concrete landing slab, masonry wall

1
HALFEN
HBB

1

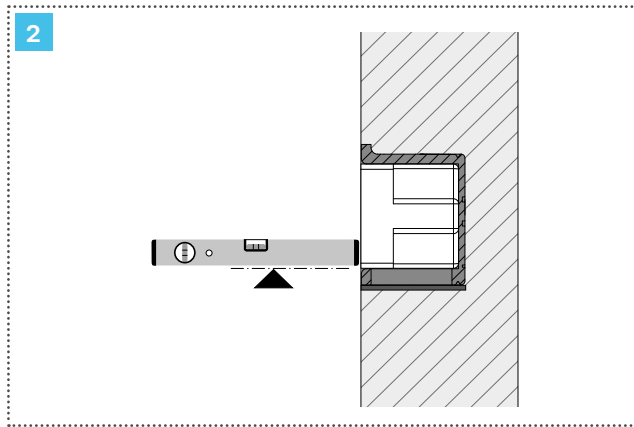


- Check the required installation height of the HBB-Box. The thickness of the HBB-Box at the bottom is 25 mm.

2
HALFEN
HTF-T

3
HALFEN
HTF-B

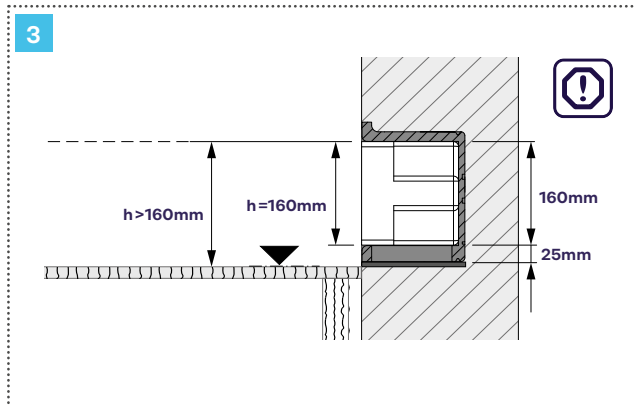
2



- Secure the HBB-Box to the masonry. Ensure the HBB-Box is level.

4
Aschwanden
CRET-TS-SET

3

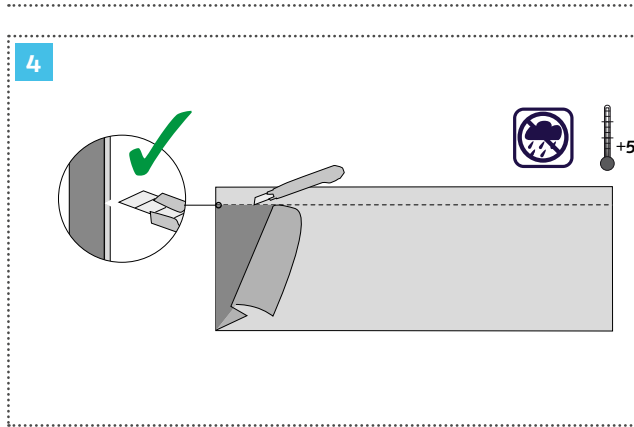


- Install the formwork for the landing slab. The height of the landing slab is determined in accordance with the engineer's specifications.

5
HALFEN
HTPL

6
HALFEN
HTT

4

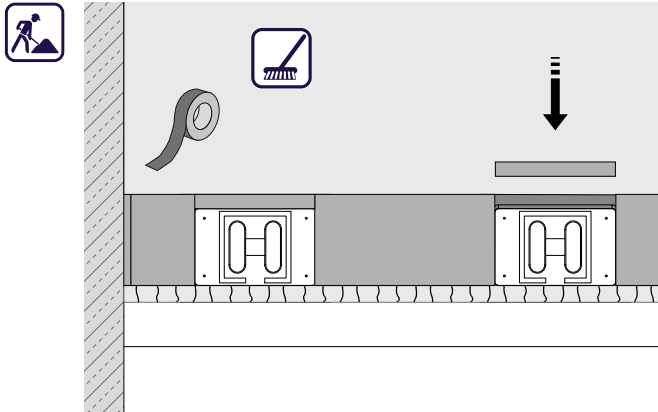


- Prepare the HALFEN HTPL Impact sound insulation plates for the vertical joint between the landing slab and the wall: The total (required) height of the HALFEN HTPL mat is the height of the landing slab + approximately 30 mm.

Impact sound insulation box for in-situ landing slabs

Installation steps for in-situ concrete landing slab, masonry wall

5



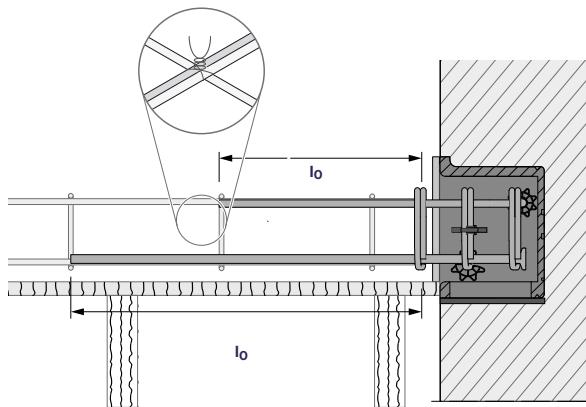
- Attach the HALFEN HTPL Impact sound insulation plate to the wall. Ensure the wall is clean and dust-free. Place the HALFEN HTPL mat over the box. Seal the butt joints in the HALFEN HTPL mats with adhesive tape.

1
HALFEN
HBB

2
HALFEN
HTF-T

3
HALFEN
HTF-B

6

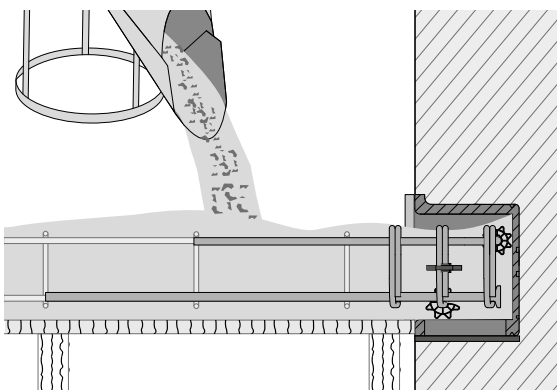


- Remove the blockout element. Install the HBB-Rebar-cage-VVH and the connecting reinforcement in accordance with the structural engineer's specifications.

4
Aschwanden
CRET-TS-SET

5
HALFEN
HTPL

7



- Pour the concrete for the landing slab and compact using a suitable vibrator.

6
HALFEN
HTT

HALFEN HBB-SET

1
HALFEN
HBB

Material specifications and test certificates

2
HALFEN
HTF-T

HBB Box

Available sizes A single size for landing slabs from 160 mm thickness

Available types HBB-V / -VV / -VVH Box for effective load directions

Weighted impact sound level difference, in accordance with DIN 7396. Testing at maximum permissible dead load, Test report 91383-01

HBB-VVH $\Delta L^*_{w,landing} \geq 26$ dB

Fire protection Fire protection of the components up to R90 in accordance with certified fire protection properties, expert report no. GA-2022/110-Nau

Bearing Closed-cell, foamed polyurethane (PUR), B2 class in accordance with EN 13501-1 / DIN 4102, microcellular closed-cell EPDM, B2 class in accordance with EN 13501 -1 / DIN 4102 Approval no. Z-16.32-519, DIBt Berlin

Material Plastic foam, building material class B2 in accordance with EN 13501 -1 / DIN 4102.

Rebar cage Reinforcement steel B500

Type test Test report S-WUE/220241, LGA Würzburg - Germany

Available sizes A single size for landing slabs from 160 mm thickness

Available types A single type for all load directions

Fire protection Fire resistance rating **R90** in accordance with EN1992-1-2, table 5.8



HALFEN HBB-SET Impact sound box set for landing slabs

3
HALFEN
HTF-B

4
Aschwanden
CRET-TS-SET

5
HALFEN
HTPL

The HALFEN HBB-SET consists of an HBB box of the required type and an HBB-Rebar-cage-VVH.

It can be used for in-situ concrete and precast landings. For in-situ concrete landing slabs, the HBB-box is used as a permanent formwork.

The HBB-SET in its variants is suitable for use in both masonry and concrete walls.

6
HALFEN
HTT

Ordering example

HALFEN HBB - SET - VVH



Type description

- ① Product brand
- ② Product designation
- ③ Designation of the box type
- ④ Designation of the load transmission through the box

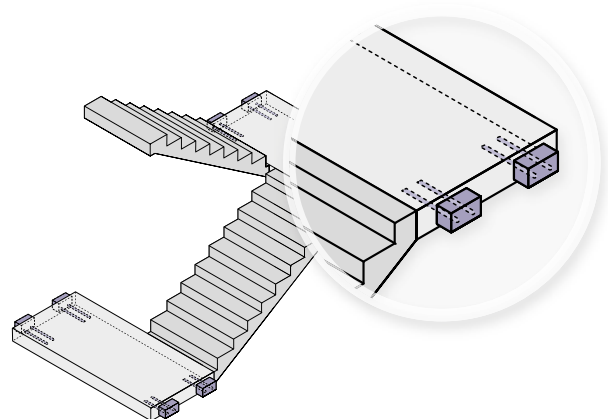
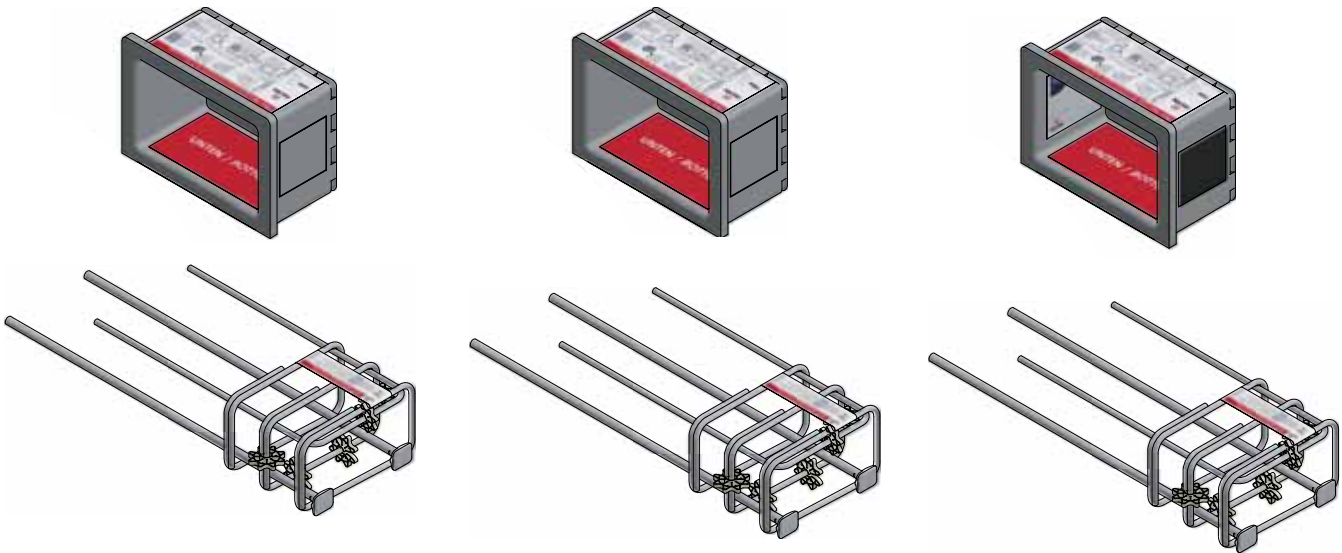


