World of Vacuum Technology

SCHMALZ

Industry Solutions Packaging

Applications and Products

Schmalz

World of Vacuum Technology

Consistent customer orientation and groundbreaking innovations, excellent quality and comprehensive consulting competence make Schmalz the world's leading partner for vacuum technology in automation, handling and clamping applications.

As a company that acts globally and offers innovative products and services, we provide our customers with efficient solutions tailored precisely to their particular applications' requirements. We inspire our customers everywhere where production processes are designed more efficiently through the use of vacuum technology.

We guarantee our partners standardized and sustainable processes with our certifications, including ISO 9001 for quality management, ISO 14001 for environmental management and ISO 50001 for energy management.

Vacuum Components Catalog

3.500 products, 700 pages – for every task a solution. The Vacuum Components Catalog of Schmalz convices with impressive diversity and extensive vacuum knowledge. Browse in the digital catalog now:
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- Place your order with the click of a mouse, get tracking information and generate follow-up orders

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Industry Solutions Packaging

Process Information & Applications

Vacuum solutions along the entire process chain

Schmalz offers state of the art vacuum solutions for

- Primary Packaging
- Secondary Packaging
- End of Line Palletizing

Schmalz is a full line supplier for vacuum components, vacuum gripping systems and manually controlled vacuum handling devices in the packaging segment for picking, packing & palletizing.

Due to deep knowledge in the packaging processes and products specifically developed for this industry we offer both support in vacuum automation as well as leading vacuum technology.

This catalogue is an extended version of the Schmalz Main Catalogue for Vacuum Technology and therefore offers a wider range of products focusing packaging applications.

For easier navigation in the catalogue please use the index of contents and the process icons to identify the application area of the products.

Our Mission Statement in Packaging

Schmalz is your vacuum specialist in primary packaging, secondary packaging and end of line palletizing. We offer extraordinary know-how in vacuum handling for packaging, a complete range of standard components to solve your handling challenges and the capability to offer customized solutions. This particular service reaches from custom design vacuum suction cups to complete turn-key large scale palletizing solutions as we understand that packaging is versatile enough not be just covered with simple standard products.
This makes us the leading supplier for vacuum technology for the entire packaging process from unpacked products to ready-to-ship pallets.

Industry Solutions Packaging

Process Information & Applications

Vacuum solutions along the entire process chain

Primary Packaging

- Direct contact with unpacked product
- food safety regulations may apply

Secondary Packaging

- Contact with already packed products
- mainly case packer applications (product into box)

End of Line Palletizing

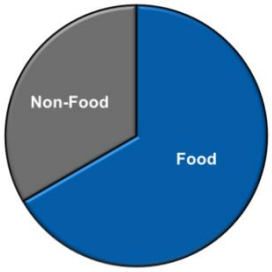
- Contact with sealed boxes and bags
- single pick, row pick & layer pick (box onto pallet)

Primary Packaging

All products, including foodstuff, get their first wrapping. With a strong focus on food safety, additional challenges have to be solved.

The product groups are classified in 2 main segments

1. Food products (e.g. confectionary, bakery, dairy, meat products, frozen food)
   Pharmaceuticals (ampouls, syringes, vials, blisters)
2. Nonfood products (personal care, cleaners, consumer products)



Primary Packaging of food products and pharmaceuticals requires highest quality standards regarding material and gripper design. The standard at Schmalz for foodsafe suction cup material is FDA compliant silicone.

In case you require complete end effectors which are engineered according to hygienic design regulations Schmalz is capable to offer customized vacuum solution which can be CIP- resp. COP-cleaned.

Vacuum end effector for handling of primary packed pharmaceuticals

Industry Solutions Packaging

Applications

Vacuum solutions along the entire process chain

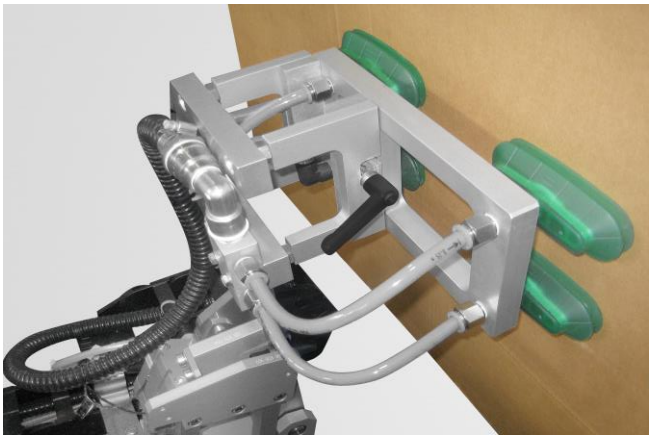
Secondary Packaging

How does an individually packed product get into a box, a tray or a blister as fast and reliable as possible?
This is the core question while doing secondary packaging. Although the vacuum equipment does not get in direct contact with food or pharmaceuticals there are challenges to take to get a stable and reliable handling process.

The challenge in **secondary packaging** is a combination of

1. **Cycle rate**
2. **Service life**, 20 million cycles is a matter of days not weeks for customers which pack millions of products every day.
3. **Workpiece variety**, as packaging can be everything which can be found in supermarkets, logistics centers and in the health care sector.

Vacuum End Effector VEE with vacuum generator for handling of bags



Bellows suction cups SPOB1 for erection of cardboard boxes

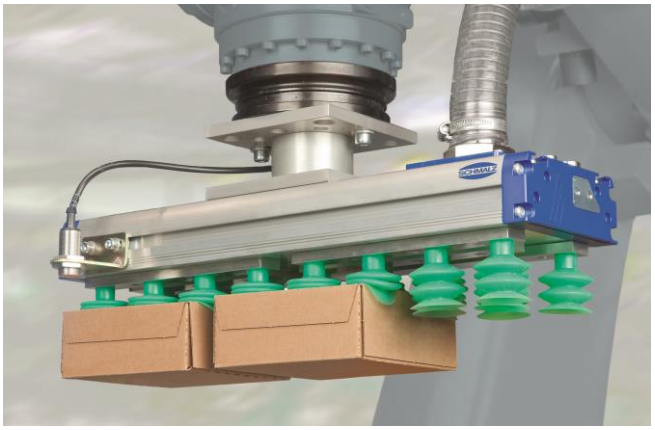
Bellows suction cups SPB1 for handling taped cardboard boxes

End of Line Palletizing EOLP

At the end of most packaging lines the packed products have to be prepared for storage or shipping.
Secondary packed products get positioned onto pallet by

- Single-pick
- Row-pick
- Layer-pick

A custom-designed vacuum gripping system from Schmalz allows you to dynamically palletize and de-palletize a wide range of packaging, including bending boxes, shrink-wrapped packages, bags and cans.



Vacuum area gripping system FMP for palletizing cardboard boxes

Overview of Section 2

Vacuum Suction Cups

Information

Suction Cups for Cardboard

- Diameter: 10 to 60 mm
- Material: Elastodur ED-65
- Connection nipple modular

Round flat suction cup with support ribs, reinforced basic body, low internal volume and flexible sealing lip for handling rigid packaging.

- Diameter: 10 to 80 mm
- Material: Elastodur ED-65
- Connection nipple modular

Round bellows suction cup with 1.5 folds, reinforced basic body, damping effect and large suction stroke for handling rigid packaging.

- Diameter: 20 to 50 mm
- Material: Elastodur ED-65
- Connection nipple modular

Round bellows suction cup with 2.5 folds and reinforced basic body, damping effect as well as large suction cup stroke for use in carton and tray erectors.

- Dimensions: 60x20 to 100x40 mm
- Material: Elastodur ED-65
- Connection nipple modular

Oval bellows suction cup with 1.5 folds, reinforced basic body, damping effect and large suction stroke for handling rigid packaging.

Suction Cups for Bags and Pouches

- Diameter: 20 to 50 mm
- Material: SI (suitable for applications in the food industry)

Round bellows suction cup with 4.5 folds with reinforced basic body and soft sealing lip for handling unstable packaging; FDA-compliant silicone.

Overview of Section 2

Vacuum Suction Cups

Bellows Suction Cups SPB2f (2.5 Folds)

- Diameter: 30 to 50 mm
- Material: SI (suitable for applications in the food industry)

Primary Secondary

Round bellows suction cup with 2.5 folds with an extremely flexible sealing lip for handling bags, even with strong wrinkling, low filling degree or liquid content for fastest Pick & Place applications.

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Bellows Suction Cups SPB4f (4.5 Folds)

- Diameter: 30 to 50 mm
- Material: SI (suitable for applications in the food industry)

Primary Secondary

Round bellows suction cup with 4.5 folds with an extremely flexible sealing lip for handling bags, even with strong wrinkling, low filling degree or liquid contents.

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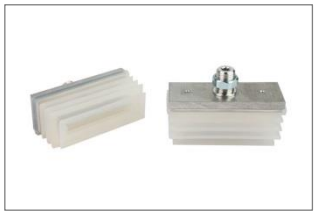
Bellows Suction Cups SPOB1f (Oval, 1.5 Folds)

- Dimensions: 35x15 to 80x35 mm
- Material: SI (suitable for applications in the food industry)

Primary Secondary

Oval bellows suction cup with 1.5 folds for dynamic handling bags and film packaging products in flow-wrap packaging processes.

54



Bellows Suction Cups FSGB-R (Rectangular)

- Dimensions: 52x25 to 80x50 mm
- Material: NBR, SI
- Connection plate screwed to elastomer part

Secondary

Rectangular bellows suction cup with 2.5 and 3.5 folds for square, non-rigid and unstable outer packaging. Mainly used to handle flow-wrapped products.

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Suction Cups for Plastic Films and Paper

Flat Suction Cups SGPN

- Diameter: 15 to 40 mm
- Material: HT1, NK, SI

Primary Secondary

Round suction cup with flat, elongated sealing lip and inner support for handling of films, paper or wafers without sucking in or damaging the workpiece.

62

Suction Cups for Packaging

Bellows Suction Cups FGA PVC (1.5 Folds)

- Diameter: 13 to 22 mm
- Material: PVC

Secondary Palletizing

Round bellows suction cup with 1.5 folds for non-rigid and unstable outer packaging.

67

Overview of Section 2

Vacuum Suction Cups

Bellows Suction Cups FG PVC (2.5 Folds)

- Diameter: 18 to 50 mm
- Material: PVC

Secondary, Palletizing

Round bellows suction cup with 2.5 folds with high suction cup stroke and damping effect for non-rigid and unstable outer packaging.

71

Bellows Suction Cups FSGA (1.5 Folds)

- Diameter: 11 to 33 mm
- Material: NBR, NK, SI(-HD)

Primary, Secondary, Palletizing

Round universal suction cup with 1.5 folds, available in various materials for a wide range of requirements. Also available in SI-HD with extra longevity on sterilized glass containers.

75

Bellows Suction Cups FSG (2.5 Folds)

- Diameter: 4 to 32 mm
- Material: NBR, NK, SI(-HD)

Primary, Secondary, Palletizing

Round universal suction cup with 2.5 folds, available in various materials for a wide range of requirements. Also available in SI-HD with extra longevity on sterilized glass containers.

80

Bellows Suction Cups SPB2 (2.5 Folds) with push-in connector

- Diameter: 20 and 40 mm
- Material: SI
- Plug-in function

Primary, Secondary, Palletizing

Round, plug-in bellows suction cup with a soft fold geometry, flexible sealing lip and a large suction cup stroke for handling curved, non-rigid packaging. Also used for building up large area grippers.

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Suction Cups for Eggs

Bellows Suction Cups FG-X

- Diameter: 30 to 35 mm
- Material: SI

Primary, Secondary

Round, bellows suction cup with a soft sealing lip for handling eggs in packing and grading machines as well as egg breaking stations.

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Suction Cups for Chocolate Candy

Chocolate Suction Cups SPG

- Diameter: 14/25/33 mm
- Material: SI, SI-HD (suitable for applications in the food industry), PVC

Primary

Bell-shaped chocolate suction cup for handling round, oval or even square chocolate candies in conjunction with picker robots; FDA-compliant silicone.

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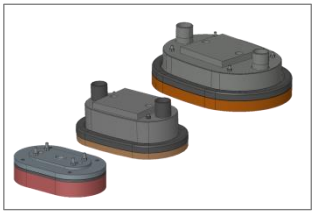
Overview of Section 2

Vacuum Suction Cups

Suction Cups for Large Bags and Sacks



Sack Suction Gripper SG

95

- Dimension: 200x130 to 360x260 mm
- Material: SI

Oval vacuum gripper for handling of paper, plastic and woven sacks mainly used in palletizing stations.

Suction Cups for Water Cooler Bottles

Schmalz Bottle Rack Loader SBRL

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- Diameter: 230 mm

Round vacuum gripper for handling and swiveling of water cooler bottles in rack-loading and unloading stations.

Suction Cups for Packaging

Material Overview

Material Overview

Description	**Abbreviation**	**ED**	**SI**	**SI-HD**	**NK**	**NBR**	**HT1**	**PVC**
	Chemical designation / Trade name	**Elastodur**	**Silicone**	**Silicone caoutchuc**	**Natural rubber**	**Nitrile caoutchuc**	**Non-marking material**	**Polyvinyl-chloride**
	Color	green	green, trans-parent, white	nature (trans-lucid), green	light brown	light gray	blue	blue
Chemical resistance	**General weathering resistance**	●●●	●●●	●●●	●●	●●	●●●	●●
	Ozone resistance	●●●	●●●●	●●●●	●●	●	●●●●	●●●
	Oil resistance	●●●	●●●●	●●●●	●	●●●●	●●●●	●●●
	Fuel re-sistance	●●	●●	●●	●	●●	●●	●
	Alcohol resistance, ethanol 96%	●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●
	Solvents resistance	●	●●	●●	●	●●	●●	●
	General resistance to acids	●	●	●	●●	●	●	●●
	Steam re-sistance	●	●●	●●	●	●●	●●●	●●●
Mechanical charac-teristics	**Wear re-sistance**	●●●(●)	●	●●	●●	●●	●●●	●●●
	Resistance to permanent deformation	●	●●	●●	●●●	●●	●●	●
	Tensile strength	●●●(●)	●	●	●●	●●	●●	●●
	Shore hard-ness	65 ± 5	45 to 65 ± 5	40 to 70 ± 5 (65 ± 5)	40 ± 5	55 ± 5	60 ± 5	40 ± 5
Temperature resistance**	**Short-term (<30 sec.)**	-40°C to +100°C *-40°F to 212°F*	-50°C to +220°C	-40°C to +220°C	-35°C to +120°C *-31°F to 248°F*	-30°C to +120°C *-22°F to 248°F*	-25°C to +170°C *-13°F to 338°F*	-30°C to +60°C
	Longer-term	-25°C to 80°C *-13°F to 176°F*	-50°C to +220°C	-30°C to +180°C	-25°C to 80°C *-13°F to 176°F*	-10°C to +70°C *14°F to 158°F*	-10°C to +140°C *14°F to 284°F*	-15°C to +50°C
Further characteristics	**Target application**	Box Erection Cardboard Rigid packag-ing	Plastic bags Trays Blisters Glass ampouls, syringes, vials Foodstuff	Packaging	Cardboard Blisters	Cardboard	High-gloss / Mirror finish packaging	Cardboard Blisters
	Non-/Low-marking	✓					✓	
	Silicone free	✓			✓	✓	✓	
	Clean room applica-tions****	✓					✓	

●●●● Excellent ●●● Very good ●● Good ● Poor to satisfactory

Suction Cups for Packaging

Material Overview

Clean Room Use of Suction Cups

The requirements in packaging handling applications are increasing. Clear room environment for product handling is often necessary, especially in the pharmaceutical industry. Therefore Schmalz is able to offer clean room-compliant suction cups.

Tested by Fraunhofer IPA

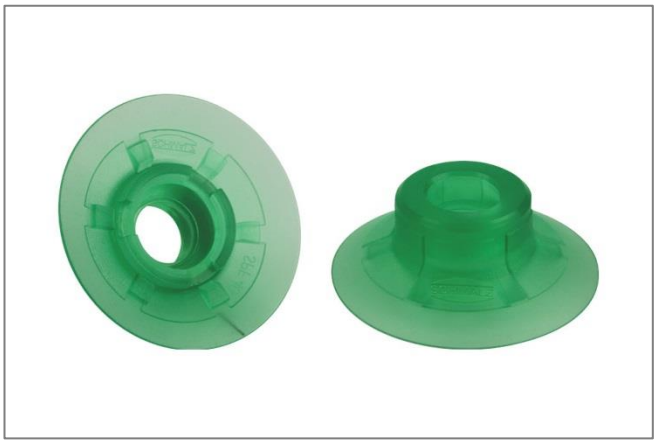
Clean room-compliant suction cups

- Suction cups dedicated for the use in clean room environment are tested/specified according to
  - VDI 2083-9.1
  - ISO 14644-1
- Based on the material and the design the defined suction cups meet the requirements of Class 4 or Class 3 according to ISO 14644-1
- Test reports and detailed information on request

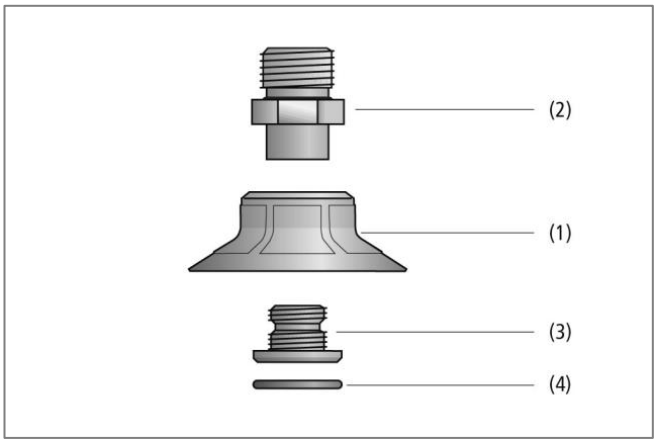
Suction Cups for Cardboard

Flat Suction Cups SPF

Suction area (Ø) from 10 mm to 60 mm



Flat suction cups SPF



System design flat suction cups SPF

Flat suction cups SPF being used in packaging machines

Suitability for Industry-Specific Applications

Applications

- Round, flat suction cup for usage in cardboard box and tray erectors
- Handling of narrow cardboard boxes with cut-outs, windows or perforation in the pharmaceuticals and cosmetics industries (in particular diameters 10 and 15 mm)
- Heavy-duty applications that require suction cups with excellent sealing (e.g. on braille writing) and low wear
- Handling of cardboard and rigid packaging in top-and side-loading machines

Design

- Round flat suction cup SPF (1) with soft, flexible sealing lip and supporting ribs on the suction surface
- Made of wear-proof material Elastodur ED-65
- Models with diameter up to 30 mm feature plug-in connection element for quick change of suction cup
- Starting at 40 mm diameter with a 2-piece connection element: consisting of machine-side component (2) and suction-side component (3)
- Clip-in filter screen (4) as pre-filter (filter pore size 250 µm)
- All connection elements with male thread are equipped with integrated sealing

Our Highlights...	Your Benefits...
• Flexible, adaptable sealing lip	> Excellent sealing when used on cardboard and rigid packaging
• Robust, reinforced main body	> High intrinsic stability of the suction cup
• Supporting rips on the suction surface	> Maximum effective diameter for high suction surface
• Wear-proof and abrasion-proof material Elastodur ED-65	> Very low wear, approx. 3 times higher compared to NBR

Suction Cups for Cardboard

Flat Suction Cups SPF

Suction area (Ø) from 10 mm to 60 mm

Designation Code Flat Suction Cups SPF

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Type connection element
Example SPF-20 ED-65 SC040:			
SPF	**20**	**ED-65**	**SC040**
SPF	10 to 60	ED-65	SC030 SC040 SC050

Ordering Data Flat Suction Cups SPF

Suction cup SPF (elastomer part + connection element) is delivered assembled. As an alternative the individual parts can also be ordered separately. To do this, the following ordering steps are required:

- Suction cup of type SPF (step 1) – elastomer part, available in various diameters
- Connection element of type SC (step 2) – available with various threads

Available accessories: filter screen

Flat Suction Cups SPF (Mounted)

Type	Part Number
SPF 10 ED-65 M5-IG	10.01.01.13254
SPF 15 ED-65 G1/8-AG	10.01.01.13238
SPF 15 ED-65 G1/8-IG	10.01.01.13239
SPF 20 ED-65 G1/8-AG	10.01.01.13240
SPF 20 ED-65 G1/8-IG	10.01.01.13241
SPF 25 ED-65 G1/8-AG	10.01.01.13242
SPF 25 ED-65 G1/8-IG	10.01.01.13243
SPF 30 ED-65 G1/8-AG	10.01.01.13244
SPF 30 ED-65 G1/8-IG	10.01.01.13245
SPF 40 ED-65 G1/4-AG	10.01.01.13246
SPF 40 ED-65 G1/4-IG	10.01.01.13247
SPF 50 ED-65 G1/4-AG	10.01.01.13248
SPF 50 ED-65 G1/4-IG	10.01.01.13249
SPF 60 ED-65 G1/4-AG	10.01.01.13250
SPF 60 ED-65 G1/4-IG	10.01.01.13251

Step 1: Flat Suction Cups SPF (Single Component)

Type	Part Number
SPF 10 ED-65 SC030	10.01.01.12894
SPF 15 ED-65 SC040	10.01.01.12895
SPF 20 ED-65 SC040	10.01.01.12370
SPF 25 ED-65 SC040	10.01.01.12371
SPF 30 ED-65 SC040	10.01.01.12372
SPF 40 ED-65 SC050	10.01.01.12373
SPF 50 ED-65 SC050	10.01.01.12374
SPF 60 ED-65 SC050	10.01.01.12896

Suction Cups for Cardboard

Flat Suction Cups SPF

Suction area (Ø) from 10 mm to 60 mm

Step 2: Connection Elements Flat Suction Cups SPF (Single Component)

Type	SPF 10	SPF 15	SPF 20	SPF 25
SC 030 M5-AG	10.01.06.02802	-	-	-
SC 040 G1/8-AG	-	10.01.06.02490	10.01.06.02490	10.01.06.02490
SC 040 G1/8-IG	-	10.01.06.02482	10.01.06.02482	10.01.06.02482
SC 050 G1/4-AG	-	-	-	-
SC 050 G1/4-IG	-	-	-	-

Type	SPF 30	SPF 40	SPF 50	SPF 60
SC 030 M5-AG	-	-	-	-
SC 040 G1/8-AG	10.01.06.02490	-	-	-
SC 040 G1/8-IG	10.01.06.02482	-	-	-
SC 050 G1/4-AG	-	10.01.06.02487	10.01.06.02487	10.01.06.02487
SC 050 G1/4-IG	-	10.01.06.02488	10.01.06.02488	10.01.06.02488

Accessories Flat Suction Cups SPF

Type	Filter Screen
SPF 10 ED-65 SC030	-
SPF 15 ED-65 SC040	-
SPF 20 ED-65 SC040	10.07.01.00309
SPF 25 ED-65 SC040	10.07.01.00309
SPF 30 ED-65 SC040	10.07.01.00309
SPF 40 ED-65 SC050	10.07.01.00308
SPF 50 ED-65 SC050	10.07.01.00308
SPF 60 ED-65 SC050	10.07.01.00308

Technical Data Flat Suction Cups SPF

Type	Suction force [N]*	Pull-off force [N]	Lateral force [N]	Volume [cm³]	Min. curve radius [mm] (convex)	Recom. internal hose diameter d [mm]**	Type Connection element SC…
SPF 10 ED-65 SC030	4.4	5.2	3.5	0.2	8	4	SC 030
SPF 15 ED-65 SC040	9.8	11.0	7.9	0.6	13	4	SC 040
SPF 20 ED-65 SC040	16.0	19.2	10.5	1.0	25	4	SC 040
SPF 25 ED-65 SC040	22.7	27.1	17.0	1.5	40	4	SC 040
SPF 30 ED-65 SC040	29.5	35.3	22.5	2.3	45	6	SC 040
SPF 40 ED-65 SC050	49.5	62.5	25.0	5.1	75	6	SC 050
SPF 50 ED-65 SC050	74.2	87.4	44.0	7.9	100	6	SC 050
SPF 60 ED-65 SC050	107.0	135.0	65.0	12.0	75	6	SC 050

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface – they do not include a safety factor

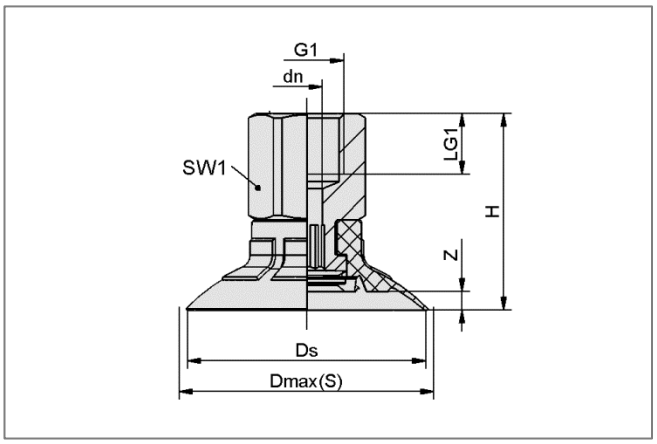
**The recommended hose diameter refers to a hose length of approx. 2 m

Suction Cups for Cardboard

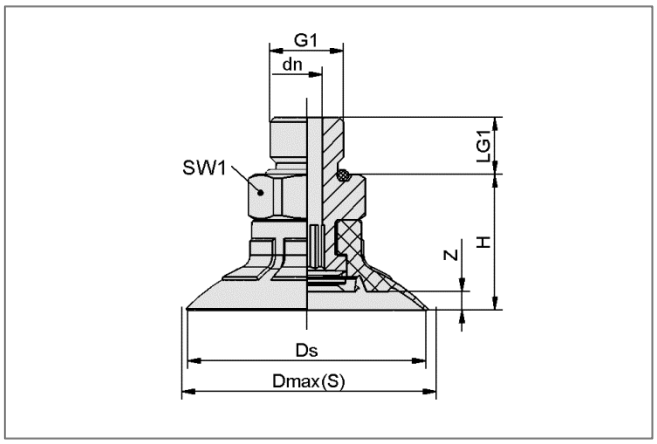
Flat Suction Cups SPF

Suction area (Ø) from 10 mm to 60 mm

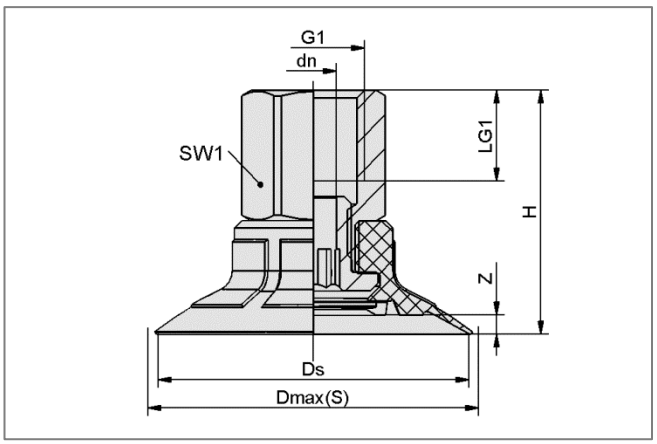
Design Data Flat Suction Cups SPF



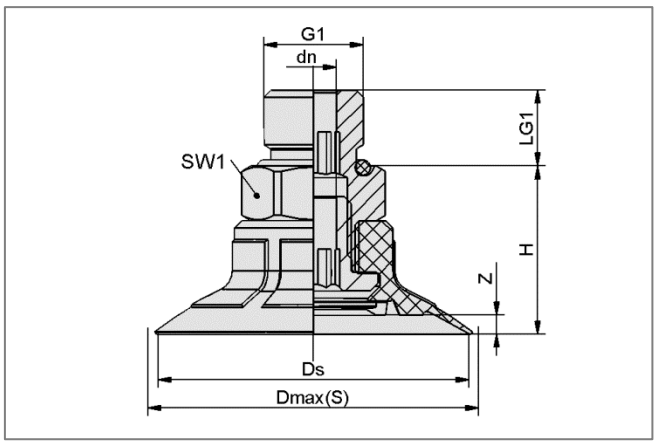
SPF 10...30 IG



SPF 10...30 AG



SPF 40...60 IG



SPF 40...60 AG

Type	Dimension in mm*							
	dn	Ds	Dmax(S)**	G1	H	LG1	SW1	Z (Stroke)
SPF 10 ED-65 M5-IG	3.1	10.5	12.0	M5-F	19	5.5	8	1.0
SPF 15 ED-65 G1/8-AG	4.1	16.4	18.5	G1/8"-M	16	7.5	14	1.5
SPF 15 ED-65 G1/8-IG	4.1	16.4	18.5	G1/8"-F	24	8.0	14	1.5
SPF 20 ED-65 G1/8-AG	4.1	21.4	23.3	G1/8"-M	17	7.5	14	2.0
SPF 20 ED-65 G1/8-IG	4.1	21.4	23.3	G1/8"-F	25	8.0	14	2.0
SPF 25 ED-65 G1/8-AG	4.1	26.4	28.0	G1/8"-M	17	7.5	14	2.0
SPF 25 ED-65 G1/8-IG	4.1	26.4	28.0	G1/8"-F	25	8.0	14	2.0
SPF 30 ED-65 G1/8-AG	4.1	31.4	33.6	G1/8"-M	18	7.5	14	2.5
SPF 30 ED-65 G1/8-IG	4.1	31.4	33.6	G1/8"-F	26	8.0	14	2.5
SPF 40 ED-65 G1/4-AG	6.1	41.4	43.7	G1/4"-M	22	10.0	17	2.5
SPF 40 ED-65 G1/4-IG	6.1	41.4	43.7	G1/4"-F	32	12.0	17	2.5
SPF 50 ED-65 G1/4-AG	6.1	51.4	53.9	G1/4"-M	23	10.0	17	3.5
SPF 50 ED-65 G1/4-IG	6.1	51.4	53.9	G1/4"-F	33	12.0	17	3.5
SPF 60 ED-65 G1/4-AG	6.1	61.2	65.0	G1/4"-M	25	10.0	17	5.1
SPF 60 ED-65 G1/4-IG	6.1	61.2	65.0	G1/4"-F	35	12.0	17	5.1

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

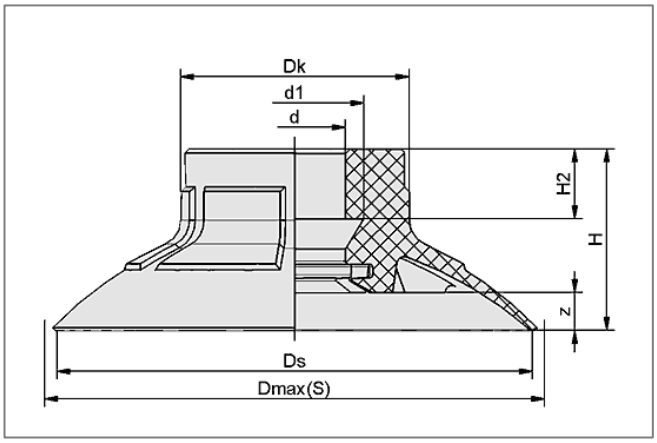
**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

Suction Cups for Cardboard

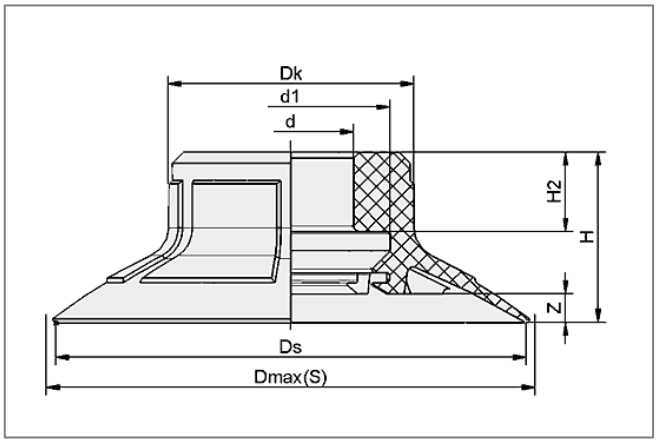
Flat Suction Cups SPF

Suction area (Ø) from 10 mm to 60 mm

Design Data Flat Suction Cups SPF



SPF 10…30



SPF 40…60

Type	Dimensions in mm*							
	d	d1	Dk	Ds	Dmax(S)**	H	H2	Z (Stroke)
SPF 10 ED-65 SC030	5.5	7.2	9.6	10.5	12.0	9	4.2	1.0
SPF 15 ED-65 SC040	7.5	10.4	13.0	16.4	18.5	10	4.6	1.5
SPF 20 ED-65 SC040	7.5	10.5	15.1	21.4	23.3	11	4.6	2.0
SPF 25 ED-65 SC040	7.5	10.5	15.1	26.4	28.0	11	4.6	2.0
SPF 30 ED-65 SC040	7.5	10.5	15.1	31.4	33.6	12	4.6	2.5
SPF 40 ED-65 SC050	11.0	17.5	21.6	41.4	43.7	15	7.0	2.5
SPF 50 ED-65 SC050	11.0	17.5	21.6	51.4	53.9	16	7.0	3.5
SPF 60 ED-65 SC050	10.5	17.5	22.1	61.2	65.0	18	7.5	5.1

