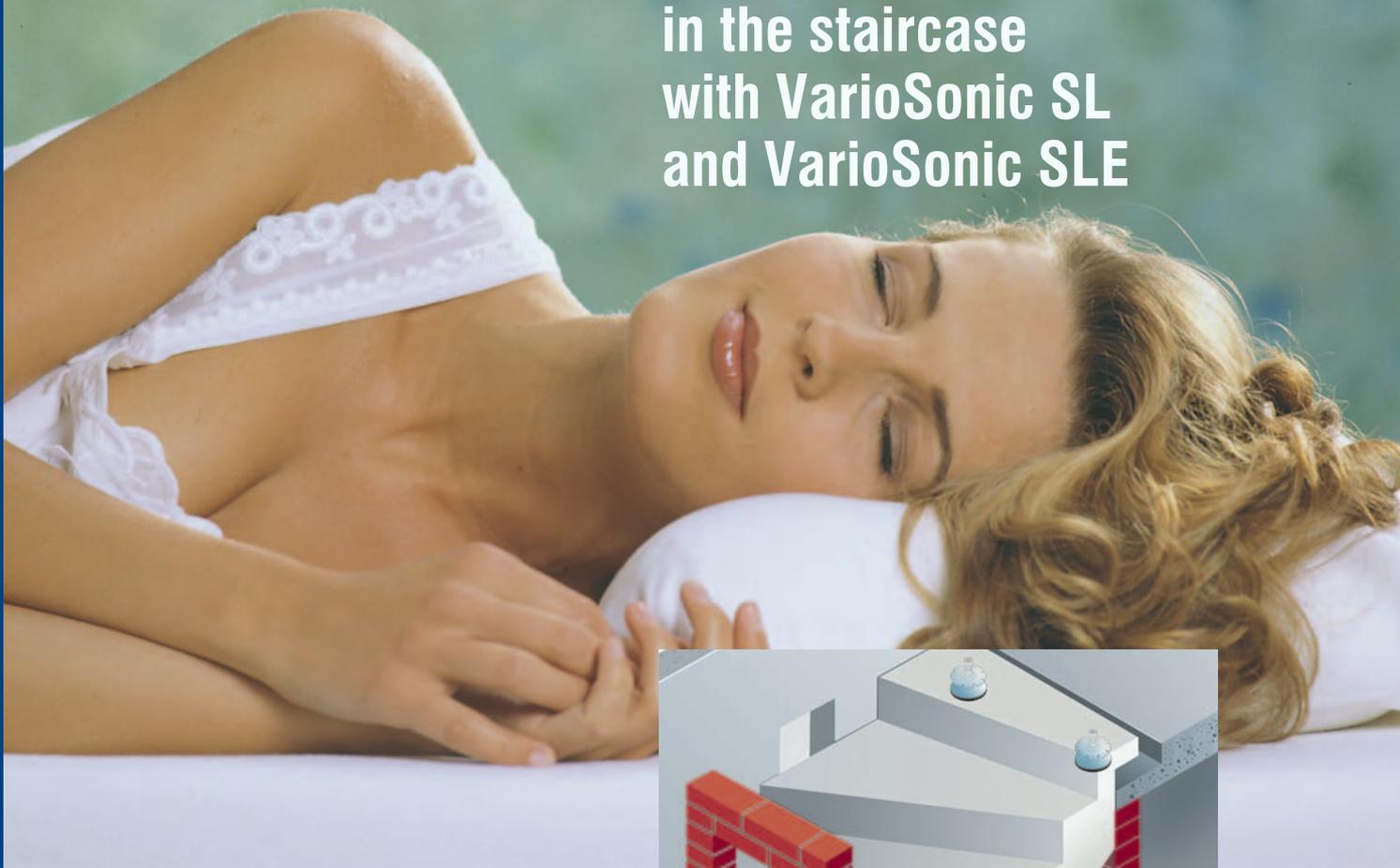


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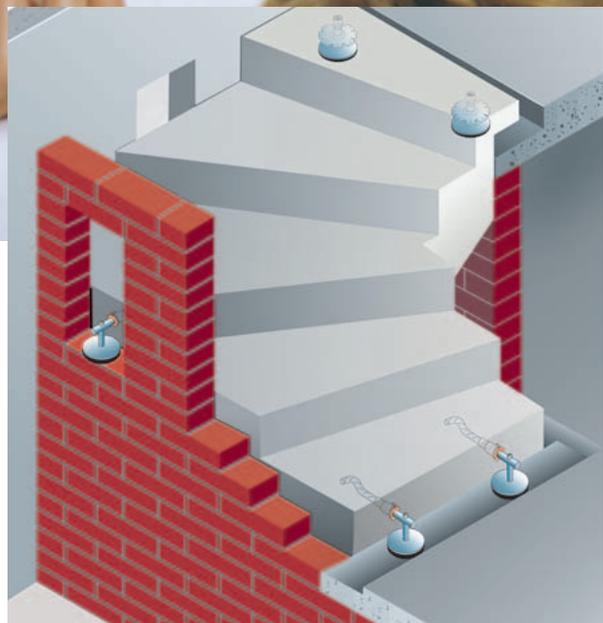
Adjustable under
load without a crane

Peace at last
in the staircase
with VarioSonic SL
and VarioSonic SLE



**VarioSonic SL and
VarioSonic SLE**

*PFEIFER staircase
bearings*



02/2015



**PFEIFER
SEIL- UND HEBETECHNIK
GMBH**

DR.-KARL-LENZ-STRASSE 66
87700 MEMMINGEN

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FAX +49 (0) 83 31-937-342

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INTERNET www.pfeifer.de

The ideal way to a perfect staircase construction – and we adapt to your requirements!