Figure: HBB-SET application

HALFEN HBB-SET – dimensions and load bearing capacities

Designation	Article number	Load direction [kN]		
		+V _{Rd,v}	-V _{Rd,v}	±V _{Rd,h}
HBB-V-SET	0970.060-0101	77.0	0	0
HBB-VV-SET	0970.060-0102	77.0	16.0	0
HBB-VVH-SET	0970.060-0103	77.0	16.0	16.0

- 1
HALFEN
HBB
- 2
HALFEN
HTF-T
- 3
HALFEN
HTF-B
- 4
Aschwanden
CRET-TS-SET
- 5
HALFEN
HTPL
- 6
HALFEN
HTT



HBB-V-SET
for vertical loads:
incl. HBB-V Box, bottom bearing pad
and HBB-Rebar cage-VVH

HBB-VV-SET
for additional loads in vertical
upward direction:
incl. HBB-VV Box, bottom and upper
bearing pad and HBB-Rebar cage-VVH

HBB-VVH-SET
for additional loads in vertical
upward direction and horizontal
loads:
incl. HBB-VVH Box, bottom,
upper and side bearing pad and
HBB-Rebar cage-VVH

HALFEN HBB-SET

Curtailment of reinforcement

Cross-section showing HBB-SET reinforcement curtailment

1
HALFEN
HBB

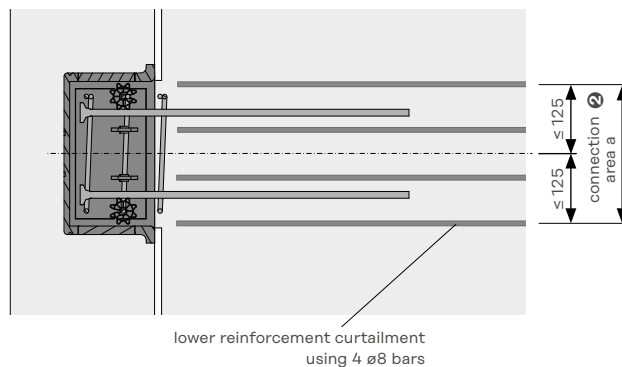
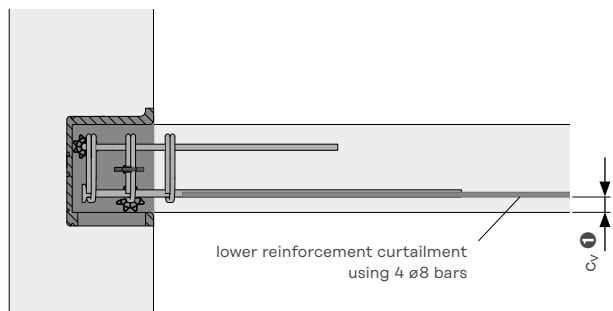


Figure: HBB-SET vertical cross-section

Figure: HBB-SET horizontal cross-section

2
HALFEN
HTF-T

3
HALFEN
HTF-B

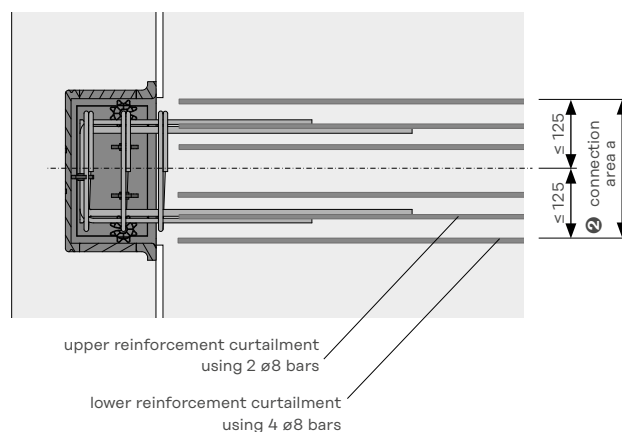
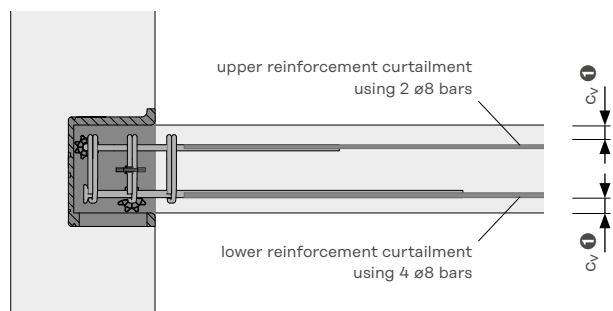


Figure: HBB-SET vertical cross-section

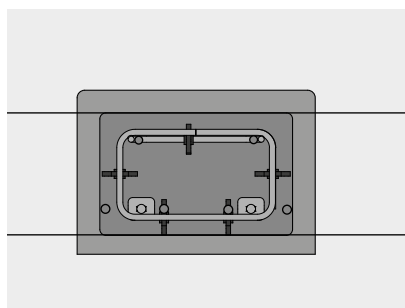
Figure: HBB-SET horizontal cross-section

4
Aschwenden
CRET-TS-SET

5
HALFEN
HTPL

6
HALFEN
HTT

Front view showing HBB-SET reinforcement curtailment



all dimensions in [mm]

- ① c_v in accordance with static specifications for R90 / F90 $c \geq 30$ mm
- ② In the curtailment area, the cross-section of curtailment reinforcement required for the lower layer is 2.01 cm². This can be realised by using 4 Ø8 mm as shown. Alternatively, welded fabric or a combination of bars and welded fabric may be used. In this case, congestion of reinforcement must be avoided.

Installation instructions – cast-in-situ concrete landing slabs and walls

1

- Determine the correct installation height for the HBB-Boxes. Attach the blockout element to the formwork. Check the correct orientation of the boxes. The bottom side of the HBB-Box is thicker (25mm).

2

- Fix the HBB-Boxes on the blockout elements. Pour the concrete of the wall.

3

- Install the formwork for the landing slab. Please note: The height of the landing slab is determined in accordance with the engineer's specification.

4

- Prepare the HALFEN HTPL Impact sound insulation plates for the vertical gap between the landing and the wall. The total height of the mat is the landing height h + approximately 30mm.

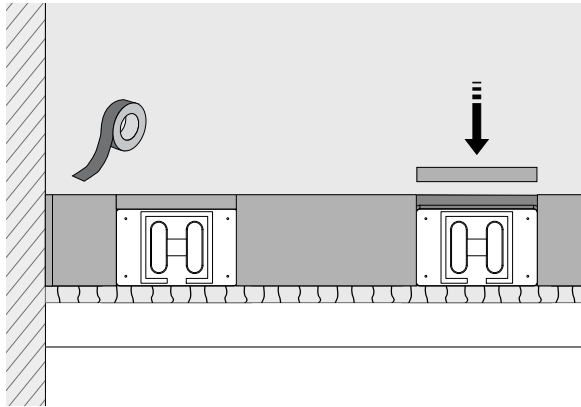
1	HALFEN HBB
2	HALFEN HTF-T
3	HALFEN HTF-B
4	Aschwanden CRET-TS-SET
5	HALFEN HTPL
6	HALFEN HTT

HALFEN HBB-SET

Installation instructions – cast-in-situ concrete landing slabs and walls

1
HALFEN
HBB

5

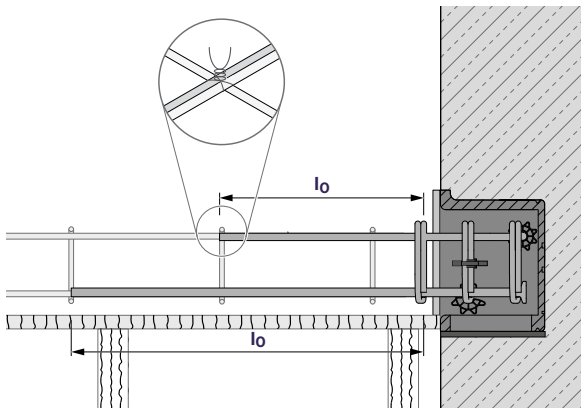


- Attach the HALFEN HTPL Impact sound insulation plates to the wall. Ensure the wall is clean and dust-free. Place the HTPL mat over the box. Seal the butt joints in the HTPL mats with adhesive tape.

2
HALFEN
HTF-T

3
HALFEN
HTF-B

6

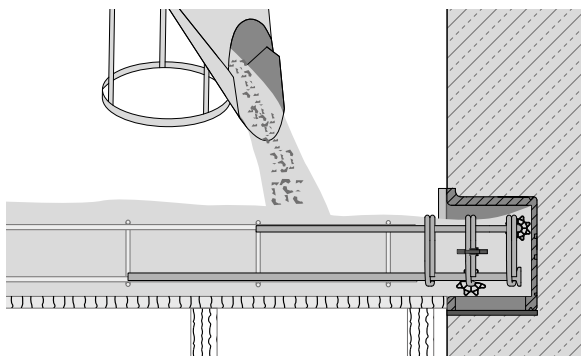


- Remove the blockout element. Install the HBB-Rebar-cage-VVH and the curtailment reinforcement in accordance with the structural engineer's specifications.

4
Aschwanden
CRET-TS-SET

5
HALFEN
HTPL

7



- Pour the concrete for the landing slab and compact using a suitable vibrator.

