SGH VibraPad

Installation/Operation/Maintenance Instructions 3/2024

Optimise the discharge of poorly flowing bulk material that tends to form bridges:

- The volume and pressure of the air are individually adjusted to the behaviour of the product.
- With regulated air pressure, pulsated air improves the flow characteristics.
- The combination of vibration and aeration ensures trouble-free discharge!
- PLEASE NOTE: VibraPads have been designed as a discharge aid for products that tend to bridge. They do not serve the purpose of speeding up the mass flow or making the discharge faster.

These installation / maintenance and operating instructions are concerned with general information. The use as well as the conditions of use of the SGH VibraPads differ depending on the product, silo/hopper shape and operating mode etc. Detailed information is described during the course of the project or in the quotation.

Area of Use and Function

With SGH VibraPads, the discharge of poorly flowing or bridge-forming prone bulk goods from silos, containers and hoppers is effectively supported. By the external supply of metered compressed air on the one hand the product is loosened from the container wall and on the other the pads are set to vibrate.

The vibrations are transmitted to the bulk material that is also then in turn made to vibrate. This prevents so-called "bridging", that is spoken of when at the discharge opening a type of stable arch is formed so that the flow of the bulk material stops.

Thanks to the vibrations and the aeration, the product can flow out.

Required air pressure: approx. 0.5 – 2.5 bar. Without prior consultation with the manufacturer, the air pressure must not exceed 2.5 bar for VibraPad ∅ 100 mm respectively 2.0 bar for VibraPad ∅ 50 mm!

Interval function: Activation approx. 2 sec / pause time approx. 15-20 sec

The details can vary depending on the product, process and container. Please contact us when necessary.

For product discharge, the SGH VibraPads should be operated exclusively intermittently and with metered air. Thus, they serve only for the discharge of stalled / poorly flowing bulk material out of a vessel. Often, a single pulse of metered air is enough, and the bulk material can flow out. They are not intended for the discharge of a specific amount of bulk material in a specific period of time.

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HRB 720896
Geschäftsführer: Matthias Nothhelfer

Possible Combinations for VibraPad 100 mm

Pad Material	Colour	FDA	EG 1935/2004 BfR XV	ISO 10993 USP Class VI	ATEX	maximume temperature[1)]
Silicone	white	x		-	x	180°C
Silicone (SB)	white	x	x	x	x	180°C
Silicone	blue	x			x	180°C
Silicone (SB)	blue	x	x	x	x	180°C
Silicone DETECT[2)]	blue	x	x	-	x	180°C
Silicone HOT	red	-		-	x	300°C
EPDM	black	x		-	x	100°C
Neoprene	black	-		-	x	80°C
Viton	grey	-		-	x	200°C
Rhodorsil (HOT)	grey	-		-	x	300°C
FKM	white	x			x	250°C
FFKM	white	x			x	250°C

Aeration Stud		
1.4305	AISI 303	V2A
1.4301	AISI 304	V2A
1.4541	AISI 321	V2A
1.4404	AISI 316L	V4A
1.4539	AISI 904L	V5A

Possible Combinations for VibraPad 100 mm SAN

Pad Material	Colour	FDA	ATEX	Maximum Temperature[1)]
Silicone	white	x	X	180°C
Silicone	blue	x	X	180°C

Aeration Stud [3)]		
1.4404	AISI 316L	V4A

German Patent No 10 2015 116 178

Possible Combinations for VibraPad mini 50 mm

Pad Material	Colour	FDA	EG 1935/2004 BfR XV	ISO 10993 USP Class VI	ATEX	maximum temperature[1)]
Silicone	White	x			x	180°C
Silicone (SB)	White	x	x	x	x	180°C
Silicone	blue	x			x	180°C
Silicone (SB)	blue	x	x	x	x	180°C
Silicone DETECT[2)]	blue	x	x		x	180°C
Silicone HOT	red	-			x	300°C
EPDM	black	x			x	125°C
Neoprene	black	-			x	125°C
Viton, FKM	grey	-			x	200°C
Rhodorsil	grey	-			x	300°C
FKM	white	x			x	200°C
FFKM	white	x			x	270°C

Aeration Stud		
1.4404	AISI 316L	V4A

[1)] short-term temperature peaks [2)] metal detectable pad [3)] non-product contacting

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Installation

One or more holes are drilled in the wall of the silo cone. The position of the holes is determined by the problem areas in the cone and / or by the manufacturer's installation recommendations. The diameters of the holes are dependent on the particular product.