Cost-effective, flexible, reliable, easy

– whichever way you look at it, there is only one solution: PFEIFER VarioSonic

Staircase bearings from PFEIFER are impressive from every angle. After all, the other components like the wave anchors and the PFEIFER sleeves have proved themselves millions of times over. Step by step. Benefits:

1. Exemplary footstep sound insulation
2. Height adjustment is possible even under load
3. Fast and uncomplicated installation
4. Already type-approved by the relevant authorities – offering total peace of mind for planning
5. They cover all the possible load ranges for all standard staircase dimensions

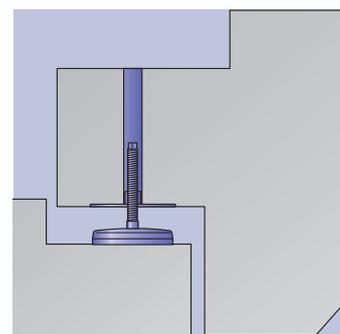
Σ In summary, what does this mean for you? The use of simple components, like wave anchors or PFEIFER sleeves, which have been tried and tested millions of times over, will help you to save costs.

Why not find out for yourself?

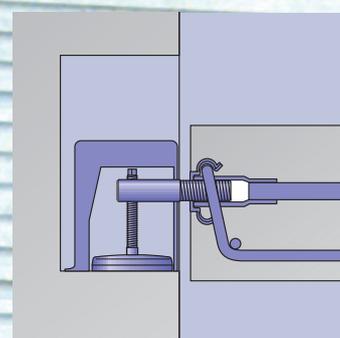
**Simple technology,
fast and flexible**

*We have the right component
for every installation scenario.*

*With PFEIFER VarioSonic
you can shorten installation
times and achieve greater
footstep sound insulation
with intermediate and end
bearings for staircases.*



VarioSonic SLE end bearing



VarioSonic SL intermediate bearing



With PFEIFER VarioSonic you can save every step of the way – both in terms of decibels and Money.



Planning benefits

- New structural type approval in accordance with DIN EN 1992-1-1
- Planning flexibility thanks to the ability to perform height adjustments at any time
- Excellent footstep sound insulation, increased requirements according to DIN 4109 are satisfied
- Gap widths of up to 3 cm between the flight of stairs and the wall are possible



Benefits in the production of the precast parts

- Easy installation of the anchors in the precast staircases
- Reliable designs combining familiar individual components such as the PFEIFER wave anchors or the PFEIFER socket
- Minimal additional reinforcement required



Benefits in the assembly of the precast parts

- Optimised processes offer noticeably shorter installation and assembly times
- Post-installation adjustment capability significantly shortens the crane installation time of the flights of stairs
- Easy adjustment of the stair height by means of the threaded adjustment device with hexagon means that height adjustments can be performed without the aid of a crane
- No protruding parts when swivelling in the stairs from above into the staircase



Purchasing benefits

- Installation costs reductions of up to 50% can be achieved
- Minimal installation costs and wage bills thanks to the exceptional ease of handling
- Handy packaging form for easy storage
- Easy handling saves installation time and wage bills



Unique – the intermediate stair bearing which can be adjusted under load without a crane ... – flexible, fast, reliable ... cost-effective!

+ Structural type approval testing

The VarioSonic SL staircase bearing is structurally type approved in accordance with DIN EN 1992-1-1 and therefore does not require any additional static verification. This means that all building regulations requirements are therefore satisfied.



+ Fire resistance of at least 90 minutes

A fire resistance time of 90 minutes can be achieved if the staircase bearings are installed in accordance with the currently valid installation instructions. This means that the requirements for domestic buildings are satisfied.



+ Height-adjustable under load

Subsequent definition of the floor level height is no problem, as the height of the stairs can be adjusted to the required level at any time. This means that installation tolerances are extremely easy to compensate for.

+ Superb footstep sound insulation

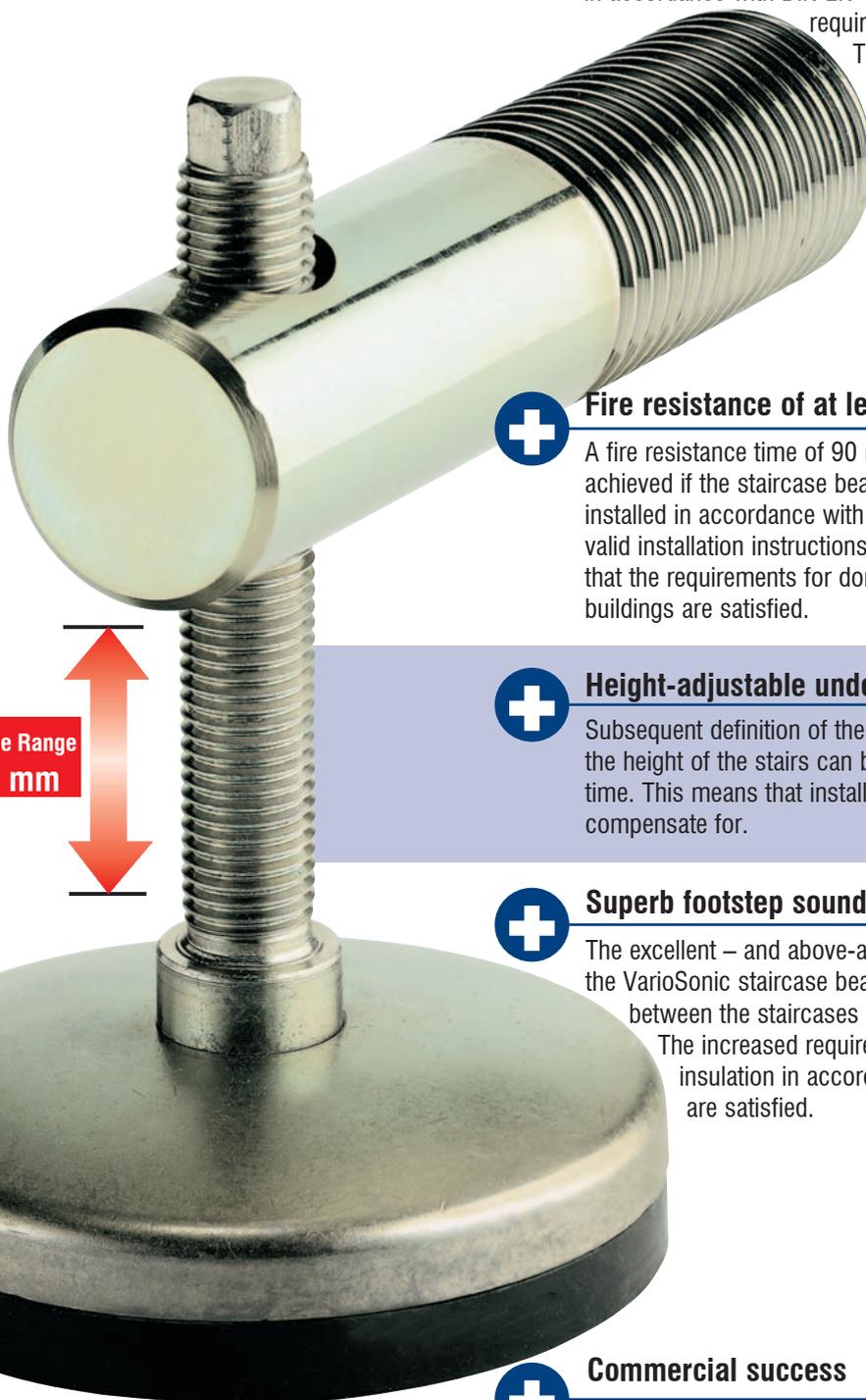
The excellent – and above-average – noise insulation properties of the VarioSonic staircase bearings offer optimum sound insulation between the staircases and the living areas at all times.