6
HALFEN
HTT

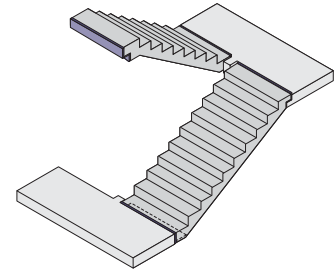
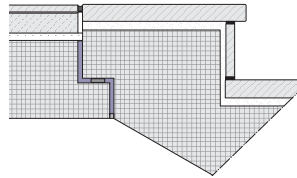
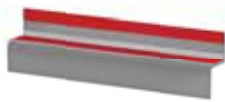
Impact sound insulation elements

Product Overview

HTF-T Impact sound insulation element

for stairway support

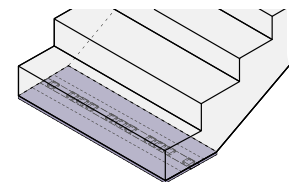
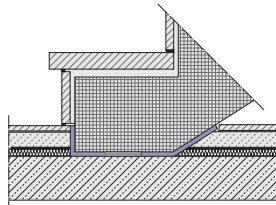
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HTF-B Impact sound insulation element

for the base of staircases

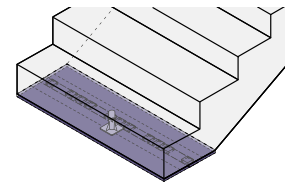
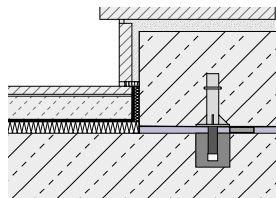
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Aschwanden CRET-TS-SET

Vertical impact sound insulation dowel
for effective restraint of stair base

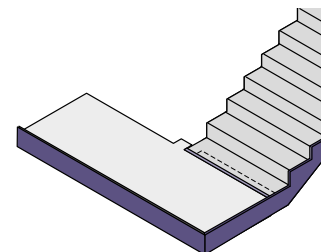
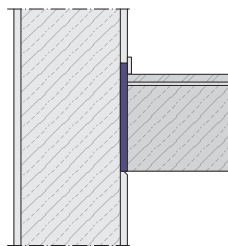
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HTPL Impact sound insulation plate

between stairway and wall

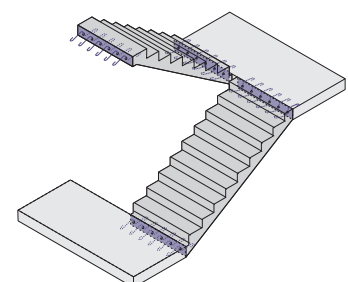
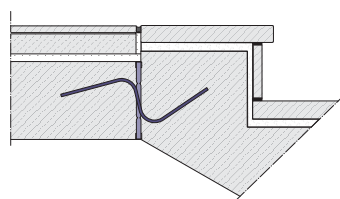
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HTT Impact sound insulation element

for stairway support

Page 45



HALFEN HTF-T

1
HALFEN
HBB

2
HALFEN
HTF-T

3
HALFEN
HTF-B

4
Aschwanden
CRET-TS-SET

5
HALFEN
HTPL

6
HALFEN
HTT

Material specifications and test certificates

Stair landing	Cast-in-situ or precast concrete
Stair elements	Precast element
Available sizes	Lengths: 1000 mm, 1200 mm, 1500 mm and special lengths available Corbel depth: 130–160 mm
Load range	T0, T1, T2
Weighted impact sound level difference	in accordance with DIN 7396 Testing at maximum permissible dead load, Test reports 91383-14, 91383-11, 91383-10
HTF-T0:	$\Delta L^*_{w,stairs} \geq 28$ dB
HTF-T1:	$\Delta L^*_{w,stairs} \geq 29$ dB
HTF-T2:	$\Delta L^*_{w,stairs} \geq 27$ dB
Fire protection	Fire protection of the components up to R90 Certified fire protection properties: Expert report no. GA-2022/110-Nau
Bearing	Heavy duty, profiled, non-reinforced elastomeric bearing; width 60 mm; Test certificate no. 853.0072 / MPA Hanover
Material	Plastic foam, building material class B2 in accordance with DIN 4102; double-sided adhesive tape for securing the position



HALFEN HTF-T2 Impact sound insulation element

HALFEN HTF-T impact sound insulation elements are used for effective, acoustic decoupling of prefabricated staircases from the landing.

High impact sound insulation values have been demonstrated by tests in accordance with DIN 7396. The built-in, heavy-duty elastomeric bearings ensure safe load transfer of the shear forces.

Adhesive strips with protective foil are pre-fitted to the element for easy mounting to the reinforced concrete substrate. The protective foil has a convenient tab to enable convenient removal.

Ordering example

HALFEN HTF - T1 - 100



Type description

- ❶ Product brand
- ❷ Product designation
- ❸ Load group
- ❹ Element length [cm]

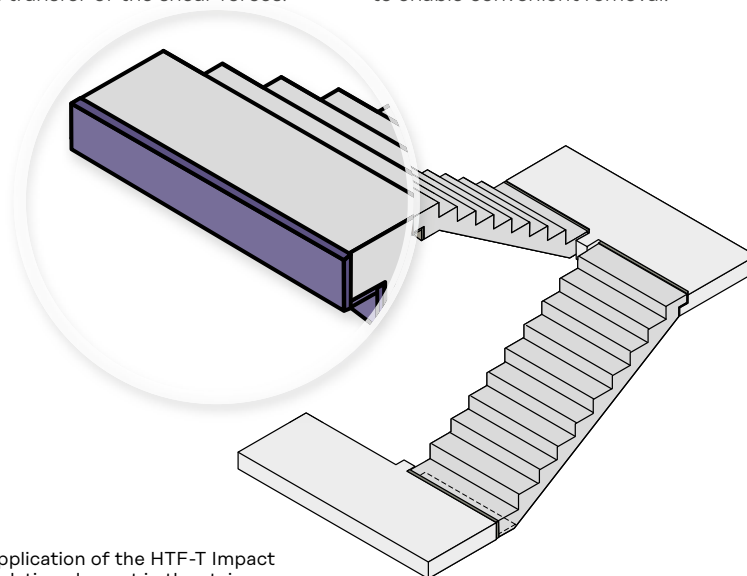


Figure: Application of the HTF-T Impact sound insulation element in the staircase

Impact sound insulation element for stairway support

HALFEN HTF-T – Product description

Designation	Length [mm]	Article number	Load bearing capacity values
			V_{Rd} [kN/m]
HTF-T0-100	1000	0972.030-00001	28.5
HTF-T0-120	1200	0972.030-00002	28.5
HTF-T0-150	1500	0972.030-00003	28.5
HTF-T1-100	1000	0972.030-00011	43.1
HTF-T1-120	1200	0972.030-00012	43.1
HTF-T1-150	1500	0972.030-00013	43.1
HTF-T2-100	1000	0972.030-00021	60.3
HTF-T2-120	1200	0972.030-00022	60.3
HTF-T2-150	1500	0972.030-00023	60.3

Top view and cross section showing HTF-T0

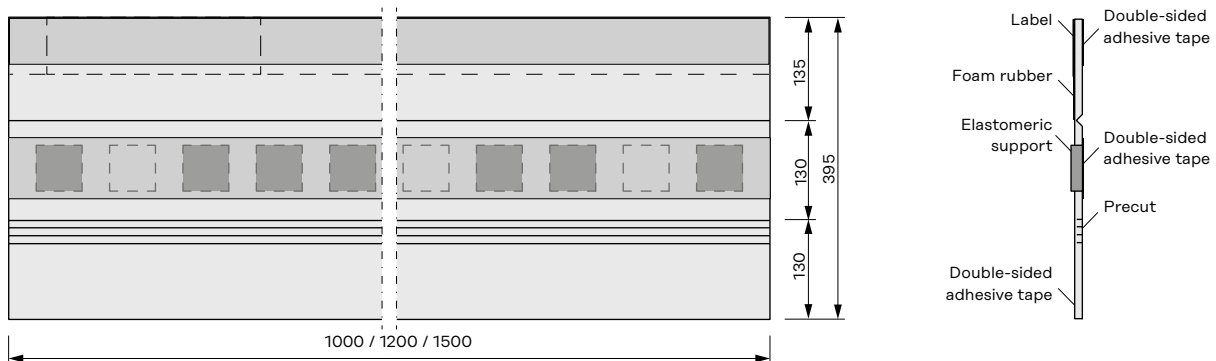


Figure: HTF-T0, top view

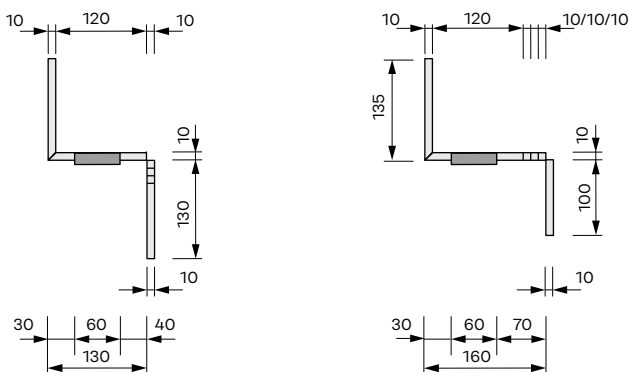


Figure: HTF-T0, cross-section. Geometry of the element with a minimum depth of the corbel of **130mm**.

Figure: HTF-T0, cross-section. Geometry of the element with a minimum depth of the corbel of **160mm**.



HTF custom solutions

Our technical support team is available to provide support for your project with custom solutions using HALFEN HTF Impact sound insulation.

Contact: → see Address page



All dimensions in [mm]