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

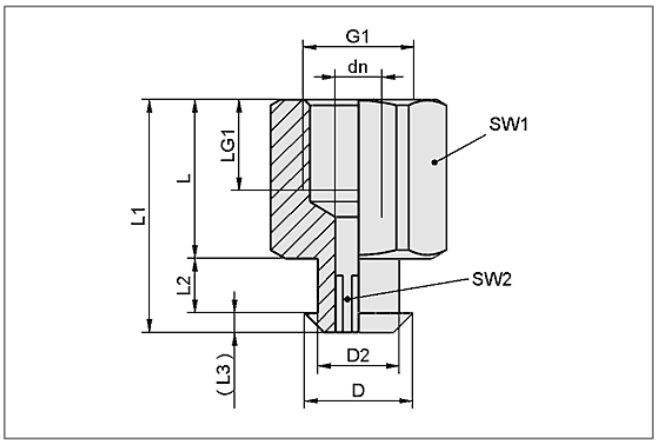
**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

Suction Cups for Cardboard

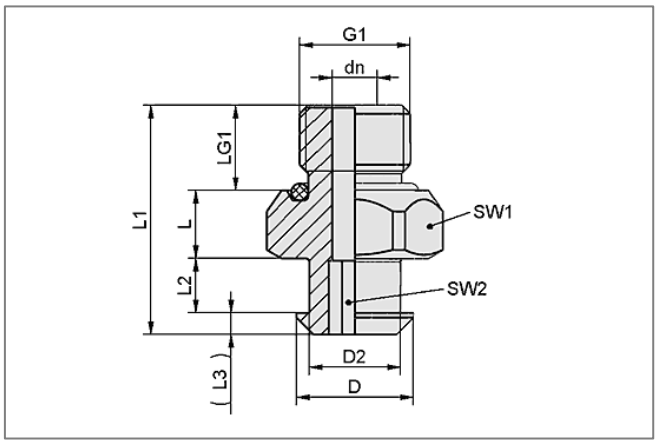
Flat Suction Cups SPF

Suction area (Ø) from 10 mm to 60 mm

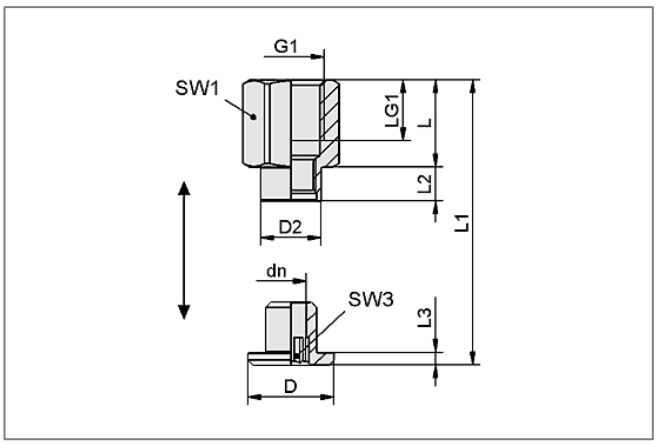
Design Data Connection Elements Flat Suction Cups SPF



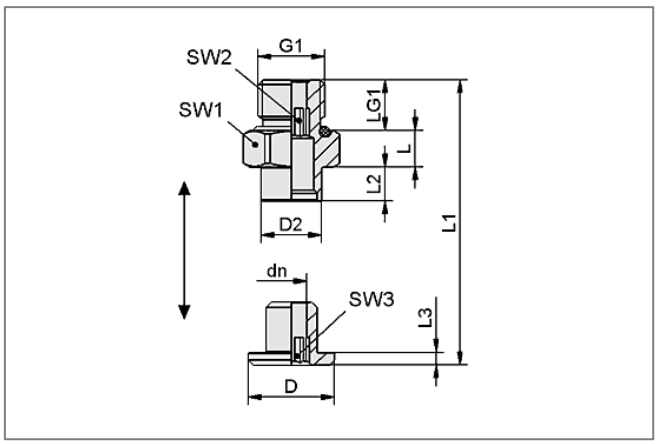
SC 040 G1/8-IG



SC 030/040 G1/8-AG



SC 050 G1/4-IG



SC 050 G1/4-AG

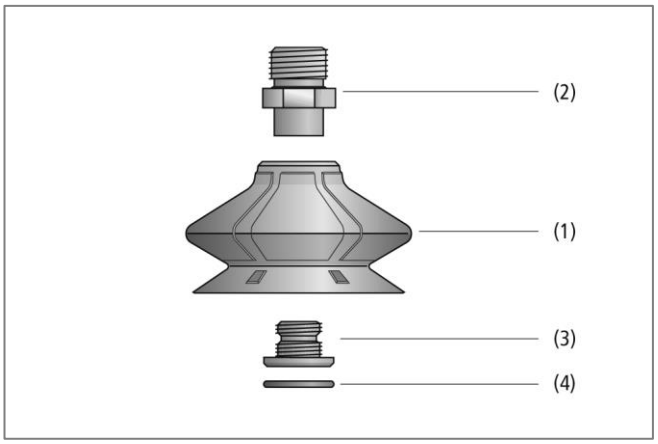
Type	Dimensions in mm											
	D	D2	dn	G1	L	L1	L2	L3	LG1	SW1	SW2	SW3
SC 030 M5-AG	7.2	6	2	M5-M	5.0	15.5	4.3	1.5	4.7	8	3	-
SC 040 G1/8-AG	10.3	8	4	G1/8"-M	6.0	25.2	4.8	1.9	7.5	14	4	-
SC 040 G1/8-IG	10.3	8	4	G1/8"-F	14.0	20.7	4.8	1.9	8.0	14	4	-
SC 050 G1/4-AG	17.0	12	6	G1/4"-M	7.2	26.5	6.8	2.5	10.0	17	6	6
SC 050 G1/4-IG	17.0	12	6	G1/4"-F	17.2	26.5	6.8	2.5	12.0	17	-	6

Suction Cups for Cardboard

Bellows Suction Cups SPB1 (1.5 Folds)

Suction area (Ø) from 10 mm to 80 mm

Bellows suction cups SPB1 (1.5 Folds)



System design bellow-shaped suction cups SPB1 (1.5 Folds)

Bellow suction cups SPB1 being used for handling of cardboard

Suitability for Industry-Specific Applications

Applications

- Round, bellows suction cup with 1.5 folds for the use in cardboard box and tray erectors
- Handling of cardboard and rigid packaging in top-loading and side-loading machines
- Palletizing and depalletizing processes
- Heavy-duty applications that require suction cups with excellent sealing and low wear

Design

- Round, bellows suction cup SPB1 (1) with 1.5 folds and soft, flexible sealing lip
- Made of wear-proof material Elastodur ED-65
- Models with diameter up to 30 mm feature plug-in connection element
- Starting at 40 mm diameter with a 2-piece connection element: consisting of machine-side component (2) and suction-side component (3)
- Clip-in filter screen (4) as pre-filter
- All connection elements with male thread are equipped with integrated sealing

Our Highlights...	Your Benefits...
• Flexible, adaptable sealing lip	> Excellent sealing performance on cardboard and rigid packaging
• Robust, reinforced main body	> High intrinsic stability in dynamic processes
• Interlocking of sealing-lip and fold due to locking elements	> Form-locking connection to avoid sliding of the suction cup
• Large effective suction surface	> High suction force but small dimensions of the suction cup
• Wear-proof and abrasion-proof material Elastodur ED-65	> Very low wear; approx. 3x the service life of NBR

Suction Cups for Cardboard

Bellows Suction Cups SPB1 (1.5 Folds)

Suction area (Ø) from 10 mm to 80 mm

Designation Code Bellows Suction Cups SPB1 (1.5 Folds)

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Connection thread
Example SPB1-30 ED-65 G1/8-AG:			
SPB1	**30**	**ED-65**	**G1/8-AG**
SPB1	10 to 80	ED-65	M5-AG (AG = male (M)) M5-IG (IG = female (F)) G1/8-AG G1/8-IG G1/4-AG G1/4-IG

Ordering Data Bellows Suction Cups SPB1 (1.5 Folds)

Suction cup SPB1 (elastomer part + connection element) is delivered assembled. As an alternative the individual parts can also be ordered separately. To do this, the following ordering steps are required:

- Suction cup of type SPB1 (step 1) – elastomer part, available in various diameters
- Connection element of type SC (step 2) – available with various threads

Available accessories: filter screen, suction cup insert

Bellows Suction Cups SPB1 (1.5 Folds) (Mounted)

Type	Part Number
SPB1 10 ED-65 M5-AG	10.01.06.03489
SPB1 10 ED-65 M5-IG	10.01.06.03568
SPB1 15 ED-65 G1/8-AG	10.01.06.03490
SPB1 15 ED-65 G1/8-IG	10.01.06.03491
SPB1 20 ED-65 G1/8-AG	10.01.06.03492
SPB1 20 ED-65 G1/8-IG	10.01.06.03493
SPB1 25 ED-65 G1/8-AG	10.01.06.03494
SPB1 25 ED-65 G1/8-IG	10.01.06.03495
SPB1 30 ED-65 G1/8-AG	10.01.06.03496
SPB1 30 ED-65 G1/8-IG	10.01.06.03497
SPB1 40 ED-65 G1/4-AG	10.01.06.03498
SPB1 40 ED-65 G1/4-IG	10.01.06.03499
SPB1 50 ED-65 G1/4-AG	10.01.06.03500
SPB1 50 ED-65 G1/4-IG	10.01.06.03501
SPB1 60 ED-65 G1/4-AG	10.01.06.03502
SPB1 60 ED-65 G1/4-IG	10.01.06.03503
SPB1 80 ED-65 G1/4-AG	10.01.06.03504
SPB1 80 ED-65 G1/4-IG	10.01.06.03505

Suction Cups for Cardboard

Bellows Suction Cups SPB1 (1.5 Folds)

Suction area (Ø) from 10 mm to 80 mm

Step 1: Bellows Suction Cups SPB1 (1.5 Folds) (Single Component)

Type	Part Number
SPB1 10 ED-65 SC030	10.01.06.02782
SPB1 15 ED-65 SC040	10.01.06.02783
SPB1 20 ED-65 SC040	10.01.06.02452
SPB1 25 ED-65 SC040	10.01.06.02453
SPB1 30 ED-65 SC040	10.01.06.02454
SPB1 40 ED-65 SC050	10.01.06.02455
SPB1 50 ED-65 SC050	10.01.06.02456
SPB1 60 ED-65 SC050	10.01.06.02457
SPB1 80 ED-65 SC065	10.01.06.03071

Step 2: Connection Elements Bellows Suction Cups SPB1 (1.5 Folds) (Single Component)

Type	SPB1 10	SPB1 15	SPB1 20	SPB1 25	SPB1 30
SC 030 M5-AG	10.01.06.02802	-	-	-	-
SC 040 G1/8-AG	-	10.01.06.02490	10.01.06.02490	10.01.06.02490	10.01.06.02490
SC 040 G1/8-IG	-	10.01.06.02482	10.01.06.02482	10.01.06.02482	10.01.06.02482

Type	SPB1 40	SPB1 50	SPB1 60	SPB1 80
SC 050 G1/4-AG	10.01.06.02487	10.01.06.02487	10.01.06.02487	-
SC 050 G1/4-IG	10.01.06.02488	10.01.06.02488	10.01.06.02488	-
SC 065 G1/4-AG L	-	-	-	10.01.06.03193
SC 065 G1/4-IG L	-	-	-	10.01.06.03194

Ordering Data Accessories Bellows Suction Cups SPB1 (1.5 Folds)

Type	Filter screen	Suction cup insert
SPB1 10 ED-65 SC030	-	10.01.06.02802
SPB1 15 ED-65 SC040	-	10.01.06.02490
SPB1 20 ED-65 SC040	10.07.01.00309	10.01.06.02490
SPB1 25 ED-65 SC040	10.07.01.00309	10.01.06.02490
SPB1 30 ED-65 SC040	10.07.01.00309	10.01.06.02490
SPB1 40 ED-65 SC050	10.07.01.00308	10.01.06.02487
SPB1 50 ED-65 SC050	10.07.01.00308	10.01.06.02487
SPB1 60 ED-65 SC050	10.07.01.00308	10.01.06.02487
SPB1 80 ED-65 SC065	10.07.01.00364	10.01.06.03194

Technical Data Bellows Suction Cups SPB1 (1.5 Folds)

Type	Suction force [N]*	Pull-off force [N]	Lateral force [N]	Volume [cm³]	Min. curve radius [mm] (convex)	Recom. internal hose diameter d [mm]**	Type Connection element
SPB1 10 ED-65 SC030	1.5	4.0	2.0	0.5	5	4	SC 030
SPB1 15 ED-65 SC040	4.3	9.0	5.0	1.5	8	4	SC 040
SPB1 20 ED-65 SC040	9.9	16.2	9.8	3.1	20	4	SC 040
SPB1 25 ED-65 SC040	14.9	23.4	13.0	5.3	20	4	SC 040
SPB1 30 ED-65 SC040	20.7	30.4	15.5	8.0	35	6	SC 040
SPB1 40 ED-65 SC050	35.9	46.8	24.8	18.3	70	6	SC 050
SPB1 50 ED-65 SC050	54.7	72.7	31.2	30.2	100	6	SC 050
SPB1 60 ED-65 SC050	78.0	100.9	49.4	49.2	200	6	SC 050
SPB1 80 ED-65 SC065	166.0	200.0	59.0	98.4	100	6	SC 065

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface – they do not include a safety factor

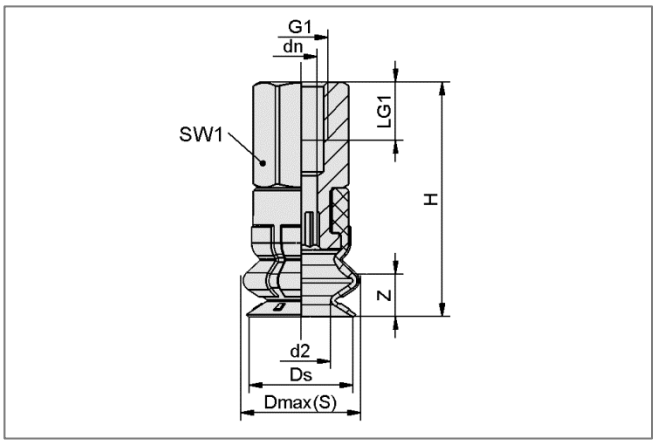
**The recommended hose diameter refers to a hose length of approx. 2 m

Suction Cups for Cardboard

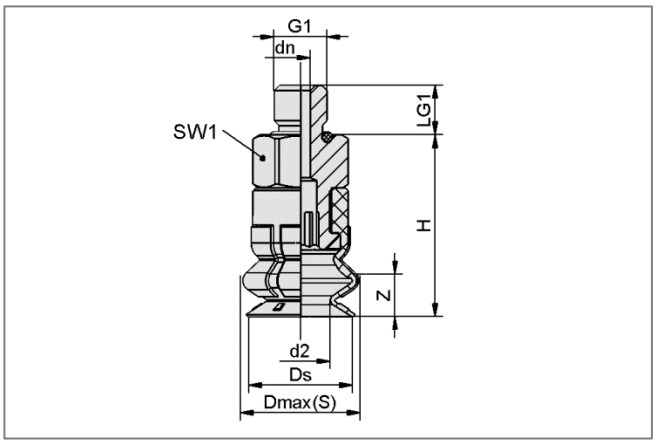
Bellows Suction Cups SPB1 (1.5 Folds)

Suction area (Ø) from 10 mm to 80 mm

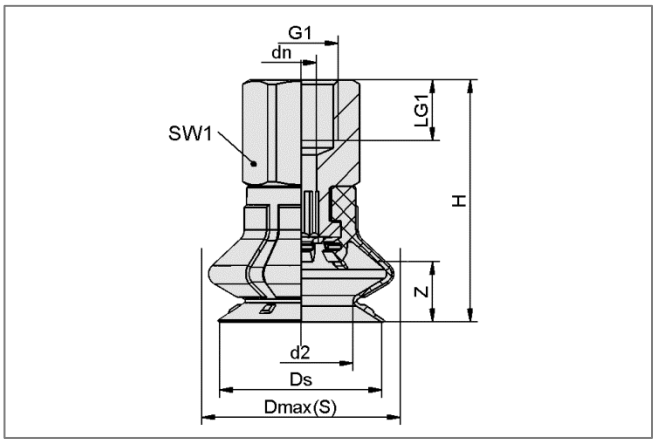
Design Data Bellows Suction Cups SPB1 (1.5 Folds)



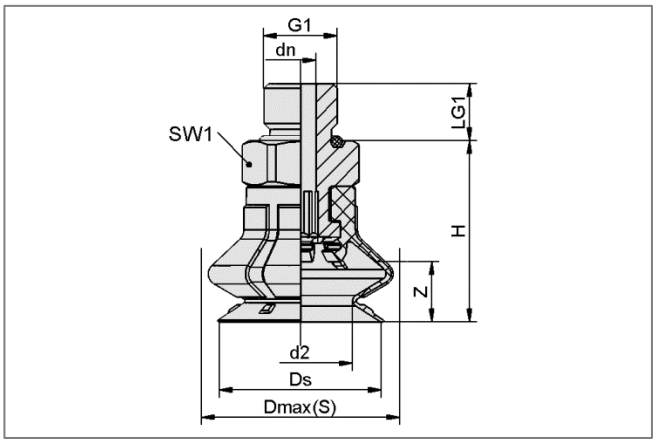
SPB1 10…15 IG



SPB1 10…15 AG



SPB1 20…80 IG



SPB1 20…80 AG

Type	Dimensions in mm*								
	dn	d2	Dmax (S)**	Ds	G1	H	LG1	SW1	Z (Stroke)
SPB1 10 ED-65 M5-AG	1.8	5.6	11.3	9.8	M5-M	17	4.7	8	4
SPB1 10 ED-65 M5-IG	3.1	5.6	11.3	9.8	M5-F	22	5.5	8	4
SPB1 15 ED-65 G1/8-AG	4.1	9.5	19.7	15.4	G1/8"-M	21	7.5	14	6
SPB1 15 ED-65 G1/8-IG	4.1	9.5	19.7	15.4	G1/8"-F	29	8.0	14	6
SPB1 20 ED-65 G1/8-AG	4.1	13.8	26.3	21.4	G1/8"-M	24	7.5	14	8
SPB1 20 ED-65 G1/8-IG	4.1	13.8	26.3	21.4	G1/8"-F	32	8.0	14	8
SPB1 25 ED-65 G1/8-AG	4.1	16.9	31.3	26.4	G1/8"-M	27	7.5	14	11
SPB1 25 ED-65 G1/8-IG	4.1	16.9	31.3	26.4	G1/8"-F	35	8.0	14	11
SPB1 30 ED-65 G1/8-AG	4.1	20.0	36.7	31.4	G1/8"-M	29	7.5	14	13
SPB1 30 ED-65 G1/8-IG	4.1	20.0	36.7	31.4	G1/8"-F	37	8.0	14	13
SPB1 40 ED-65 G1/4-AG	6.1	26.1	48.0	41.4	G1/4"-M	37	10.0	17	16
SPB1 40 ED-65 G1/4-IG	6.1	26.1	48.0	41.4	G1/4"-F	47	12.0	17	16
SPB1 50 ED-65 G1/4-AG	6.1	32.3	58.4	51.4	G1/4"-M	39	10.0	17	18
SPB1 50 ED-65 G1/4-IG	6.1	32.3	58.4	51.4	G1/4"-F	49	12.0	17	18
SPB1 60 ED-65 G1/4-AG	6.1	38.6	69.9	61.4	G1/4"-M	43	10.0	17	22
SPB1 60 ED-65 G1/4-IG	6.1	38.6	69.9	61.4	G1/4"-F	53	12.0	17	22
SPB1 80 ED-65 G1/4-AG	6.1	56.0	88.0	81.4	G1/4"-M	54	10.0	22	27
SPB1 80 ED-65 G1/4-IG	6.1	56.0	88.0	81.4	G1/4"-F	54	12.0	22	27

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

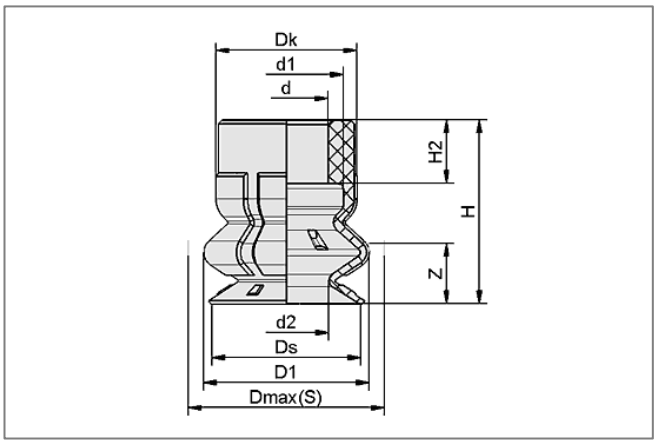
**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

Suction Cups for Cardboard

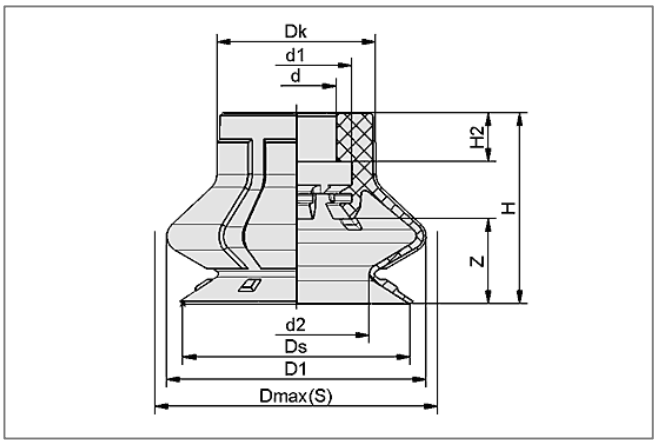
Bellows Suction Cups SPB1 (1.5 Folds)

Suction area (Ø) from 10 mm to 80 mm

Design Data Bellows Suction Cups SPB1 (1.5 Folds)



SPB1 10…15



SPB1 20…80

Type	Dimensions in mm*									
	d	d1	d2	D1	Dk	Dmax (S)**	Ds	H	H2	Z (Stroke)
SPB1 10 ED-65 SC030	5.5	7.5	5.6	11.0	9.4	11.3	9.8	12	4.2	4
SPB1 15 ED-65 SC040	7.5	10.5	9.5	18.4	15.1	19.7	15.4	15	4.6	6
SPB1 20 ED-65 SC040	7.5	10.5	13.8	24.6	15.1	26.3	21.4	18	4.6	8
SPB1 25 ED-65 SC040	7.5	10.5	16.9	29.0	15.1	31.3	26.4	21	4.6	11
SPB1 30 ED-65 SC040	7.5	10.5	20.0	34.2	15.1	36.7	31.4	23	4.6	13
SPB1 40 ED-65 SC050	11.0	17.5	26.1	44.6	21.6	48.0	41.4	30	7.0	16
SPB1 50 ED-65 SC050	11.0	17.5	32.3	55.2	21.6	58.4	51.4	32	7.0	18
SPB1 60 ED-65 SC050	11.0	17.5	38.6	65.7	21.6	69.6	61.4	36	7.0	22
SPB1 80 ED-65 SC065	14.0	29.3	56.0	82.7	27.1	88.0	81.4	46	15.3	24

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

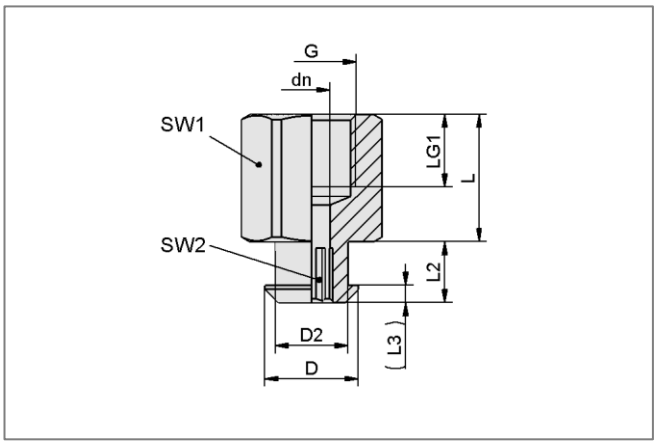
**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

Suction Cups for Cardboard

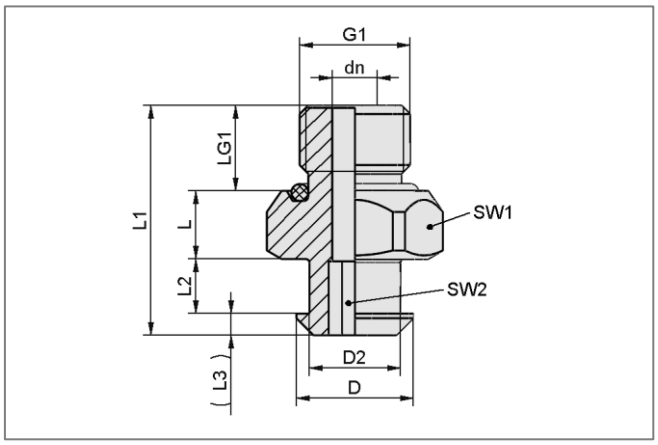
Bellows Suction Cups SPB1 (1.5 Folds)

Suction area (Ø) from 10 mm to 80 mm

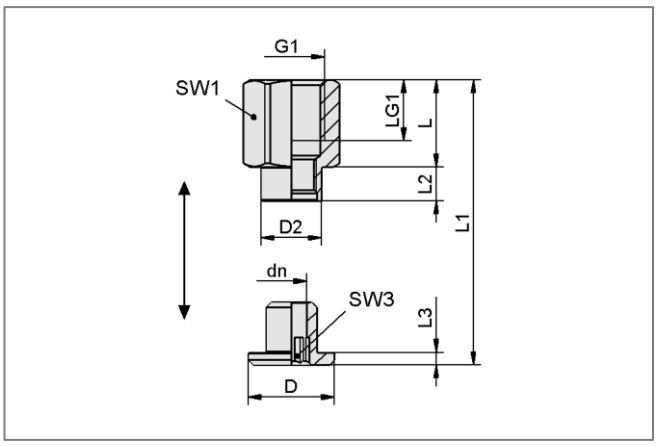
Design Data Connection Elements Bellows Suction Cups SPB1 (1.5 Folds)



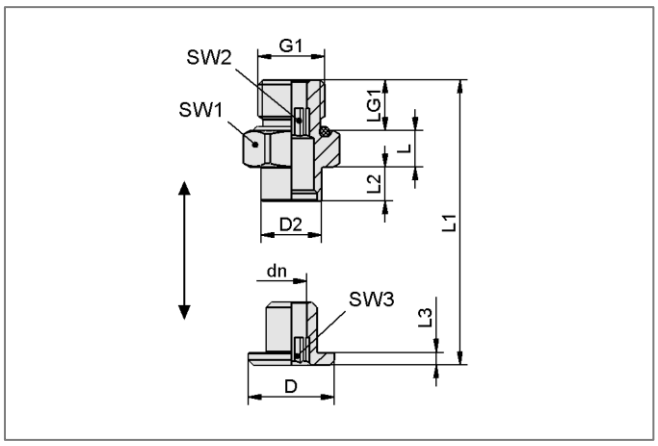
SC 040 G1/8-IG



SC 030/040-AG



SC 050/065 G1/4-IG



SC 050/065 G1/4-AG

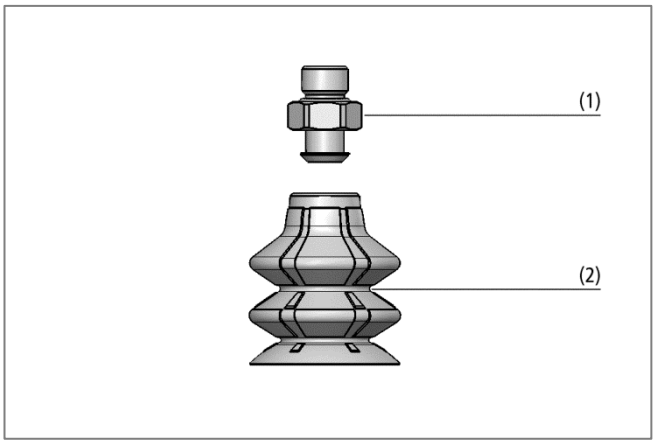
Type	Dimensions in mm											
	D	D2	dn	G1	L	L1	L2	L3	LG1	SW1	SW2	SW3
SC 030 M5-AG	7.2	6	2	M5-M	5.0	15.5	4.3	1.5	4.7	8	3	-
SC 040 G1/8-AG	10.3	8	4	G1/8“-M	6.0	20.2	4.8	1.9	7.5	14	4	-
SC 040 G1/8-IG	10.3	8	4	G1/8“-F	14.0	20.7	4.8	1.9	8.0	14	4	-
SC 040 G1/4-AG	17.0	12	6	G1/4“-M	7.2	26.5	6.8	2.5	10.0	17	6	6
SC 040 G1/4-IG	17.0	12	6	G1/4“-F	17.2	26.5	6.8	2.5	12.0	17	-	6
SC 040 G1/4-AG L	29.0	15	6	G1/4“-M	8.0	36.1	15.1	3.0	10.0	22	6	6
SC 040 G1/4-IG L	29.0	15	6	G1/4“-F	18.0	36.1	15.1	3.0	12.0	22	-	6

Suction Cups for Cardboard

Bellows Suction Cups SPB2 (2.5 Folds)

Suction area (Ø) from 20 mm to 50 mm

Bellows suctions cups SPB2 (2.5 Folds)



System design bellows suction cups SPB2 (2.5 Folds)

Bellow Suction Cups SPB2 being used in side-loading machines

Suitability for Industry-Specific Applications

Applications

- Round bellows suction cup with 2.5 folds for use in carton and tray erectors with high demands on suction cup stroke, dynamics and wear resistance
- Handling of non-rigid workpieces such as filled cardboard boxes for palletizing and depalletizing processes
- Applications which require high adaptability and high height compensation, such as taking cartons from a magazine in rotary erectors
- Handling of cardboard, inherently stable and flexible packaging in top-loading and side-loading machines

Design

- Round bellows suction cup SPB2 with 2.5 folds (2) and flexible sealing lip
- Diameter up to 30 mm with a one-piece plug-in connection element (1)
- From diameter 40 mm with two-piece connection element: consisting of machine-side component and suction cup-side component
- Available as mounted suction cup consisting of connection element and suction cup or as individual parts

Our Highlights...	Your Benefits...
• High suction cup stroke	> Good adaptability and height adjustment on curved surfaces
• Large inner fold diameters	> High volume flow rates and short cycle times
• Flexible, adaptable sealing lip	> Good sealing on cardboard and rigid packaging
• Locking elements between sealing lip and fold	> Gearing prevents shifting of the suction cup
• Wear and abrasion resistant material Elastodur ED-65	> Low wear, lifetime of ED-65 about 3 times longer than NBR

Suction Cups for Cardboard

Bellows Suction Cups SPB2 (2.5 Folds)

Suction area (Ø) from 20 mm to 50 mm

Designation Code Bellows Suction Cups SPB2 (2.5 Folds)

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Connection thread
Example SPB2 30 ED-65 G1/8-AG:			
SPB2	**30**	**ED-65**	**G1/8-AG**
SPB2	20 to 50	ED-65	G1/4-AG (AG = male (M)) G1/4-IG (IG = female (F)) G1/8-AG G1/8-IG

Ordering Data Bellows Suction Cups SPB2 (2.5 Folds)

Suction cup SPB2 (elastomer part + connection element) is delivered assembled. As an alternative the individual parts can also be ordered separately. To do this, the following ordering steps are required:

- Suction cup of type SPB2 (step 1) – elastomer part, available in various diameters
- Connection element of type SC (step 2) – available with various threads

Bellows Suction Cups SPB2 (2.5 Folds) (Mounted)

Type	Connection			
	G1/8“-F	G1/8“-M	G1/4“-F	G1/4“-M
SPB2 20 ED-65	10.01.06.03454	10.01.06.03453	-	-
SPB2 25 ED-65	10.01.06.03456	10.01.06.03455	-	-
SPB2 30 ED-65	10.01.06.03458	10.01.06.03457	-	-
SPB2 40ED-65	-	-	10.01.06.03460	10.01.06.03459
SPB2 50 ED-65	-	-	10.01.06.03462	10.01.06.03461

Step 1: Bellows Suction Cups SPB2 (2.5 Folds) (Single Component)

Type	Part Number
SPB2 20 ED-65 SC040	10.01.06.03409
SPB2 25 ED-65 SC040	10.01.06.03410
SPB2 30 ED-65 SC040	10.01.06.03411
SPB2 40 ED-65 SC050	10.01.06.03412
SPB2 50 ED-65 SC050	10.01.06.03413