The increased requirements in terms of footstep sound insulation in accordance with DIN 4109, sheet 2:1989-11 are satisfied.



+ Commercial success

Shorter planning times, shorter crane times and the faster assembly and installation mean that staircases can be completed noticeably faster. With no protruding parts to obstruct the precast parts while they are being swivelled into the staircase and the design and construction flexibility which results from the height-adjustment capability, installation engineers will be thrilled.



PFEIFER intermediate staircase bearings VarioSonic SL

Item no. 05.370



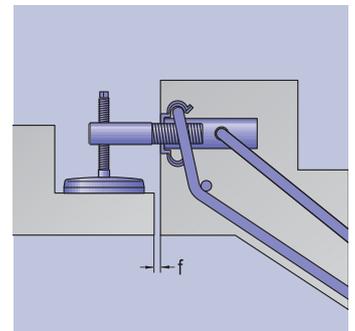
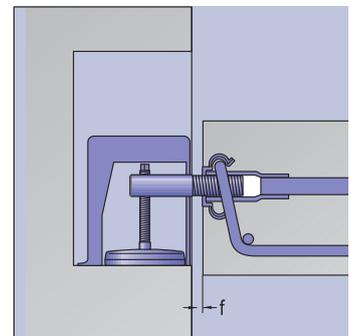
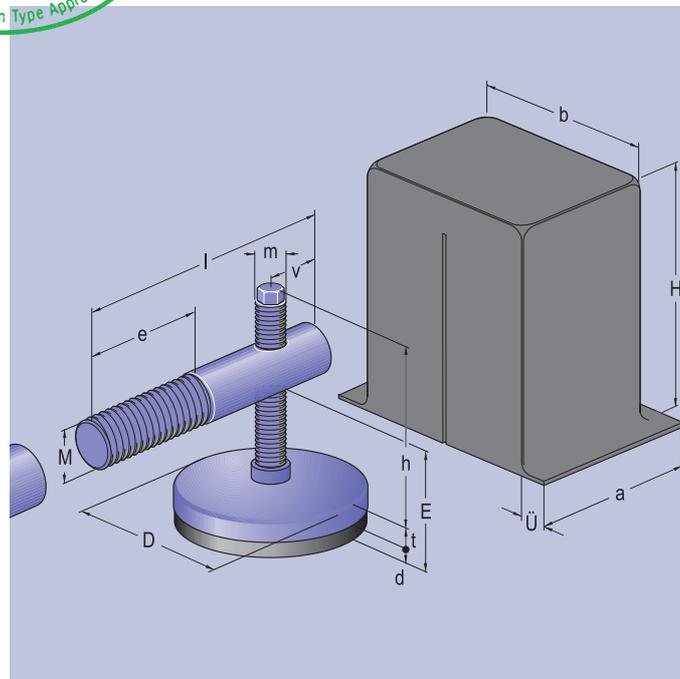
PFEIFER

Connection elements
Staircase bearings



Material:

- Socket: precision steel tube, galvanized
- Lateral force bolt: high-strength steel, galvanized
- Neoprene bearings
- Foam box
- Plastic data clip



The PFEIFER intermediate staircase bearing VarioSonic SL is designed as an intermediate bearing which absorbs the vertical components of the moment of tilt of angled or twisted staircases. It is also possible to anchor stair landings of precast staircases at four bearing points with the aid of the VarioSonic SL. Cutouts are positioned in the rising staircase walls into which the supporting foot is supported. When the stairs are swivelled in, no part of the com-

ponents protrudes in the way of the precast parts. The bearings can also be used to transmit the vertical influences at the starting points and end points of angled, twisted or even straight stairs onto the floor.



Ref. no.	Type	Dimensions in [mm]											Pack. units [units]	Weight [kg]				
		M	l	e	h	m	E	D	t	d	v	a			b	H	ü	
05.370.422.3	SL-H 150	36	150	62	120	16	50-90	100	18	10	25						1	2,80
05.370.322.3	SL-W 150	36	150	62	120	16	50-90	100	18	10	25						1	4,15
05.370.222.3	SL-HS 150	36	150	62	120	16	50-90	100	18	10	25	145	180	200	15		1	3,15
05.370.122.3	SL-WS 150	36	150	62	120	16	50-90	100	18	10	25	145	180	200	15		1	4,50

Ordering example: PFEIFER intermediate staircase bearing with sleeve and staircase bearing data clip, foam box, lateral force bolt with positioning foot (galvanized) and neoprene bearing: 200 PFEIFER VarioSonic SL-HS, ref. no. 05.370.222.3.