HALFEN HTF-T

Top view and cross section showing HTF-T1 and HTF-T2

1
HALFEN
HBB

2
HALFEN
HTF-T

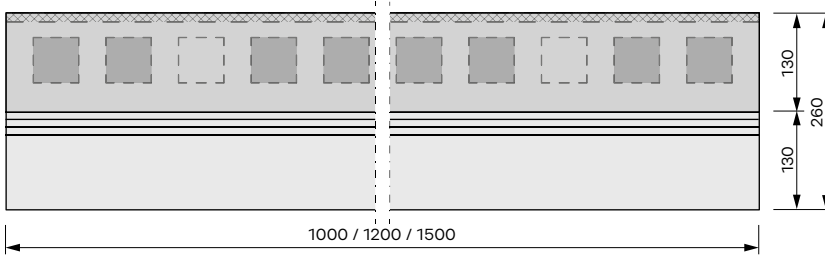


Figure: HTF-T1, top view

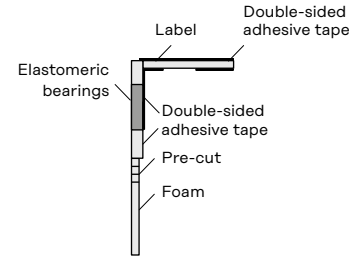


Figure: HTF-T1, section

3
HALFEN
HTF-B

4
Aschwanden
CRET-TS-SET

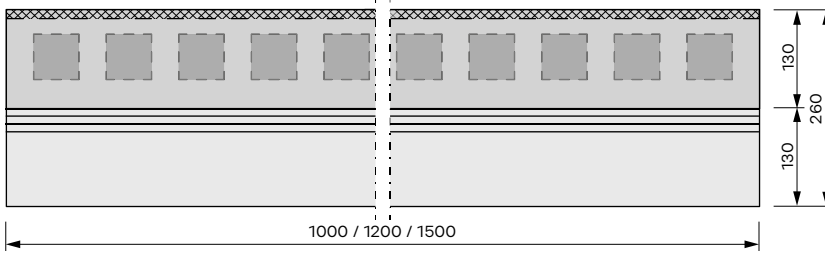


Figure: HTF-T2, top view

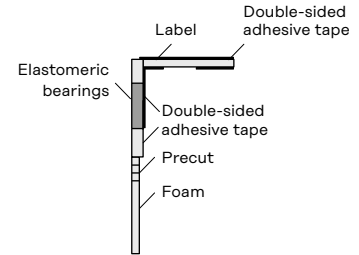


Figure: HTF-T2, cross-section

5
HALFEN
HTPL

6
HALFEN
HTT

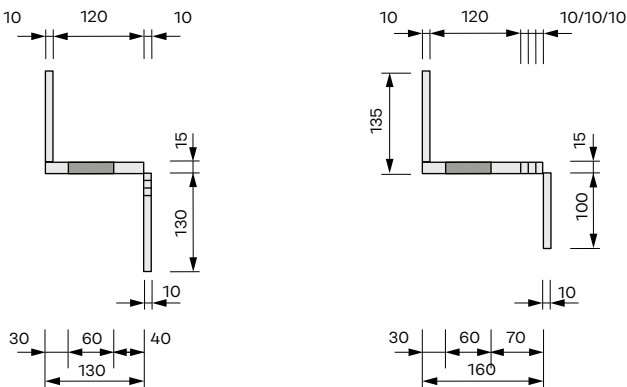


Figure: HTF-T1/HTF-T2 cross-section



HTF custom solutions

Our technical support team is available to provide support for your project with custom solutions using HALFEN HTF Impact sound insulation.

Contact: → see Address page



All dimensions in [mm]

Impact sound insulation element for stairway support

Application

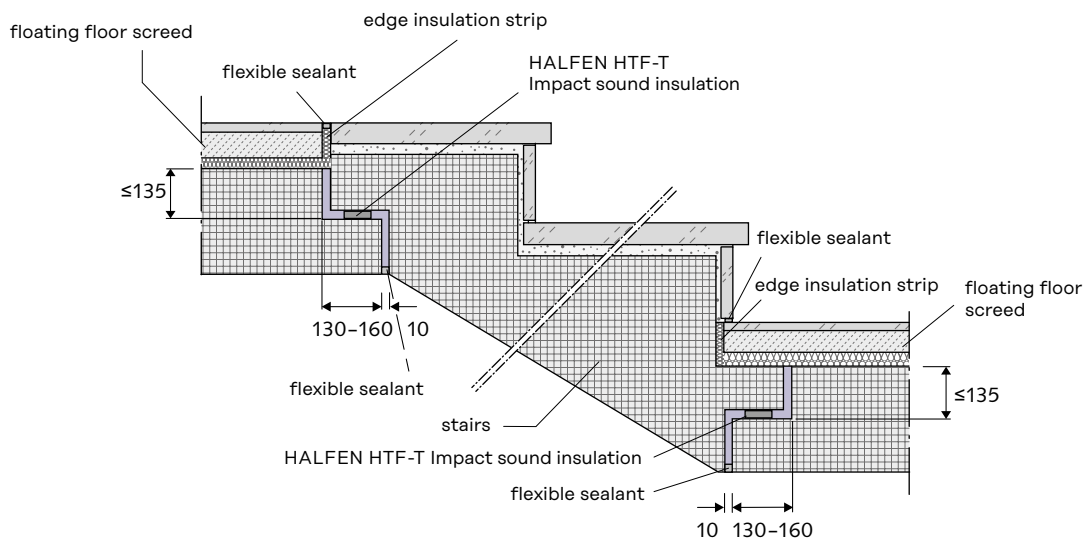


Figure: Cross-section showing the typical installation configuration for a HALFEN HTF-T impact sound insulation element

Dimensions [mm]

1
HALFEN
HBB

2
HALFEN
HTF-T

3
HALFEN
HTF-B

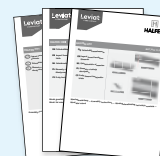
4
Aschwanden
CRET-TS-SET

5
HALFEN
HTPL

6
HALFEN
HTT



More detailed installation instructions can be found on the Internet at:
www.halfen.com/en ▶ **Product Ranges** ▶ **Concrete**
 ▶ **Reinforcement systems** ▶ **Impact sound insulation products**

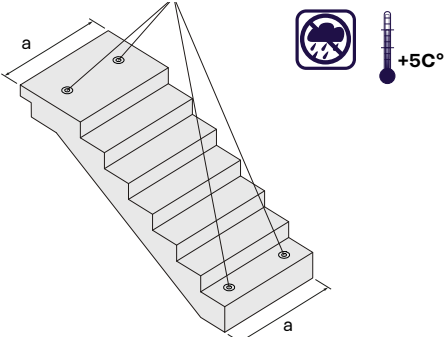


HALFEN HTF-T

Installation instructions – Precast stairs

1
HALFEN
HBB

1

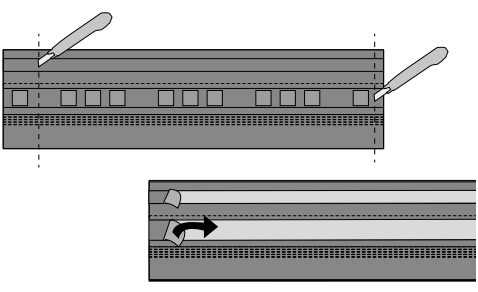


■ Verify the width of the precast stair elements as delivered to the construction site

2
HALFEN
HTF-T

3
HALFEN
HTF-B

2

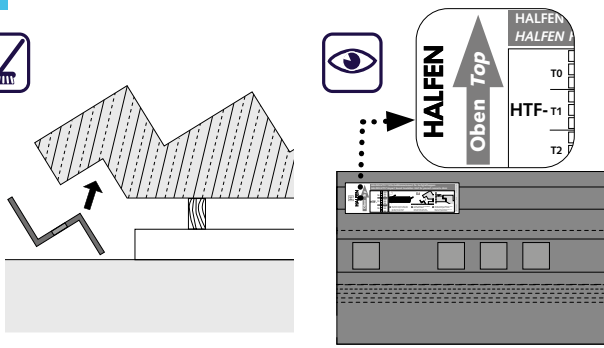


■ Cut the HTF-T mat to the required width. Remove the protective foil on the adhesive strips.

4
Aschwanden
CRET-TS-SET

5
HALFEN
HTPL

3

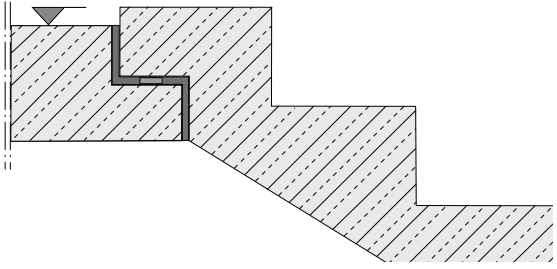


■ Position and stick the HTF-T mat to the concrete. The surface must be clean and dust-free.

⚠ Ensure the mat is installed in the correct orientation.

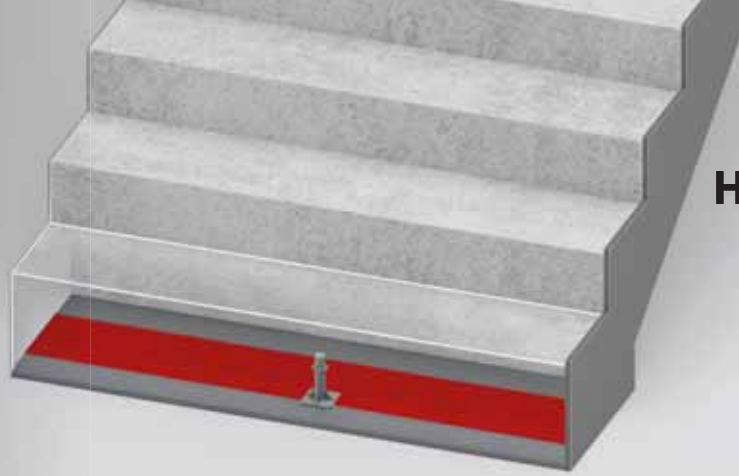
6
HALFEN
HTT

4



■ Cut the mat flush with the surface of the concrete slab.

⚠ Check installation complies with the architect's specifications.



1
HALFEN
HBB

Material specifications and test certificates

Floor slab	Cast-in-situ or precast concrete
Stair elements	Cast-in-situ or precast concrete
Available sizes	Lengths: 1000mm, 1200mm, 1500mm and special lengths available Width: 600mm
Weighted impact sound level	in accordance with DIN 7396 Testing at maximum permissible dead load, Test report 91383-14, 91383-13, 91383-12 HTF-B0: $\Delta L^*_{w,stairs} \geq 28$ dB HTF-B1: $\Delta L^*_{w,stairs} \geq 28$ dB HTF-B2: $\Delta L^*_{w,stairs} \geq 27$ dB
Fire protection	Fire protection of the components up to R90 Certified fire protection properties: Expert report no. GA-2022/110-Nau
Bearing	Profiled, non-reinforced elastomeric bearing; width 60 mm
Material	Plastic foam, building material class B2 in accordance with DIN 4102



HALFEN HTF-B Impact sound insulation element

2
HALFEN
HTF-T

3
HALFEN
HTF-B

HALFEN HTF-B Impact sound insulation elements are used for the effective acoustic separation of precast or cast-in-situ concrete staircases from the base slab.

High impact sound insulation values have been demonstrated by tests in accordance with DIN 7396. The transverse loads are transferred to the floor slabs by means of heavy-duty elastomeric bearings.

Adhesive strips with protective foil are pre-fitted to the element for easy mounting to the reinforced concrete substrate. The protective foil has a convenient tab to enable easy removal.

4
Aschwenden
CRET-TS-SET

Ordering example

HALFEN HTF - B0 - 150



Type description

- ① Product brand
- ② Product designation
- ③ Load group
- ④ Element length [cm]



HTF custom solutions

Our technical support team is available to provide support for your project with custom solutions using HALFEN HTF Impact sound insulation.