Step 2: Connection Elements Bellows Suction Cups SPB2 (2.5 Folds) (Single Component)

Type	SPB2 20	SPB2 25	SPB2 30	SPB2 40	SPB2 50
SC 040 G1/8-AG	10.01.06.02490	10.01.06.02490	10.01.06.02490	-	-
SC 040 G1/8-IG	10.01.06.02482	10.01.06.02482	10.01.06.02482	-	-
SC 050 G1/4-AG	-	-	-	10.01.06.02487	10.01.06.02487
SC 050 G1/4-IG	-	-	-	10.01.06.02488	10.01.06.02488

Suction Cups for Cardboard

Bellows Suction Cups SPB2 (2.5 Folds)

Suction area (Ø) from 20 mm to 50 mm

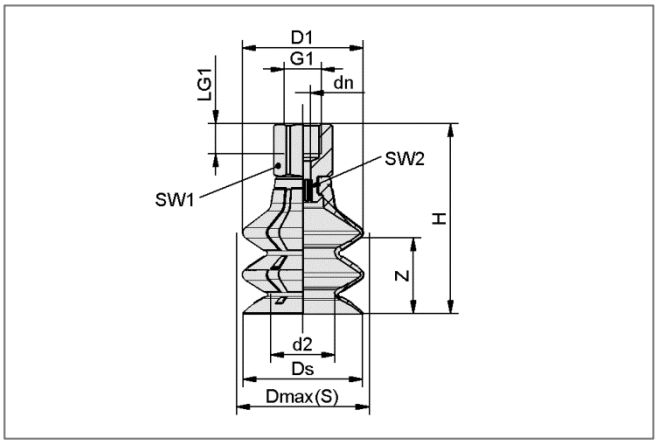
Technical Data Bellows Suction Cups SPB2 (2.5 Folds)

Type	Suction force [N]*	Pull-off force [N]	Lateral force [N]	Volume [cm³]	Min. curve radius [mm] (convex)	Recom. interal hose diameter d [mm]**	Type Connection element
SPB2 20 ED-65 SC040	6.8	15.7	8.4	4.2	20	4	SC 040
SPB2 25 ED-65 SC040	9.9	20.1	9.1	7.6	20	4	SC 040
SPB2 30 ED-65 SC040	14.4	28.4	12.8	12.4	30	6	SC 040
SPB2 40 ED-65 SC050	24.8	40.5	20.3	27.9	60	6	SC 050
SPB2 50 ED-65 SC050	34.6	61.8	28.5	51.8	75	6	SC 050

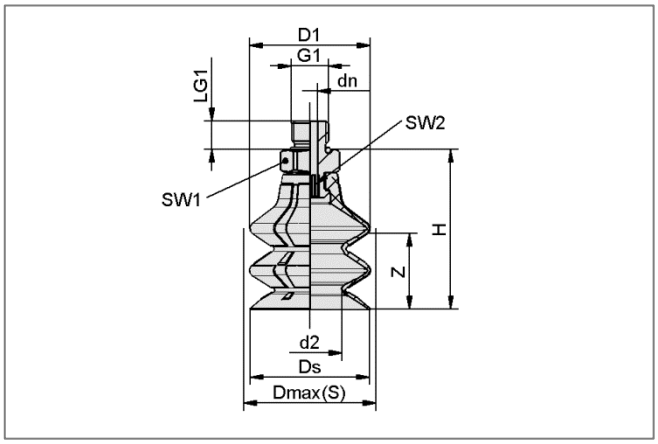
*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface – they do not include safety factors

**The recommended hose diameter refers to a hose length of approx. 2 m

Design Data Bellows Suction Cups SPB2 (2.5 Folds)



SPB2...IG



SPB2…AG

Typ	Dimensions in mm*										
	dn	d2	D1	Dmax(S)**	Ds	G1	H	LG1	SW1	SW2	Z (Hub)
SPB2 20 ED-65 G1/8-AG	4.0	12.0	22.1	23.5	21.4	G1/8“-M	31	7.5	14	4	13
SPB2 20 ED-65 G1/8-IG	4.0	12.0	22.1	23.5	21.4	G1/8“-F	39	8.0	14	4	13
SPB2 25 ED-65 G1/8-AG	4.0	14.5	27.2	28.0	26.4	G1/8“-M	37	7.5	14	4	17
SPB2 25 ED-65 G1/8-IG	4.0	14.5	27.2	28.0	26.4	G1/8“-F	45	8.0	14	4	17
SPB2 30 ED-65 G1/8-AG	4.0	16.9	32.2	34.0	31.4	G1/8“-M	42	7.5	14	4	20
SPB2 30 ED-65 G1/8-IG	4.0	16.9	32.2	34.0	31.4	G1/8“-F	50	8.0	14	4	20
SPB2 40 ED-65 G1/4-AG	6.1	22.9	42.2	44.5	41.3	G1/4“-M	52	10.0	17	6	25
SPB2 40 ED-65 G1/4-IG	6.1	22.9	42.2	44.5	41.3	G1/4“-F	62	12.0	17	6	25
SPB2 50 ED-65 G1/4-AG	6.1	27.1	52.5	55.5	51.3	G1/4“-M	63	10.0	17	6	32
SPB2 50 ED-65 G1/4-IG	6.1	27.1	52.5	55.5	51.3	G1/4“-F	73	12.0	17	6	32

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

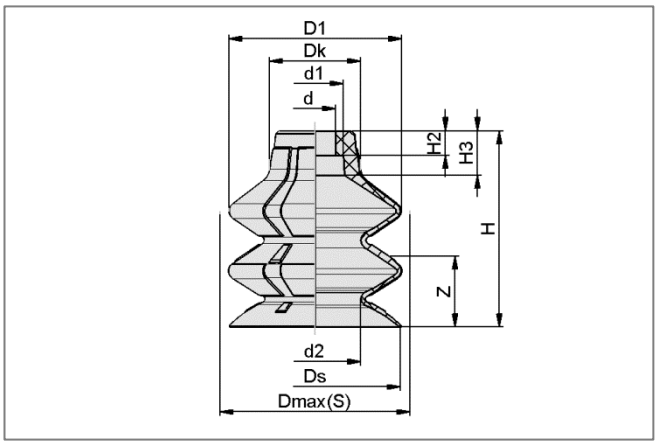
**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

Suction Cups for Cardboard

Bellows Suction Cups SPB2 (2.5 Folds)

Suction area (Ø) from 20 mm to 50 mm

Design Data Bellows Suction Cups SPB2 (2.5 Folds)



SPB2…ED-65

Type	Dimensions in mm*										
	d	d1	d2	D1	Dk	Dmax(S)**	Ds	H	H2	H3	Z (Hub)
SPB2 20 ED-65 SC040	7.5	10.5	12.0	22.2	15.0	23.5	21.4	25	4.6	7.0	13
SPB2 25 ED-65 SC040	7.5	10.5	14.5	27.2	15.5	28.0	26.4	31	4.6	7.8	17
SPB2 30 ED-65 SC040	7.5	10.5	16.9	32.2	16.8	34.0	31.4	36	4.6	7.9	20
SPB2 40 ED-65 SC050	11.0	17.3	22.9	42.2	22.5	44.5	41.3	45	7.0	9.9	25
SPB2 50 ED-65 SC050	11.0	17.3	27.1	52.2	23.5	55.5	51.3	56	7.0	11.6	32

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

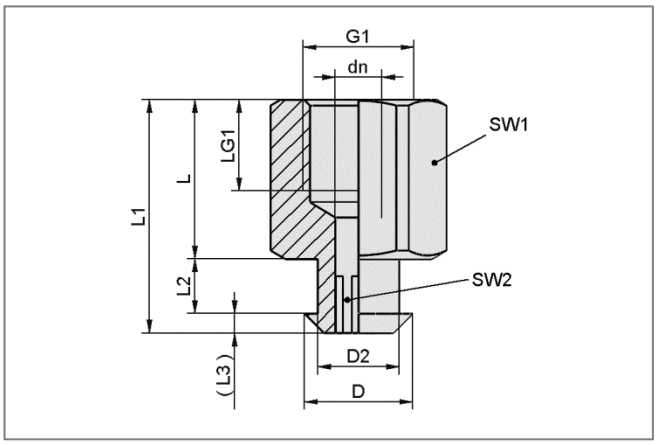
**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

Suction Cups for Cardboard

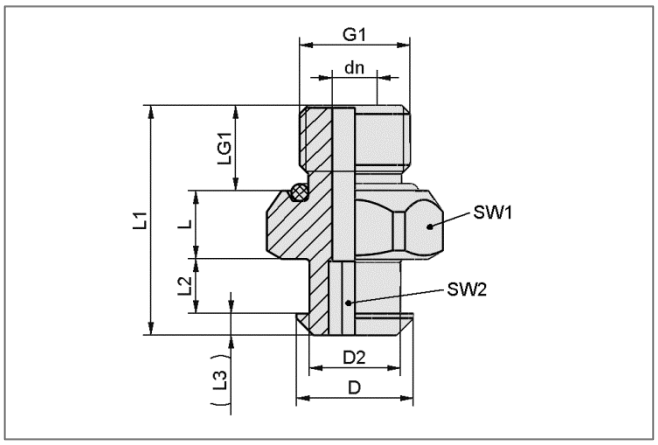
Bellows Suction Cups SPB2 (2.5 Folds)

Suction area (Ø) from 20 mm to 50 mm

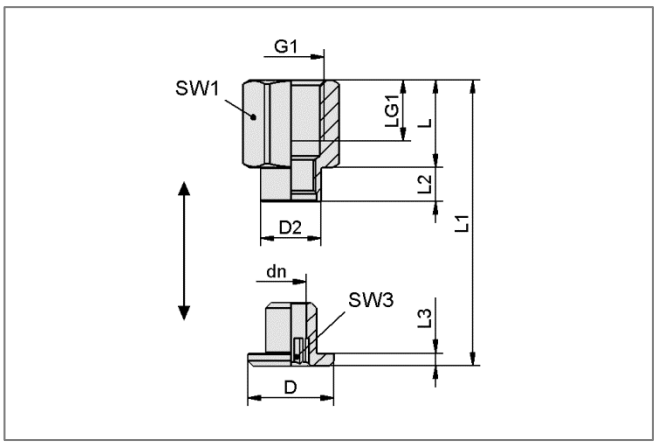
Design Data Connection Elements Bellows Suction Cups SPB2



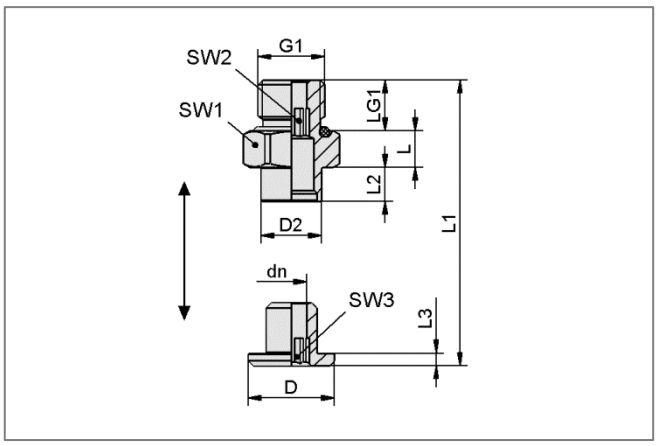
SC 040 G1/8-IG



SC 030/040 G1/8-AG



SC 050 G1/4-IG



SC 050 G1/4-AG

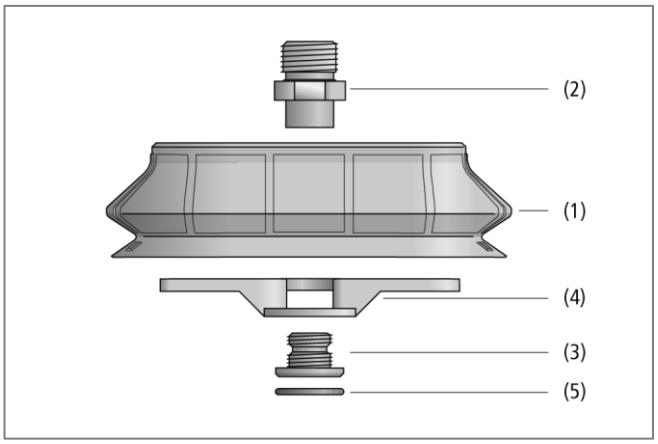
Type	Dimensions in mm*											
	D	D2	dn	G1	L	L1	L2	L3	LG1	SW1	SW2	SW3
SC 040 G1/8-AG	10.3	8	4	G1/8“-M	6.0	20.2	4.8	1.9	7.5	14	4	-
SC 040 G1/8-IG	10.3	8	4	G1/8“-F	14.0	20.7	4.8	1.9	8.0	14	4	-
SC 050 G1/4-AG	17.0	12	6	G1/4“-M	7.2	26.5	6.8	2.5	10.0	17	6	6
SC 050 G1/4-IG	17.0	12	6	G1/4“-F	17.2	26.5	6.8	2.5	12.0	17	-	6

Suction Cups for Cardboard

Bellows Suction Cups SPOB1 (Oval, 1.5 Folds)

Suction area (LxW) from 60x20 mm to 100x40 mm

Bellows suction cups SPOB1 (oval, 1.5 Folds)



System design bellows suction cups SPOB1 (oval, 1.5 Folds)

Bellows suction cups SPOB1 being used for handling of cardboard

Suitability for Industry-Specific Applications

Applications

- Oval, bellows suction cup with 1.5 folds for the use in cardboard box and tray erectors
- Handling of cardboard and rigid or flexible packaging in top-loading and side-loading machines
- Palletizing and depalletizing processes
- Heavy-duty applications that require suction cups with excellent sealing and low wear

Design

- Oval, bellows suction cup SPOB1 (1) with 1.5 folds and soft, flexible sealing lip
- Made of wear-proof material Elastodur ED-65 with a long service life
- All sizes come with a 2-piece connection element: consisting of machine-side component (2) and suction-side component (3)
- Size 100 mm x 40 mm with additional suction cup insert (4); included in scope of delivery of connection elements; reusable
- Clip-in filter screen (5) as pre-filter (filter pore size 250 µm)

Our Highlights...	Your Benefits...
• Oval shape	> Ideal for all oblong workpieces
• Suction cup features robust, reinforced main body	> High intrinsic stability of the suction cup in dynamic processes
• “Interlocking“ of sealing-lip and fold due to locking elements	> Form-locking connection to avoid sliding of the suction cup
• Made from wear-proof and abrasion-proof material Elastodur ED-65	> Very low wear; approx. 3x the service life of NBR

Suction Cups for Cardboard

Bellows Suction Cups SPOB1 (Oval, 1.5 Folds)

Suction area (LxW) from 60x20 mm to 100x40 mm

Designation Code Bellows Suction Cups SPOB1 (Oval, 1.5 Folds)

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Connection thread
Example SPOB1 60x20 ED-65 G1/8-AG:			
SPOB1	**60x20**	**ED-65**	**G1/8-AG**
SPOB1	60x20 100x40	ED-65	G1/4-AG (AG = male (M)) G1/4-IG (IG = female (F)) G1/8-AG G1/8-IG

Ordering Data Bellows Suction Cups SPOB1 (Oval, 1.5 Folds)

Suction cup SPOB1 (elastomer part + connection element) is delivered assembled. As an alternative the individual parts can also be ordered separately. To do this, the following ordering steps are required:

- Suction cup of type SPOB1 (step 1) – elastomer part, available in various diameters
- Connection element of type SC (step 2) – available with various threads, includes stabilization plate for model size 100 x 400 mm

Available accessories: filter screen

Bellows Suction Cups SPOB1 (Oval, 1.5 Folds) (Mounted)

Type	Part Number
SPOB1 60x20 ED-65 G1/8-AG	10.01.06.03510
SPOB1 60x20 ED-65 G1/8-IG	10.01.06.03511
SPOB1 100x40 ED-65 G1/4-AG	10.01.06.03512
SPOB1 100x40 ED-65 G1/4-IG	10.01.06.03513

Step 1: Bellows Suction Cups SPOB1 (Oval, 1.5 Folds) (Single Component)

Type	Part Number
SPOB1 60x20 ED-65 SC040	10.01.06.02462
SPOB1 100x40 ED-65 SC050	10.01.06.02461

Step 2: Ordering data Connection Elements Bellows Suction Cups SPOB1 (Oval, 1.5 Folds) (Single C.)

Type	SPOB1 60x20	SPOB1 100x40
SC 040-AR G1/8-AG	10.01.06.02495	-
SC 040-AR G1/8-IG	10.01.06.02496	-
SC 050-AR G1/4-AG	-	10.01.06.02491
SC 050-AR G1/4-IG	-	10.01.06.02493

Ordering Data Accessories Bellows Suction Cups SPOB1 (Oval, 1.5 Folds)

Type	Filter screen
SPOB1 60x20 ED-65 SC040	10.07.01.00309
SPOB1 100x40 ED-65 SC050	10.07.01.00308

Suction Cups for Cardboard

Bellows Suction Cups SPOB1 (Oval, 1.5 Folds)

Suction area (LxW) from 60x20 mm to 100x40 mm

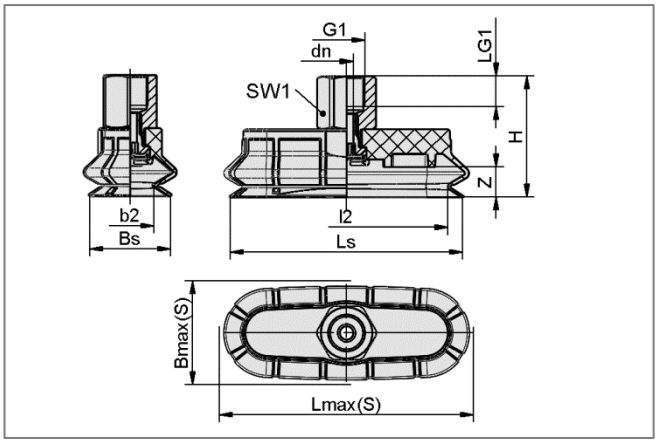
Technical Data Bellows Suction Cups SPOB1 (Oval, 1.5 Folds)

Type	Suction force [N]*	Pull-off force [N]	Lateral force [N]	Volume [cm³]	Min. curve radius [mm] (convex)	Recom. internal hose diameter d [mm]**	Type Connection element
SPOB1 60x20 ED-65 SC040	32.5	39.8	32.2	11.0	25	6	SC 040
SPOB1 100x40 ED-65 SC050	111.2	131.4	76.9	60.1	50	6	SC 050

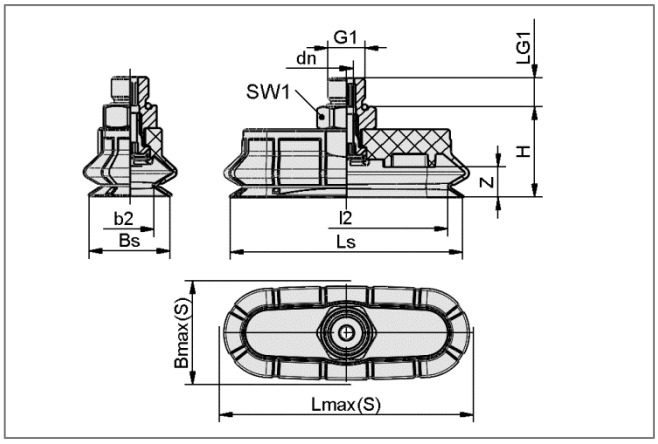
*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface – they do not include a safety factor

**The recommended hose diameter refers to a hose length of approx. 2 m

Design Data Bellows Suction Cups SPOB1 (Oval, 1.5 Folds)



SPOB1 IG



SPOB1 AG

Type	Dimensions in mm*											
	b2	Bmax (S)**	Bs	dn	G1	H	LG1	Lmax(S)**	Ls	l2	SW1	Z (Stroke)
SPOB1 60x20 ED-65 G1/8-AG	12.8	27.5	21.4	3.6	G1/8“-M	18	7.5	67.0	61.4	53.5	14	8
SPOB1 60x20 ED-65 G1/8-IG	12.8	27.5	21.4	3.6	G1/8“-F	18	8.0	67.0	61.4	53.5	14	8
SPOB1 100x40 ED-65 G1/4-AG	25.9	52.0	41.4	6.1	G1/4“-M	30	10.0	113.0	104.4	88.9	17	16
SPOB1 100x40 ED-65 G1/4-IG	25.9	52.0	41.4	6.1	G1/4“-F	30	12.0	113.0	104.4	88.9	17	16

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

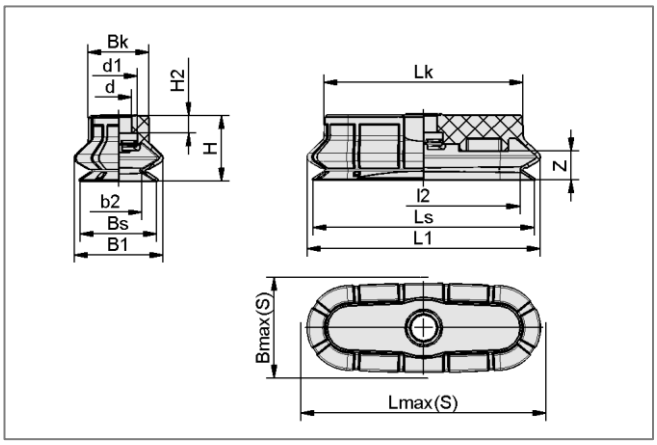
**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

Suction Cups for Cardboard

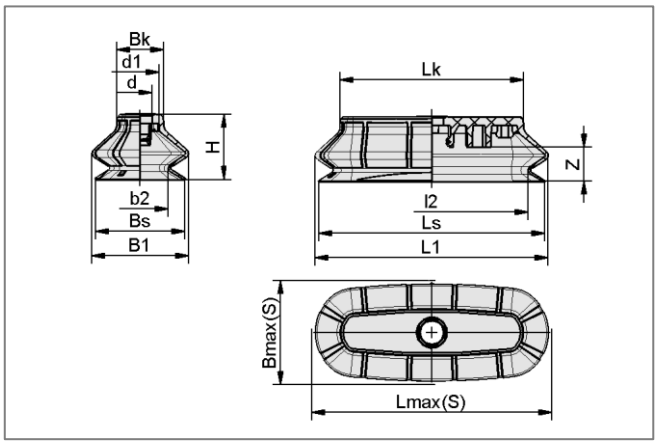
Bellows Suction Cups SPOB1 (Oval, 1.5 Folds)

Suction area (LxW) from 60x20 mm to 100x40 mm

Design Data Bellows Suction Cups SPOB1 (Oval, 1.5 Folds)



SPOB1 60x20



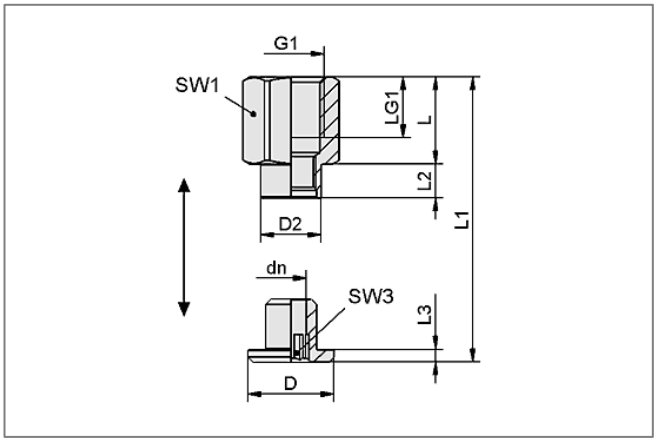
SPOB1 100x40

Type	Dimensions in mm*														
	b2	B1	Bk	Bmax (S)**	Bs	d	d1	H	H2	l2	L1	Lk	Lmax (S)**	Ls	Z (Stroke)
SPOB1 60x20 ED-65 SC040	12.8	24.6	16.8	27.5	21.4	7.3	10.5	18	4.8	53.4	64.6	55.1	67.0	61.4	8
SPOB1 100x40 ED-65 SC050	25.9	44.6	21.6	52.0	41.4	11.0	17.5	30	7.0	88.9	107.6	84.6	113.0	104.4	16

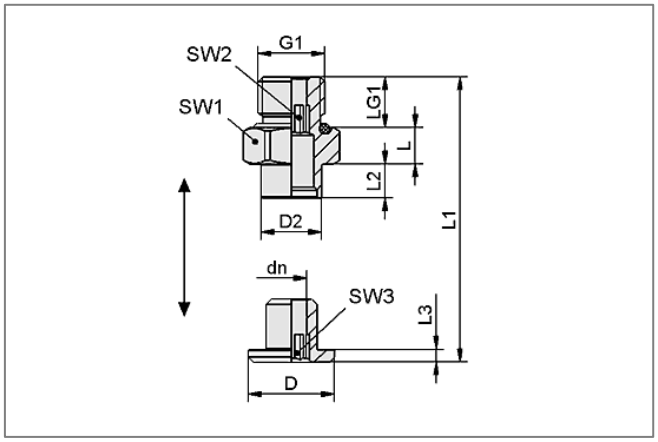
*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

Design Data Connection Elements Bellows Suction Cups SPOB 1 (Oval, 1.5 Folds)



SC040/050-IG



SC040/050-AG

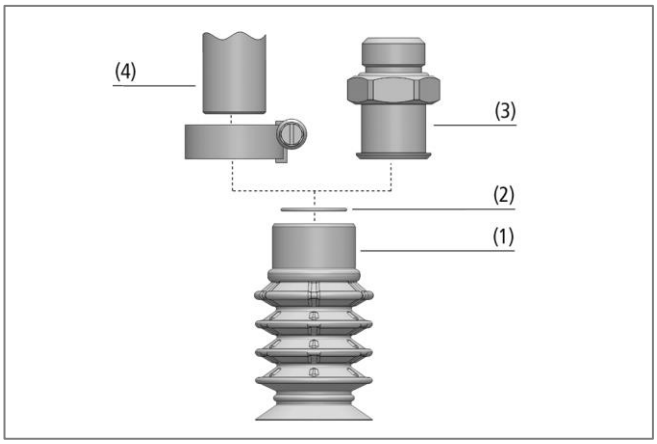
Type	Dimensions in mm											
	D	D2	dn	G1	L	L1	L2	L3	LG1	SW1	SW2	SW3
SC 040-AR G1/8-AG	10.3	8	4	G1/8“-M	6.0	20.3	4.8	4.8	2.0	14	4	4
SC 040-AR G1/8-IG	10.3	8	4	G1/8“-F	14.0	20.8	4.8	4.8	2.0	14	-	4
SC 050-AR G1/4-AG	17.0	12	6	G1/4“-M	7.2	26.5	6.8	6.8	2.5	17	6	6
SC 050-AR G1/4-IG	17.0	12	6	G1/4“-F	17.2	26.5	6.8	6.8	2.5	17	-	6

Suction Cups for Bags and Pouches

Bellows Suction Cups SPB4 (4.5 Folds)

Suction area (Ø) from 20 mm to 50 mm

Bellows suction cups SPB4 (4.5 Folds)



System design bellows suction cups SPB4 (4.5 Folds)

Bellow suction cups SPB4 for handling foil-wrapped products

Suitability for Industry-Specific Applications

Applications

- Round, bellows suction cup with 4.5 folds for handling of flexible products such as pouches and other plastic film packaging
- Process reliable gripping and handling of solid, powdery and liquid filled pouches
- High-speed packaging processes, particularly in conjunction with parallel kinematic robots
- Handling of abrasive bags with extra longevity by heavy duty silicone SI-HD

Design

- Bellows suction cup SPB4 (1) with 4.5 folds and soft, flexible sealing lip
- Special reinforced bellows for additional stability
- Mounting via Schmalz Connector SC (3). Alternatively direct attachment on 3/8“ – or 1/2“-pipe via hose clamp (4)
- All mounting elements with male thread include an integrated sealing ring
- Optional pre-filter (2) (250 µm filter fineness)
- Optional insert disc SPPI for the lower suction fold avoids taping the foil

Our Highlights...	Your Benefits...
• Thin, steep sealing lip with flow fins	> Extraordinary sealing on pouches and other flexible materials
• Functional separation of folds and sealing lip	> Compressed bellows have no negative effect on flexibility of sealing lip
• Reinforced basic body and folds	> No collapsing when suction cup is stretched under vacuum
• Extra large nominal diameter for high volume flow rates	> Sized for operation with pumps, blowers and multi-stage ejectors
• Food grade material (FDA conform) Silicone SI	> Suitable for applications in the food industry

Suction Cups for Bags and Pouches

Bellows Suction Cups SPB4 (4.5 Folds)

Suction area (Ø) from 20 mm to 50 mm

Designation Code Bellows Suction Cups SPB4 (4.5 Folds)

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Connection thread
Example SPB4 30 SI-55 G1/4-AG:			
SPB4	**30**	**SI-55**	**G1/4-AG**
SPB4	20 30 40 50	SI-55 SI-HD	G1/8-AG (AG = male (M)) G1/8-IG (IG = female (F)) G1/4-AG G1/4-IG G3/8-AG G3/8-IG G1/2-AG G1/2-IG

Ordering Data Bellows Suction Cups SPB4 (4.5 Folds)

Suction cup SPB4 (elastomer part + connection element) is delivered assembled. As an alternative the individual parts can also be ordered separately. To do this, the following ordering steps are required:

- Suction cup of type SPB4 (step 1) – elastomer part, available in various diameters
- Connection element of type SC (step 2) – available with various threads

Available accessories: filter screen, hose clamp, insert disc

Bellows Suction Cups SPB4 (4.5 Folds) (Mounted)

Type	G3/8"-IG	G3/8"-AG	G1/8"-IG	G1/8"-AG
SPB4-20 SI-55	10.01.06.03519	10.01.06.03516	10.01.06.03517	10.01.06.03514
SPB4-30 SI-55	10.01.06.03525	10.01.06.03522	10.01.06.03523	10.01.06.03520
SPB4-40 SI-55	10.01.06.03530	10.01.06.03527	-	-
SPB4-50 SI-55	10.01.06.03536	10.01.06.03533	-	-

Type	G1/4"-IG	G1/4"-AG	G1/2"-IG	G1/2"-AG
SPB4-20 SI-55	10.01.06.03518	10.01.06.03515	-	-
SPB4-30 SI-55	10.01.06.03524	10.01.06.03521	-	-
SPB4-40 SI-55	10.01.06.03529	10.01.06.03526	10.01.06.03531	10.01.06.03528
SPB4-50 SI-55	10.01.06.03535	10.01.06.03532	10.01.06.03537	10.01.06.03534

Step 1: Bellows Suction Cups SPB4 (4.5 Folds) (Single Component)

Type	Part Number
SPB4 20 SI-55 SC080	10.01.06.02588
SPB4 20 SI-HD SC080	10.01.06.03378
SPB4 30 SI-55 SC080	10.01.06.02589
SPB4 30 SI-HD SC080	10.01.06.03180
SPB4 40 SI-55 SC090	10.01.06.02590
SPB4 40 SI-HD SC090	10.01.06.03379
SPB4 50 SI-55 SC090	10.01.06.02613
SPB4 50 SI-HD SC090	10.01.06.03380

Suction Cups for Bags and Pouches

Bellows Suction Cups SPB4 (4.5 Folds)

Suction area (Ø) from 20 mm to 50 mm

Step 2: Ordering data Connection elements Bellows Suction Cups SPB4 (4.5 Folds) (Single Component)

Type	SPB4 20…30	SPB4 40…50
SC 080 G1/8-AG	10.01.06.03142	-
SC 080 G1/8-IG	10.01.06.03270	-
SC 080 G1/4-AG	10.01.06.03268	-
SC 080 G1/4-IG	10.01.06.03271	-
SC 080 G3/8-AG	10.01.06.02593	-
SC 080 G3/8-IG	10.01.06.02594	-
SC 080 NPT1/4-AG	10.01.06.03662	-
SC 080 NPT1/4-IG	10.01.06.03663	-
SC 080 NPT3/8-AG	10.01.06.03664	-
SC 080 NPT3/8-IG	10.01.06.03665	-
SC 090 G1/8-AG	-	10.01.06.03269
SC 090 G1/8-IG	-	10.01.06.03272
SC 090 G1/4-AG	-	10.01.06.02793
SC 090 G1/4-IG	-	10.01.06.03273
SC 090 G3/8-AG	-	10.01.06.02791
SC 090 G3/8-IG	-	10.01.06.03274
SC 090 G1/2-AG	-	10.01.06.02595
SC 090 G1/2-IG	-	10.01.06.02596
SC 090 NPT1/4-AG	-	10.01.06.03666
SC 090 NPT1/4-IG	-	10.01.06.03667
SC 090NPT3/8-AG	-	10.01.06.03668
SC 090NPT3/8-IG	-	10.01.06.03669

Ordering Data Accessories Bellows Suction Cups SPB4 (4.5 Folds)