Type testing report and detailed installation instructions can be downloaded from the Building Technology download area of www.pfeifer.de.

Unique – the intermediate stair bearing which can be adjusted under load without a crane ... – flexible, fast, reliable ... cost-effective!

+ Structural type testing

The VarioSonic SLE staircase bearing is structurally type approved in accordance with DIN EN 1992-1-1 and therefore does not require any additional static verification. This means that all building regulations requirements are therefore satisfied.



+ Height-adjustable under load

Subsequent definition of the floor level height is no problem, as the height of the stairs can be adjusted to the required level at any time. The staircase height can still be adjusted years down the line!

+ Fire resistance of at least 90 minutes

A fire resistance time of 90 minutes can be achieved if the staircase bearings are installed in accordance with the currently valid installation instructions. This means that the requirements for domestic buildings are satisfied.



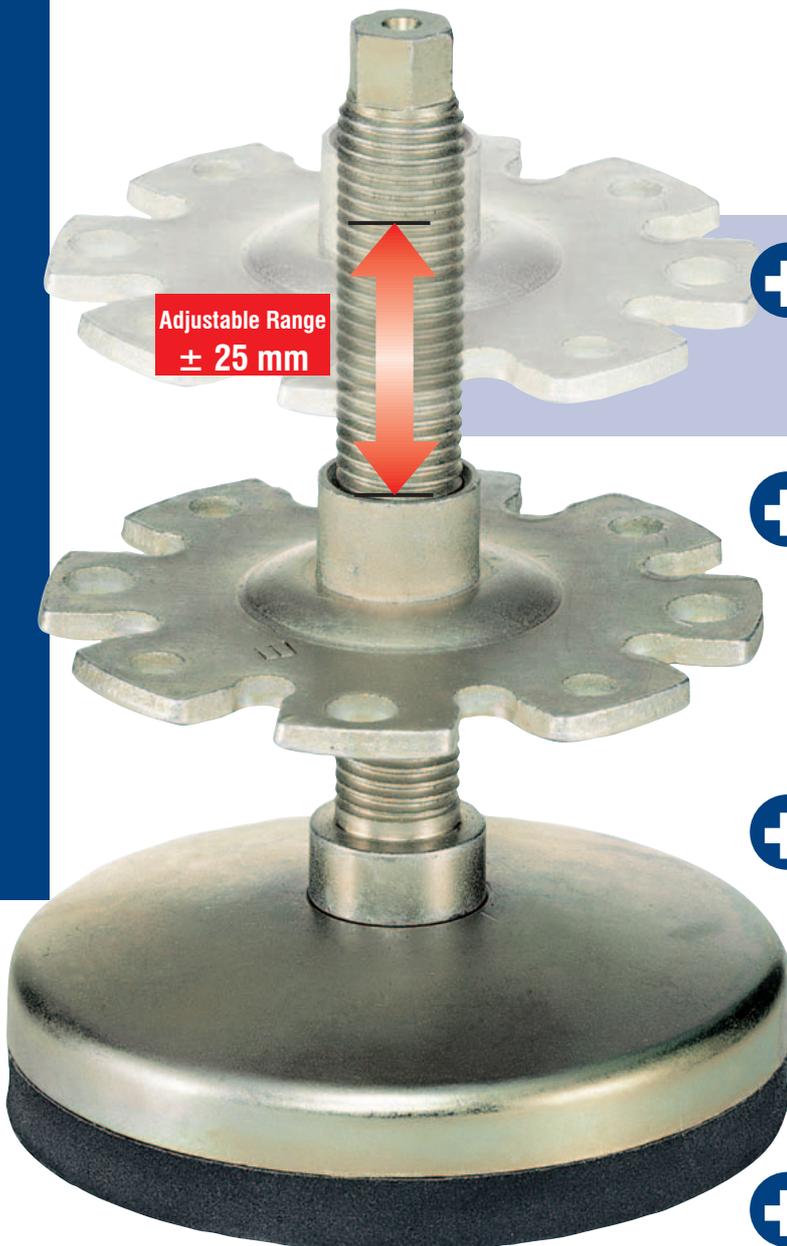
+ Superb footstep sound insulation

The excellent – and above-average – noise insulation properties of the VarioSonic staircase bearings offer optimum sound insulation between the staircases and the living areas at all times. The increased requirements in terms of footstep sound insulation in accordance with DIN 4109, sheet 2:1989-11 are satisfied.



+ Commercial success

Shorter planning times, shorter crane times and the faster assembly and installation mean that staircases can be completed noticeably faster. With no protruding parts to obstruct the precast parts while they are being assembled into the staircase and the ease with which the height of the bearings can be adjusted from above via the hexagon, installation engineers will be thrilled by the design and construction flexibility afforded by this solution.