Contact: → see Address page

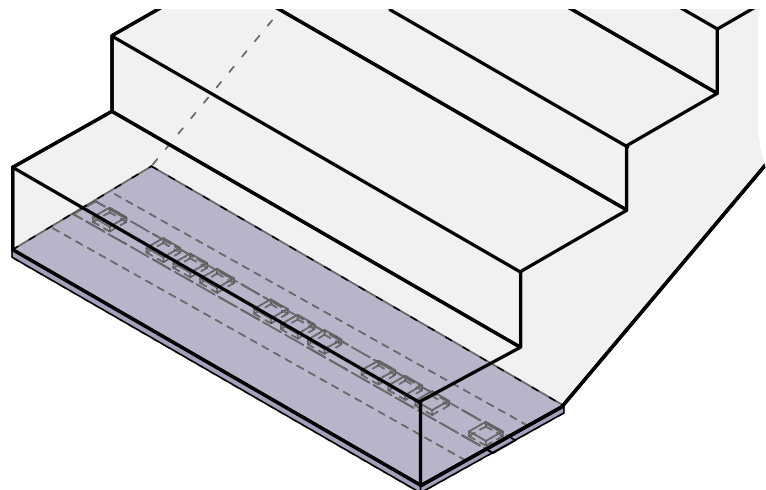


Figure: Application of the HTF-B Impact sound insulation element to the stair element

5
HALFEN
HTPL

6
HALFEN
HTT

HALFEN HTF-B

HALFEN HTF-B – Product description

Designation	Length [mm]	Width [mm]	Article number	Load bearing capacity values V_{Rd} [kN/m]
HTF-B0-100-60	1000	600	0973.010-00011	28.5
HTF-B0-120-60	1200	600	0973.010-00012	28.5
HTF-B0-150-60	1500	600	0973.010-00013	28.5
HTF-B1-100-60	1000	600	0973.010-00021	43.1
HTF-B1-120-60	1200	600	0973.010-00022	43.1
HTF-B1-150-60	1500	600	0973.010-00023	43.1
HTF-B2-100-60	1000	600	0973.010-00031	60.3
HTF-B2-120-60	1200	600	0973.010-00032	60.3
HTF-B2-150-60	1500	600	0973.010-00033	60.3

i Special dimensions are available on request (widths larger than 1500 mm)

Top view and cross section showing HTF-B0, -B1, -B2

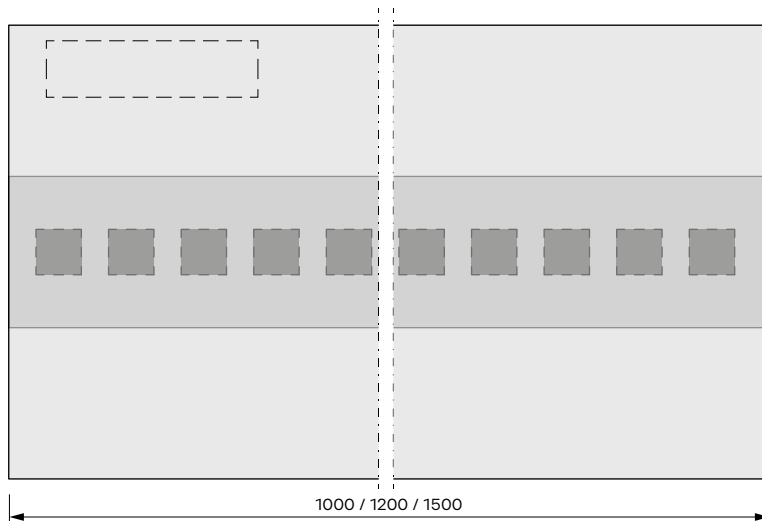


Figure: HTF-B, top view

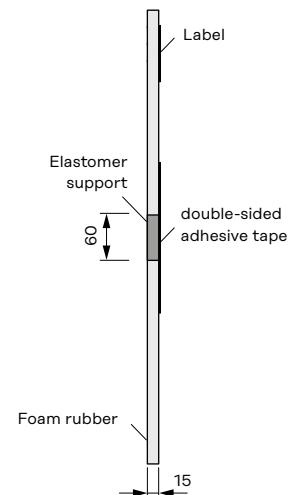


Figure: HTF-B, section

i All dimensions in [mm]

Impact sound insulation element for the base of staircases

Application

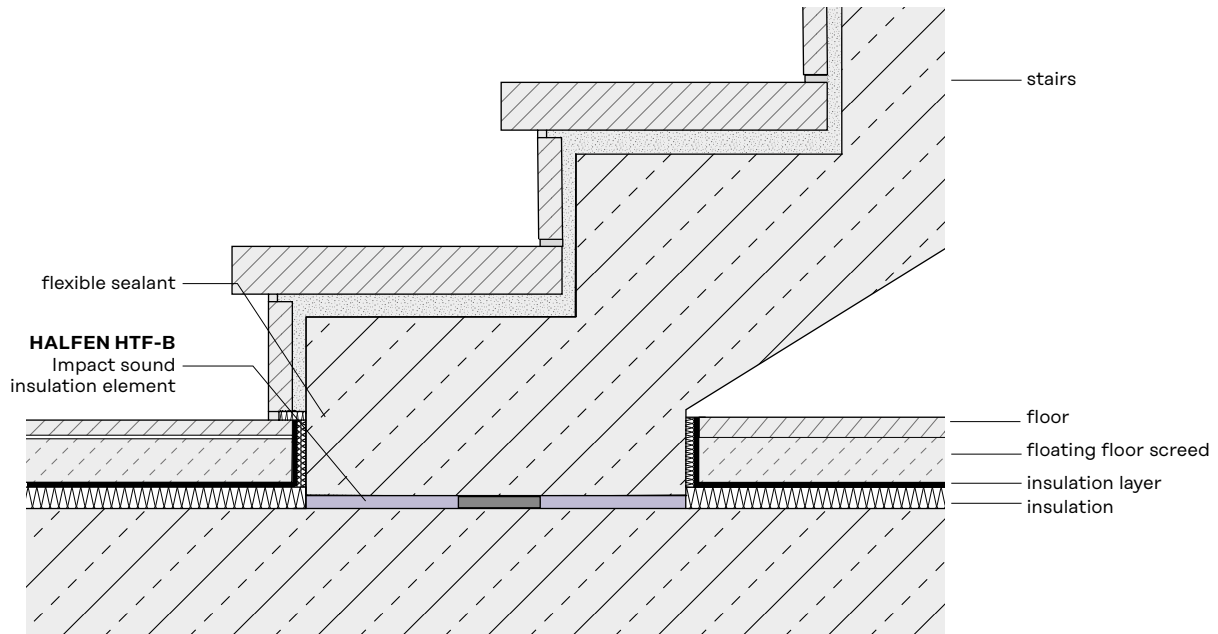


Figure: HALFEN HTF-B Impact sound insulation, vertical cross-section

1
HALFEN
HBB

2
HALFEN
HTF-T

3
HALFEN
HTF-B

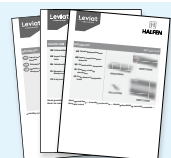
4
Aschwanden
CRET-TS-SET

5
HALFEN
HTPL

6
HALFEN
HTT



More detailed installation instructions can be found on the Internet at:
www.halfen.com/en ▶ **Product Ranges** ▶ **Concrete**
 ▶ **Reinforcement systems** ▶ **Impact sound insulation products**

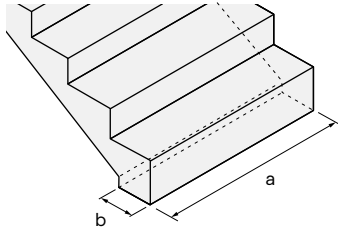


HALFEN HTF-B

Installation instructions – Precast stairs

1
HALFEN
HBB

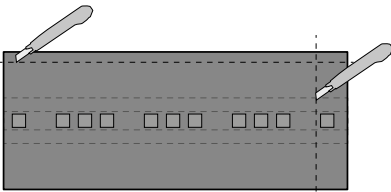
1



- Verify the width and depth of the precast stair elements as delivered to the construction site.

2
HALFEN
HTF-T

2



- Cut the HTF-B mat to the required width and depth. Remove the protective foil on the adhesive strips.

3
HALFEN
HTF-B

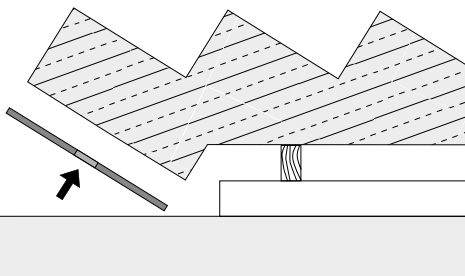
4



- Position and fix the HTF-B mat to the concrete. The surface must be clean and dust-free.

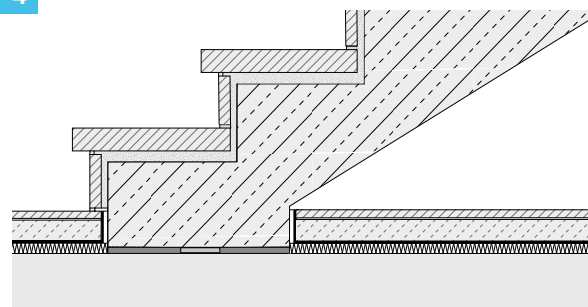
4
Aschwanden
CRET-TS-SET

3



5
HALFEN
HTPL

4



Check installation complies with the architect's specifications.

6
HALFEN
HTT

Aschwanden CRET-TS-SET



1
HALFEN
HBB

Material specifications and test certificates

Floor slab	Cast-in-situ concrete
Stair elements	Cast-in-situ or precast concrete
Available sizes	Dowel: 180 mm total length / 20 mm diameter Sleeve: 110 mm total length
Fire protection	Fire protection of the components up to R90 Certified fire protection properties: Expert report no. GA-2022/110-Nau
Material	Acoustic insulation: Elastomeric sleeve Dowel: Stainless steel Sleeve: Plastic



Aschwanden CRET-TS Dowel and CRET-TS-SET (above)

2
HALFEN
HTF-T

3
HALFEN
HTF-B

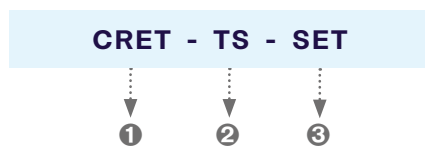
Aschwanden CRET-TS is a sound damping connector for precast or cast-in-situ concrete stairways.

Placed vertically across the joint between the floor slab and the first step of the stairs, CRET-TS ensures a reliable and

secure positioning of the staircase, while guaranteeing an acoustic decoupling from the floor slab.