Type	Filter screen	Hose clamp	Insert disc SPPI
SPB4 20 SI-55 SC080	10.07.01.00320	10.07.10.00002	10.01.06.02915
SPB4 20 SI-HD SC080	10.07.01.00320	10.07.10.00002	10.01.06.02915
SPB4 30 SI-55 SC080	10.07.01.00320	10.07.10.00002	10.01.06.02855
SPB4 30 SI-HD SC080	10.07.01.00320	10.07.10.00002	10.01.06.02855
SPB4 40 SI-55 SC090	10.07.01.00321	10.07.10.00003	10.01.06.02856
SPB4 40 SI-HD SC090	10.07.01.00321	10.07.10.00003	10.01.06.02856
SPB4 50 SI-55 SC090	10.07.01.00321	10.07.10.00003	10.01.06.02916
SPB4 50 SI-HD SC090	10.07.01.00321	10.07.10.00003	10.01.06.02916

Technical Data Bellows Suction Cups (4.5 Folds)

Type	Suction force [N] at -200 mbar*	Suction force [N] at -400 mbar*	Suction force [N] at -600 mbar*	Pull-off force [N] at -200 mbar	Pull-off force [N] at -400 mbar	Volume [cm³]	Type Connection element
SPB4 20 SI-55 SC080	2.6	5.3	8	4.9	7	7.9	SC 080
SPB4 20 SI-HD SC080	2.6	5.3	8	4.9	7	7.9	SC 080
SPB4 30 SI-55 SC080	5.3	10.6	16	9.9	13	15.6	SC 080
SPB4 30 SI-HD SC080	5.3	10.6	16	9.9	13	15.6	SC 080
SPB4 40 SI-55 SC090	8.3	16.6	25	14.1	23	35.7	SC 090
SPB4 40 SI-HD SC090	8.3	16.6	25	14.1	23	35.7	SC 090
SPB4 50 SI-55 SC090	16.5	33.0	50	22.0	37	64.5	SC 090
SPB4 50 SI-HD SC090	16.5	33.0	50	22.0	37	64.5	SC 090

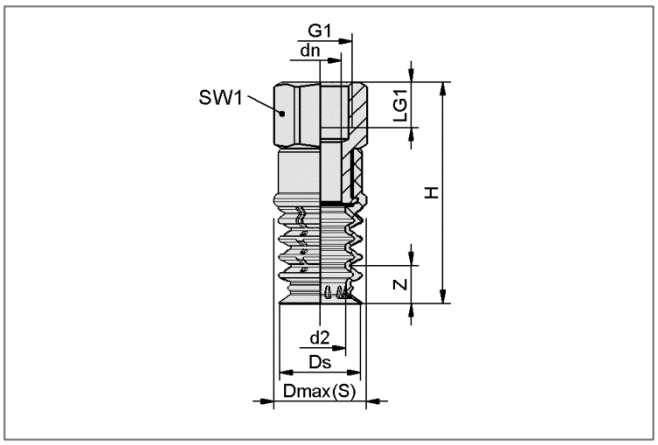
*The specified suction forces are theoretical values with a smooth, dry workpiece surface – they do not include a safety factor

Suction Cups for Bags and Pouches

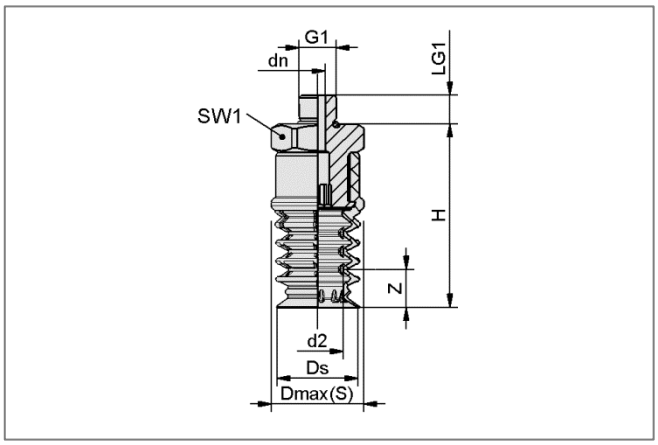
Bellows Suction Cups SPB4 (4.5 Folds)

Suction area (Ø) from 20 mm to 50 mm

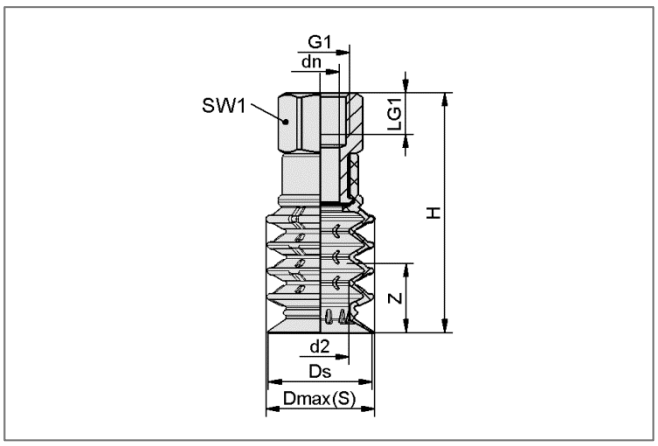
Design Data Bellows Suction Cups SPB4 (4.5 Folds)



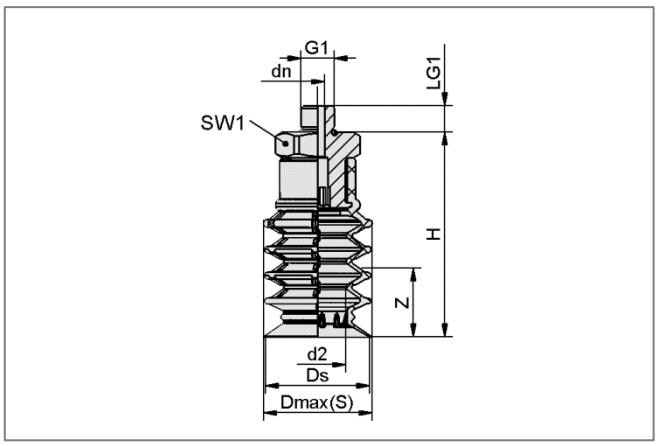
SPB4 20 IG



SPB4 20 AG



SPB4 30…50 IG



SPB4 30…50 AG

Suction Cups for Bags and Pouches

Bellows Suction Cups SPB4 (4.5 Folds)

Suction area (Ø) from 20 mm to 50 mm

Type	Dimensions in mm*								
	dn	d2	Dmax(S)**	Ds	G1	H	LG1	SW1	Z (Stroke)
SPB4 20 SI-55 G1/8-AG	4.0	13.5	24.4	21.4	G1/8“-M	48	7.5	22	10
SPB4 20 SI-55 G1/4-AG	8.0	13.5	24.4	21.4	G1/4“-M	48	10.0	22	10
SPB4 20 SI-55 G3/8-AG	10.3	13.5	24.4	21.4	G3/8“-M	48	10.0	22	10
SPB4 20 SI-55 G1/8-IG	8.6	13.5	24.4	21.4	G1/8“-F	58	12.0	22	10
SPB4 20 SI-55 G1/4-IG	11.0	13.5	24.4	21.4	G1/4“-F	58	12.0	22	10
SPB4 20 SI-55 G3/8-IG	11.0	13.5	24.4	21.4	G3/8“-F	58	12.0	22	10
SPB4 30 SI-55 G1/8-AG	4.0	17.0	31.5	30.2	G1/8“-M	60	7.5	22	20
SPB4 30 SI-55 G1/4-AG	8.0	17.0	31.5	30.2	G1/4“-M	60	10.0	22	20
SPB4 30 SI-55 G3/8-AG	10.3	17.0	31.5	30.2	G3/8“-M	60	10.0	22	20
SPB4 30 SI-55 G1/8-IG	8.6	17.0	31.5	30.2	G1/8“-F	70	12.0	22	20
SPB4 30 SI-55 G1/4-IG	11.0	17.0	31.5	30.2	G1/4“-F	70	12.0	22	20
SPB4 30 SI-55 G3/8-IG	11.0	17.0	31.5	30.2	G3/8“-F	70	12.0	22	20
SPB4 40 SI-55 G1/4-AG	8.0	23.0	41.5	40.5	G1/4“-M	73	10.0	27	27
SPB4 40 SI-55 G3/8-AG	10.3	23.0	41.5	40.5	G3/8“-M	73	10.0	27	27
SPB4 40 SI-55 G1/2-AG	15.0	23.0	41.5	40.5	G1/2“-M	73	14.0	27	27
SPB4 40 SI-55 G1/4-IG	11.4	23.0	41.5	40.5	G1/4“-F	87	12.0	27	27
SPB4 40 SI-55 G3/8-IG	15.0	23.0	41.5	40.5	G3/8“-F	87	12.0	27	27
SPB4 40 SI-55 G1/2-IG	15.0	23.0	41.5	40.5	G1/2“-F	87	16.0	27	27
SPB4 50 SI-55 G1/4-AG	8.0	30.0	51.5	50.3	G1/4“-M	84	10.0	27	37
SPB4 50 SI-55 G3/8-AG	10.3	30.0	51.5	50.3	G3/8“-M	84	10.0	27	37
SPB4 50 SI-55 G1/2-AG	15.0	30.0	51.5	50.3	G1/2“-M	84	14.0	27	37
SPB4 50 SI-55 G1/4-IG	11.4	30.0	51.5	50.3	G1/4“-F	98	12.0	27	37
SPB4 50 SI-55 G3/8-IG	15.0	30.0	51.5	50.3	G3/8“-F	98	12.0	27	37
SPB4 50 SI-55 G1/2-IG	15.0	30.0	51.5	50.3	G1/2“-F	98	16.0	27	37

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

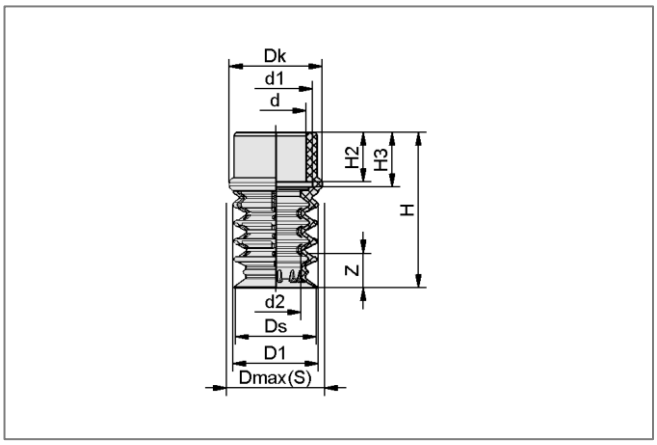
**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

Suction Cups for Bags and Pouches

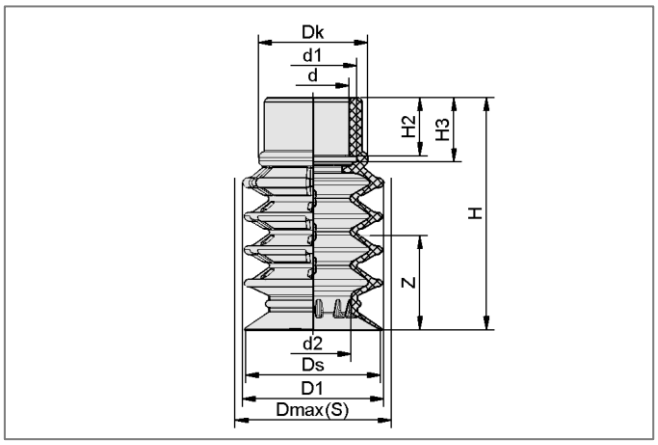
Bellows Suction Cups SPB4 (4.5 Folds)

Suction area (Ø) from 20 mm to 50 mm

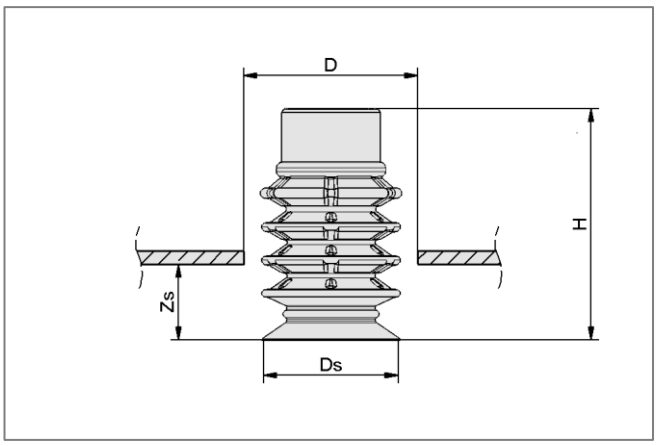
Design Data Bellows Suction Cups SPB4 (4.5 Folds)



SPB4 20



SPB4 30…50



Installation instructions when using a support plate

Type	Dimensions in mm*												
	d	d1	d2	D**	D1	Dk	Dmax(S)***	Ds	H	H2	H3	Z (Stroke)	Zs
SPB4 20 SI-55 SC 080	16	19.6	13.5	30	22.0	24	24.4	21.4	41	13	14.4	10	8
SPB4 20 SI-HD SC 080	16	19.6	13.5	30	22.0	24	24.4	21.4	41	13	14.4	10	8
SPB4 30 SI-55 SC 080	16	19.6	17.0	39	31.0	24	31.5	30.2	52	13	14.4	20	17
SPB4 30 SI-HD SC 080	16	19.6	17.0	39	31.0	24	31.5	30.2	52	13	14.4	20	17
SPB4 40 SI-55SC 090	20	24.8	23.0	51	41.0	31	41.5	40.5	66	14	16.0	27	25
SPB4 40 SI-HD SC 090	20	24.8	23.0	51	41.0	31	41.5	40.5	66	14	16.0	27	25
SPB4 50 SI-55 SC 090	20	24.8	30.0	61	51.0	31	51.5	50.3	76	14	16.0	37	35
SPB4 50 Si-HD SC 090	20	24.8	30.0	61	51.0	31	51.5	30.3	76	14	16.0	37	35

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**These parameters ensure that the suction cup seal on the packaging is correct and that the shear force is maximized when using a support plate

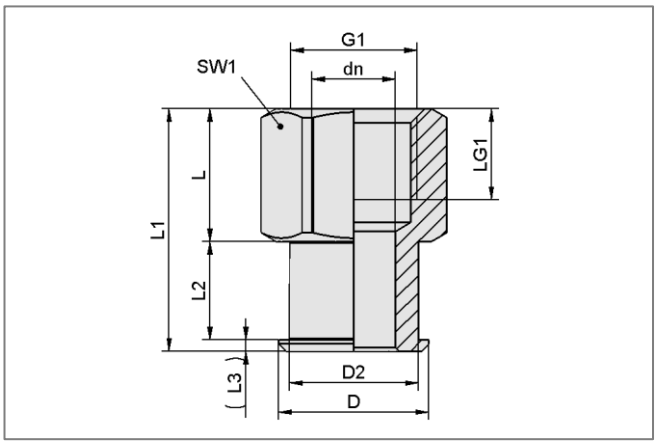
***External dimension of the suction cup when it is pressed against the workpiece by the vacuum

Suction Cups for Bags and Pouches

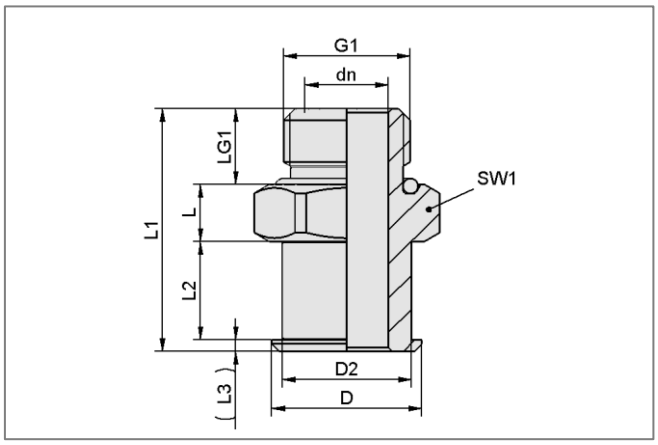
Bellows Suction Cups SPB4 (4.5 Folds)

Suction area (Ø) from 20 mm to 50 mm

Design Data Connection Elements Bellows Suction Cups SPB4 (4.5 Folds)



SC...IG



SC...AG

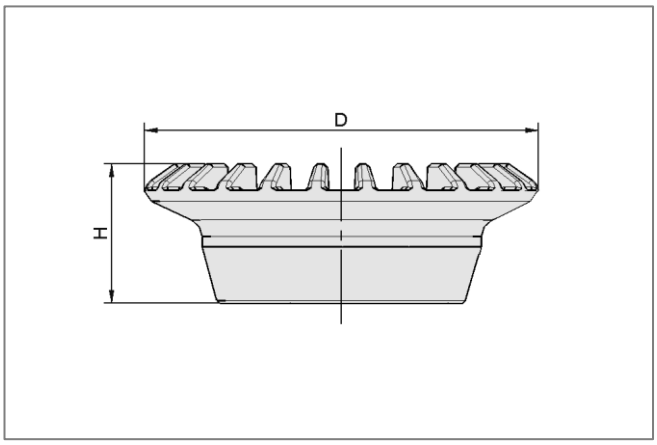
Type	Dimensions in mm									
	D	D2	dn	G1	L	L1	L2	L3	LG1	SW1
SC 080 G1/8-AG	19.8	17	4	G1/8"-M	7.5	28	13	1.5	8	22
SC 080 G1/8-IG	19.8	17	9	G1/8"-F	17.5	32	13	1.5	12	22
SC 080 G1/4-AG	19.8	17	8	G1/4"-M	7.5	32	13	1.5	10	22
SC 080 G1/4-IG	19.8	17	11	G1/4"-F	17.5	32	13	1.5	12	22
SC 080 G3/8-AG	19.8	17	10	G3/8"-M	7.5	32	13	1.5	10	22
SC 080 G3/8-IG	19.8	17	11	G3/8"-F	17.5	32	13	1.5	12	22
SC 080 NPT1/4-AG	19.8	17	8	NPT1/4-M	7.5	32	13	1.5	10	22
SC 080 NPT1/4-IG	19.8	17	10	NPT1/4-F	17.5	32	13	1.5	13	22
SC 080 NPT3/8-AG	19.8	17	10	NPT3/8-M	7.5	32	13	1.5	10	22
SC 080 NPT3/8-IG	19.8	17	10	NPTF3/8-F	17.5	32	13	1.5	13	22
SC 090 G1/8-AG	25.0	21	4	G1/8"-M	7.5	31	14	2.0	8	27
SC 090 G1/8-IG	25.0	21	9	G1/8"-F	21.5	38	14	2.0	12	27
SC 090 G1/4-AG	25.0	21	8	G1/4"-M	7.5	34	14	2.0	10	27
SC 090 G1/4-IG	25.0	21	11	G1/4"-F	21.5	38	14	2.0	12	27
SC 090 G3/8-AG	25.0	21	10	G3/8"-M	7.5	34	14	2.0	10	27
SC 090 G3/8-IG	25.0	21	15	G3/8"-F	21.5	38	14	2.0	12	27
SC 090 G1/2-AG	25.0	21	15	G1/2"-M	7.5	38	14	2.0	14	27
SC 090 G1/2-IG	25.0	21	15	G1/2"-F	21.5	38	14	2.0	16	27
SC 090 NPT1/4-AG	25.0	21	8	NPT1/4-M	10.0	36	14	2.0	10	27
SC 090 NPT1/4-IG	25.0	21	10	NPT1/4-F	21.5	38	14	2.0	14	27
SC 090 NPT3/8-AG	25.0	21	10	NPT3/8-M	10.0	36	14	2.0	10	27
SC 090 NPT3/8-IG	25.0	21	10	NPTF3/8-F	21.5	38	14	2.0	13	27

Suction Cups for Bags and Pouches

Bellows Suction Cups SPB4 (4.5 Folds)

Suction area (Ø) from 20 mm to 50 mm

Design Data Suction Cup Inserts SPI (for SPB4)



SPI

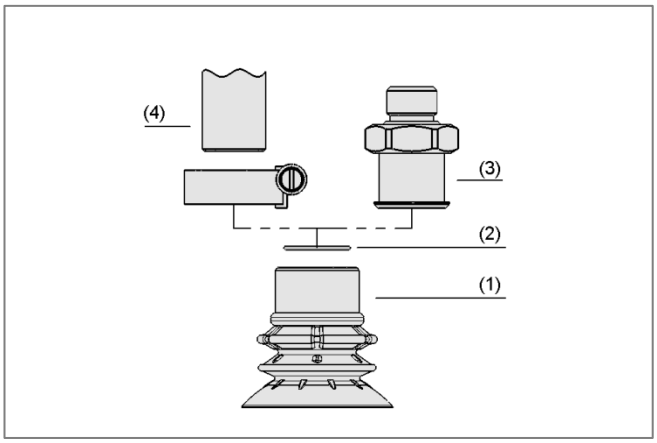
Type	Dimensions in mm For suction cup type	D	H
SPI 16 PE	SPB4 20	16	7.5
SPI 24 PE	SPB4 30	24	9.5
SPI 32 PE	SPB4 40	32	11.5
SPI 42 PE	SPB4 50	42	15.0

Suction Cups for Bags and Pouches

Bellows Suction Cups SPB2f (2.5 Folds)

Suction area (Ø) from 30 mm to 50 mm

Bellows Suction Cups SPB2f (2.5 Folds)



System design bellows Suction Cups SPB2f (2.5 Folds)

Bellows Suction Cups SPB2f for handling bags

Suitability for Industry-Specific Applications

Applications

- Round bellows suction cup with 2.5 folds for the dynamic handling of bags and other very flexible packaging
- Reliable gripping and handling especially of bags and packaging with low filling degree as well as liquid, solid or powder filled pouches
- Stability in fast packaging processes, particularly together with delta robots (case packers and pick-and-place applications)

Design

- Bellows suction cup SPB2f with 2.5 folds (1) as well as soft, flexible sealing lip with segmented flow fins and integrated bag stabilizer
- Very large shaft diameter for high volume flow rates
- Special reinforced bellows for additional stability
- Installation using the Schmalz connection element SC (3); alternatively by attaching directly onto a 3/8" or 1/2" pipe (4) on the machine side and fixing with a hose clamp
- All connection elements SC with male thread are equipped with an integrated sealing ring
- Optional filter as pre-filter (2) (250 µm filter pore size)

Our Highlights...	Your Benefits...
• Extremely flexible and adaptable sealing lip with flow fins	> Optimal sealing on bags, even with strong wrinkles, low filling degree or during swivel motion
• Integrated bag stabilizer	> Bag stabilization; even thin and soft plastic films (LDPE) are not drawn in
• Compact, reinforced basic body with 2.5 folds	> Safe, stable gripping, even at high speeds; no swinging of the workpiece
• Very large nominal diameter	> High volume flow rates and short cycle times
• Suction cup made from FDA compliant silicone	> Can be used directly in the food industry

Suction Cups for Bags and Pouches

Bellows Suction Cups SPB2f (2.5 Folds)

Suction area (Ø) from 30 mm to 50 mm

Designation Code Bellows Suction Cups SPB2f (2.5 Folds)

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Connection thread
Example SPB2f 30 SI-55 G1/8-AG:			
SPB2f	**30**	**SI-55**	**G1/8-AG**
SPB2f	30 to 50	SI-55	G1/8-AG (AG = male (M)) G1/8-IG (IG = female (F)) G1/4-AG G1/4-IG G3/8-AG G3/8-IG

Ordering Data Bellows Suction Cups SPB2f (2.5 Folds)

Suction cup SPB2f (elastomer part + connection element) is delivered assembled. As an alternative the individual parts can also be ordered separately. To do this, the following ordering steps are required:

- Suction cup of type SPB2f (step 1) - elastomer part, available in various diameters
- Connection element of type SC (step 2) - available with various threads

Bellows Suction Cups SPB2f (2.5 Folds) (Mounted)

Type	Part Number
SPB2f 30 SI-55 G1/8-AG	10.01.06.03698
SPB2f 30 SI-55 G1/8-IG	10.01.06.03699
SPB2f 30 SI-55 G1/4-AG	10.01.06.03700
SPB2f 30 SI-55 G1/4-IG	10.01.06.03701
SPB2f 30 SI-55 G3/8-AG	10.01.06.03702
SPB2f 30 SI-55 G3/8-IG	10.01.06.03703
SPB2f 40 SI-55 G1/8-AG	10.01.06.03646
SPB2f 40 SI-55 G1/8-IG	10.01.06.03647
SPB2f 40 SI-55 G1/4-AG	10.01.06.03648
SPB2f 40 SI-55 G1/4-IG	10.01.06.03649
SPB2f 40 SI-55 G3/8-AG	10.01.06.03650
SPB2f 40 SI-55 G3/8-IG	10.01.06.03651
SPB2f 50 SI-55 G1/8-AG	10.01.06.03652
SPB2f 50 SI-55 G1/8-IG	10.01.06.03653
SPB2f 50 SI-55 G1/4-AG	10.01.06.03654
SPB2f 50 SI-55 G1/4-IG	10.01.06.03655
SPB2f 50 SI-55 G3/8-AG	10.01.06.03656
SPB2f 50 SI-55 G3/8-IG	10.01.06.03657
SPB2f 50 SI-55 G1/2-AG	10.01.06.03658
SPB2f 50 SI-55 G1/2-IG	10.01.06.03659

Step 1: Bellows Suction Cups SPB2f (2.5 Folds) (Single Component)

Type	Part Number
SPB2f 30 SI-55 SC080	10.01.06.03643
SPB2f 40 SI-55 SC080	10.01.06.03559
SPB2f 50 SI-55 SC090	10.01.06.03560

Suction Cups for Bags and Pouches

Bellows Suction Cups SPB2f (2.5 Folds)

Suction area (Ø) from 30 mm to 50 mm

Step 2: Connection Elements Bellows Suction Cups SPB2f (2.5 Folds)

Type	SPB2f 30…40	SPB2f 50
SC 080 G1/8-AG	10.01.06.03142	-
SC 080 G1/8-IG	10.01.06.03270	-
SC 080 G1/4-AG	10.01.06.03268	-
SC 080 G1/4-IG	10.01.06.03271	-
SC 080 G3/8-AG	10.01.06.02593	-
SC 080 G3/8-IG	10.01.06.02594	-
SC 080 NPT1/4-AG	10.01.06.03662	-
SC 080 NPT1/4-IG	10.01.06.03663	-
SC 080 NPT3/8-AG	10.01.06.03664	-
SC 080 NPT3/8-IG	10.01.06.03665	-
SC 090 G1/8-AG	-	10.01.06.03269
SC 090 G1/8-IG	-	10.01.06.03272
SC 090 G1/4-AG	-	10.01.06.02793
SC 090 G1/4-IG	-	10.01.06.03273
SC 090 G3/8-AG	-	10.01.06.02791
SC 090 G3/8-IG	-	10.01.06.03274
SC 090 G1/2-AG	-	10.01.06.02595
SC 090 G1/2-IG	-	10.01.06.02596
SC 090 NPT1/4-AG	-	10.01.06.03666
SC 090 NPT1/4-IG	-	10.01.06.03667
SC 090 NPT3/8-AG	-	10.01.06.03668
SC 090 NPT3/8-IG	-	10.01.06.03669

Technical Data Bellows Suction Cups SPB2f (2.5 Folds)

Type	Suction force [N] at -200 mbar*	Suction force [N] at -400 mbar*	Suction force [N] at -600 mbar*	Volume [cm³]	Type Connection element
SPB2f 30 SI-55 SC080	4.3	8.5	12.8	7.2	SC 080
SPB2f 40 SI-55 SC080	6.8	13.6	20.4	12.9	SC 080
SPB2f 50 SI-55 SC090	13.7	27.3	41.0	26.5	SC 090

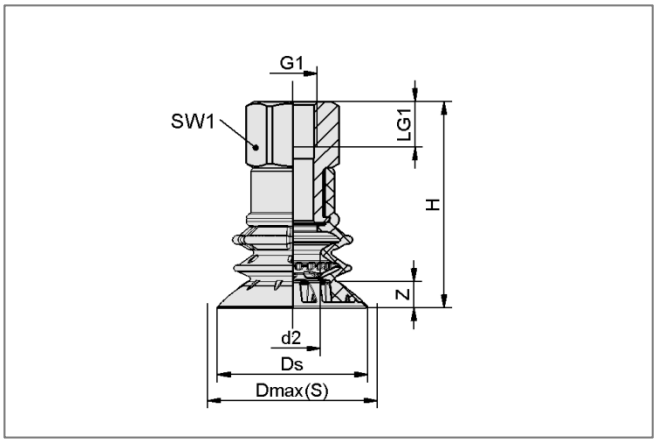
*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include safety factors

Suction Cups for Bags and Pouches

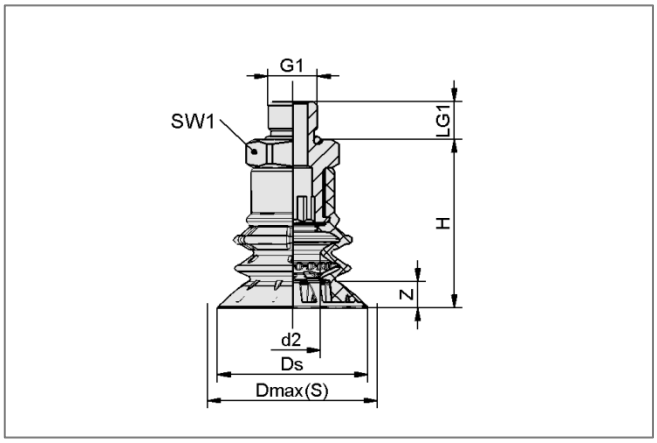
Bellows Suction Cups SPB2f (2.5 Folds)

Suction area (Ø) from 30 mm to 50 mm

Design Data Bellows Suction Cups SPB2f (2.5 Folds)



SPB2f…IG



SPB2f…AG

Type	Dimensions in mm*							
	d2	Dmax(S)**	Ds	G1	H	LG1	SW1	Z (Stroke)
SPB2f 30 SI-55 G1/8-AG	7.2	32.0	30.0	G1/8"-M	40	7.5	22.0	5
SPB2f 30 SI-55 G1/8-IG	7.2	32.0	30.0	G1/8"-F	50	12.0	22.0	5
SPB2f 30 SI-55 G1/4-AG	7.2	32.0	30.0	G1/4"-M	40	10.0	22.0	5
SPB2f 30 SI-55 G1/4-IG	7.2	32.0	30.0	G1/4"-F	50	12.0	22.0	5
SPB2f 30 SI-55 G3/8-AG	7.2	32.0	30.0	G3/8"-M	40	10.0	22.0	5
SPB2f 30 SI-55 G3/8-IG	7.2	32.0	30.0	G3/8"-F	50	12.0	22.0	5
SPB2f 40 SI-55 G1/8-AG	15.3	42.0	39.7	G1/8"-M	45	7.5	22.0	7
SPB2f 40 SI-55 G1/8-IG	15.3	42.0	39.7	G1/8"-F	55	12.0	22.0	7
SPB2f 40 SI-55 G1/4-AG	15.3	42.0	39.7	G1/4"-M	45	10.0	22.0	7
SPB2f 40 SI-55 G1/4-IG	15.3	42.0	39.7	G1/4"-F	55	12.0	22.0	7
SPB2f 40 SI-55 G3/8-AG	15.3	42.0	39.7	G3/8"-M	45	10.0	22.0	7
SPB2f 40 SI-55 G3/8-IG	15.3	42.0	39.7	G3/8"-F	55	12.0	22.0	7
SPB2f 50 SI-55 G1/8-AG	21.0	52.0	49.7	G1/8"-M	53	7.5	27.0	9
SPB2f 50 SI-55 G1/8-IG	21.0	52.0	49.7	G1/8"-F	67	12.0	27.0	9
SPB2f 50 SI-55 G1/4-AG	21.0	52.0	49.7	G1/4"-M	53	10.0	27.0	9
SPB2f 50 SI-55 G1/4-IG	21.0	52.0	49.7	G1/4"-F	67	12.0	27.0	9
SPB2f 50 SI-55 G3/8-AG	21.0	52.0	49.7	G3/8"-M	53	10.0	27.0	9
SPB2f 50 SI-55 G3/8-IG	21.0	52.0	49.7	G3/8"-F	67	12.0	27.0	9
SPB2f 50 SI-55 G1/2-AG	21.0	52.0	49.7	G1/2"-M	53	14.0	27.0	9
SPB2f 50 SI-55 G1/2-IG	21.0	52.0	49.7	G1/2"-F	67	16.0	27.0	9

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

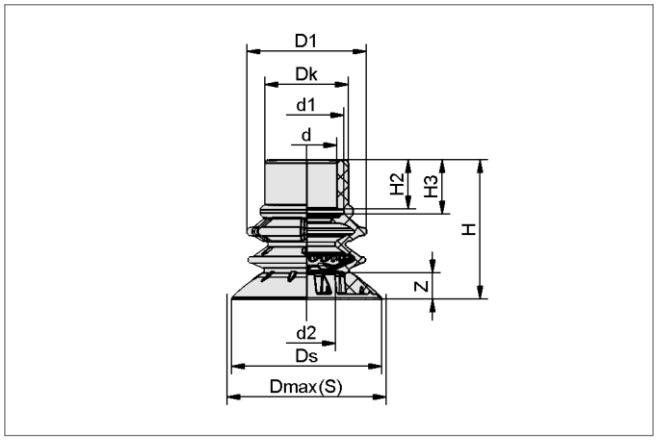
**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