Adjustable Range
± 25 mm

PFEIFER end staircase bearings VarioSonic SLE

Item no. 05.371



PFEIFER

Connection elements
Staircase bearings

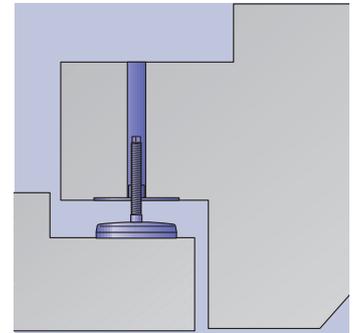
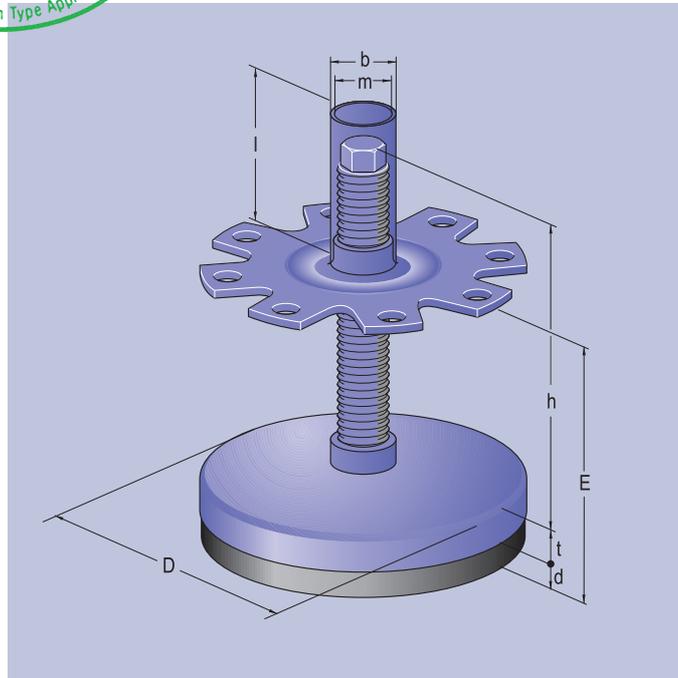
The PFEIFER end staircase bearing VarioSonic SLE is used on straight or angled flights of stairs in order to support the end points on the floor or the stair landings. To do this, a correspondingly formed bracket is installed on the stairs. The VarioSonic SLE is positioned at the underside of the bracket, where it can transmit the vertical force components into the floor. Up to a rated resistance of 33.6 kN per bearing point can be fully transmitted – both

in terms of the static force components and the variable influences. The building regulations approved elastomer bearing underneath the positioning foot of the VarioSonic SLE offers reliable insulation of foot-step noise between the staircase and the floor.



Material:

- Galvanized steel
- Neoprene bearings
- Plastic tube



Ref. no.	Type	V_{Rd} [kN]*	Dimensions in [mm]							Plastic pipe l	Packaging units [units]	Weight [kg]
			D	t	d	h	b	m	E			
05.371.122.3	SLE	33,6	100	18	10	120	20	M16	40-100	200	4	3,9

* Rated resistance of the bearing force.

Ordering example: PFEIFER end staircase bearing with a rated resistance of $V_{Rd} = 33.6$ kN, with positioning foot and installation flange, neoprene bearing and plastic pipe: 400 PFEIFER VarioSonic SLE, ref. no. 05.371.122.3.



Type testing report and detailed installation instructions can be downloaded from the Building Technology download area of www.pfeifer.de.

Installation instructions

PFEIFER VarioSonic SL staircase bearings

Application area

PFEIFER VarioSonic SL staircase bearings are designed to transmit the vertical influences from angled or twisted precast staircases (Fig. 1) or precast stair landings into the wall of the staircase (Fig. 4). Corresponding cutouts need to be positioned in the staircase walls for this purpose. They can also be used as bearings at starting or end points (Fig. 2-3) of flights of stairs at the landing or the floor.

The rated resistance is depending on the width of the joint and the position in the precast element as pic. 6/7. If there is a large edge gap it may be necessary to order the longer lateral force bolts. Planned lateral forces cannot be applied. A stable support must be provided (Fig. 5).

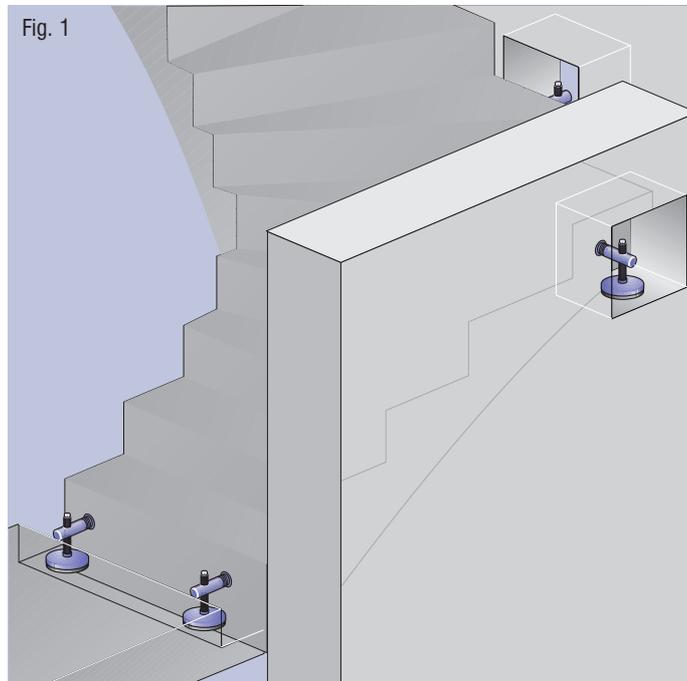


Fig. 1

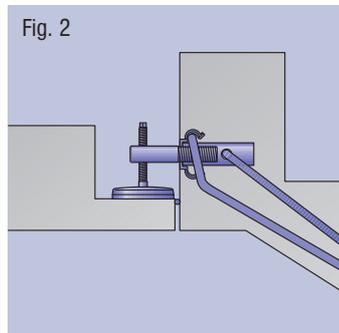


Fig. 2

Fig. 2:
Bearing on a staircase landing with VarioSonic SL without a sound insulation box

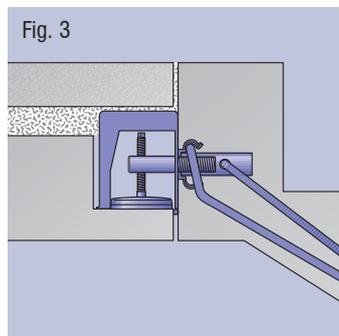


Fig. 3

Fig. 3:
Bearing on a staircase landing with VarioSonic SL with a sound insulation box