4
Aschwanden
CRET-TS-SET

Ordering example



Type description

- ① Product designation
- ② Stair fixing element
- ③ CRET-TS acoustic dowel + HSD plastic sleeve

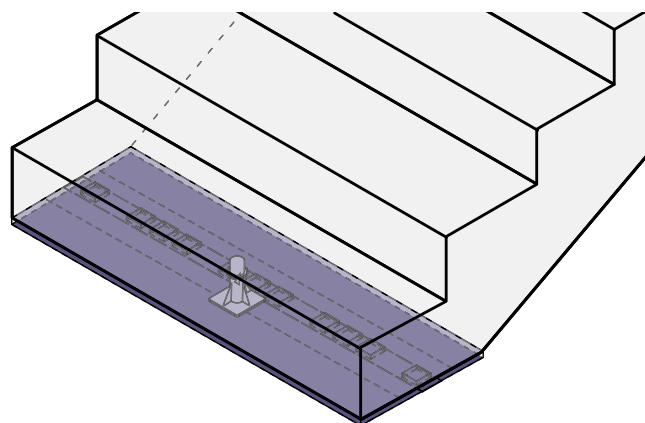


Figure: Application of CRET-TS-SET with HTF-B mat

5
HALFEN
HTPL

6
HALFEN
HTT

Aschwanden CRET-TS-SET

CRET-TS-SET – Product description

Designation	Description	Length [mm]	Article number
CRET-TS-SET	Acoustic dowel diameter 20 mm with elastomeric sleeve + HSD plastic sleeve	205	0975.010-00001
CRET - TS $\varnothing 20 \times 180$ - A4	Dowel diameter 20 mm in stainless steel with elastomeric acoustic sleeve	185	0975.010-00101
HSD - P 20 \times 110 - KS	Plastic sleeve	110	0729.030-00101

Top view and cross-section CRET-TS-SET

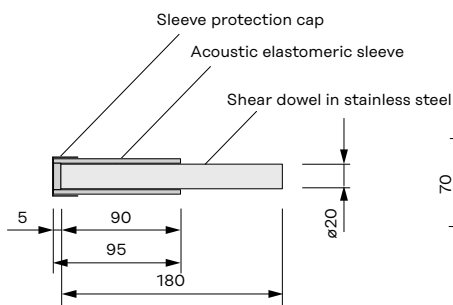


Figure: CRET-TS, cross-section

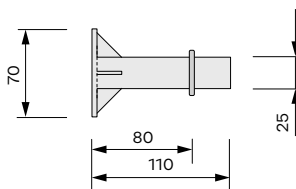


Figure: HSD plastic sleeve, cross-section

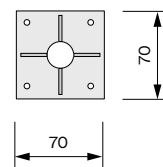


Figure: HSD plastic sleeve, front view

i All dimensions in [mm]

Vertical impact sound insulation dowel for stair fixing

Application

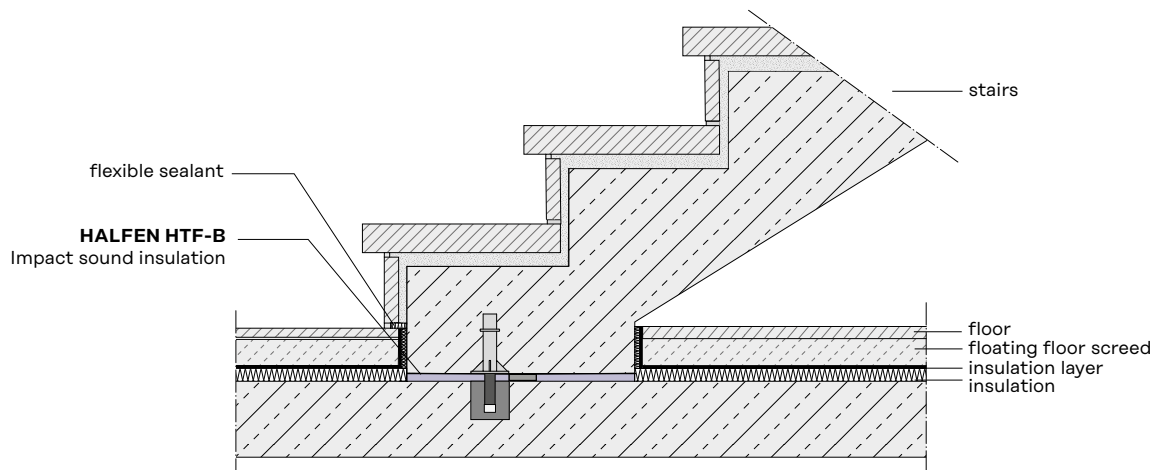


Figure: Installation cross-section – HSD plastic sleeve installed in precast stairs;
Aschwanden CRET-TS-SET cast in floor slab, with stairs resting on HTF-B acoustic mat

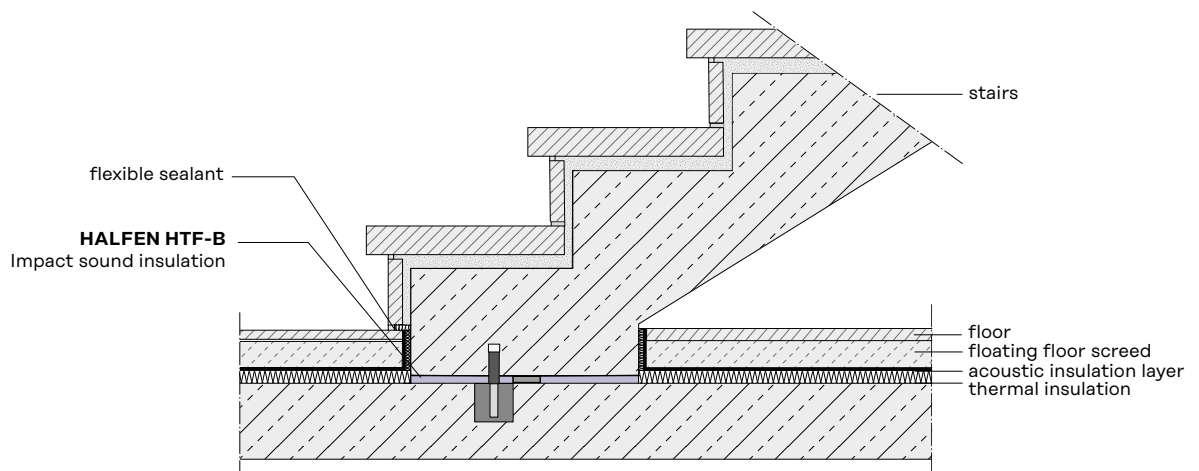


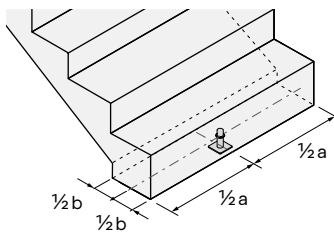
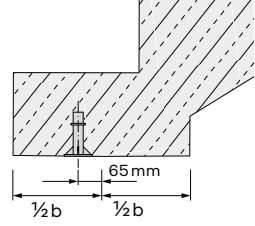


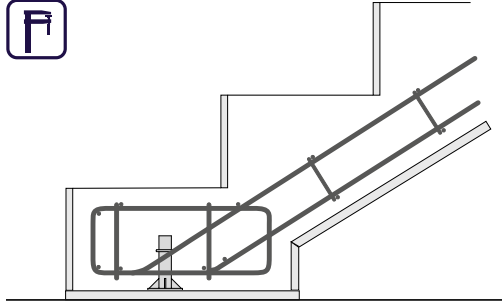


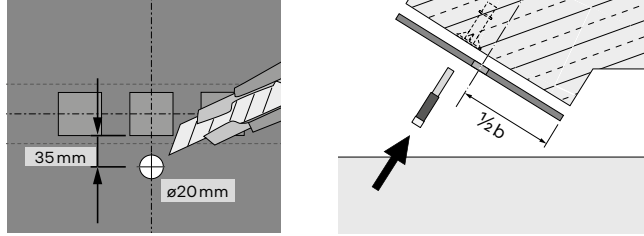

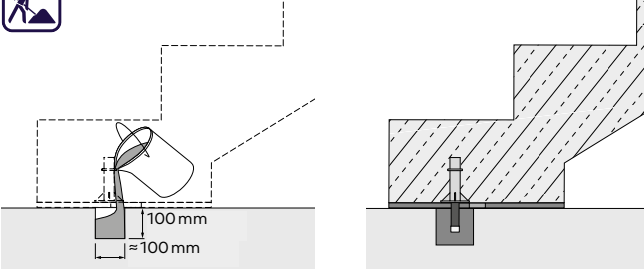


Figure: Installation cross-section – Aschwanden CRET-TS acoustic dowel + HTF-B acoustic mat

1	HALFEN HBB
2	HALFEN HTF-T
3	HALFEN HTF-B
4	Aschwanden CRET-TS-SET
5	HALFEN HTPL
6	HALFEN HTT

Aschwanden CRET TS-SET

Installation instructions – Sleeve fitted in precast concrete stairs

<p>1 HALFEN HBB</p>	<p>1</p>   <p>■ Determine the position of the sleeve in the formwork at the precast plant.</p>  
<p>2 HALFEN HTF-T</p>	<p>2</p>   <p>■ Fix the HSD plastic sleeve to the formwork. Install the reinforcement of the stairs. Pour the concrete.</p> 
<p>3 HALFEN HTF-B</p>	<p>3</p>   <p>■ On the construction site, cut out a hole for the dowel in the HTF-B mat. Stick the mat onto the cleaned and dust-free soffit of the precast staircase, insert the dowel in the HSD plastic sleeve.</p> 
<p>4 Aschwanden CRET-TS-SET</p>	<p>4</p>  <p>■ Fill the recess in the reinforced concrete slab with mortar and immediately install the precast stair element.</p> 

HALFEN HTPL



1
HALFEN
HBB

Material specifications and test certificates

Stair elements	Cast-in-situ or precast concrete
Wall	Cast-in-situ concrete or masonry
Available sizes	Length: 1000mm Widths: 250mm and 420mm
Fire protection	Fire protection of the components up to R 90 Certified fire protection properties: Expert report no. GA-2022/110-Nau
Materials	Foam material class B2 in accordance with DIN 4102



HALFEN HTPL-25-100 Joint insulation plate

2
HALFEN
HTF-T

3
HALFEN
HTF-B

The HALFEN HTPL-100 Impact sound insulation plate consists of a robust PE foam. The required cutting to size can be done easily on the construction site or at the precast concrete factory.

For easy installation, the entire surface of the plate is covered with a white, self-adhesive, double-sided film. The plate reliably prevents the transmission of any impact sound.

The HTPL mats must be installed at the interface between the landing slab or the staircase and the adjacent wall to prevent any acoustic bridge.