Suction Cups for Bags and Pouches

Bellows Suction Cups SPB2f (2.5 Folds)

Suction area (Ø) from 30 mm to 50 mm

Design Data Bellows Suction Cups SPB2f (2.5 Folds)



SPB2f 30…50

Type	Dimensions in mm*										
	d	d1	d2	D1	Dk	Dmax(S)**	Ds	H	H2	H3	Z (Stroke)
SPB2f 30 SI-55 SC080	16.0	19.6	7.2	24.4	22.0	32.0	30.0	32	13.0	14.4	5
SPB2f 40 SI-55 SC080	16.0	19.6	15.3	31.6	24.4	42.0	39.7	37	13.0	14.4	7
SPB2f 50 SI-55 SC090	20.0	24.8	21.0	41.6	31.0	52.0	49.7	46	14.0	16.0	9

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

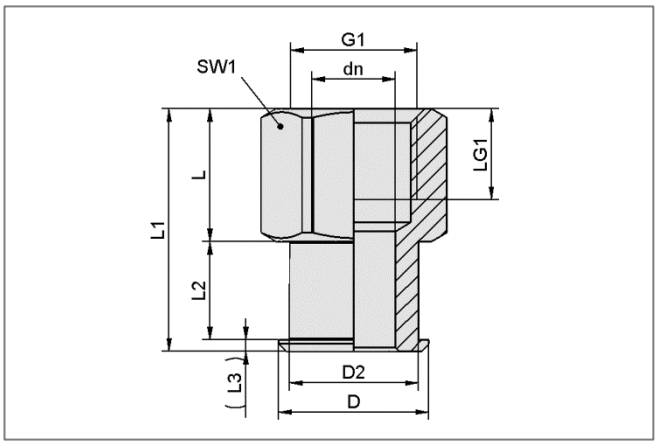
**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

Suction Cups for Bags and Pouches

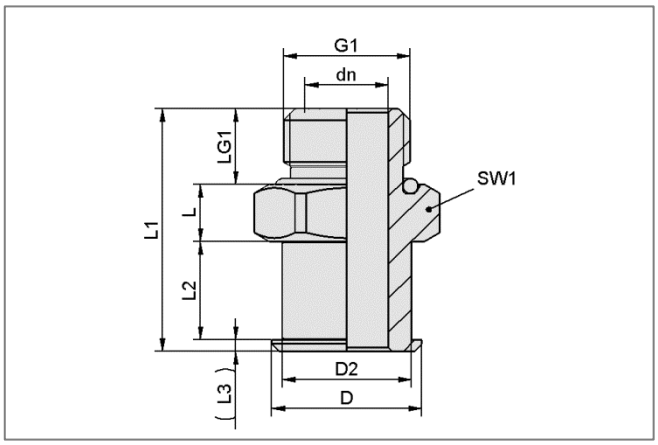
Bellows Suction Cups SPB2f (2.5 Folds)

Suction area (Ø) from 30 mm to 50 mm

Design Data Connection Elements Bellows Suction Cups SPB2f



SC…IG



SC…AG

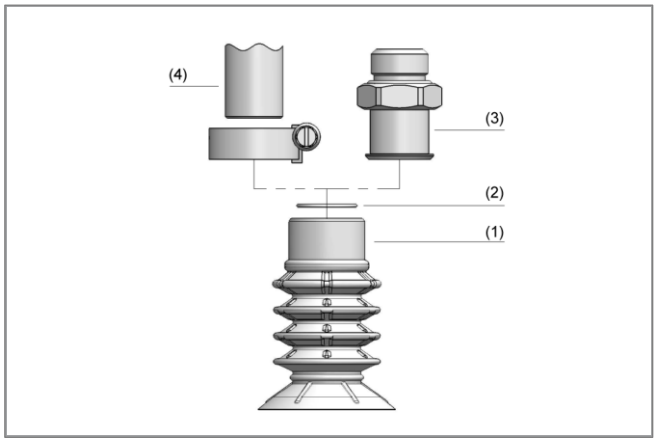
Type	Dimensions in mm									
	D	D2	dn	G1	L	L1	L2	L3	LG1	SW1
SC 080 G1/8-AG	19.8	17	4	G1/8"-M	7.5	28.0	13.0	1.5	7.5	22
SC 080 G1/8-IG	19.8	17	9	G1/8"-F	17.5	32.0	13.0	1.5	12.0	22
SC 080 G1/4-AG	19.8	17	8	G1/4"-M	7.5	32.0	13.0	1.5	10.0	22
SC 080 G1/4-IG	19.8	17	11	G1/4"-F	17.5	32.0	13.0	1.5	12.0	22
SC 080 G3/8-AG	19.8	17	10	G3/8"-M	7.5	32.0	13.0	1.5	10.0	22
SC 080 G3/8-IG	19.8	17	11	G3/8"-F	17.5	32.0	13.0	1.5	12.0	22
SC 080 NPT1/4-AG	19.8	17	8	NPT1/4-M	7.5	32.2	13.0	1.5	10.2	22
SC 080 NPT1/4-IG	19.8	17	10	NPT1/4-F	17.5	32.0	13.0	1.5	12.8	22
SC 080 NPT3/8-AG	19.8	17	10	NPT3/8-M	7.5	32.4	13.0	1.5	10.4	22
SC 080 NPT3/8-IG	19.8	17	10	NPTF3/8-F	17.5	32.0	13.0	1.5	12.8	22
SC 090 G1/8-AG	25.0	21	4	G1/8"-M	7.5	31.0	14.0	2.0	7.5	27
SC 090 G1/8-IG	25.0	21	9	G1/8"-F	21.5	37.5	14.0	2.0	12.0	27
SC 090 G1/4-AG	25.0	21	8	G1/4"-M	7.5	33.5	14.0	2.0	10.0	27
SC 090 G1/4-IG	25.0	21	11	G1/4"-F	21.5	37.5	14.0	2.0	12.0	27
SC 090 G3/8-AG	25.0	21	10	G3/8"-M	7.5	33.5	14.0	2.0	10.0	27
SC 090 G3/8-IG	25.0	21	15	G3/8"-F	21.5	37.5	14.0	2.0	12.0	27
SC 090 G1/2-AG	25.0	21	15	G1/2"-M	7.5	37.5	14.0	2.0	14.0	27
SC 090 G1/2-IG	25.0	21	15	G1/2"-F	21.5	37.5	14.0	2.0	16.0	27
SC 090 NPT1/4-AG	25.0	21	8	NPT1/4-M	10.0	36.2	14.0	2.0	10.2	27
SC 090 NPT1/4-IG	25.0	21	10	NPT1/4-F	21.5	37.5	14.0	2.0	13.8	27
SC 090 NPT3/8-AG	25.0	21	10	NPT3/8-M	10.0	36.4	14.0	2.0	10.4	27
SC 090 NPT3/8-IG	25.0	21	10	NPTF3/8-F	21.5	37.5	14.0	2.0	12.8	27

Suction Cups for Bags and Pouches

Bellows Suction Cups SPB4f (4.5 Folds)

Suction area (Ø) from 30 mm to 50 mm

Bellows suction cups SPB4f (4.5 Folds)



System design bellows suction cups SPB4f (4.5 Folds)

Bellows suction cup SPB4f for handling pouches

Suitability for Industry-Specific Applications

Applications

- Bellows suction cup for handling bags and other very flexible packaging
- Reliable gripping and handling especially of bags and packaging with low filling degree as well as liquid, solid or powder filled pouches
- For use in fast packaging processes, particularly together with delta robots (case packers and pick-and-place applications)
- Handling of abrasive bags (bags coated with dust or pouder) longevity by heavy duty silicone SI-HD

Design

- Bellows suction cup SPB4f with 4.5 folds (1) and integrated bag stabilizer
- Very large shaft diameter for high volume flow rates
- Installation using the Schmalz connection element SC (3); alternatively by attaching directly onto a 3/8‘‘ or 1/2‘‘ pipe (4) on the machine side and fixing with a hose clamp
- All connection elements with a male thread are equipped with an integrated sealing lip
- Flexible sealing lip with segmented flow fins
- Optional pre-filter (2)

Our Highlights...	Your Benefits...
• Extremely flexible and adaptable sealing lip	> Optimal sealing on bags, even with strong wrinkles, low filling degree or during swivel motion
• Integrated bag stabilizer	> Additional bag stabilization; even thin and soft plastic films (LDPE) are not drawn in
• Reinforced body and folds	> Secure gripping with high lateral loads and swinging workpieces
• Very large nominal diameter for high volume flow rates	> Designed for operation using pumps, blowers and multi-stage ejectors
• Suction cup made of FDA-compliant silicone	> Can be used directly in the food industry

Suction Cups for Bags and Pouches

Bellows Suction Cups SPB4f (4.5 Folds)

Suction area (Ø) from 30 mm to 50 mm

Designation Code Bellows Suction Cups SPB4f (4.5 Folds)

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Connection thread
Example SPB4f 40 SI-55 G1/8-IG:			
SPB4f	**40**	**SI-55**	**G1/8-IG**
SPB4f	30 40 50	SI-55 SI-HD	G1/8-AG G1/8-IG G1/4-AG G1/4-IG G3/8-AG G3/8-IG G1/2-AG G1/2-IG

Ordering Data Bellows Suction Cups SPB4f (4.5 Folds)

Suction cup SPB4f (elastomer part + connection element) with integrated bag stabilizer is delivered assembled. As an alternative the individual parts can also be ordered separately. To do this, the following ordering steps are required:

- Suction cup of type SPB4f (step 1) – elastomer part, available in various diameters
- Connection element of type SC (step 2) – available with various threads

Available accessories: filter screen, hose clamp

Bellows Suction Cups SPB4f (4.5 Folds) (Mounted)

Type	Part Number
SPB4f 30 SI-55 G1/8-AG	10.01.06.03538
SPB4f 30 SI-55 G1/4-AG	10.01.06.03539
SPB4f 30 SI-55 G3/8-AG	10.01.06.03540
SPB4f 30 SI-55 G1/8-IG	10.01.06.03541
SPB4f 30 SI-55 G1/4-IG	10.01.06.03542
SPB4f 30 SI-55 G3/8-IG	10.01.06.03543
SPB4f 40 SI-55 G1/8-AG	10.01.06.03544
SPB4f 40 SI-55 G1/4-AG	10.01.06.03545
SPB4f 40 SI-55 G3/8-AG	10.01.06.03546
SPB4f 40 SI-55 G1/8-IG	10.01.06.03547
SPB4f 40 SI-55 G1/4-IG	10.01.06.03548
SPB4f 40 SI-55 G3/8-IG	10.01.06.03549
SPB4f 50 SI-55 G1/8-AG	10.01.06.03550
SPB4f 50 SI-55 G1/4-AG	10.01.06.03551
SPB4f 50 SI-55 G3/8-AG	10.01.06.03552
SPB4f 50 SI-55 G1/2-AG	10.01.06.03553
SPB4f 50 SI-55 G1/8-IG	10.01.06.03554
SPB4f 50 SI-55 G1/4-IG	10.01.06.03555
SPB4f 50 SI-55 G3/8-IG	10.01.06.03556
SPB4f 50 SI-55 G1/2-IG	10.01.06.03557

Step 1: Bellows Suction Cups SPB4f (4.5 Folds)

Type	Part Number
SPB4f 30 SI-55 SC080	10.01.06.03264
SPB4f 30 SI-HD SC080	10.01.06.03563
SPB4f 40 SI-55 SC080	10.01.06.03265
SPB4f 40 SI-HD SC080	10.01.06.03448
SPB4f 50 SI-55 SC090	10.01.06.03266
SPB4f 50 SI-HD SC090	10.01.06.03564

Suction Cups for Bags and Pouches

Bellows Suction Cups SPB4f (4.5 Folds)

Suction area (Ø) from 30 mm to 50 mm

Step 2: Connection Elements Bellows Suction Cups SPB4f (4.5 Folds)

Type	SPB4f 30	SPB4f 40	SPB4f 50
SC080 G1/8-AG	10.01.06.03142	10.01.06.03142	-
SC080 G1/8-IG	10.01.06.03270	10.01.06.03270	-
SC080 G1/4-AG	10.01.06.03268	10.01.06.03268	-
SC080 G1/4-IG	10.01.06.03271	10.01.06.03271	-
SC080 G3/8-AG	10.01.06.02593	10.01.06.02593	-
SC080 G3/8-IG	10.01.06.02594	10.01.06.02594	-
SC080 NPT 1/4-AG	10.01.06.03662	10.01.06.03662	-
SC080 NPT 1/4-IG	10.01.06.03663	10.01.06.03663	-
SC080 NPT 3/8-AG	10.01.06.03664	10.01.06.03664	-
SC080 NPT 3/8-IG	10.01.06.03665	10.01.06.03665	-
SC090 G1/8-AG	-	-	10.01.06.03269
SC090 G1/8-IG	-	-	10.01.06.03272
SC090 G1/4-AG	-	-	10.01.06.02793
SC090 G1/4-IG	-	-	10.01.06.03273
SC090 G3/8-AG	-	-	10.01.06.02791
SC090 G3/8-IG	-	-	10.01.06.03274
SC090 G1/2-AG	-	-	10.01.06.02595
SC090 G1/2-IG	-	-	10.01.06.02596
SC090 NPT 1/4-AG	-	-	10.01.06.03666
SC090 NPT 1/4-IG	-	-	10.01.06.03667
SC090 NPT 3/8-AG	-	-	10.01.06.03668
SC090 NPT 3/8-IG	-	-	10.01.06.03669

Ordering Data Accessories Bellows Suction Cups SPB4f (4.5 Folds)

Type	Filter screen	Hose clamp
SPB4f 30 SI-55 SC080	10.07.01.00320	10.07.10.00002
SPB4f 30 SI-HD SC080	10.07.01.00320	10.07.10.00002
SPB4f 40 SI-55 SC080	10.07.01.00320	10.07.10.00002
SPB4f 40 SI-HD SC080	10.07.01.00320	10.07.10.00002
SPB4f 50 SI-55 SC090	10.07.01.00321	10.07.10.00003
SPB4f 50 SI-HD SC090	10.07.01.00321	10.07.10.00003

Technical Data Bellows Suction Cups SPB4f (4.5 Folds)

Type	Suction force[N] at -200 mbar*	Suction force [N] at -400 mbar*	Suction force [N] at -600 mbar*	Volume [cm³]	Type Connection element
SPB4f 30 SI-55 SC080	4.3	8.5	12.8	6.0	SC 080
SPB4f 30 SI-HD SC080	4.3	8.5	12.8	6.0	SC 080
SPB4f 40 SI-55 SC080	6.8	13.6	20.4	15.1	SC 080
SPB4f 40 SI-HD SC080	6.8	13.6	20.4	15.1	SC 080
SPB4f 50 SI-55 SC090	13.7	27.3	41.0	33.1	SC 090
SPB4f 50 SI-HD SC090	13.7	27.3	41.0	33.1	SC 090

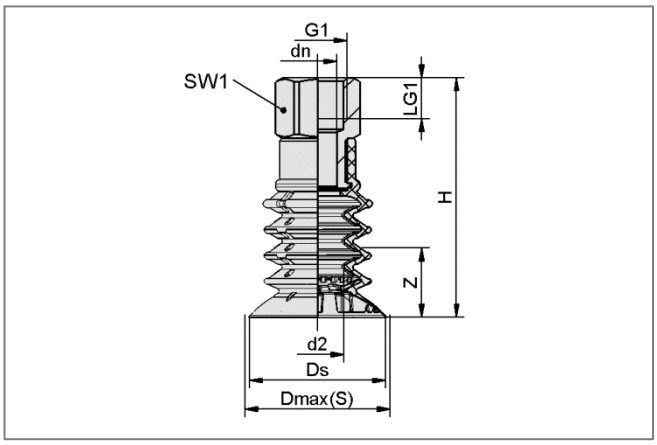
*The specified suction forces are theoretical values with a smooth, dry workpiece surface – they do not include a safety factor

Suction Cups for Bags and Pouches

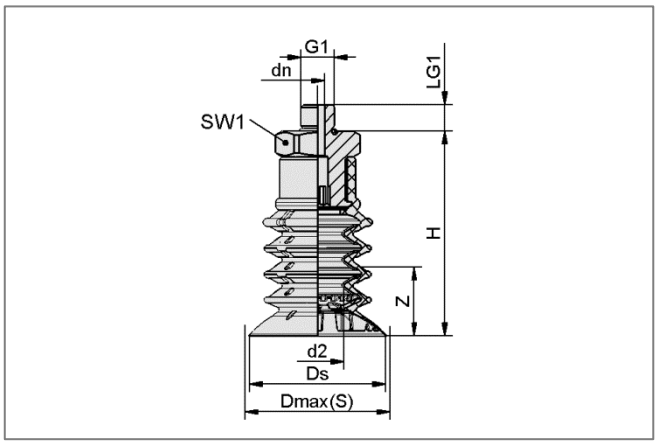
Bellows Suction Cups SPB4f (4.5 Folds)

Suction area (Ø) from 30 mm to 50 mm

Design Data Bellows Suction Cups SPB4f (4.5 Folds)



SPB4f IG



SPB4f AG

Type	Dimensions in mm*								
	dn	d2	Dmax(S)**	Ds	G1	H	LG1	SW1	Z (Stroke)
SPB4f 30 SI-55 G1/8-AG	3.0	12.3	32.0	30.7	G1/8"-M	48	7.5	22	10
SPB4f 30 SI-55 G1/4-AG	8.0	12.3	32.0	30.7	G1/4"-M	48	10.0	22	10
SPB4f 30 SI-55 G3/8-AG	10.3	12.3	32.0	30.7	G3/8"-M	48	10.0	22	10
SPB4f 30 SI-55 G1/8-IG	8.6	12.3	32.0	30.7	G1/8"-F	58	12.0	22	10
SPB4f 30 SI-55 G1/4-IG	11.0	12.3	32.0	30.7	G1/4"-F	58	12.0	22	10
SPB4f 30 SI-55 G3/8-IG	11.0	12.3	32.0	30.7	G3/8"-F	58	12.0	22	10
SPB4f 40 SI-55 G1/8-AG	3.0	15.3	42.0	39.7	G1/8"-M	60	7.5	22	20
SPB4f 40 SI-55 G1/4-AG	8.0	15.3	42.0	39.7	G1/4"-M	60	10.0	22	20
SPB4f 40 SI-55 G3/8-AG	8.0	15.3	42.0	39.7	G3/8"-M	60	10.0	22	20
SPB4f 40 SI-55 G1/8-IG	8.6	15.3	42.0	39.7	G1/8"-F	70	12.0	22	20
SPB4f 40 SI-55 G1/4-IG	11.0	15.3	42.0	39.7	G1/4"-F	70	12.0	22	20
SPB4f 40 SI-55 G3/8-IG	11.0	15.3	42.0	39.7	G3/8"-F	70	12.0	22	20
SPB4f 50 SI-55 G1/8-AG	4.0	21.0	52.0	49.7	G1/8"-M	73	7.5	27	26
SPB4f 50 SI-55 G1/4-AG	8.0	21.0	52.0	49.7	G1/4"-M	73	10.0	27	26
SPB4f 50 SI-55 G3/8-AG	10.3	21.0	52.0	49.7	G3/8"-M	73	10.0	27	26
SPB4f 50 SI-55 G1/2-AG	15.0	21.0	52.0	49.7	G1/2"-M	73	14.0	27	26
SPB4f 50 SI-55 G1/8-IG	8.6	21.0	52.0	49.7	G1/8"-F	87	12.0	27	26
SPB4f 50 SI-55 G1/4-IG	11.4	21.0	52.0	49.7	G1/4"-F	87	12.0	27	26
SPB4f 50 SI-55 G3/8-IG	15.0	21.0	52.0	49.7	G3/8"-F	87	12.0	27	26
SPB4f 50 SI-55 G1/2-IG	15.0	21.0	52.0	49.7	G1/2"-F	87	16.0	27	26

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

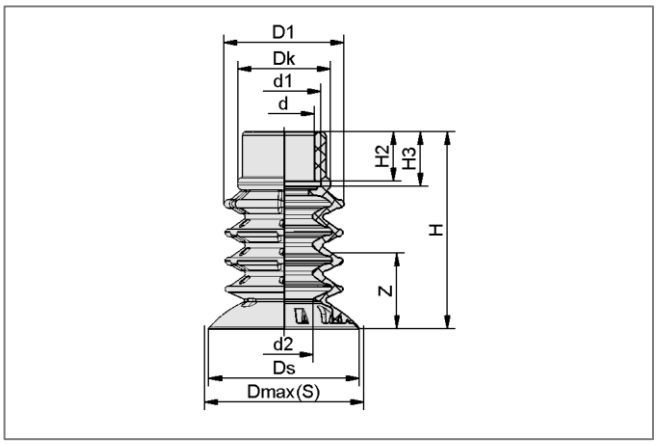
**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

Suction Cups for Bags and Pouches

Bellows Suction Cups SPB4f (4.5 Folds)

Suction area (Ø) from 30 mm to 50 mm

Design Data Bellows Suction Cups SPB4f (4.5 Folds)



SPB4f 30...50

Type	Dimensions in mm*										
	d	d1	d2	D1	Dk	Dmax(S)**	Ds	H	H2	H3	Z (Stroke)
SPB4f 30 SI-55 SC080	16	19.6	12.3	22.4	24.4	32	31	40	13	14.4	10
SPB4f 30 SI-HD SC080	16	19.6	12.3	22.4	24.4	32	31	40	13	14.4	10
SPB4f 40 SI-55 SC080	16	19.6	15.3	31.6	24.4	42	40	52	13	14.4	20
SPB4f 40 SI-HD SC080	16	19.6	15.3	31.6	24.4	42	40	52	13	14.4	20
SPB4f 50 SI-55 SC090	20	24.8	21.0	41.6	31.0	52	50	65	14	16.0	26
SPB4f 50 SI-HD SC090	20	24.8	21.0	41.6	31.0	52	50	65	14	16.0	26

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

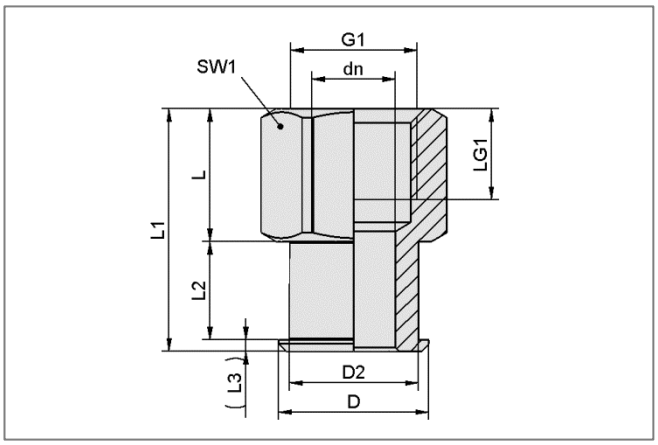
**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

Suction Cups for Bags and Pouches

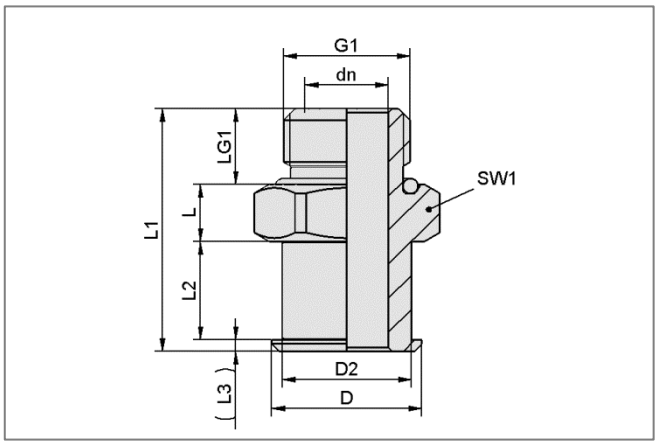
Bellows Suction Cups SPB4f (4.5 Folds)

Suction area (Ø) from 30 mm to 50 mm

Design Data Connection Elements Bellows Suction Cups SPB4f



SC…IG



SC…AG

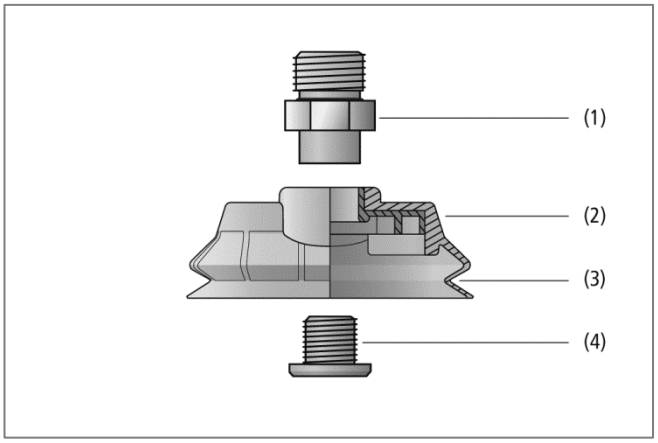
Typ	Dimensions in mm									
	D	D2	dn	G1	L	L1	L2	L3	LG1	SW1
SC 080 G1/8-AG	19.8	17	4	G1/8"-M	7.5	28.0	13.0	1.5	8.0	22
SC 080 G1/8-IG	19.8	17	9	G1/8"-F	17.5	32.0	13.0	1.5	12.0	22
SC 080 G1/4-AG	19.8	17	8	G1/4"-M	7.5	32.0	13.0	1.5	10.0	22
SC 080 G1/4-IG	19.8	17	11	G1/4"-F	17.5	32.0	13.0	1.5	12.0	22
SC 080 G3/8-AG	19.8	17	10	G3/8"-M	7.5	32.0	13.0	1.5	10.0	22
SC 080 G3/8-IG	19.8	17	11	G3/8"-F	17.5	32.0	13.0	1.5	12.0	22
SC 080 NPT1/4-AG	19.8	17	8	NPT1/4-M	7.5	32.2	13.0	1.5	10.2	22
SC 080 NPT1/4-IG	19.8	17	10	NPT1/4-F	17.5	32.0	13.0	1.5	12.8	22
SC 080 NPT3/8-AG	19.8	17	10	NPT3/8-M	7.5	32.4	13.0	1.5	10.4	22
SC 080 NPT3/8-IG	19.8	17	10	NPTF3/8-F	17.5	32.0	13.0	1.5	12.8	22
SC 090 G1/8-AG	25.0	21	4	G1/8"-M	7.5	31.0	14.0	2.0	8.0	27
SC 090 G1/8-IG	25.0	21	9	G1/8"-F	21.5	27.5	14.0	2.0	12.0	27
SC 090 G1/4-AG	25.0	21	8	G1/4"-M	7.5	33.5	14.0	2.0	10.0	27
SC 090 G1/4-IG	25.0	21	11	G1/4"-F	21.5	37.5	14.0	2.0	12.0	27
SC 090 G3/8-AG	25.0	21	10	G3/8"-M	7.5	33.5	14.0	2.0	10.0	27
SC 090 G3/8-IG	25.0	21	15	G3/8"-F	21.5	37.5	14.0	2.0	12.0	27
SC 090 G1/2-AG	25.0	21	15	G1/2"-M	7.5	37.5	14.0	2.0	14.0	27
SC 090 G1/2-IG	25.0	21	15	G1/2"-F	21.5	37.5	14.0	2.0	16.0	27
SC 090 NPT1/4-AG	25.0	21	8	NPT1/4-M	10.0	36.2	14.0	2.0	10.2	27
SC 090 NPT1/4-IG	25.0	21	10	NPT1/4-F	21.5	37.5	14.0	2.0	13.8	27
SC 090 NPT3/8-AG	25.0	21	10	NPT3/8-M	10.0	36.4	14.0	2.0	10.4	27
SC 090 NPT3/8-IG	25.0	21	10	NPTF3/8-F	21.5	37.5	14.0	2.0	12.8	27

Suction Cups for Bags and Pouches

Bellows Suction Cups SPOB1f (Oval, 1.5 Folds)

Suction area (LxW) from 35x15 mm to 80x35 mm

Bellows suction cups SPOB1f (oval, 1.5 Folds)



System design bellows suction cups SPOB1f (oval, 1.5 Folds)

SPOB1f bellows suction cups for handling small flow-wrap packaging

Suitability for Industry-Specific Applications

Applications

- Oval bellows suction cup with 1.5 folds for reliable handling of small, film packaging products such as candy bars, popsicles or bulk materials
- Used in packaging lines for processing bulk material packaging in the case-packing process step
- Handling of small flow-wrap packaging with different fill levels
- Stability and high suction force in rapid packaging processes thanks to its oval shape

Design

- Oval bellows suction cup with 1.5 folds (3) with a very soft and flexible sealing lip
- Integrated anti-rotation guard and easy-to-use function for positioning the suction cup on the workpiece (2)
- Large shaft diameter for high flow rates
- Mounting using one-piece Schmalz SC 040 connection element (1) respectively two-piece Schmalz SC 050 connection element (1) and (4)
- All SC connection elements with male threads come equipped with an integrated sealing ring

Our Highlights...	Your Benefits...
• Oval shape with 1.5 folds	> High holding force and secure gripping even on small workpieces such as tubular bag packaging
• Very flexible and easy-to-adapt sealing lip and suction bellows	> Optimum sealing for bag packaging even when the bags have an extremely large number of folds and are not very full
• Integrated anti-rotation guard	> Simple and reliable positioning of the suction cup on the workpiece (no additional component parts required)
• Large nominal diameter	> High flow rates for short cycle times
• FDA-compliant silicone material	> Capable of direct use in the food product sector

Suction Cups for Bags and Pouches

Bellows Suction Cups SPOB1f (Oval, 1.5 Folds)

Suction area (LxW) from 35x15 mm to 80x35 mm

Designation Code Bellows Suction Cups SPOB1f (Oval, 1.5 Folds)

Abbreviated designation	Suction area LxW in mm	Material and Shore hardness	Type connection element
Example SPOB1f 60x25 SI-55 SC050:			
SPOB1f	**60x25**	**SI-55**	**SC050**
SPOB1f	35x15 60x25 80x35	SI-55	SC040 SC050

Ordering Data Bellows Suction Cups SPOB1f (Oval, 1.5 Folds)

The SPOB1f suction cup (elastomer part + connection element) with integrated bag stabilizer is delivered assembled. As an alternative, the suction cup can be ordered as individual parts. To do this, the following ordering steps are required:

- SPB2f-type suction cup (step 1) - elastomer part, available in a range of different diameters
- SC-type connection element (step 2) - available with a range of different threads

Bellows Suction Cups SPOB1f (Oval, 1.5 Folds) (Mounted)

Type	Part Number
SPOB1f 35x15 SI-55 G1/8-AG	10.01.06.03736
SPOB1f 35x15 SI-55 G1/8-IG	10.01.06.03735
SPOB1f 60x25 SI-55 G1/4-AG	10.01.06.03738
SPOB1f 60x25 SI-55 G1/4-IG	10.01.06.03737
SPOB1f 80x35 SI-55 G1/4-AG	10.01.06.03740
SPOB1f 80x35 SI-55 G1/4-IG	10.01.06.03739

Step 1: Bellows Suction Cups SPOB1f (Oval, 1.5 Folds) (Single Component)

Type	Part Number
SPOB1f 35x15 SI-55 SC040-AR	10.01.06.03625
SPOB1f 60x25 SI-55 SC050-AR	10.01.06.03626
SPOB1f 80x35 SI-55 SC050-AR	10.01.06.03627

Step 2: Connection Elements Bellows Suction Cups SPOB1f (Oval, 1.5 Folds)

Type	SPOB1f 35x15	SPOB1f 60x25	SPOB1f 80x35
SC 040-AR G1/8-AG	10.01.06.02495	-	-
SC 040-AR G1/8-IG	10.01.06.02496	-	-
SC 040-AR NPT1/8-AG	10.01.06.02581	-	-
SC 050-AR G1/4-AG	-	10.01.06.03741	10.01.06.03741
SC 050-AR G1/4-IG	-	10.01.06.03742	10.01.06.03742
SC 050-AR NPT1/4-AG	-	10.01.06.02543	10.01.06.02543
SC 050-AR NPT1/4-IG	-	10.01.06.02546	10.01.06.02546

Technical Data Bellows Suction Cups SPOB1f (Oval, 1.5 Folds)

Type	Suction force [N] at -200 mbar*	Suction force [N] at -400 mbar*	Suction force [N] at -600 mbar*	Volume [cm³]	Min. work-piece width [mm]	Recom. internal hose diameter d [mm]**	Type Connection element
SPOB1f 35x15 SI-55 SC040	4.2	8.4	12.6	2.1	10.0	6	SC 040
SPOB1f 60x25 SI-55 SC050	12.2	24.4	36.6	11.5	20.0	8	SC 050
SPOB1f 80x35 SI-55 SC050	24.9	49.8	74.7	26.1	30.0	8	SC 050