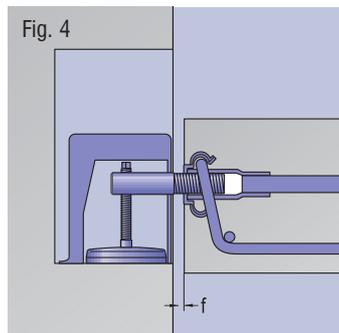


Fig. 4

Fig. 4:
Bearing supporting a flight of stairs or landing with VarioSonic SL in the staircase wall

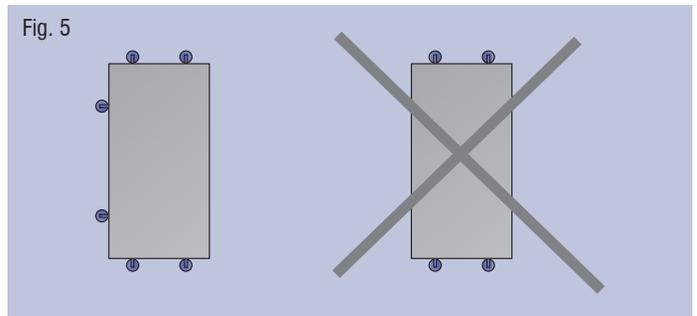


Fig. 5

Dimensioning of the VarioSonic SL

Different gap widths f can arise as a result of variations in the design of the stair gap, for example due to fire regulations. The rated resistance of the bearing force is shown as a function of the gap width in the diagram in Fig. 6. Exact compliance with the boundary conditions specified in planning is required in order to avoid excess loads.

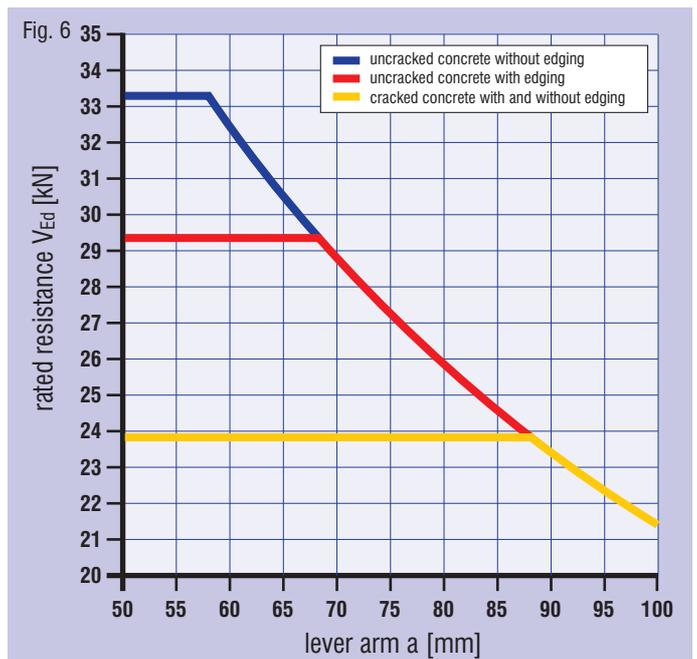
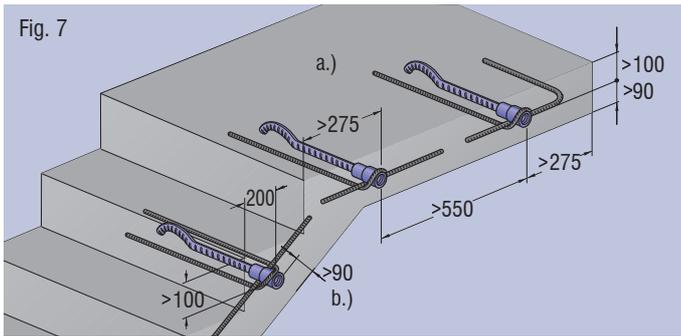


Fig. 6

Installation:

Edge and axis distances of the anchors in the precast staircase or landing

The local load transmission into the concrete is ensured by maintaining the distances between the bearings themselves and between the bearings and the free edge – see Fig. 7. The minimum component thicknesses required here must also be satisfied. The lower distance from the anchor to the edge of 90 mm applies to a concrete cover thickness of $c = 2.5$ cm. This distance needs to be changed accordingly if the concrete cover has a different thickness.



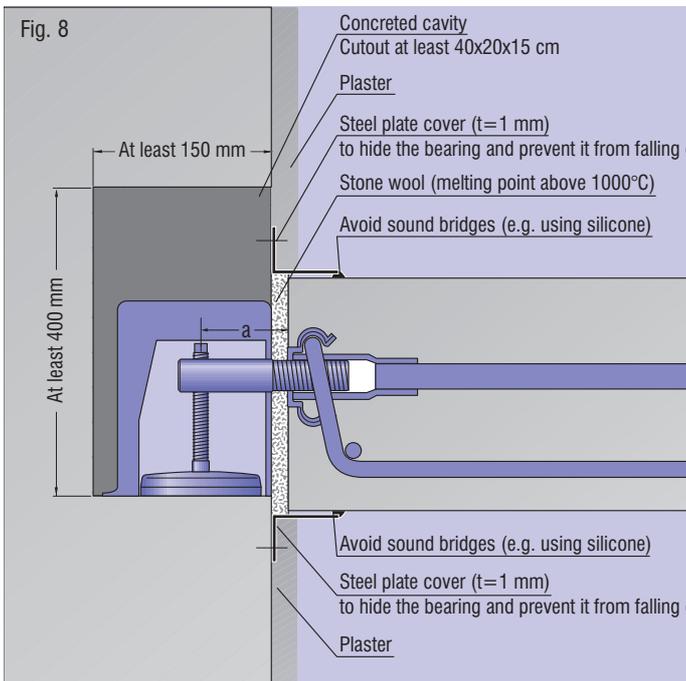
Installation of the lateral force bolts

Due to various design configurations of the stair gap, there may be different bolt projections, joint width and thus lever arms „a“. Various joint widths lead to different depths for the shear bolt. The minimum depth is 40 mm.