4
Aschwanden
CRET-TS-SET

Ordering example



Type description

- ① Product brand
- ② Product designation
- ③ Element length [cm]
- ④ Element width [cm]

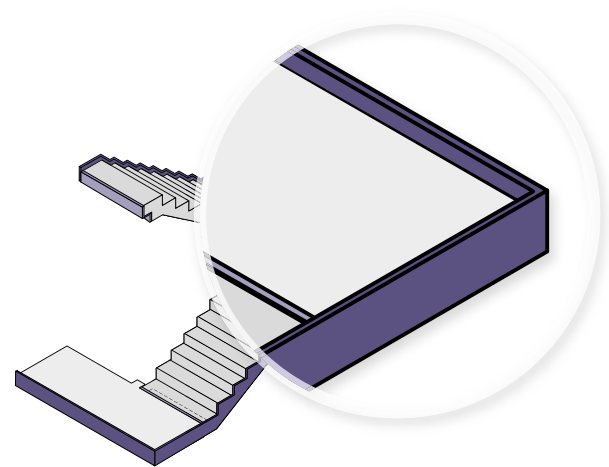


Figure: Application of the HTPL Impact sound insulation plate in a staircase

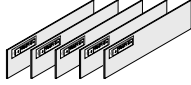



5
HALFEN
HTPL

6
HALFEN
HTT

HALFEN HTPL

HALFEN HTPL – Product description

Designation	Width	Length	Thickness	Article number
	[mm]	[mm]	[mm]	
HTPL-25-100	250	1000	15	0974.010-00011
HTPL-42-100	420	1000	15	0974.010-00021
HTPL-25-100-SET	250	1000	15	0974.020-00001
HTPL-42-100-SET	420	1000	15	0974.020-00002

HTPL SET COMPONENTS	
15 pcs. HTPL-25-100 or HTPL-42-100	
Leviat folding-ruler	
1 Roll of tape (20m)	
Pencil	



HTPL Impact sound insulation plates are part of the HALFEN sound insulation range and can be combined with other HALFEN sound insulation products to prevent sound transmission resulting from rigid connections between the stairs and surrounding walls.

Top view and cross-section

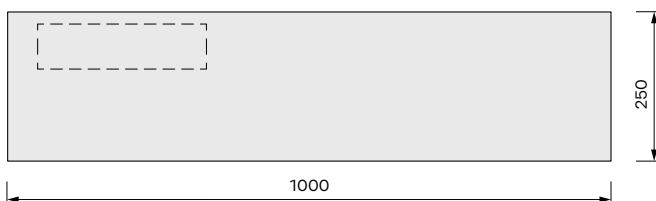


Figure: HTPL-25-100, top view

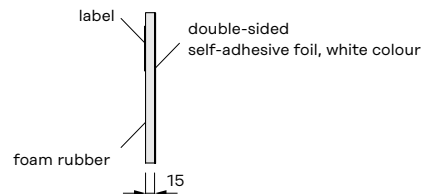


Figure: HTPL-25-100, section

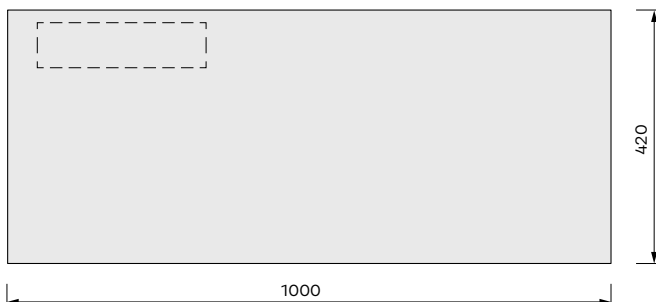


Figure: HTPL-42-100, top view

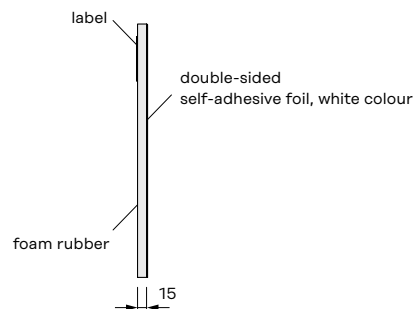


Figure: HTPL-42-100, section



All dimensions in [mm]

Application

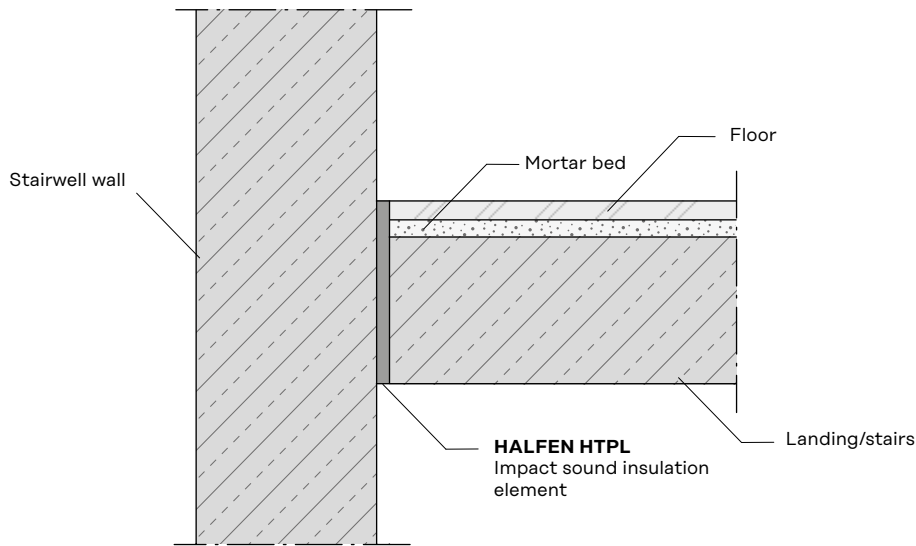


Figure: HALFEN HTPL Impact sound insulation plate; cross-section 1

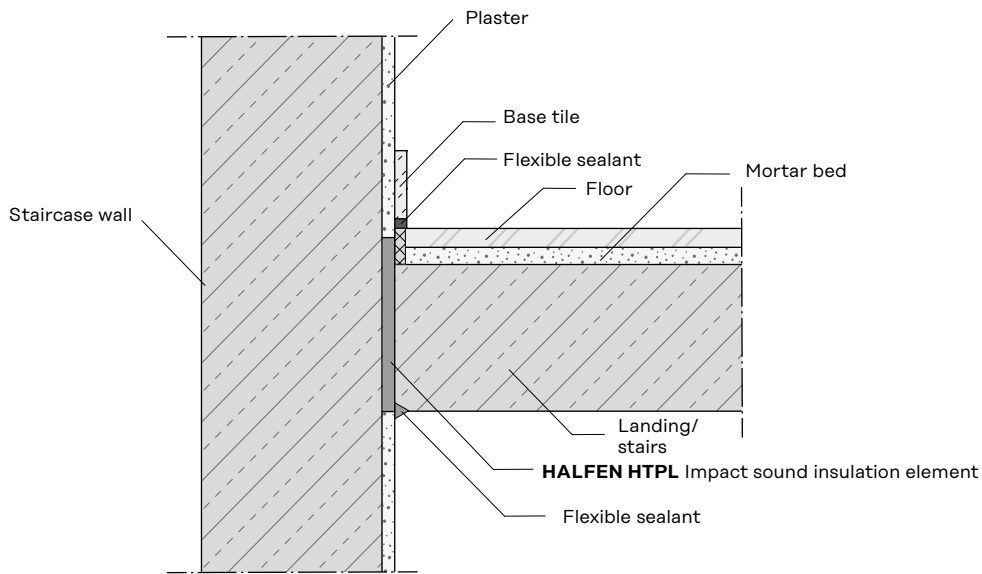


Figure: HALFEN HTPL Impact sound insulation plate; cross-section 2



HTPL Impact sound insulation plates are part of the HALFEN sound insulation range and can be combined with other HALFEN sound insulation products to prevent sound transmission resulting from rigid connections between the stairs and surrounding walls.

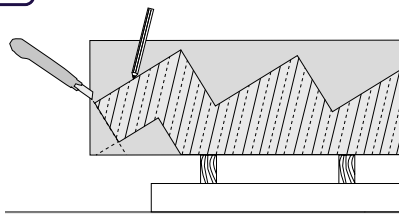
1	HALFEN HBB
2	HALFEN HTF-T
3	HALFEN HTF-B
4	Aschwenden CRET-TS-SET
5	HALFEN HTPL
6	HALFEN HTT

HALFEN HTPL

Installation instructions – Precast stairs

1
HALFEN
HBB

1

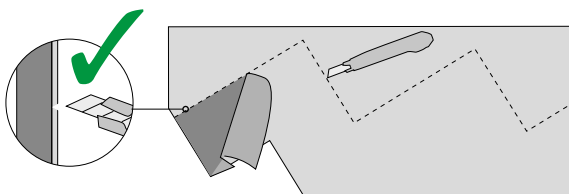


- On site, align the HTPL mats with the bottom edge of the staircase (see illustration). Trace the outline of the stairs with a pencil.

2
HALFEN
HTF-T

2

- Cutting

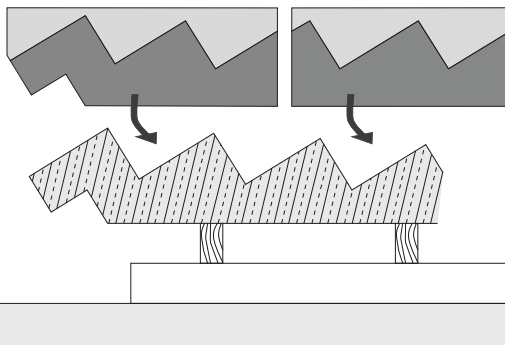


Using a very sharp blade, cut through the protective foil, taking care not to damage the sound absorbing material underneath; then remove the foil from the mats.

3
HALFEN
HTF-B

4
Aschwanden
CRET-TS-SET

3



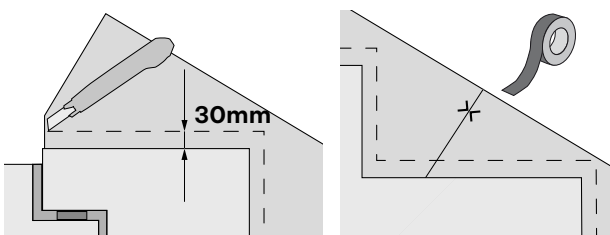
- Stick the HTPL mats onto the clean and dust-free concrete surface of the precast stairs. Ensure the joints between individual mats are tightly butted to each other.

5
HALFEN
HTPL

6
HALFEN
HTT

4

- Cut and remove excess material leaving an exposed 30 mm edge. Seal the joints between mats with water-resistant adhesive tape.



Precise installation is required as gaps left between the elements may cause sound bridging. This would have a negative impact on the acoustic comfort in the adjacent rooms and the building.



1
HALFEN
HBB

Material specifications and test certificates

Stair landing slab	Cast-in-situ or semi-precast concrete elements
Stair elements	Cast-in-situ or precast concrete
Sound insulation	Impact sound reduction: $\Delta L = 12$ dB Certified acoustic properties: test report 2027/7205-1-Re, IBMB Braunschweig
Fire protection	Fire protection verification: F90/F120 and R90/R120 in accordance with report GA-2017/128, IBB GmbH
Type tested	S-WUE 040519, LGA Würzburg
Product range	Available in three load sizes for staircase widths of 90 cm up to 200 cm, and landing slab thickness from 16 cm to 25 cm.
Materials	Galvanised steel sheet, mineral fibre insulation material and non-reinforced elastomeric bearings with general building authority approval, B500NR reinforcement steel.