*The specified suction forces are theoretical values with a smooth, dry workpiece surface - they do not include a safety factor

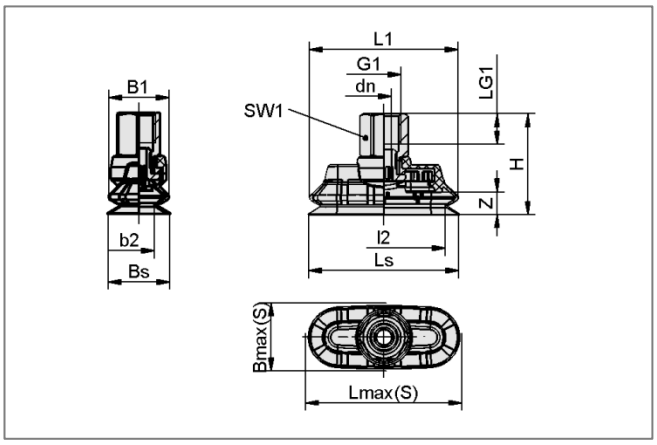
**The recommended hose diameter refers to a hose length of approx. 2 m

Suction Cups for Bags and Pouches

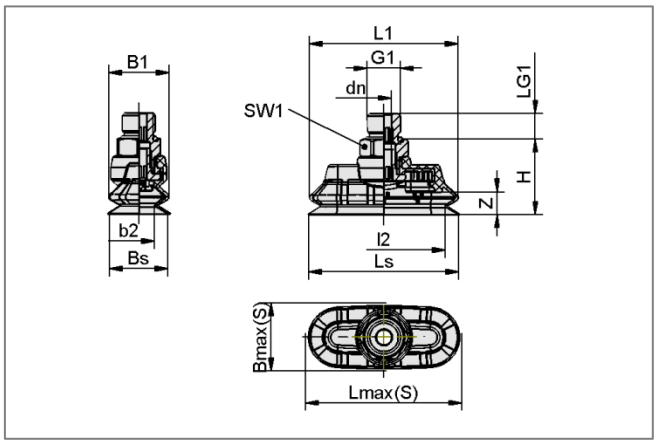
Bellows Suction Cups SPOB1f (Oval, 1.5 Folds)

Suction area (LxW) from 35x15 mm to 80x35 mm

Design Data Bellows Suction Cups SPOB1f (Oval, 1.5 Folds)



SPOB1f IG



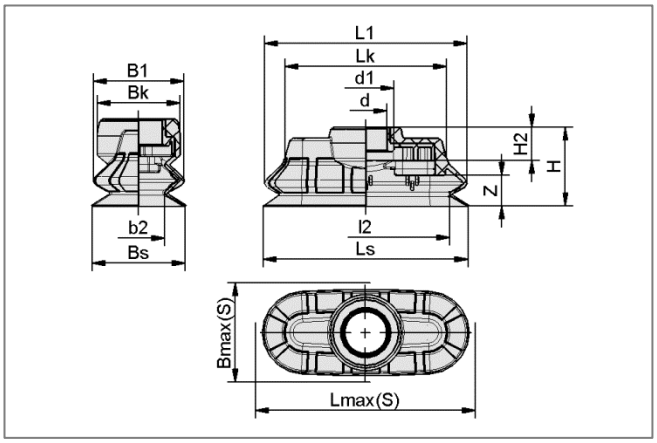
SPOB1f AG

Type	Dimension in mm*													
	B1	Bs	b2	G1	Ls	L1	Lmax (S)**	Bmax (S)**	l2	H	Z (Hub)	dn	SW1	LG1
SPOB1f 35x15 SI-55 G1/8-IG	15	14.6	8.0	G1/8“-F	34.6	35	37	17	28.0	19.0	4	4	14	7.5
SPOB1f 35x15 SI-55 G1/8-AG	15	14.6	8.0	G1/8“-M	34.6	35	37	17	28.0	27.0	4	4	14	8.0
SPOB1f 60x25 SI-55 G1/4-IG	25	24.5	13.8	G1/4“-F	59.5	60	62	27	48.8	30.2	9	6	17	10.0
SPOB1f 60x25 SI-55 G1/4-AG	25	24.5	13.8	G1/4“-M	59.5	60	62	27	48.8	40.2	9	6	17	12.0
SPOB1f 80x35 SI-55 G1/4-IG	35	34.5	21.0	G1/4-F	79.5	80	83	38	66.0	34.2	11	6	17	10.0
SPOB1f 80x35 SI-55 G1/4-AG	35	34.5	21.0	G1/4“-M	79.5	80	83	38	66.0	44.2	11	6	17	12.0

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

Design Data Bellows Suction Cups SPOB1f (Oval, 1.5 Folds)



SPOB1f

Type	Dimensions in mm*													
	b2	B1	Bk	Bmax (S)**	Bs	d	d1	H	H2	l2	L1	Lk	Lmax (S)**	Ls	Z (Hub)
SPOB1f 35x15 SI-55 SC040	8.0	15	14	17	14.6	8.3	11.0	13	5.0	28.0	35	28.5	37	34.6	4
SPOB1f 60x25 SI-55 SC050	13.8	25	22	27	24.5	12.4	17.3	23	6.9	48.8	60	46.9	62	59.5	9
SPOB1f 80x35 SI-55 SC050	21.0	35	24	38	34.5	12.4	17.3	27	6.9	66.0	80	61.1	83	79.5	11

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

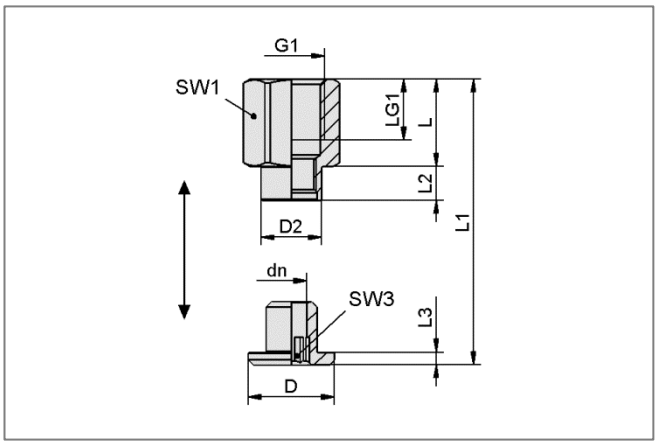
**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

Suction Cups for Bags and Pouches

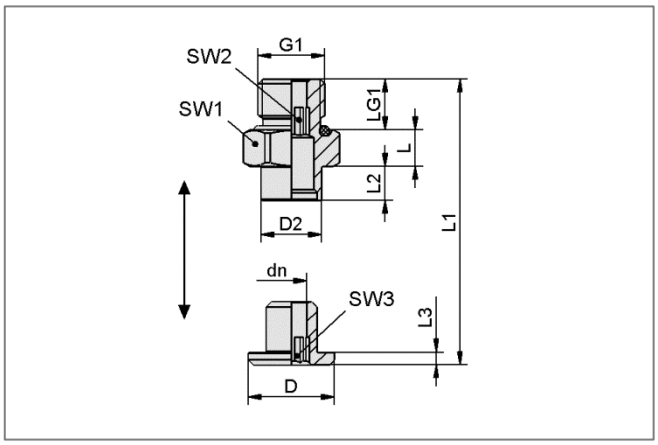
Bellows Suction Cups SPOB1f (Oval, 1.5 Folds)

Suction area (LxW) from 35x15 mm to 80x35 mm

Design Data Connection Elements Bellows Suction Cups SPOB1f



SC 040 G1/8-IG / SC 050 G1/4-IG



SC 040 G1/8-AG / SC 050 G1/4-AG

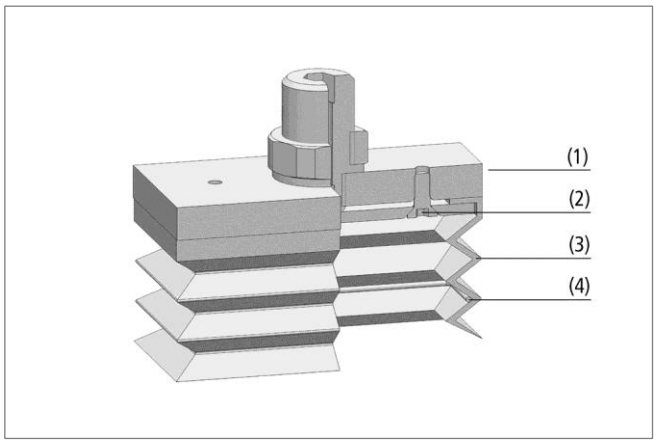
Type	Dimension in mm											
	D	D2	dn	G1	L	L1	L2	L3	LG1	SW1	SW2	SW3
SC 040 G1/8-AG	10,3	8	4	G1/8"-M	6,0	20,3	4,8	2,0	7,5	14	4	4
SC 040 G1/8-IG	10,3	8	4	G1/8"-F	14,0	20,8	4,8	2,0	8,0	14	-	4
SC 050 G1/4-AG	17,0	12	6	G1/4"-M	7,2	26,5	6,8	2,5	10,0	17	6	6
SC 050 G1/4-IG	17,0	12	6	G1/4"-F	17,2	26,5	6,8	2,5	12,0	17	-	6

Suction Cups for Bags and Pouches

Bellows Suction Cups FSGB-R (Rectangular)

Suction area (LxW) from 52x25 mm to 80x50 mm

Bellows suction cups FSGB-R (rectangular)



System design bellows suction cups FSGB-R

Bellows suction cups FSGB-R for handling of packing materials

Suitability for Industry-Specific Applications

Applications

- Rectangular bellows suction caps with 2.5 or 3.5 folds for handling of rectangular packing materials with non-uniform surfaces
- Handling of film-packed products, filled plastic bags; work-pieces with folds
- Handling of non-rigid workpieces and flexible outer packing materials which can be deformed during handling
- Use of supporting frame in variable numbers depending on application

Design

- Rectangular bellows suction cup FSGB-R with single sealing lip, consisting of suction cup FGB-R (3) and connection plates (1)
- FSGB-R 52x25 and FSGB-R 60x29 with 2.5 folds; FSGB-R 80x30, FSGB-R80x40 and FSGB-R 80x50 with 3.5 folds
- Very adaptable geometry and soft, flexible sealing lip
- Suction cup is securely clamped between connection plates; screw connection (2) of the cup to allow simple, replacement of cup
- Supporting frames (4) (available as accessories) can op-tionally be mounted in one or more of the corrugations

Our Highlights...	Your Benefits...
• Large, rectangular suction surface	> Good gripping of rectangular workpieces
• Soft and flexible folds	> Good adaptation to non-uniform surfaces and non-rigid workpieces
• Soft and adaptable sealing lip	> Sealing on structured sur-faces and workpieces with folds
• Supporting frames for mounting in folds (optional)	> Improved stability of the suction cups folds

Suction Cups for Bags and Pouches

Bellows Suction Cups FSGB-R (Rectangular)

Suction area (LxW) from 52x25 mm to 80x50 mm

Designation Code Bellows Suction Cups FSGB-R (Rectangular)

Abbreviated designation	Suction area LxW in mm	Material and Shore hardness	Connection thread
Example FSGB-R 60x29 NBR-50 G1/8-IG:			
FSGB-R	**60x29**	**NBR-50**	**G1/8-IG**
FSGB-R	52x25 60x29 80x30 80x40 80x50	NBR-50 SI-50	G1/8-IG (IG = female (F)) G1/4-AG (AG = male (M))

Ordering Data Bellows Suction Cups FSGB-R (Rectangular)

Suction cup FSGB-R (elastomer part + connection plate) is delivered assembled. The assembly consists of:

- Suction cup of type FGB-R – elastomer part, available in various dimensions (LxW) and materials
- Aluminium support plate – available with various threads

Available spare parts: suction cup FGB-R
Available accessories: supporting frames

Bellows Suction Cups FSGB-R (Rectangular)

Type	Suction cup material / hardness in Shore A	
	Perbunan NBR 50±5ShA	Silicone SI 50±5ShA
FSGB-R 52x25 G1/4-AG*	10.01.06.02281	10.01.06.02282
FSGB-R 52x25 G1/8-IG*	10.01.06.02287	10.01.06.02288
FSGB-R 60x29 G1/4-AG*	10.01.06.02283	-
FSGB-R 60x29 G1/8-IG*	10.01.06.02289	-
FSGB-R 80x30 G1/4-AG**	-	10.01.06.02284
FSGB-R 80x30 G1/8-IG**	-	10.01.06.02290
FSGB-R 80x40 G1/4-AG**	-	10.01.06.02285
FSGB-R 80x40 G1/8-IG**	-	10.01.06.02291
FSGB-R 80x50 G1/4-AG**	-	10.01.06.02286
FSGB-R 80x50 G1/8-IG**	-	10.01.06.02292

*2.5 Folds

**3.5 Folds

Ordering Data Spare Parts Bellows Suction Cups

Type	Suction cup material / hardness in Shore A	
	Perbunan NBR 50±5ShA	Silicone SI 50±5ShA
FGB-R 52x25*	10.01.06.01115	10.01.06.01116
FGB-R 60x29*	10.01.06.01117	-
FGB-R 80x30**	-	10.01.06.01112
FGB-R 80x40**	-	10.01.06.01113
FGB-R 80x50**	-	10.01.06.01114

*2.5 Folds

**3.5 Folds

Ordering Data Accessories Bellows Suction Cups FSGB-R (Rectangular)

Type	Supporting frame
FSGB-R 52x25	10.01.06.02276
FSGB-R 60x29	10.01.06.02277
FSGB-R 80x30	10.01.06.02278
FSGB-R 80x40	10.01.06.02279
FSGB-R 80x50	10.01.06.02280

Suction Cups for Bags and Pouches

Bellows Suction Cups FSGB-R (Rectangular)

Suction area (LxW) from 52x25 mm to 80x50 mm

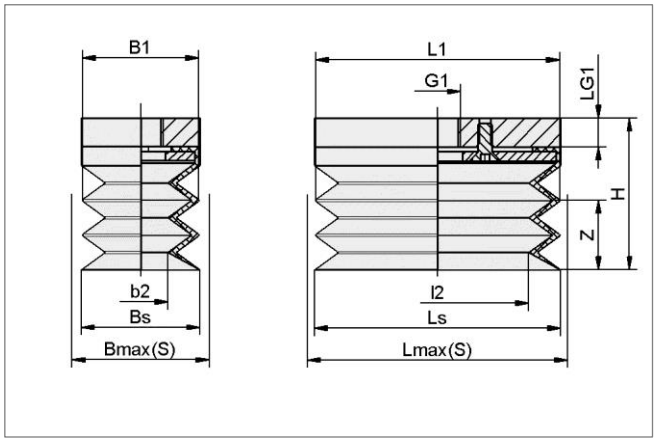
Technical Data Bellows Suction Cups FSGB-R (Rectangular)

Type	Suction force [N]*	Volume [cm³]	Number of folds	Recom. internal hose diameter d [mm]**
FSGB-R 52x25	20	16	2.5	6
FSGB-R 60x29	36	22	2.5	6
FSGB-R 80x30	29	41	3.5	6
FSGB-R 80x40	61	61	3.5	9
FSGB-R 80x50	92	80	3.5	9

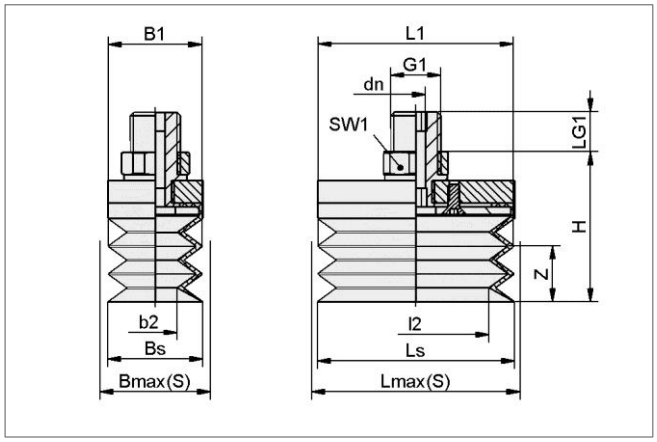
*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface – they do not include a safety factor

**The recommended hose diameter refers to a hose length of approx. 2 m

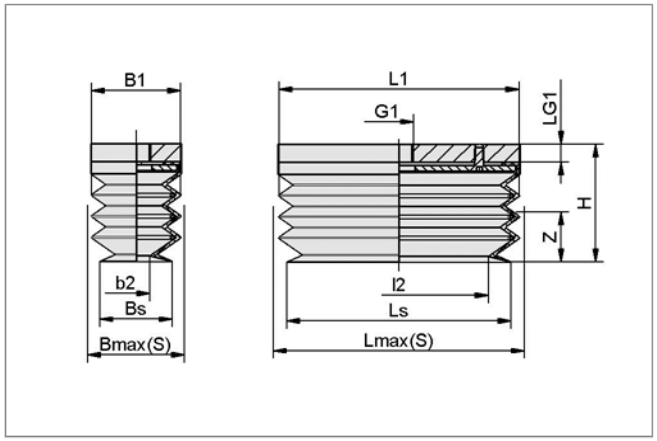
Design Data Bellows Suction Cups FSGB-R (Rectangular)



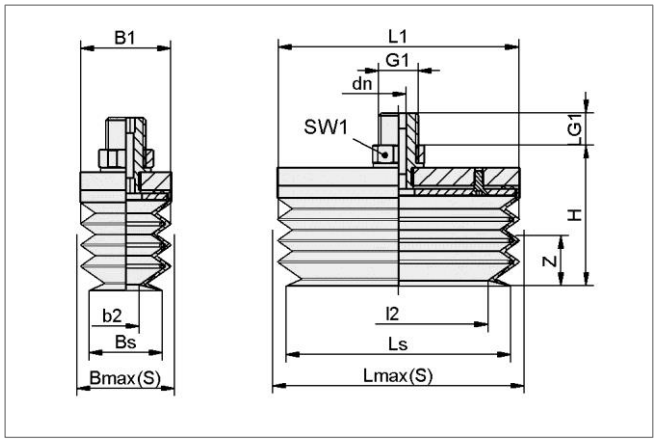
FSGB-R 52x25 to 60x29 IG



FSGB-R 52x25 to 60x29 AG



FSGB-R 52x25 to 60x29 IG



FSGB-R 52x25 to 60x29 AG

Suction Cups for Bags and Pouches

Bellows Suction Cups FSGB-R (Rectangular)

Suction area (LxW) from 52x25 mm to 80x50 mm

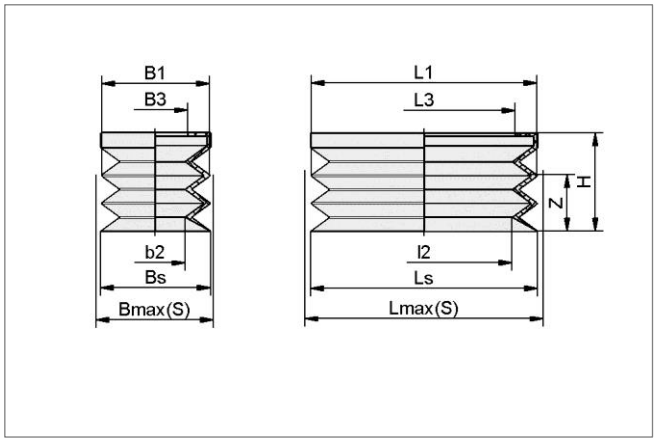
Design Data Bellows Suction Cups FSGB-R (Rectangular)

Type	Dimensions in mm*														
	b2	B1	Bmax (S)	Bs	dn	G1	H	l2	L1	LG1	Lmax (S)	Ls	LG2	SW1	Z (Stroke)**
FSGB-R 52x25 G1/4-AG*	10.0	25	27.5	25.0	5	G1/4“-M	50.0	37.0	52	10.5	54.5	52.0	-	17	15
FSGB-R 52x25 G1/8-IG*	10.0	25	27.5	25.0	5	G1/8“-F	32.0	37.0	52	-	54.5	52.0	6.0	-	15
FSGB-R 60x29 G1/4-AG*	15.0	29	32.0	29.0	5	G1/4“-M	50.0	45.0	60	10.5	63.0	60.0	-	17	14
FSGB-R 60x29 G1/8-IG*	15.0	29	32.0	29.0	-	G1/8“-F	32.0	45.0	60	6.0	63.0	60.0	6.0	-	14
FSGB-R 80x30 G1/4-AG**	9.0	24	33.0	24.0	5	G1/4“-M	57.0	59.0	74	10.5	83.0	74.0	-	17	16
FSGB-R 80x30 G1/8-IG**	9.0	24	33.0	24.0	-	G1/8“-F	39.0	59.0	74	6.0	83.0	74.0	6.0	-	16
FSGB-R 80x40 G1/4-AG**	19.0	34	44.0	34.0	5	G1/4“-M	57.0	59.0	74	10.5	84.0	74.0	-	17	13
FSGB-R 80x40 G1/8-IG**	19.0	34	44.0	34.0	-	G1/8“-F	39.0	59.0	74	6.0	84.0	74.0	6.0	-	13
FSGB-R 80x50 G1/4-AG**	29.0	44	54.0	44.0	5	G1/4“-M	57.0	59.0	74	10.5	84.0	74.0	-	17	13
FSGB-R 80x50 G1/8-IG**	29.0	44	54.0	44.0	-	G1/8“-F	39.0	59.0	74	6.0	84.0	74.0	6.0	-	13

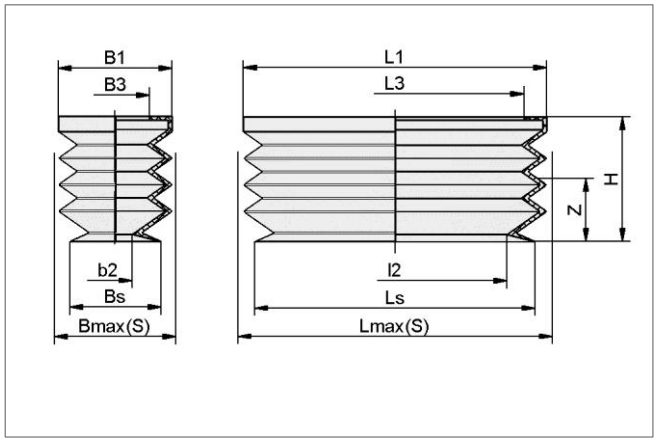
*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**The specified stroke is for use with a supporting frame in each fold

Design Data Bellows Suction Cups FGB-R – Spare Parts for FSGB-R



FGB-R 52x25 to 60x29



FGB-R 80x30 to 80x50

Type	Dimensions in mm*										
	b2	Bmax(S)	Bs	B1	B3	H	l2	L1	L3	Lmax(S)	Ls	Z (Stroke)**
FGB-R 52x25	10.0	27.5	25.0	25	13	26	37.0	52	40	54.5	52.0	15
FGB-R 60x29	15.0	32.0	29.0	29	17	26	45.0	60	48	63.0	60.0	14
FGB-R 80x30	9.0	33.0	24.0	30	18	33	59.0	80	68	83.0	74.0	16
FGB-R 80x40	19.0	44.0	34.0	40	28	33	59.0	80	68	84.0	74.0	13
FGB-R 80x50	29.0	54.0	44.0	50	38	33	59.0	80	68	84.0	74.0	13

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

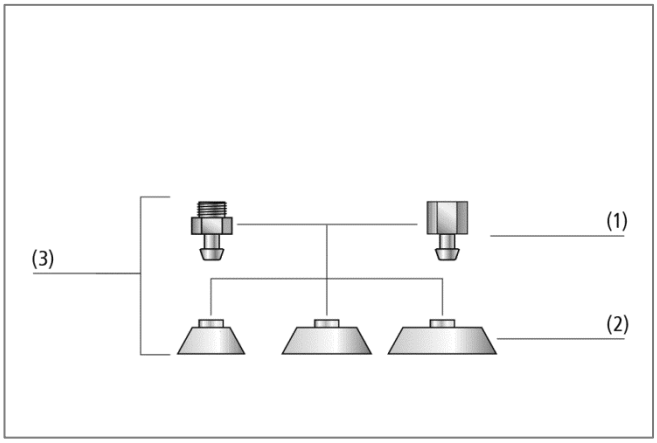
**The specified stroke is for use with a supporting frame in each fold

Suction Cups for Plastic Films and Paper

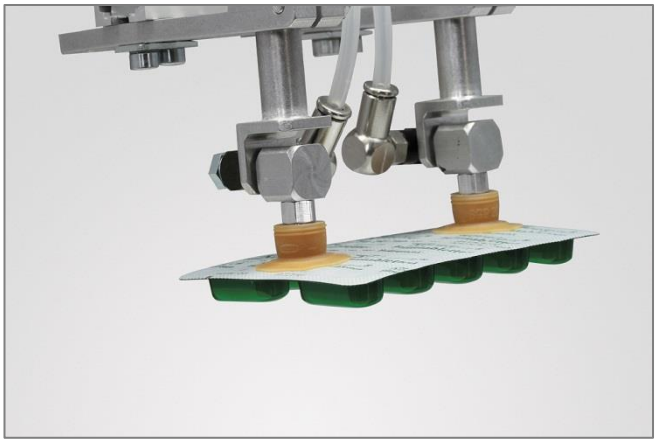
Flat Suction Cups SGPN

Suction area (Ø) from 15 mm to 40 mm

Flat suction cups SGPN



System design flat suction cups SGPN



Flat suction cups SGPN for handling blister packaging

Suitability for Industry-Specific Applications

Applications

- Handling of various packing material, e.g. plastic films, paper, blister packs
- Gentle handling of plastic films and paper due to flat, long-tapered sealing lip and inner support

Design

- Robust, wear-resistant suction cup SGPN (3) with single sealing lip, consisting of suction cup SGP (2) and connection nipple (1)
- All nipples are plugged in
- With each nipple family, the replacement cups and nipples can be combined as desired

Our Highlights...	Your Benefits...
• Flat, long-tapered sealing lip and inner support	> No “pulling-in“ into the suction cup, i.e. very suitable for plastic film, paper and solar cells
• Material: Natural rubber NK 40 Shore A	> No crinkling when gripping paper and plastic film
• Material: Silicone SI 50 Shore A	> Resistant to ozone, UV radiation and heat; very suitable for handling tasks in the paper and printing industry

Suction Cups for Plastic Films and Paper

Flat Suction Cups SGPN

Suction area (Ø) from 15 mm to 40 mm

Designation Code Flat Suction Cups SGPN

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Connection thread
Example SGPN 20 SI-50 M5-AG:			
SGPN	**20**	**SI-50**	**M5-AG**
SGPN	15 to 40	NK-40 SI-50 HT1-60	M5-AG (AG = male (M)) G1/8-AG G1/8-IG (IG = female (F)) G1/4-AG G1/4-IG

Ordering Data Flat Suction Cups SGPN

Flat suction cup SGPN (elastomer part + connection nipple) is delivered unassembled. The delivery consists of:

- Suction cup of type SGP – elastomer part, available in various diameters and materials
- Connection nipple of type SA-NIP – available with various threads

Available spare parts: suction cup SGP, connection nipple SA-NIP

Flat Suction Cups SGPN

Type	Natural Rubber NK 40±5ShA	Silicone SI 50±5ShA	Non-Marking Material HT1 60±5ShA
SGPN 15 M5-AG	10.01.01.11977	10.01.01.11980	10.01.01.12396
SGPN 15 G1/8-AG	10.01.01.10315	10.01.01.11981	10.01.01.12397
SGPN 15 G1/8-IG	10.01.01.10181	10.01.01.11982	10.01.01.12398
SGPN 20 M5-AG	10.01.01.11978	10.01.01.11983	-
SGPN 20 G1/8-AG	10.01.01.10316	10.01.01.11984	-
SGPN 20 G1/8-IG	10.01.01.10180	10.01.01.11985	-
SGPN 24 M5-AG	10.01.01.11979	10.01.01.11986	10.01.01.12403
SGPN 24 G1/8-AG	10.01.01.10317	10.01.01.11987	10.01.01.12404
SGPN 24 G1/8-IG	10.01.01.10182	10.01.01.11988	10.01.01.12405
SGPN 30 G1/4-AG	10.01.01.00791	10.01.01.11989	10.01.01.12399
SGPN 30 G1/4-IG	10.01.01.00790	10.01.01.11990	10.01.01.12400
SGPN 34 G1/4-AG	10.01.01.10831	-	-
SGPN 34 G1/4-IG	10.01.01.10830	-	-
SGPN 35 G1/4-AG	10.01.01.00793	10.01.01.12785	10.01.01.12848
SGPN 35 G1/4-IG	10.01.01.00792	10.01.01.12787	10.01.01.12849
SGPN 40 G1/8-AG	10.01.01.11739	10.01.01.12773	10.01.01.12847
SGPN 40 G1/4-AG	10.01.01.00795	10.01.01.12775	10.01.01.12845
SGPN 40 G1/4-IG	10.01.01.00794	10.01.01.12774	10.01.01.12846

Suction Cups for Plastic Films and Paper

Flat Suction Cups SGPN

Suction area (Ø) from 15 mm to 40 mm

Ordering Data Spare Parts Flat Suction Cups and Connection Nipples

Type	Natural Rubber NK 40±5ShA	Silicone SI 50±5ShA	Non-Marking Material HT1 60±5ShA
SGP 15	10.01.01.10318	10.01.01.10574	10.01.01.12394
SGP 20	10.01.01.10319	10.01.01.10571	-
SGP 24	10.01.01.10320	10.01.01.10577	10.01.01.12402
SGP 30	10.01.01.10787	10.01.01.01064	10.01.01.12395
SGP 34	10.01.01.10829	-	-
SGP 35	10.01.01.10788	10.01.01.12784	10.01.01.12811
SGP 40	10.01.01.10789	10.01.01.12772	10.01.01.12812

Type	Connection nipple	
SGPN 15 M5-AG	SA-NIP N016 M5-AG DN250	10.01.06.00123
SGPN 15 G1/8-AG	SA-NIP N016 G1/8-AG DN350	10.01.06.05735
SGPN 15 G1/8-IG	SA-NIP N016 G1/8-IG DN350	10.01.06.05731
SGPN 20 M5-AG	SA-NIP N016 M5-AG DN250	10.01.06.00123
SGPN 20 G1/8-AG	SA-NIP N016 G1/8-IG DN350	10.01.06.05735
SGPN 20 G1/8-IG	SA-NIP N016 G1/8-AG DN350	10.01.06.05731
SGPN 24 M5-AG	SA-NIP N016 M5-IG DN250	10.01.06.00123
SGPN 24 G1/8-AG	SA-NIP N016 G1/8-AG DN350	10.01.06.05735
SGPN 24 G1/8-IG	SA-NIP N016 G1/8-IG DN550	10.01.06.05731
SGPN 30 G1/4-AG	SA-NIP N033 G1/4-AG DN550	10.01.01.00818
SGPN 30 G1/4-IG	SA-NIP N033 G1/4-IG DN550	10.01.01.00817
SGPN 34 G1/4-AG	SA-NIP N033 G1/4-AG DN550	10.01.01.00818
SGPN 34 G1/4-IG	SA-NIP N033 G1/4-IG DN550	10.01.01.00817
SGPN 35 G1/4-AG	SA-NIP N033 G1/4-AG DN550	10.01.01.00820
SGPN 35 G1/4-IG	SA-NIP N033 G1/4-IG DN550	10.01.01.00819
SGPN 40 G1/4-AG	SA-NIP N033 G1/8-AG DN550	10.01.01.11738
SGPN 40 G1/4-AG	SA-NIP N033 G1/4-AG DN550	10.01.01.00822
SGPN 40 G1/4-IG	SA-NIP N033 G1/4-IG DN550	10.01.01.00821

Technical Data Flat Suction Cups SGPN

Type	Suction force [N]*	Volume [cm³]	Recom. internal hose diameter d [mm]**	Nipple family
SGP 15	5.5	0.12	2	N 016
SGP 20	8.5	0.31	2	N 016
SGP 24	11.0	0.70	4	N 016
SGP 30	19.0	1.50	4	N 033
SGP 34	25.0	2.10	4	N 033
SGP 35	31.0	2.20	4	N 034
SGP 40	33.0	2.90	4	N 035

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface – they do not include a safety factor

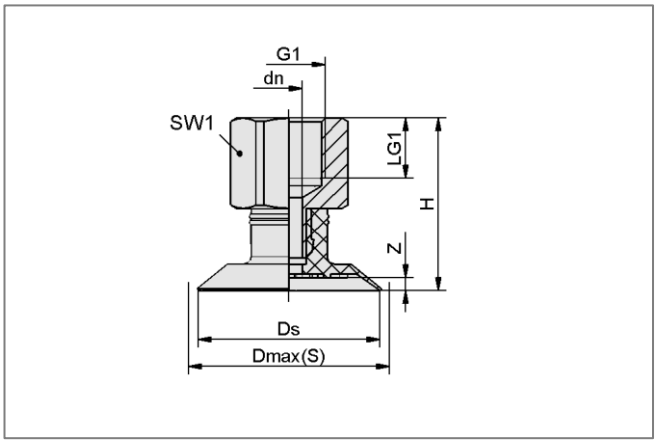
**The recommended hose diameter refers to a hose length of approx. 2 m