The shear pin transmits the vertical effects as a cantilever screwed into the sleeve on the adjustable foot. Depending on the lever arm „a“ learns of the transverse force bolt different bending moments, while the transverse force is not changed. The design resistance of the bearing as a function of lever arm „a“ is shown in the diagram Figure 6.

Side cutout openings in the staircase wall

A corresponding cutout must be provided in the staircase wall if the VarioSonic SL staircase bearing is used. The lateral force bolt protrudes into this cutout, and the positioning foot rests upon the base area of the cutout. The opening must be large enough to allow subsequent turning of the positioning foot around the lateral force bolt. The minimum dimensions are shown in Fig. 8. The base



area must be capable of absorbing the pressure forces which depend upon the vertical influences. In the case of brickwork walls, it may also be necessary to install a concrete layer.

$$\text{Surface pressure: } \sigma = \frac{V_{Rd}}{7853} \text{ [N/mm}_2\text{]}$$

The dimensions of the cutout can be made smaller if no further footstep noise insulation measures are to be installed (e.g. when using the SL-H or SL-W without foam box).

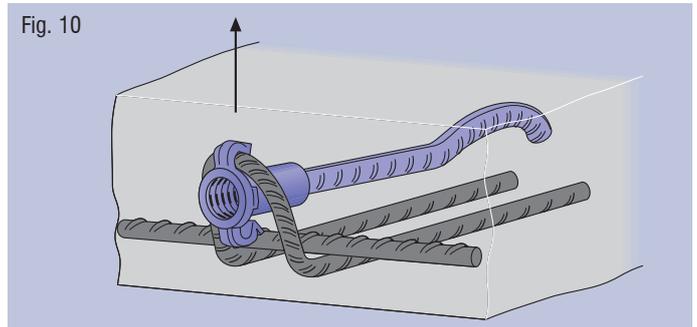
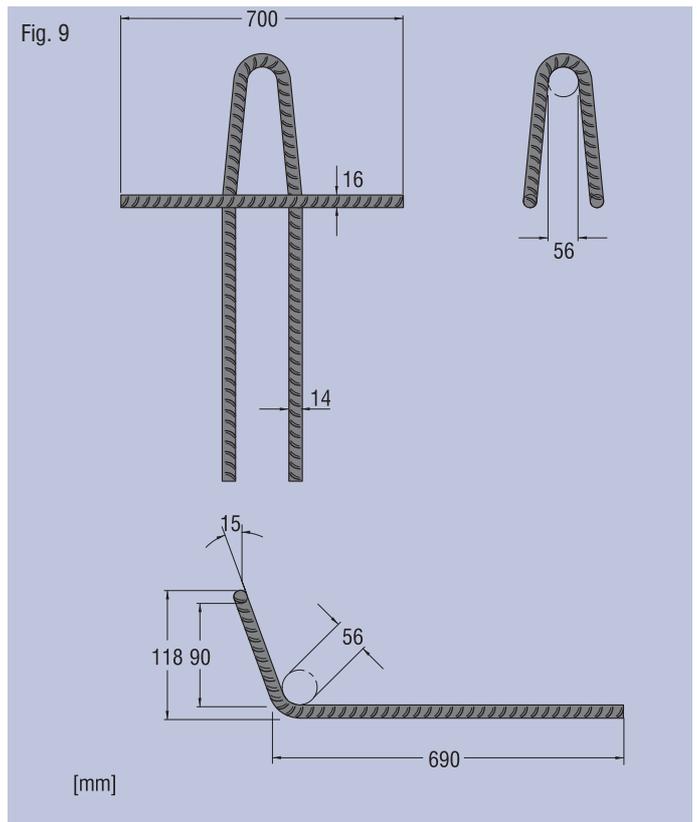
For fire safety reasons the back of the cutout often needs to be closed off or remain closed. The minimum residual wall thickness should be chosen in accordance with the fire safety regulations. This results in the minimum wall thickness for the staircase wall.

Anchor selection

Two different anchor types are available: the PFEIFER wave anchor and the PFEIFER socket. The corresponding choice should be made in accordance with the data sheet when ordering. The wave anchor is a complete lifting anchor, including the load-bearing main reinforcement in the form of a wavy, pressed-in concrete steel anchor. However, the PFEIFER socket may be a better choice particularly in applications where space is restricted in the longitudinal direction of the anchor (twisted staircase). Here, the main load-bearing reinforcement should be installed at the site in accordance with the installation instructions for PFEIFER socket. The reinforcement should be adapted to the geometry of the component.

Additional reinforcement for lateral tensile force acting on the anchors in the staircase or landing

In addition to the standard reinforcement provision of reinforcement in precast flights of stairs or stair landings, a lateral tensile reinforcement should also be installed which transmits the vertical forces at right angles to the component plane. The lateral tensile reinforcement comprises a holding pin with a lateral bar in accordance with the installation instructions for PFEIFER wave anchors (Fig. 9). It is secured without play or gap to the front end of sleeve of the anchor (Fig. 10) by means of the VarioSonic data clip. This is very important for an effective transmission of forces. The flame-red VarioSonic dataclip is visible at the front end of the precast stairs and ensures that a non-designated and properly reinforced lifting anchor is used by mistake. The lateral bar can be angled through 90° if the installation is close to the edge and directed rearwards with the standard concrete cover (Fig. 7).



Installation instructions for PFEIFER VarioSonic SLE stair bearings

Application area

PFEIFER VarioSonic SLE stair bearings are used on straight or twisted stairs to support the ends on the floor or landings (Fig. 11). To do this, a formed bracket is installed on the stairs and on the floor. The VarioSonic SLE is positioned between floor and stairs, where it transmits the vertical force components.

Components

The VarioSonic SLE is supplied as a complete unit. As can be seen in Fig. 12, it comprises an positioning foot with a neoprene bearings, the installation flange and the plastic pipe.

Transmission of forces

In accordance with the static type verification, a rated resistance of 33.6 kN applies to the VarioSonic SLE bearing.