The VibraPads are mounted from the inside or from the outside with the SGH external mounting aid. The flexible pad adjusts itself to the vessel shape. The outer edge of the pad prevents the backflow of the product. Please note that the nut(s) need only be hand tightened. With external mounting, the centring disc must always be fitted vertically. Depending on the circumference of the cone, the thrust washer must be adapted to this circumference.

The air supply takes place via the internal thread of the bolt (alternatively, the external thread is also possible). The cross section of the air supply is dependent on the number of VibraPads. With numbers of VibraPads up to 10, a ¼" air line is sufficient. For higher numbers, we recommend a ½" air line.

Required air pressure: approx. 0.5 – 2.5 bar. Without prior consultation with the manufacturer, the air pressure must not exceed 2.5 bar for VibraPad ∅ 100 mm resp. 2.0 bar for VibraPad ∅ 50 mm!

Interval function: Activation approx. 2 sec / pause time approx. 15-20 sec

The details can vary depending on the product, process and container. Please contact us when necessary.

Mounting from inside

Mounting hole size	VibraPad type	External thread	Internal thread
Ø 22 mm	VibraPad 100 mm	G ½"	G ¼"
Ø 22 mm	VibraPad SAN 100 mm	G ½"	G ¼"
Ø 14 mm	VibraPad mini 50 mm	G ¼"	G 1/8"

VibraPad 100 mm with UNC ¾" outside thread / G ¼" inside thread (mounting hole Ø 20 mm) on request.

The pad + aeration stud are mounted from inside: The aeration stud is pushed through the drilled opening until the pad lies against the inside of the vessel. Then the silicone sealing ring, thrust washer, flat washer and nut(s) are mounted from the outside. It is sufficient to tighten the nuts only hand tight.

Please ensure that the vessel inner wall is free of chips or product residues. Mount the VibraPads only on a level surface (that is, not on weld seams or bulges).

Mounting from outside	Mounting hole size	VibraPad type	External thread	Internal thread
	Ø 50 mm	VibraPad 100 mm	G ½"	G ¼"
	Ø 60 mm	VibraPad SAN 100 mm	G ½"	G ¼"
	Ø 29 mm	VibraPad mini 50 mm	G ¼"	G 1/8"

VibraPad 100 mm with UNC ¾" outside thread / G ¼" inside thread (mounting hole Ø 20 mm) on request.

The pad + aeration stud with the mounting rod screwed on are mounted from the outside: The aeration stud along with the pad is carefully pushed through the drilled opening after which the counter plate is inserted into the vessel at an angle and counter-tightened with the mounting handle until the pad and counter plate lie against the inner side of the vessel. It is sufficient to tighten the nuts only hand tight. Please ensure that the vessel inner wall is free of chips or product residues. Mount the VibraPads only on a level surface (that is, not on weld seams or bulges).

Insertion

Centering

Screwing

Please make sure that the counter plate is positioned vertically

Then the silicone sealing ring, thrust washer, flat washer and nut(s) are mounted from the outside. The final step is to remove the mounting rod.

When mounting into a round silo cone, the thrust washer must be matched to the radius

On request, we will gladly supply precisely fitting FESTO push-in fittings and sleeving.
Our pneumatic turnkey controller (FESTO) is likewise optionally available.

The elastomer pads / pads are wear parts. Please carry out regular visual inspections

Recommended Installation

The number of VibraPads and their installation depend on various factors such as the product's flow behaviour and the vessel's size and shape. The arrangement of the VibraPads is essential for their effectiveness – we will gladly advise you on this!