HALFEN HTT-6 Impact sound insulation

2
HALFEN
HTF-T

3
HALFEN
HTF-B

4
Aschwanden
CRET-TS-SET

HALFEN HTT impact sound insulation elements are suitable for supporting cast-in-situ and precast concrete stairs onto cast-in-situ concrete landing slabs subjected to predominantly static loads.

Static verification must be provided for the stair element and landing slab to confirm product suitability.

Subject to adequate concrete cover to the reinforcement, HTT elements will provide a high level of safety in the event of fire, allowing for a fire resistance class of R90/RF120 (F90/F120).

HTT elements are suitable for the transfer of vertical and horizontal loads.

Lateral load restraint is provided on the understanding that additional reinforcement stirrups are installed, as specified on the drawing on page 46.

Ordering example

HALFEN HTT - 6 - 18 - 100



Type description

- ❶ Product brand
- ❷ Product designation
- ❸ Load group
- ❹ Landing slab height [cm]
- ❺ Element length l/stair width [cm]

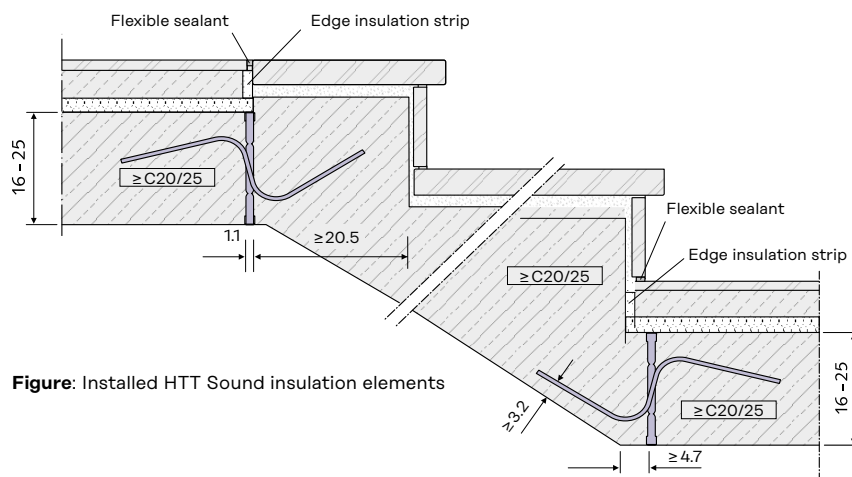


Figure: Installed HTT Sound insulation elements

5
HALFEN
HTPL

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HALFEN
HTT

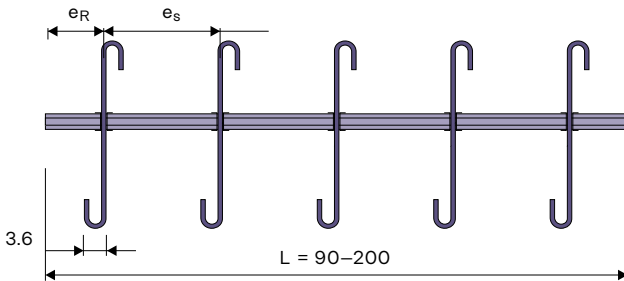
HALFEN HTT

HALFEN HTT – dimensions and load bearing capacities

Article name	Element height	Element length	Reinforcement	Spacings (approx.)		Values for structural design	
	h [cm]	L [cm]	number and diameter [mm]	Edge distance e_R	Spacing e_s	Lateral force V_{Rd} [kN/element]	Horizontal force H_{Rd} \ominus [kN/element]
HTT-4	16–25	90–200	3 $\varnothing 6$	L/6	L/3	35.9	± 3.1
HTT-6			5 $\varnothing 6$	L/10	L/5	59.9	± 4.2
HTT-8			6 $\varnothing 6$	L/12	L/6	71.8	± 4.3

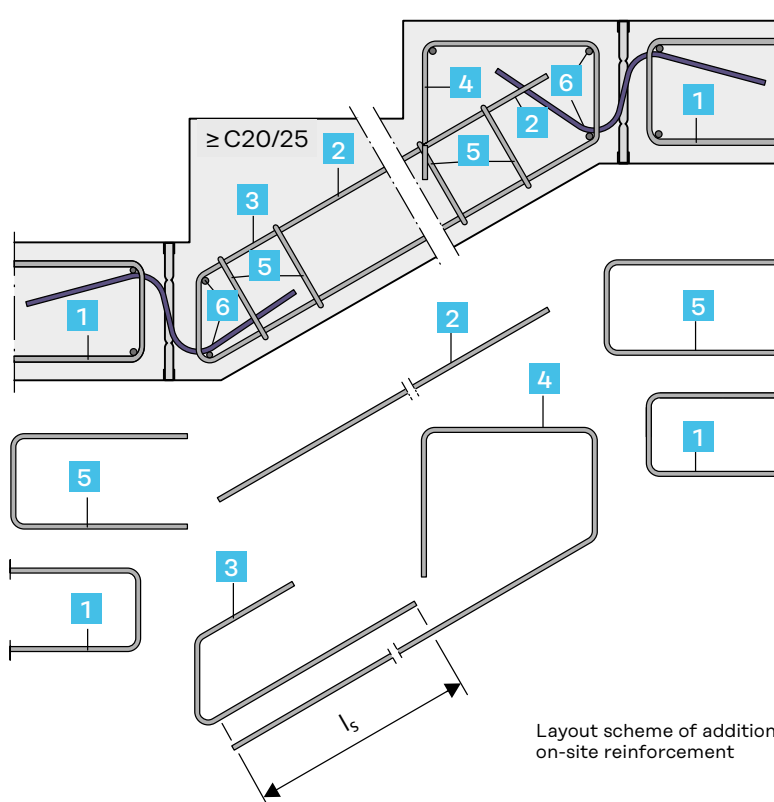
\ominus max. possible horizontal load in longitudinal direction of the stairs (applies for maximum shear load)
 → see type test

Dimensions diagram



Standard lengths L = 100 / 120 cm
 Custom lengths L = 90 – 200 cm

Design regulations for reinforcing and installation notes



Additional on-site reinforcement

(static verification required in accordance with the type test by a structural engineer):

- 1 End stirrups or mesh reinforcement
- 2 Top reinforcement layer
- 3 End stirrups, bent as hanger reinforcement
- 4 Bottom reinforcement layer, bent as hanger reinforcement
- 5 End stirrups, 2x $\varnothing 8$
- 6 Reinforcement bars $\varnothing 8$ (HTT-4, -6) or $\varnothing 10$ (HTT-8)

Note

Positions 1–4 are calculated in accordance with static requirements. Moments resulting from excentric connections have to be considered in the design calculation for the stair elements.

Impact sound insulation element for stairway support

Installation instructions – Precast stairs

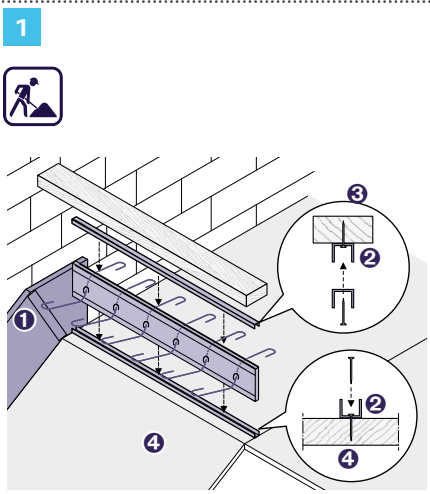


Figure: Assembly scheme for in-situ cast elements

Application with cast-in-situ concrete stairs and landings

Installation procedure for cast-in-situ stairs

- HTPL Sound insulation plates ① are fixed to the wall, following the outline of the stairs. The surface of the wall must be completely clean ensuring there are no gaps between the plates
- The bottom HTT Nail bar ② is fixed to the formwork at the specified position
- Insert the HTT element in the nail bar
- The top HTT Nail bar ② is fixed using an auxiliary aid (e.g. timber batten ③) and slotted to the top of the HTT Impact sound insulation element

Correctly align and fix the HTT element at the required vertical position.

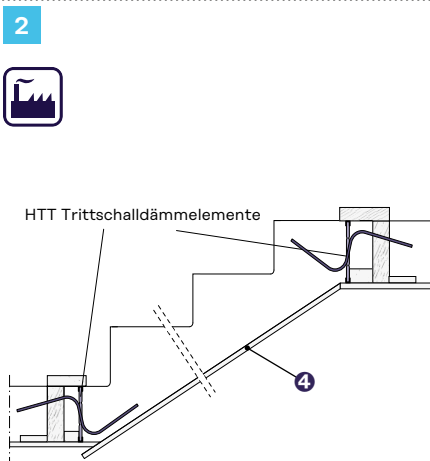


Figure: Formwork in the precast plant

Application with precast concrete stairs and cast-in-situ concrete landings

Installation in the precast plant:

- Installation of the formwork as on the picture at the left hand-side
- Fix the HTT Impact sound insulation element with the nail bars (included) as shown in figure 1
- The HTT element must be aligned and fixed vertically at the appropriate position

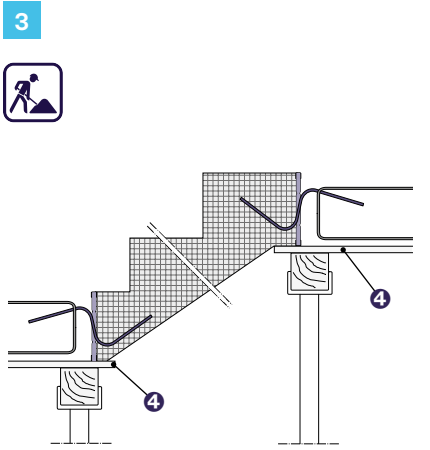


Figure: On-site installation of the precast stair element

Application with precast concrete stairs and cast-in-situ concrete or semi-precast concrete landings

Installation of precast element on-site:

- Installation as in figure 2
- Both cast-in-situ concrete and precast concrete landings are achievable.
- Place the HALFEN HTPL Sound insulation plates in the gap between the stairs and the adjoining wall of the stairwell.

Installation note

- ① HALFEN HTPL Impact sound insulation plate
- ② Nail bar (supplied)
- ③ Auxiliary aid
- ④ On-site formwork



On-site



Precast plant

1
HALFEN
HBB

2
HALFEN
HTF-T

3
HALFEN
HTF-B

4
Aschwanden
CRET-TS-SET

5
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HTPL

6
HALFEN
HTT







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