The verification calculations for the transmission of forces in the concrete and the design of the concrete consoles including the positioning of the reinforcement are to be performed by the engineer responsible for the load-bearing structure. A qualitative positioning of the reinforcement in the flight of stairs is shown in Fig. 14.

The pressure forces (depending on the vertical influences) underneath the SLE need to be taken into account:

$$\text{Surface pressure: } \sigma = \frac{V_{Rd}}{7853} \text{ [N/mm}_2\text{]}$$

Installation

Minimum and intermediate distances need to be taken into account during installation of the VarioSonic SLE staircase bearings. These can be seen in Fig. 13, which also shows the adjustment potential and gap distances. The minimum plate thickness of 100 mm must be satisfied, whereby any protruding plastic pipe can be simply cut off.

Fig. 12

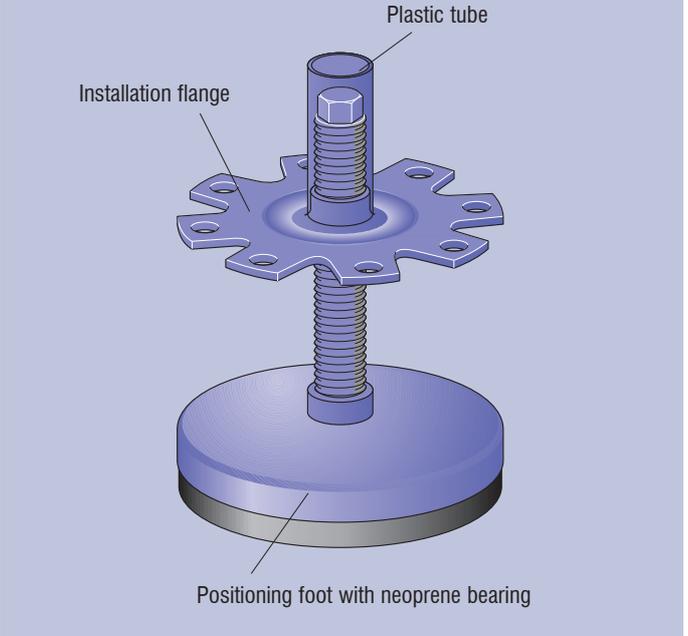


Fig. 13

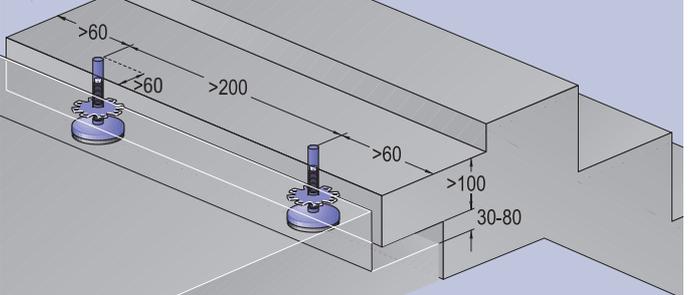


Fig. 14

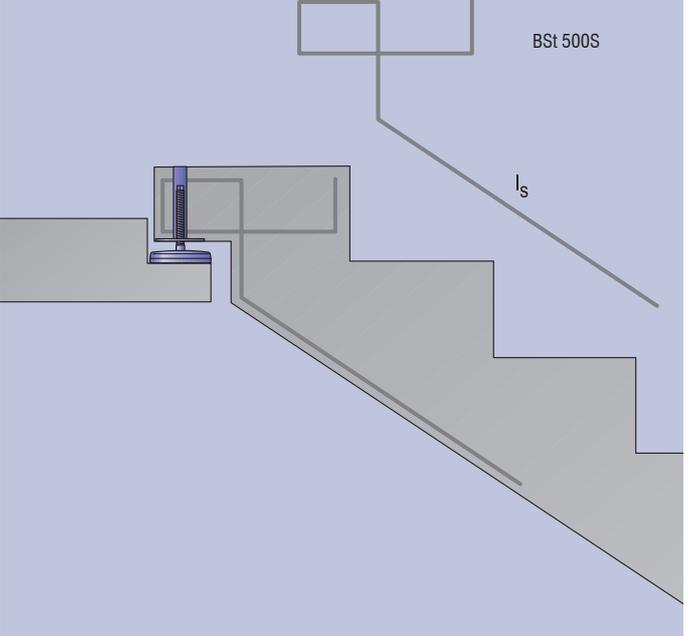
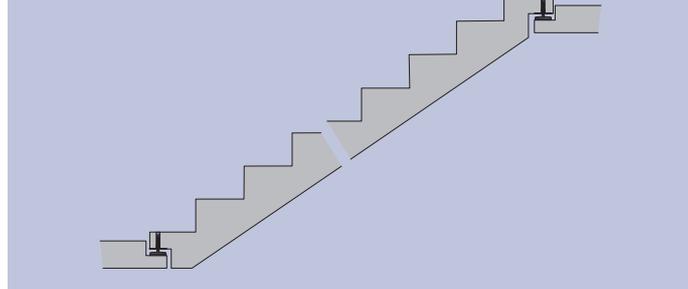


Fig. 11



Enquiry

Order Please tick the relevant box.

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Details of company placing order

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Contact name
Tel.
Fax

Building project

Order form for PFEIFER staircase bearings



VarioSonic SLE



VarioSonic SL-WS



VarioSonic SL-HS



VarioSonic SL-W



VarioSonic SL-H

Item	Type designation in accordance with the pictures above	Quantity	Preferred delivery date	Individual price	Total price

This order is placed subject to the sales and delivery terms of PFEIFER Seil- und Hebeteknik GmbH, with which you are familiar.

Total
plus packaging
and delivery
charge

Delivery address (only if different from the order address)

Date and signature

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-  Lifting Anchor Systems
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DB Anchor 682
for Permanent Fixing
-  Fixing Systems
Socket Dowels
Polyamide Sockets
-  Fixing Systems
HK Assembly Anchor System
-  Connection Systems
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Wall Shoe System
-  Connection Systems
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Delta Anchor System
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