VibraPads are installed in the cone of the hopper/silo. The bulk material, vessel size and diameter determine how many VibraPads are needed. Depending on the cone size, generally 3-4 VibraPads are distributed over the perimeter in the first row, starting at about 200 - 450 mm above the outlet.

A second row of x VibraPads is installed 450 - 600 mm above the first row, their position being offset to row 1. Depending on the silo size, more pads/rows can be installed. The distance of the VibraPads from one another varies in direct relationship to the funnel height/diameter of the silo/hopper.

Generally, 2 to 6 VibraPads can be connected in series, with more than 6 pads, we recommend a separate supply line.

These standard recommendations must always be adapted to the individual on-site requirements.

Amount of Air Required

We recommend that the VibraPads are operated by pulsing air on and off at a suitably regulated pressure. The product and the number of VibraPads determine the air pressure and pulse durations.

A higher air pressure and pulse rate produce more vibration thus preventing caking or bridging of products that tend to adhere. Adhering products, therefore, need this higher air pressure and pulse rate. With dry products that are less prone to bridge formation, a lower air pressure and pulse rate produce improved flow behaviour.

Calculation of Air Consumption

VibraPads are operated in pulses. A guide value for the air consumption in m³/h is calculated by multiplying together the aeration time/minute, air pressure and the number of VibraPads. The ON and OFF durations (1 cycle) are dependent on the particular application.

Example:	Number of VibraPads	4
	Air pressure	2 bar
	ON time	2 sec
	OFF time	10 sec
	1 cycle	12 sec

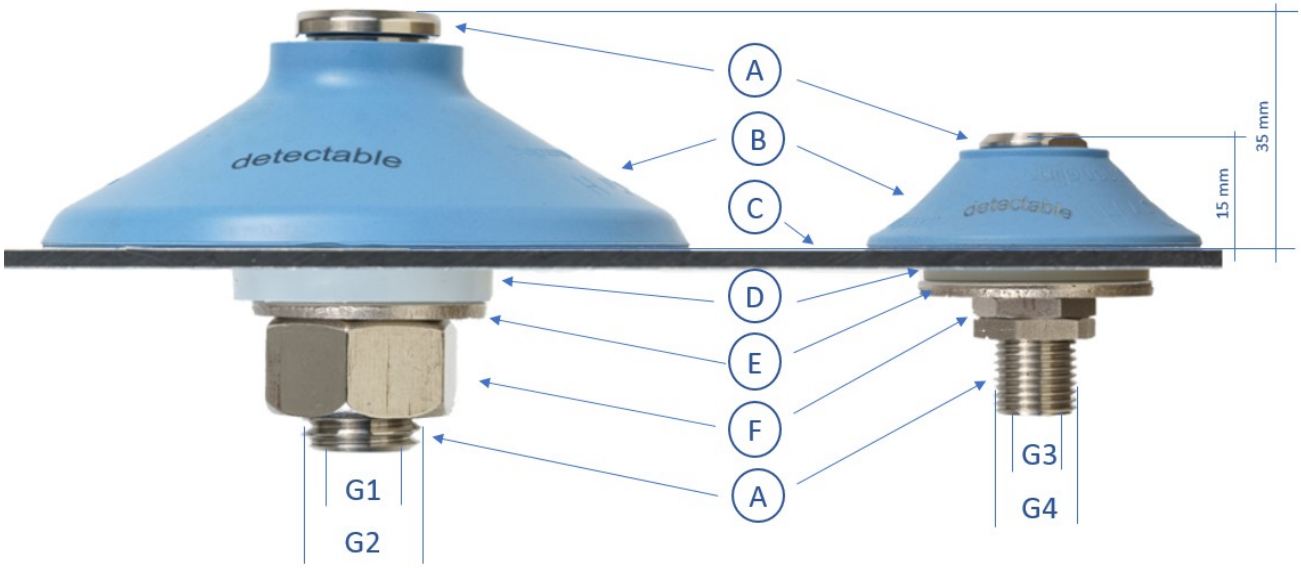
60 /12 = 5 cycles/min

5 x 0,022 (air consumption at 2 bar) x 4 VibraPads
= 0,44 m³/min

		m³ / Aeration nozzle		
		Pulse time in seconds		
bar	m³/min.	1 sec	2 sec	3 sec
3,0	1,235	0,021	0,042	0,061
2,5	0,967	0,016	0,032	0,048
2,0	0,680	0,011	0,022	0,034
1,5	0,615	0,010	0,020	0,031
1,0	0,459	0,008	0,015	0,023
0,5	0,255	0,005	0,008	0,013