Suction Cups for Plastic Films and Paper

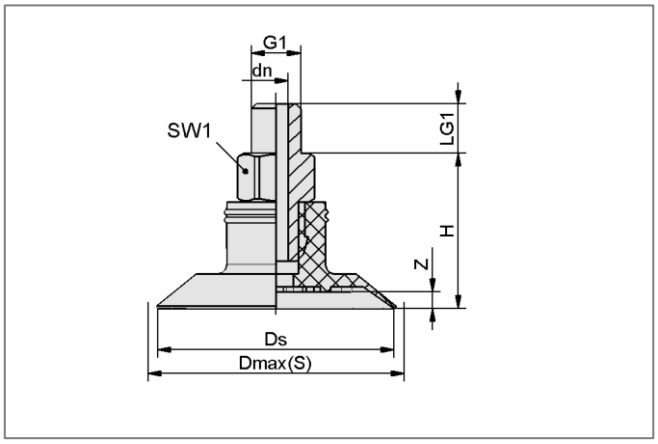
Flat Suction Cups SGPN

Suction area (Ø) from 15 mm to 40 mm

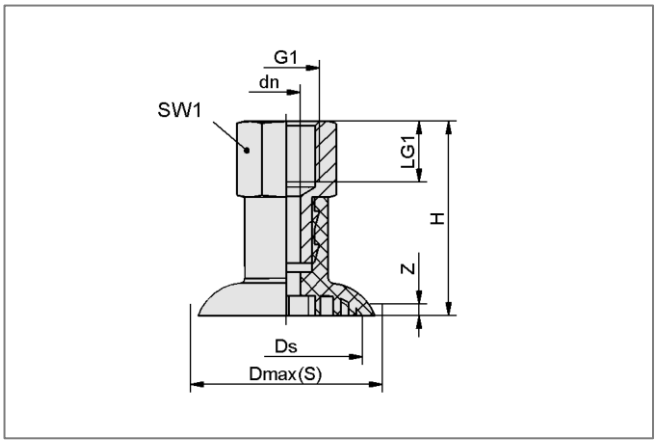
Design Data Flat Suction Cups SGPN



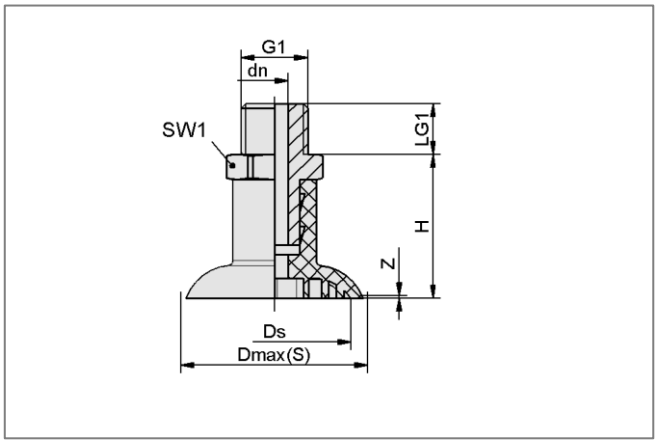
SGPN 15 to 40 IG



SGPN 15 to 40 AG



SGPN 35 IG



SGPN 35 AG

Type	Dimensions in mm*							
	dn	Dmax(S)	Ds	G1	H	LG1	SW1	Z (Stroke)
SGPN 15 M5-AG	2.5	15.5	14.5	M5-M	15.0	5.0	7	0.9
SGPN 15 G1/8-AG	3.5	15.5	14.5	G1/8“-M	16.0	7.5	14	0.9
SGPN 15 G1/8-IG	3.5	15.5	14.5	G1/8“-F	22.0	8.0	14	0.9
SGPN 20 M5-AG	2.5	22.0	20.0	M5-M	15.4	5.0	7	1.5
SGPN 20 G1/8-AG	3.5	22.0	20.0	G1/8“-M	16.4	7.5	14	1.5
SGPN 20 G1/8-IG	3.5	22.0	20.0	G1/8“-F	22.4	8.0	14	1.5
SGPN 24 M5-AG	2.5	25.5	24.0	M5-M	15.8	5.0	7	1.7
SGPN 24 G1/8-AG	3.5	25.5	24.0	G1/8“-M	16.8	7.5	14	1.7
SGPN 24 G1/8-IG	3.5	25.5	24.0	G1/8“-F	22.8	8.0	14	1.7
SGPN 30 G1/4-AG	5.5	32.0	30.0	G1/4“-M	27.2	10.0	17	2.0
SGPN 30 G1/4-IG	5.5	32.0	30.0	G1/4“-F	37.2	12.0	17	2.0
SGPN 34 G1/4-AG	5.5	37.5	34.0	G1/4“-M	28.0	10.0	17	1.4
SGPN 34 G1/4-IG	5.5	37.5	34.0	G1/4“-F	38.0	12.0	17	1.4
SGPN 35 G1/4-AG	5.5	35.0	34.0	G1/4“-M	28.5	10.0	17	0.5
SGPN 35 G1/4-IG	5.5	35.0	34.0	G1/4“-F	38.5	12.0	17	0.5
SGPN 40 G1/8-AG	5.0	42.0	40.0	G1/8“-M	25.6	9.0	17	2.3
SGPN 40 G1/4-AG	5.5	42.0	40.0	G1/4“-M	25.6	10.0	17	2.3
SGPN 40 G1/4-IG	5.5	42.0	40.0	G1/4“-F	35.6	12.0	17	2.3

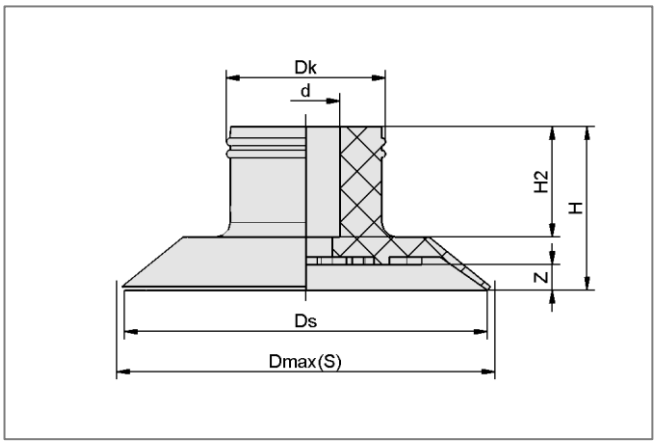
*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

Suction Cups for Plastic Films and Paper

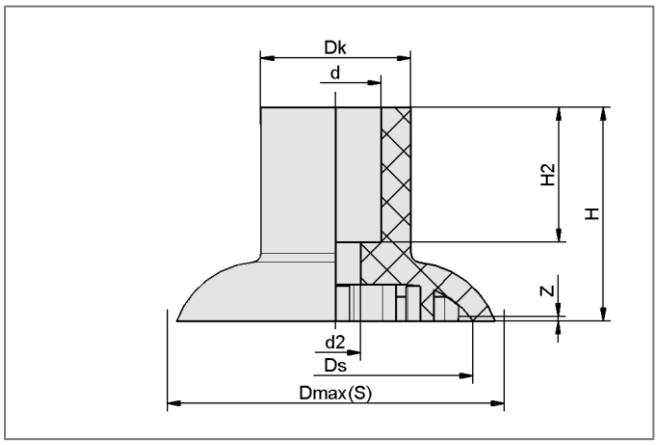
Flat Suction Cups SGPN

Suction area (Ø) from 15 mm to 40 mm

Design Data Flat Suction Cups SGP – Spare Parts for SGPN



SGP 15 to 40



SGP 35

Type	Dimensions in mm*						
	d	Dk	Dmax(S)	Ds	H	H2	Z (Stroke)
SGP 15	4.5	9.5	15.5	14.5	10.0	7.2	0.9
SGP 20	4.5	11.0	22.0	20.0	10.4	7.1	1.5
SGP 24	4.5	10.5	25.5	24.0	10.8	7.3	1.7
SGP 30	11.2	15.6	32.0	30.0	22.2	15.7	2.0
SGP 34	11.2	15.2	37.5	34.0	23.0	16.8	1.4
SGP 35	10.0	16.5	35.0	30.2	23.5	14.8	0.5
SGP 40	8.0	16.0	42.0	40.0	20.6	14.5	2.3

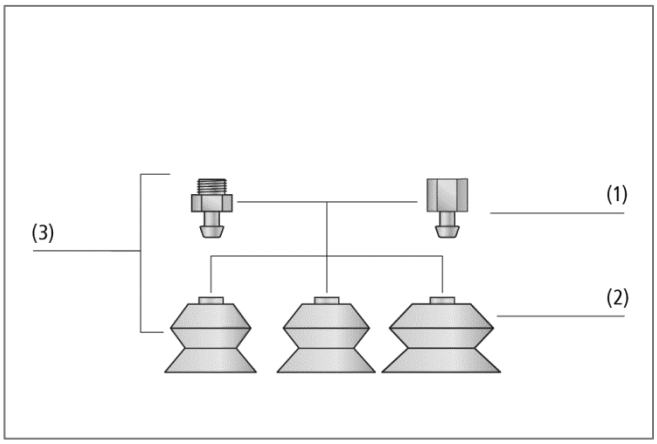
*Acceptable dimensional tolerances for rubber cups concerning to DIN ISO 3302-1 M3

Suction Cups for Packaging

Bellows Suction Cups FGA PVC (1.5 Folds)

Suction area (Ø) from 13 mm to 22 mm

Bellows suction cups FGA PVC (1.5 Folds)



System design bellows suction cups FGA PVC (1.5 Folds)

Bellows suction cups FGA PVC for handling non-rigid workpieces

Suitability for Industry-Specific Applications

Applications

- Round, bellows suction cup with 1.5 folds for handling of fragile workpieces thanks to damping effect of corrugations and soft sealing lip
- Usage in box openers and for handling of non-rigid workpieces and soft packaging materials
- Handling tasks in special processes which use chlorinated water, such as rinsing of plastic bags

Design

- Robust and wear-resistant suction cup FGA (2) with 1.5 folds and single sealing lip
- Very adaptable geometry and soft, flexible material
- Large effective internal diameter
- With each nipple family, the replacement cups and nipples (1) can be combined as desired (3)

Our Highlights...	Your Benefits...
• 1.5 folds	> Good damping when positioning on workpiece
• Large effective internal diameter	> High suction force
• Soft and adaptable sealing lip and bottom corrugation	> Good adaptation to curved or uneven surfaces
• Stiffer upper corrugation	> High stability against horizontal acceleration
• Flexible and adaptable material	> Optimum sealing, even on non-rigid workpieces
• Wear-resistant material PVC	> Long operating lifetime, very wide range of applications

Suction Cups for Packaging

Bellows Suction Cups FGA PVC (1.5 Folds)

Suction area (Ø) from 13 mm to 22 mm

Designation Code Bellows Suction Cups FGA PVC (1.5 Folds)

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness
Example FGA 13 PVC-50:		
FGA	**13**	**PVC-50**
FGA	13 19 22	PVC-50

Ordering Data Bellows Suction Cups FGA PVC (1.5 Folds)

Suction cup FGA PVC (elastomer part) is supplied as an individual part. In order to receive a complete suction cup (elastomer part + connection nipple), the following ordering steps are required:

- Suction cup of type FGA PVC (step 1) – elastomer part, available in various diameters
- Connection nipple of type SA-NIP (step 2) – available with various threads

Step 1: Bellows Suction Cups FGA PVC (1.5 Folds)

Type	Part Number
FGA 13 PVC-50 N016	10.01.06.01549
FGA 19 PVC-50 N056	10.01.06.01975
FGA 22 PVC-50 N016	10.01.06.01947

Step 2: Connection Nipples Bellows Suction Cups FGA PVC (1.5 Folds)

Type	M5-AG	G1/8-AG	G1/8-IG
FGA 13 PVC-50 N016	10.01.06.00123	10.01.06.05735	10.01.06.05731
FGA 19 PVC-50 N056	10.01.06.03080	10.01.06.03571	10.01.06.03572
FGA 22 PVC-50 N016	10.01.06.00123	10.01.06.05735	10.01.06.05731

Technical Data Bellows Suction Cups FGA PVC (1.5 Folds)

Type	Suction force [N]*	Pull-off force [N]	Volume [cm³]	Min. curve radius [mm] (convex)	Recom. internal hose diameter d [mm]**
FGA 13 PVC-50	1.7	6	0.6	10	4
FGA 19 PVC-50	5.9	10	2.0	20	4
FGA 22 PVC-50	5.3	16	2.3	20	4

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface – they do not include a safety factor

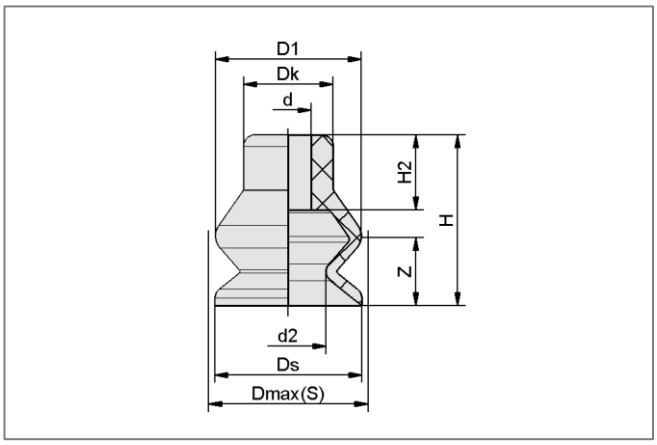
**The recommended hose diameter refers to a hose length of approx. 2 m

Suction Cups for Packaging

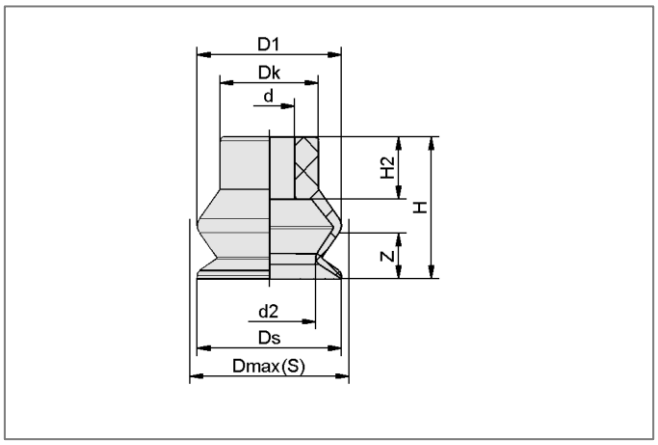
Bellows Suction Cups FGA PVC (1.5 Folds)

Suction area (Ø) from 13 mm to 22 mm

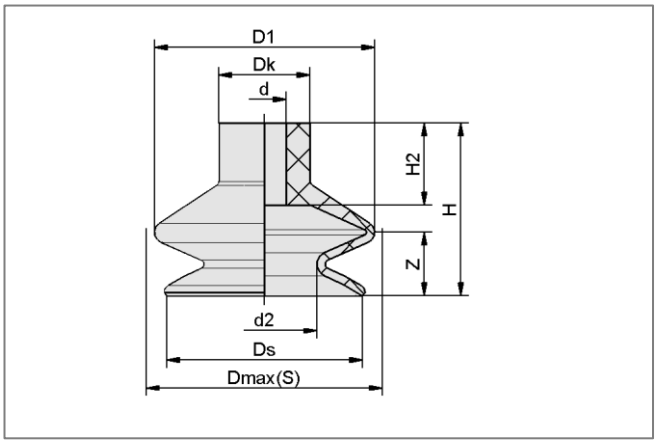
Design Data Bellows Suction Cups FGA PVC (1.5 Folds)



FGA 13 PVC-50



FGA 19 PVC-50



FGA 22 PVC-50

Type	Dimensions in mm*								
	D1	d	d2	Dk	Dmax(S)	Ds	H	H2	Z (Stroke)
FGA 13 PVC-50	12.8	4.0	6.6	7.9	14.5	12.9	15.0	6.6	6
FGA 19 PVC-50	19.0	6.6	12.2	13.0	21.5	19.0	18.7	8.2	6
FGA 22 PVC-50	24.2	4.8	11.5	10.0	25.0	21.5	19.0	9.0	7

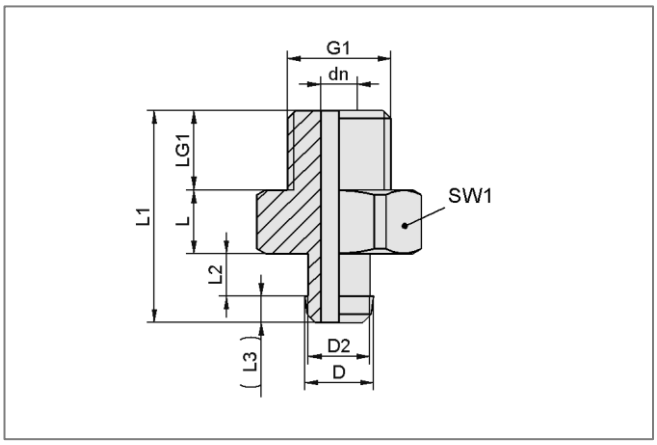
*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

Suction Cups for Packaging

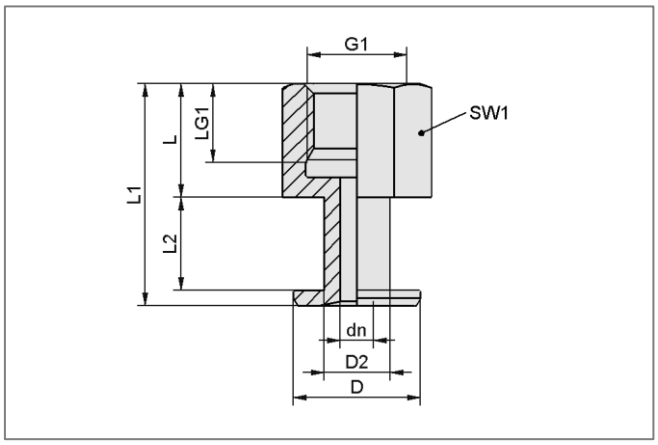
Bellows Suction Cups FGA PVC (1.5 Folds)

Suction area (Ø) from 13 mm to 22 mm

Design Data Connection Elements Bellows Suction Cups FGA PVC (1.5 Folds)



SA-NIP G1/8-IG



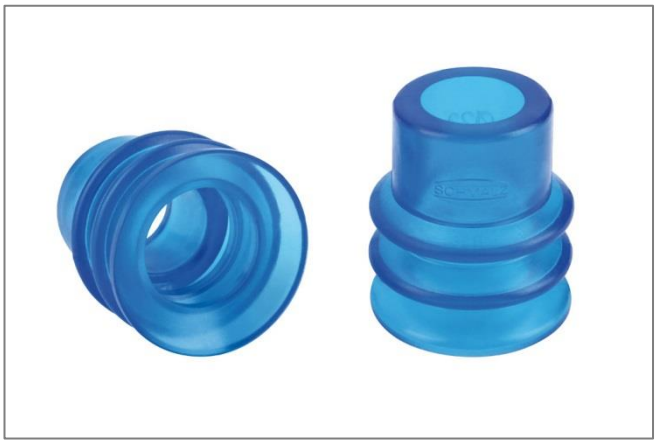
SA-NIP M5-AG, G1/8-AG

Type	Dimensions in mm									
	D	D2	dn	G1	L	L1	L2	L3	LG1	SW1
SA-NIP N016 M5-AG DN250	6.5	6.0	3.0	M5-M	5.0	16.0	3.5	2.5	5.0	7
SA-NIP N016 G1/8-AG DN350	6.5	6.0	4.0	G1/8“-M	6.0	20.0	4.0	2.5	7.5	14
SA-NIP N016 G1/8-IG DN350	6.5	6.0	4.0	G1/8“-F	12.0	18.5	4.0	2.5	8.0	14
SA-NIP N056 M5-AG DN250	8.2	7.6	2.5	M5-M	5.0	17.0	4.0	3.0	5.0	14
SA-NIP N056 G1/8-AG DN400	8.2	7.6	4.0	G1/8“-M	5.0	20.0	4.0	3.0	5.0	14
SA-NIP N056 G1/8-IG DN400	8.2	7.6	4.0	G1/8“-F	10.0	17.0	4.0	3.0	8.0	14

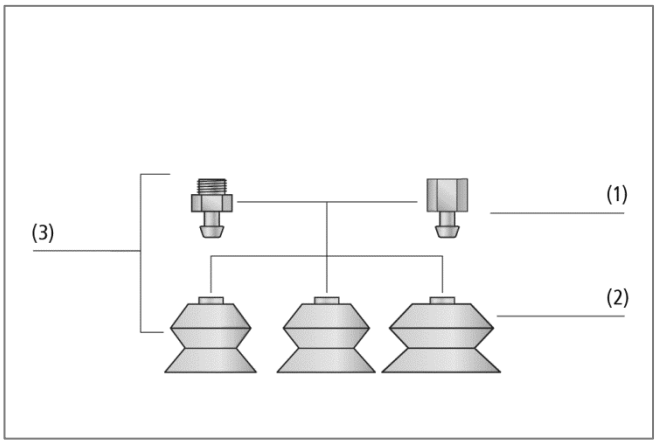
Suction Cups for Packaging

Bellows Suction Cups FG PVC (2.5 Folds)

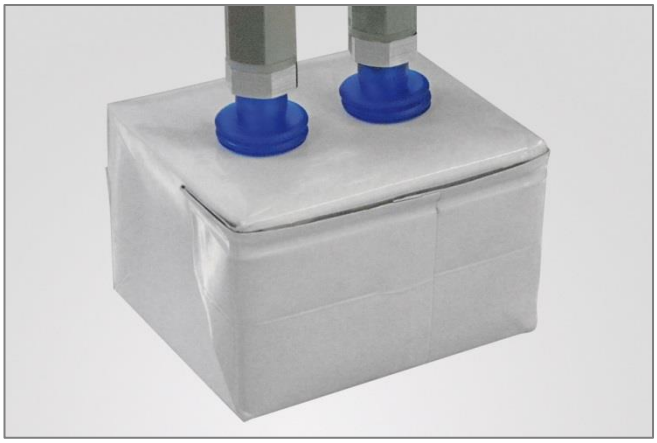
Suction area (Ø) from 18 mm to 50 mm



Bellows suction cups FG PVC (2.5 Folds)



System design bellows suction cups FG PVC (2.5 Folds)



Bellows suction cups FG PVC for handling small cardboard boxes

Suitability for Industry-Specific Applications

Applications

- Round, bellows suction cup with 2.5 folds for handling of extremely fragile workpieces thanks to damping effects of folds and soft sealing lip
- Usage in box openers and for handling of non-rigid workpieces and soft packaging materials
- Handling tasks in special processes which use chlorinated water, such as rinsing of plastic bags

Design

- Robust and wear-resistant suction cup FG (2) with 2.5 folds and single sealing lip
- Very adaptable geometry and soft, flexible material
- Large effective internal diameter
- With each nipple family, the replacement cups and nipples (1) can be combined as desired (3)

Our Highlights...	Your Benefits...
• 2.5 folds	> Good damping when positioning on workpiece
• Large effective internal diameter	> High suction force
• Soft and flexible sealing lip	> Good adaptation to curved or uneven surfaces
• Flexible, adaptable material and soft folds	> Optimum sealing, particularly on non-rigid workpieces
• Wear-resistant material PVC	> Long operating lifetime, very wide range of applications

Suction Cups for Packaging

Bellows Suction Cups FG PVC (2.5 Folds)

Suction area (Ø) from 18 mm to 50 mm

Designation Code Bellows Suction Cups FG PVC (2.5 Folds)

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Type connection element
Example FG 32 PVC-50:			
FG	**32**	**PVC-50**	
FG	18 23 32 40 50	PVC-50	N016 N033 N057

Ordering Data Bellows Suction Cups FG PVC (2.5 Folds)

Suction cup FG PVC (elastomer part) is supplied as an individual part. In order to receive a complete suction cup (elastomer part + connection nipple), the following ordering steps are required:

- Suction cup of type FG PVC (step 1) – elastomer part, available in various diameters
- Connection nipple of type SA-NIP (step 2) – available with various threads

Step 1: Bellows Suction Cups FG PVC (2.5 Folds)

Type	Part Number
FG 18 PVC-50 N016	10.01.06.01941
FG 23 PVC-50 N057	10.01.06.01942
FG 32 PVC-50	10.01.06.01943
FG 40 PVC-50 N033	10.01.06.02468
FG 50 PVC-50 N033	10.01.06.02469

Step 2: Connection Nipples Bellows Suction Cups FG PVC (2.5 Folds)

Type	M5-AG	G1/8“-AG	G1/4“-AG	G1/8“-IG	G1/4“-IG
FG 18 PVC-50 N016	10.01.06.00123	10.01.06.05735	-	10.01.06.05731	-
FG 23 PVC-50 N057	-	10.01.06.03573	-	10.01.06.03574	-
FG 32 PVC-50	-	10.01.06.02249	-	-	-
FG 40 PVC-50 N033	-	-	10.01.01.00818	-	10.01.01.00817
FG 50 PVC-50 N033	-	-	10.01.01.00818	-	10.01.01.00817

Technical Data Bellows Suction Cups FG PVC (2.5 Folds)

Type	Suction force [N]*	Pull-off force [N]	Volume [cm³]	Min. curve radius [mm] (convex)	Recom. internal hose diameter d [mm]**
FG 18 PVC-50	3.2	8	1.9	15	4
FG 23 PVC-50	6.6	15	3.4	20	4
FG 32 PVC-50	13.9	24	9.0	30	6
FG 40 PVC-50	21.7	56	15.2	60	6
FG 50 PVC-50	36.6	68	28.4	75	6

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface – they do not include a safety factor

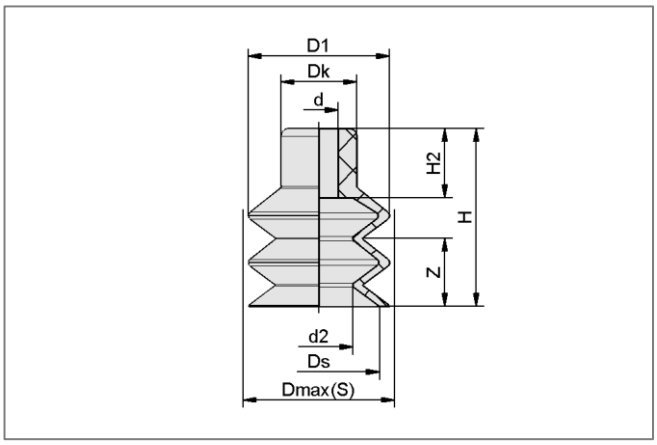
**The recommended hose diameter refers to a hose length of approx. 2 m

Suction Cups for Packaging

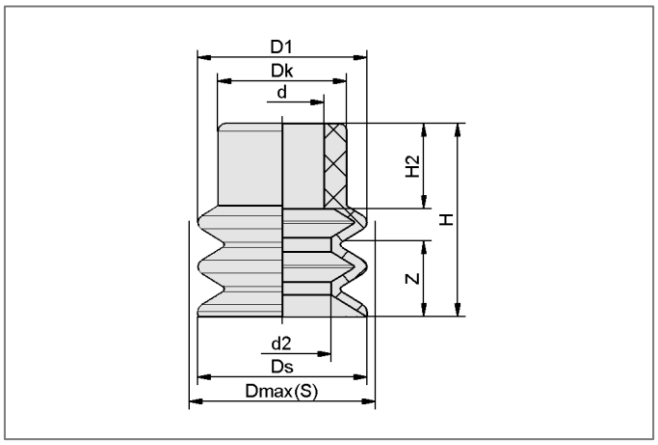
Bellows Suction Cups FG PVC (2.5 Folds)

Suction area (Ø) from 18 mm to 50 mm

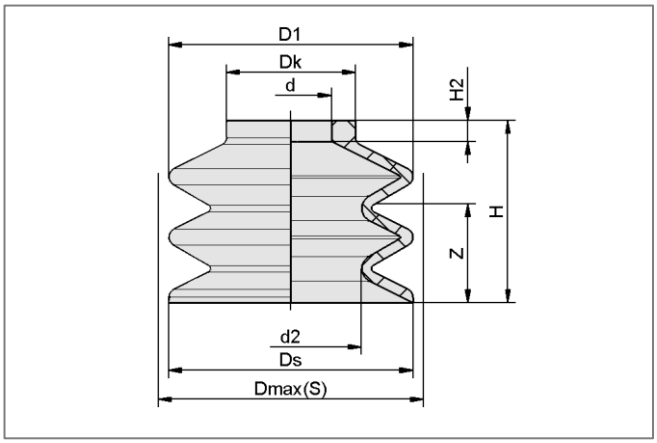
Design Data Bellows Suction Cups FG PVC (2.5 Folds)



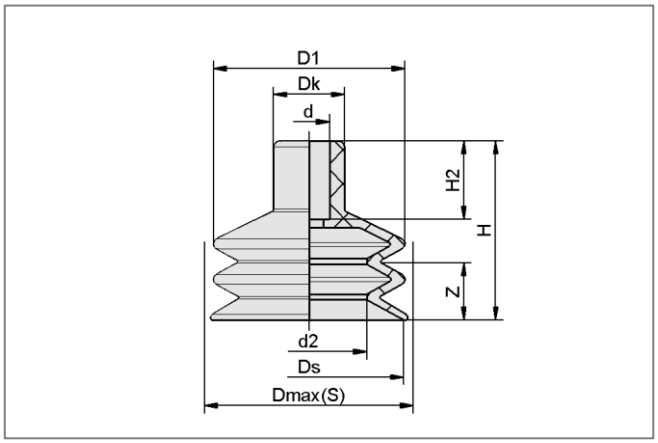
FG 18 PVC-50



FG 23 PVC-50



FG 32 PVC-50



FG 40 to 50 PVC-50

Type	Dimensions in mm*								
	D1	d	d2	Dk	Dmax(S)**	Ds	H	H2	Z (Stroke)
FG 18 PVC-50 N016	18.6	5.0	8.9	10	20.0	16.0	23.5	9.2	9
FG 23 PVC-50 N057	22.3	11.0	12.9	17	25.0	22.3	25.5	11.3	10
FG 32 PVC-50	32.4	8.0	18.6	18	33.5	32.2	37.5	13.0	15
FG 40 PVC-50 N033	40.4	10.8	23.4	19	44.0	40.0	41.7	20.7	11
FG 50 PVC-50 N033	50.5	10.8	30.4	19	54.0	50.0	47.2	20.7	15

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

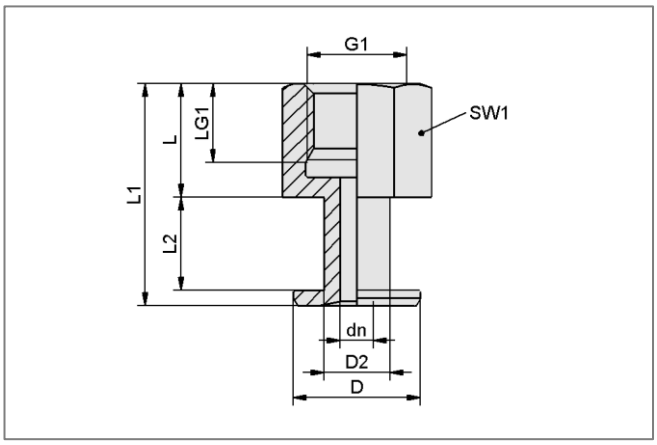
**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

Suction Cups for Packaging

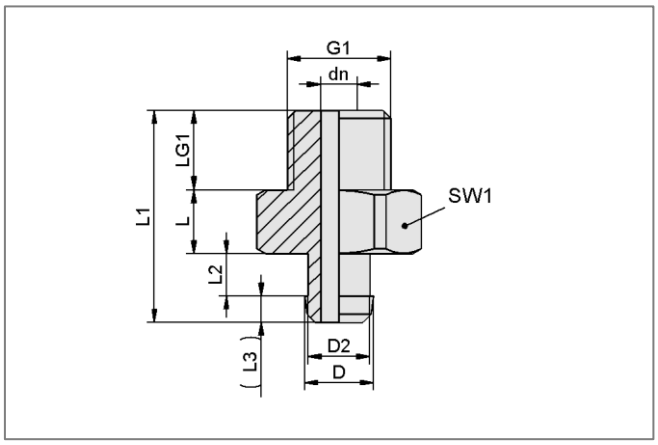
Bellows Suction Cups FG PVC (2.5 Folds)

Suction area (Ø) from 18 mm to 50 mm

Design Data Connection Nipples Bellows Suction Cups FG PVC (2.5 Folds)