VibraPad ∅ 100 mm
for internal mounting

VibraPad mini ∅ 50 mm
for internal mounting



A	Aeration stud	
B	Pad Ø100 mm / Pad mini Ø50 mm	
C	Silo wall	
D	Sealing ring	
E	Thrust washer	
F	Hexagonal nut(s)	
G1	Connector internal thread	G1/4"
G2	Connector external thread	G1/2" (UNC ¾" on request)
G3	Connector internal thread	G1/8"
G4	Connector external thread	G1/4"
H	Centring disc / counter plate *	
I	*Mounting rod* *	
J	O-Ring ** (not to be seen above)	

* only necessary for external mounting
** only included with VibraPad mini

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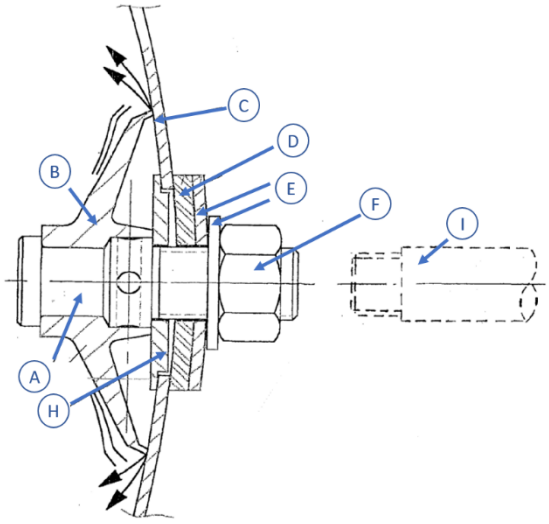
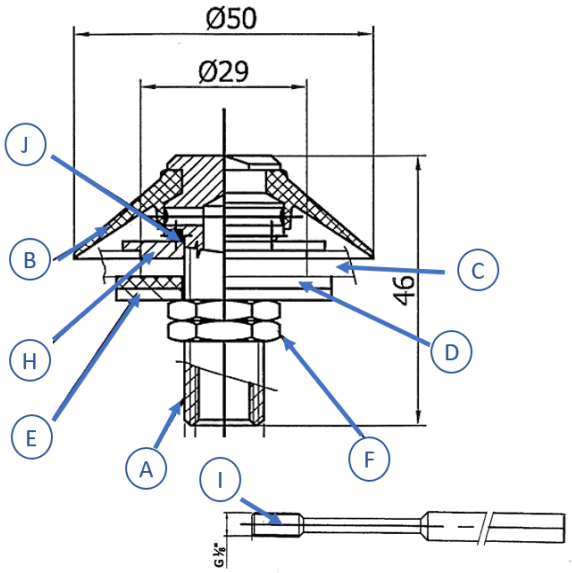
VibraPad ∅ 100 mm for external mounting



VibraPad mini ∅ 50 mm for external mounting



A	Aeration stud	
B	Pad Ø100 mm / Pad mini Ø50 mm	
C	Silo wall	
D	Sealing ring	
E	Thrust washer	
F	Hexagonal nut(s)	
G1	Connector internal thread	G1/4"
G2	Connector external thread	G1/2" (UNC ¾" on request)
G3	Connector internal thread	G1/8"
G4	Connector external thread	G1/4"
H	Centring disc / counter plate *	
I	Mounting rod *	
J	O-Ring **	

* only necessary for external mounting
** only included with VibraPad mini