SA-NIP G1/8"-IG, G1/4"-IG



SA-NIP M5-AG, G1/8"-AG, G1/4"-AG

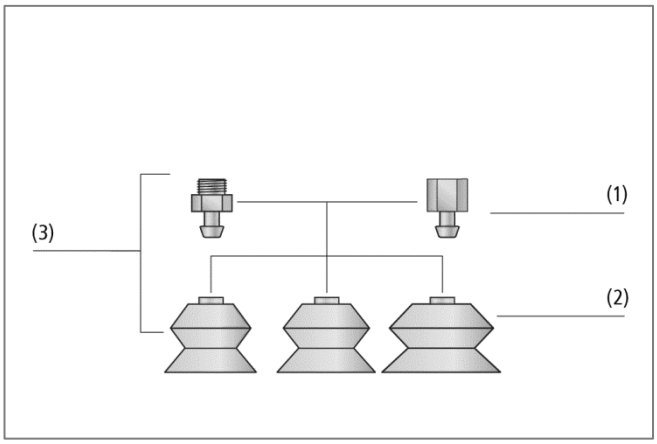
Type	Dimensions in mm								
	D	dn	D2	G1	L	L1	LG1	L2	SW1
SA-NIP N016 M5-AG DN250	6.5	2.5	5.8	M5-M	5	16.0	5.0	3.5	7
SA-NIP N016 G1/8-AG DN350	6.5	3.5	5.8	G1/8"-M	6	20.0	7.5	4.0	14
SA-NIP N057 G1/8-AG DN510	14.0	5.1	11.8	G1/8"-M	7	27.8	8.0	11.3	17
SA-NIP G1/8-AG DN500	16.0	5.0	12.0	G1/8"-M	5	17.6	8.0	2.3	17
SA-NIP N016 G1/8-IG DN350	6.5	3.5	5.8	G1/8"-F	12	18.5	8.0	4.0	14
SA-NIP N057 G1/8-IG DN510	14.0	5.1	11.8	G1/8"-F	12	24.0	8.0	11.3	17
SA-NIP N033 G1/4-AG DN550	13.0	5.5	11.0	G1/4"-M	5	28.0	10.0	13.0	17
SA-NIP N033 G1/4-IG DN550	13.0	5.5	11.0	G1/4"-F	15	28.0	12.0	13.0	17

Suction Cups for Packaging

Bellows Suction Cups FSGA (1.5 Folds)

Suction area (Ø) from 11 mm to 33 mm

Bellows suction cups FSGA (1.5 Folds)



System design bellows suction cups FSGA (1.5 Folds)

Bellows suction cups FSGA being used for handling cardboard boxes

Suitability for Industry-Specific Applications

Applications

- Round, bellows suction cup with 1.5 folds for handling of extremely sensitive workpieces (optimum damping effect due to folds and smooth sealing lip)
- Handling of workpieces with uneven surface, such as pipes (folds permit optimal adaptation to concave and convex surfaces)
- Handling of sterilized glass containers like ampoules, syringes and vials in pharmaceutical filling machines (extended cup longevity by Heavy Duty Silicone SI-HD)

Design

- Robust, wear-resistant suction cup FSGA (3) with single sealing lip, consisting of suction cup FGA (2) with 1.5 folds and connection nipple (1)
- All nipples are plugged in
- Suction cups with a diameter of 25 mm or more with supports on the bottom
- With each nipple family, the replacement cups and nipples can be combined as desired

Our Highlights...	Your Benefits...
• Wide range of diameters and materials	> For a wide range of different workpieces
• Soft, tapered sealing lip	> Very good adaptation to curved or uneven workpiece surfaces
• 1.5 folds	> High suction force and optimum damping effect during placement on workpieces
• Very stiff top fold	> Good resistance to horizontal forces at high acceleration values
• Supports on the bottom (diameter > 25 mm)	> No permanent deformation of thin-walled workpieces

Suction Cups for Packaging

Bellows Suction Cups FSGA (1.5 Folds)

Suction area (Ø) from 11 mm to 33 mm

Designation Code Bellows Suction Cups FSGA (1.5 Folds)

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Connection thread
Example FSGA 14 NK-55 G1/8-IG:			
FSGA	**14**	**NK-45**	**G1/8-IG**
FSGA	11 to 33	NBR-55 NK-45 SI-55 SI-HD (65 Shore)	G1/8-AG (AG = male (M)) G1/8-IG (IG = female (F)) G1/4-AG

Ordering Data Bellows Suction Cups FSGA (1.5 Folds)

Suction cup FSGA (elastomer part + connection nipple) is delivered unassembled (diameters of 33 mm and more are assembled). The delivery consists of:

- Suction cup of type FGA – elastomer part, available in various diameters and materials
- Connection nipple of type SA-NIP – available with various threads

Available spare parts: suction cup FGA, connection nipple SA-NIP

Bellows Suction Cups FSGA (1.5 Folds)

Type	Suction cup material / hardness in Shore A			
	Perbunan NBR 55 ±5ShA	Natural Rubber NK 45±5ShA	Silicone SI 55±5ShA	Silicone SI-HD
FSGA 11 G1/8-AG	10.01.06.00075	10.01.06.00408	10.01.06.00085	on request
FSGA 11 G1/8-IG	10.01.06.00061	10.01.06.00407	10.01.06.00068	
FSGA 11 M5-AG	10.01.06.00076	10.01.06.00406	10.01.06.00086	
FSGA 14 G1/8-AG	10.01.06.00381	10.01.06.00387	10.01.06.00384	
FSGA 14 G1/8-IG	10.01.06.00380	10.01.06.00386	10.01.06.00383	
FSGA 14 M5-AG	10.01.06.00379	10.01.06.00385	10.01.06.00382	
FSGA 16 G1/8-AG	10.01.06.00077	10.01.06.00411	10.01.06.00087	
FSGA 16 G1/8-IG	10.01.06.00062	10.01.06.00410	10.01.06.00069	
FSGA 16 M5-AG	10.01.06.00078	10.01.06.00409	10.01.06.00088	
FSGA 20 G1/8-AG	10.01.06.00390	10.01.06.00396	10.01.06.00393	
FSGA 20 G1/8-IG	10.01.06.00389	10.01.06.00395	10.01.06.00392	
FSGA 20 M5-AG	10.01.06.00388	10.01.06.00394	10.01.06.00391	
FSGA 22 G1/8-AG	10.01.06.00079	10.01.06.00414	10.01.06.00089	
FSGA 22 G1/8-IG	10.01.06.00063	10.01.06.00413	10.01.06.00070	
FSGA 22 M5-AG	10.01.06.00080	10.01.06.00412	10.01.06.00090	
FSGA 25 G1/8-AG	10.01.06.00399	10.01.06.00405	10.01.06.00402	
FSGA 25 G1/8-IG	10.01.06.00398	10.01.06.00404	10.01.06.00401	
FSGA 33 G1/4-AG	10.01.06.00081	10.01.06.00330	10.01.06.00091	
FSGA 33 G1/4-IG	10.01.06.00064	10.01.06.00415	10.01.06.00071	

Suction Cups for Packaging

Bellows Suction Cups FSGA (1.5 Folds)

Suction area (Ø) from 11 mm to 33 mm

Ordering Data Spare Parts Bellows Suction Cups

Type	Suction cup material / hardness in Shore A			
	Perbunan NBR 55 ±5ShA	Natural Rubber NK 45±5ShA	Silicone SI 55±5ShA	Silicone SI-HD
FGA 11	10.01.06.00095	10.01.06.00423	10.01.06.00098	10.01.06.02976
FGA 14	10.01.06.00370	10.01.06.00372	10.01.06.00371	10.01.06.03143
FGA 16	10.01.06.00096	10.01.06.00424	10.01.06.00099	10.01.06.02459
FGA 20	10.01.06.00373	10.01.06.00375	10.01.06.00374	-
FGA 22	10.01.06.00097	10.01.06.00425	10.01.06.00100	10.01.06.03419
FGA 25	10.01.06.00376	10.01.06.00378	10.01.06.00377	10.01.06.03245
FGA 33	10.01.06.00130	10.01.06.00426	10.01.06.00126	-

Ordering Data Spare Parts Suction Cup Nipples

Type	Suction cup nipples [AG]		Suction cup nipples [IG]	
FSGA 11 M5	SA-NIP N016 M5-AG	10.01.06.00123	-	-
FSGA 11 G1/8	SA-NIP N016 G1/8-AG	10.01.06.05735	SA-NIP N016 G1/8-IG	10.01.06.05731
FSGA 14 M5	SA-NIP N016 M5-AG	10.01.06.00123	-	-
FSGA 14 G1/8	SA-NIP N016 G1/8-AG	10.01.06.05735	SA-NIP N016 G1/8-IG	10.01.06.05731
FSGA 16 M5	SA-NIP N016 M5-AG	10.01.06.00123	-	-
FSGA 16 G1/8	SA-NIP N016 G1/8-AG	10.01.06.05735	SA-NIP N016 G1/8-IG	10.01.06.05731
FSGA 20 M5	SA-NIP N016 M5-AG	10.01.06.00123	-	-
FSGA 20 G1/8	SA-NIP N016 G1/8-AG	10.01.06.05735	SA-NIP N016 G1/8-IG	10.01.06.05731
FSGA 22 M5	SA-NIP N016 M5-AG	10.01.06.00123	-	-
FSGA 22 G1/8	SA-NIP N016 G1/8-AG	10.01.06.05735	SA-NIP N016 G1/8-IG	10.01.06.05731
FSGA 25 G1/8	SA-NIP N016 G1/8-AG	10.01.06.05735	SA-NIP N016 G1/8-IG	10.01.06.05731
FSGA 33 G1/4	SA-NIP N018 G1/4-AG	10.01.06.01065	SA-NIP N018 G1/4-IG	10.01.06.01066

Technical Data Bellows Suction Cups FSGA (1.5 Folds)

Type	Suction force [N]*	Pull-off force [N]**	Volume [cm³]	Min. curve radius [mm] (convex)	Recom. internal hose diameter d [mm]***	Nipple family
FSGA 11	0.95	3.8	0.225	10	4	N 016
FSGA 14	1.20	5.0	0.420	13	4	N 016
FSGA 16	2.30	6.7	0.750	20	4	N 016
FSGA 20	4.70	10.7	1.150	30	4	N 016
FSGA 22	5.70	15.2	1.400	25	4	N 016
FSGA 25	5.30	17.3	3.150	20	4	N 016
FSGA 33	13.60	39.6	4.750	40	6	N 018

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface – they do not include a safety factor

**The pull-off force of the versions made of natural rubber is reduced by about 40%

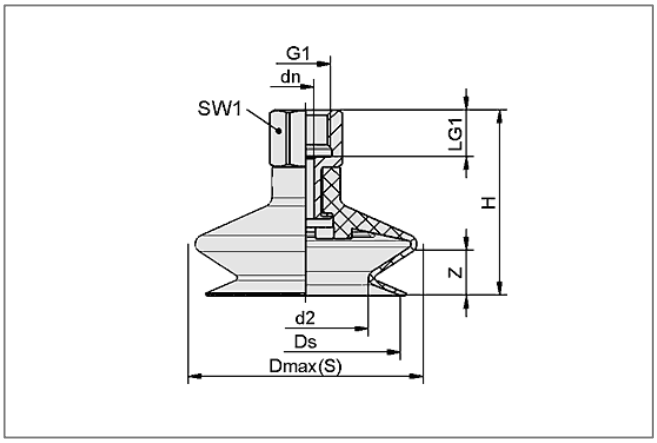
***The recommended hose diameter refers to a hose length of approx. 2 m

Suction Cups for Packaging

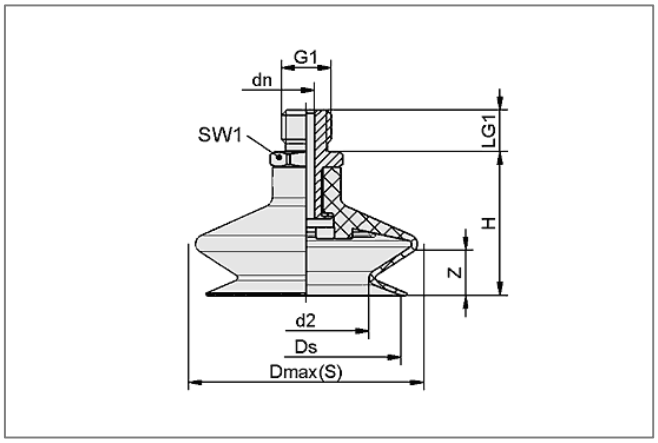
Bellows Suction Cups FSGA (1.5 Folds)

Suction area (Ø) from 11 mm to 33 mm

Design Data Bellows Suction Cups FSGA (1.5 Folds)



FSGA 11 to 33 IG



FSGA 11 to 33 AG

Type	Dimensions in mm*								
	d2	dn	Dmax (S)	Ds	G1	H	LG1	SW1	Z (Stroke)
FSGA 11 G1/8-AG	5.1	3.5	13.0	10.4	G1/8"-M	22.0	7.5	14	4
FSGA 11 G1/8-IG	5.1	3.5	13.0	10.4	G1/8"-F	28.0	8.0	14	4
FSGA 11 M5-AG	5.1	2.5	13.0	10.4	M5-M	21.0	5.0	7	4
FSGA 14 G1/8-AG	5.0	3.5	14.5	12.5	G1/8"-M	21.5	7.5	14	5
FSGA 14 G1/8-IG	5.0	3.5	14.5	12.5	G1/8"-F	27.5	8.0	14	5
FSGA 14 M5-AG	5.0	2.5	14.5	12.5	M5-M	20.5	5.0	7	5
FSGA 16 G1/8-AG	8.4	3.5	18.5	15.6	G1/8"-M	25.2	7.5	14	7
FSGA 16 G1/8-IG	8.4	3.5	18.5	15.6	G1/8"-F	31.2	8.0	14	7
FSGA 16 M5-AG	8.4	2.5	18.5	15.6	M5-M	24.2	5.0	7	7
FSGA 20 G1/8-AG	11.0	3.5	21.0	18.1	G1/8"-M	21.2	7.5	14	5
FSGA 20 G1/8-IG	11.0	3.5	21.0	18.1	G1/8"-F	27.2	8.0	14	5
FSGA 20 M5-AG	11.0	2.5	21.0	18.1	M5-M	20.2	5.0	7	5
FSGA 22 G1/8-AG	11.7	3.5	25.0	21.5	G1/8"-M	25.0	7.5	14	6
FSGA 22 G1/8-IG	11.7	3.5	25.0	21.5	G1/8"-F	31.0	8.0	14	6
FSGA 22 M5-AG	11.7	2.5	25.0	21.5	M5-M	24.0	5.0	7	6
FSGA 25 G1/8-AG	9.9	3.5	26.5	22.5	G1/8"-M	29.0	7.5	14	9
FSGA 25 G1/8-IG	9.9	3.5	26.5	22.5	G1/8"-F	35.0	8.0	14	9
FSGA 33 G1/4-AG	17.0	4.4	38.0	30.0	G1/4"-M	31.0	11.0	17	9
FSGA 33 G1/4-IG	17.0	4.4	38.0	30.0	G1/4"-F	42.0	12.0	17	9

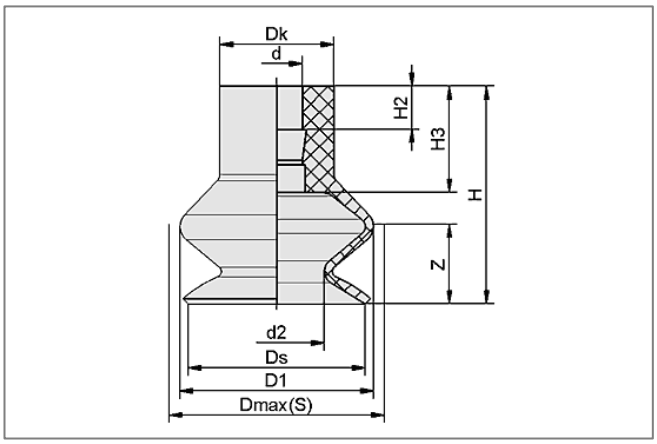
*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

Suction Cups for Packaging

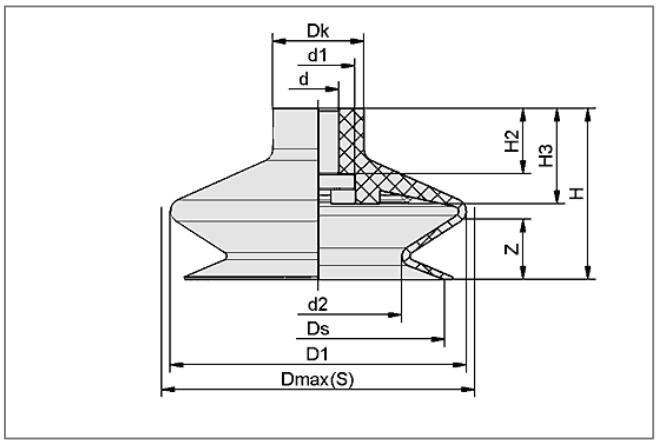
Bellows Suction Cups FSGA (1.5 Folds)

Suction area (Ø) from 11 mm to 33 mm

Design Data Bellows Suction Cups FGA (1.5 Folds) – Spare Parts for FSGA



FGA 11 to 25



FGA 33

Type	Dimensions in mm*										
	d	d1	d2	D1	Dk	Dmax(S)	Ds	H	H2	H3	Z (Stroke)
FGA 11	4.5	-	5.1	12.0	10	13.0	10.4	16.0	3.8	9.3	4
FGA 14	4.5	-	5.0	13.7	10	14.5	12.5	15.5	3.8	8.5	5
FGA 16	4.5	-	8.4	17.0	10	18.5	15.6	19.2	3.8	9.4	7
FGA 20	4.5	-	11.0	19.9	10	21.0	18.1	15.2	3.8	8.7	5
FGA 22	4.5	-	11.7	24.2	10	25.0	21.5	19.0	3.8	9.1	6
FGA 25	4.5	-	9.9	25.0	10	26.5	22.5	23.0	3.8	8.9	9
FGA 33	8.0	16.0	17.0	36.0	18	38.0	30.0	27.0	13.0	14.0	9

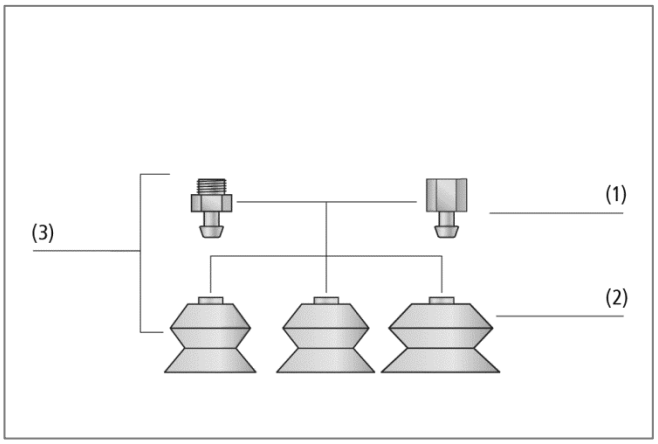
*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

Suction Cups for Packaging

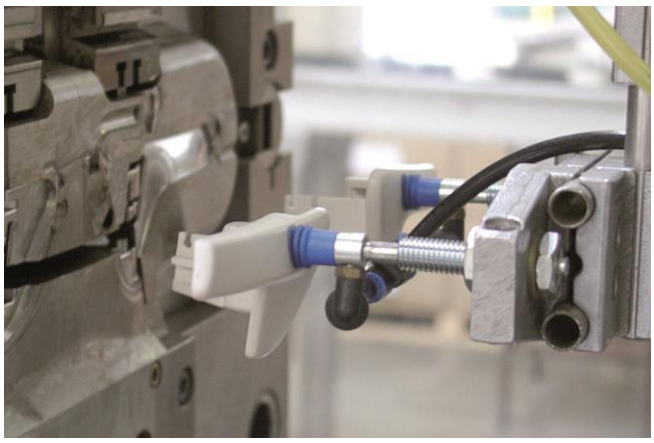
Bellows Suction Cups FSG (2.5 Folds)

Suction area (Ø) from 4 mm to 32 mm

Bellows suction cups FSG (2.5 Folds)



System design bellows suction cups FSG (2.5 Folds)



Bellows suction cups FSG being used for hot plastic parts

Suitability for Industry-Specific Applications

Applications

- Round, bellows suction cup with 2.5 folds for handling of extremely sensitive workpieces (optimum damping effect)
- Handling of workpieces with extremely uneven surfaces, such as pipes (optimal adaptation to concave and convex surfaces)
- Special design of the folds permits use in systems with very short cycle times
- Handling of sterilized glass containers like ampoules, syringes and vials in pharmaceutical filling machines (extended cup longevity by Heavy Duty Silicone SI-HD)

Design

- Robust, wear-resistant suction cup FSG (3) with single sealing lip, consisting of suction cup FG (2) with 2.5 folds and connection nipple (1)
- All nipples are plugged in
- Suction cups with a diameter of 52 mm or more with supports on the bottom
- With each nipple family, the replacement cups and nipples can be combined as desired

Our Highlights...	Your Benefits...
• Wide range of diameters and materials	> Wide range of workpieces shapes and sizes
• 2.5 folds	> High suction force and optimum damping effect during placement on workpieces
• Soft, flexible folds	> Very high stroke of suction cup
• Soft, tapered sealing lip	> Very good adaptation to curved workpiece surfaces

Suction Cups for Packaging

Bellows Suction Cups FSG (2.5 Folds)

Suction area (Ø) from 4 mm to 32 mm

Designation Code Bellows Suction Cups (2.5 Folds)

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Connection thread
Example FSG 18 SI-55 G1/8-IG:			
FSG	**18**	**SI-55**	**G1/8-IG**
FSG	4 to 32	NBR-55 NK-45 SI-55 SI-HD (65 Shore)	M5-IG (IG = female (F)) G1/8-AG (AG = male (M)) G1/8-IG G1/4-AG G1/4-IG

Ordering Data Bellows Suction Cups FSG (2.5 Folds)

Suction cup FSG (elastomer part + connection nipple) is delivered unassembled. The delivery consists of:

- Suction cup of type FG – elastomer part, available in various diameters and materials
- Connection nipple of type SA-NIP – available with various threads

Available spare parts: suction cup FG, connection nipple SA-NIP

Suction Cups for Packaging

Bellows Suction Cups FSG (2.5 Folds)

Suction area (Ø) from 4 mm to 32 mm

Bellows Suction Cups FSG (2.5 Folds)

Type	Suction cup material / hardness in Shore A			
	Perbunan NBR 55±5ShA	Natural Rubber NK 45±5ShA	Silicone SI 55±5ShA	Silicone SI-HD
FSG 4 M5-AG	-	10.01.06.02964	10.01.06.02966	on request
FSG 4 M5-IG	-	10.01.06.02965	10.01.06.02967	
FSG 5 M5-AG	-	10.01.06.00663	10.01.06.00665	
FSG 5 M5-IG	-	10.01.06.00662	10.01.06.00664	
FSG 7 G1/8-AG	-	10.01.06.00020	10.01.06.00034	
FSG 7 G1/8-IG	-	10.01.06.00001	10.01.06.00010	
FSG 7 M5-AG	-	10.01.06.00021	10.01.06.00035	
FSG 9 G1/8-AG	10.01.06.00432	10.01.06.00022	10.01.06.00036	
FSG 9 G1/8-IG	10.01.06.00431	10.01.06.00002	10.01.06.00011	
FSG 9 M5-AG	10.01.06.00430	10.01.06.00023	10.01.06.00037	
FSG 12 G1/8-AG	10.01.06.00564	10.01.06.00562	10.01.06.00563	
FSG 12 G1/8-IG	10.01.06.00561	10.01.06.00559	10.01.06.00560	
FSG 12 M5-AG	10.01.06.00567	10.01.06.00565	10.01.06.00566	
FSG 14 G1/8-AG	10.01.06.00435	10.01.06.00024	10.01.06.00038	
FSG 14 G1/8-IG	10.01.06.00434	10.01.06.00003	10.01.06.00012	
FSG 14 M5-AG	10.01.06.00433	10.01.06.00025	10.01.06.00039	
FSG 18 G1/8-AG	10.01.06.00438	10.01.06.00026	10.01.06.00040	
FSG 18 G1/8-IG	10.01.06.00437	10.01.06.00004	10.01.06.00013	
FSG 18 M5-AG	10.01.06.00436	10.01.06.00027	10.01.06.00041	
FSG 20 G1/8-AG	10.01.06.00441	10.01.06.00028	10.01.06.00042	
FSG 20 G1/8-IG	10.01.06.00440	10.01.06.00005	10.01.06.00014	
FSG 20 M5-AG	10.01.06.00439	10.01.06.00029	10.01.06.00043	
FSG 25 G1/8-AG	10.01.06.00443	10.01.06.00334	10.01.06.00337	
FSG 25 G1/8-IG	10.01.06.00442	10.01.06.00333	10.01.06.00336	
FSG 32 G1/4-AG	10.01.06.00445	10.01.06.00030	10.01.06.00044	
FSG 32 G1/4-IG	10.01.06.00444	10.01.06.00006	10.01.06.00015	

Ordering Data Spare Parts Bellows Suction Cups

Type	Suction cup material / hardness in Shore A			
	Perbunan NBR 55±5ShA	Natural Rubber NK 45±5ShA	Silicone SI 55±5ShA	Silicone SI-HD
FG 4	-	10.01.06.02962	10.01.06.02963	-
FG 5	-	10.01.06.00640	10.01.06.00642	-
FG 7	-	10.01.06.00050	10.01.06.00055	-
FG 9	10.01.06.00452	10.01.06.00051	10.01.06.00056	10.01.06.03148
FG 12	10.01.06.00558	10.01.06.00557	10.01.06.00549	-
FG 14	10.01.06.00453	10.01.06.00052	10.01.06.00057	-
FG 18	10.01.06.00454	10.01.06.00053	10.01.06.00058	-
FG 20	10.01.06.00455	10.01.06.00054	10.01.06.00059	-
FG 25	10.01.06.00456	10.01.06.00335	10.01.06.00338	10.01.06.03246
FG 32	10.01.06.00457	10.01.06.00140	10.01.06.00144	-

Suction Cups for Packaging

Bellows Suction Cups FSG (2.5 Folds)

Suction area (Ø) from 4 mm to 32 mm

Ordering Data Spare Cups Suction Cup Nipples

Type	Suction cup nipples [AG]		Suction cup nipples [IG]	
FSG 4 M5	SA-NIP N017 M5-AG	10.01.06.00314	SA-NIP N017 M5-IG	10.01.06.00313
FSG 5 M5	SA-NIP N017 M5-AG	10.01.06.00314	SA-NIP N017 M5-IG	10.01.06.00313
FSG 7 G1/8	SA-NIP N016 G1/8-AG	10.01.06.05735	SA-NIP N016 G1/8-IG	10.01.06.05731
FSG 7 M5	SA-NIP N016 M5-AG	10.01.06.00123	-	-
FSG 9 M5	SA-NIP N016 M5-AG	10.01.06.00123	-	-
FSG 9 G1/8	SA-NIP N016 G1/8-AG	10.01.06.05735	SA-NIP N016 G1/8-IG	10.01.06.05731
FSG 12 M5	SA-NIP N016 M5-AG	10.01.06.00123	-	-
FSG 12 G1/8	SA-NIP N016 G1/8-AG	10.01.06.05735	SA-NIP N016 G1/8-IG	10.01.06.05731
FSG 14 M5	SA-NIP N016 M5-AG	10.01.06.00123	-	-
FSG 14 G1/8	SA-NIP N016 G1/8-AG	10.01.06.05735	SA-NIP N016 G1/8-IG	10.01.06.05731
FSG 18 M5	SA-NIP N016 M5-AG	10.01.06.00123	-	-
FSG 18 G1/8	SA-NIP N016 G1/8-AG	10.01.06.05735	SA-NIP N016 G1/8-IG	10.01.06.05731
FSG 20 M5	SA-NIP N016 M5-AG	10.01.06.00123	-	-
FSG 20 G1/8	SA-NIP N016 G1/8-AG	10.01.06.05735	SA-NIP N016 G1/8-IG	10.01.06.05731
FSG 25 G1/8	SA-NIP N016 G1/8-AG	10.01.06.05735	SA-NIP N016 G1/8-IG	10.01.06.05731
FSG 32 G1/4	SA-NIP N018 G1/4-AG	10.01.06.01065	SA-NIP N018 G1/4-IG	10.01.06.01066

Technical Data Bellows Suction Cups FSG (2.5 Folds)

Type	Suction force [N]*	Pull-off force [N]**	Volume [cm³]	Min. curve radius [mm] (convex)	Recom. internal hose diameter d [mm]***	Nipple family
FSG 4	0.3	0.6	0.053	4	2	N 017
FSG 5	0.1	0.8	0.033	8	2	N 017
FSG 7	0.1	0.9	0.043	8	4	N 016
FSG 9	0.7	2.3	0.150	10	4	N 016
FSG 12	0.9	3.5	0.600	13	4	N 016
FSG 14	1.2	5.7	0.975	15	4	N 016
FSG 18	2.3	8.5	1.350	20	4	N 016
FSG 20	3.8	12.1	2.000	30	4	N 016
FSG 25	4.5	19.0	5.400	30	4	N 016
FSG 32	12.0	36.9	10.000	35	6	N 018

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface – they do not include a safety factor

**The pull-off force of the versions made of natural rubber is reduced by about 40%

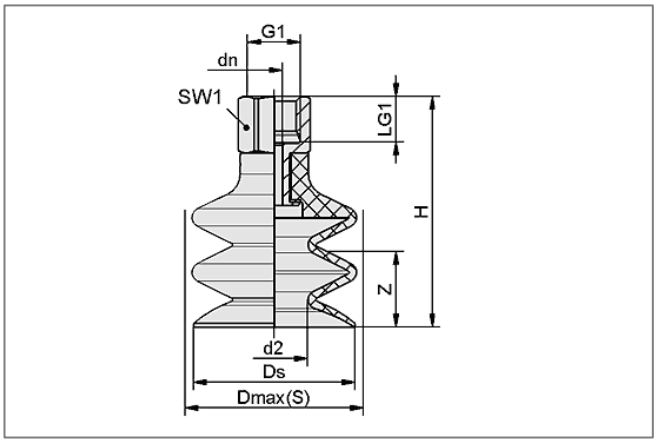
***The recommended hose diameter refers to a hose length of approx. 2 m

Suction Cups for Packaging

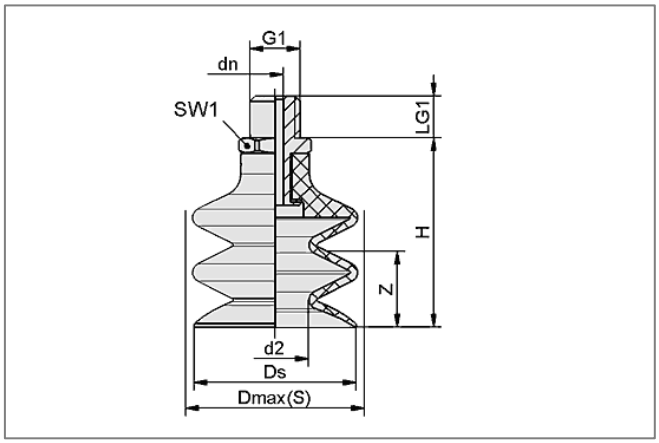
Bellows Suction Cups FSG (2.5 Folds)

Suction area (Ø) from 4 mm to 32 mm

Design Data Bellows Suction Cups FSG (2.5 Folds)



FSG 4 to 32 IG



FSG 4 to 32 AG

Type	Dimensions in mm*								
	d2	dn	Ds	Dmax(S)	G1	H	LG1	SW1	Z (Stroke)
FSG 4 M5-AG	2.4	2.0	3.8	7.0	M5-M	19.0	5.0	8	2
FSG 4 M5-IG	2.4	2.0	3.8	7.0	M5-F	24.0	5.5	8	2
FSG 5 M5-AG	2.6	2.0	5.0	7.0	M5-M	19.0	5.0	8	2
FSG 5 M5-IG	2.6	2.0	5.0	7.0	M5-F	24.0	5.5	8	2
FSG 7 G1/8-AG	1.8	3.5	5.9	9.0	G1/8"-M	20.0	7.5	14	3
FSG 7 G1/8-IG	1.8	3.5	5.9	9.0	G1/8"-F	26.0	8.5	14	3
FSG 7 M5-AG	1.8	2.5	5.9	9.0	M5-M	19.0	5.0	7	3
FSG 9 G1/8-AG	4.1	3.5	9.0	9.5	G1/8"-M	21.0	7.5	14	3
FSG 9 G1/8-IG	4.1	3.5	9.0	9.5	G1/8"-F	27.0	8.5	14	3
FSG 9 M5-AG	4.1	2.5	9.0	9.5	M5-M	20.0	5.0	7	3
FSG 12 G1/8-AG	5.0	3.5	12.0	13.0	G1/8"-M	27.0	7.5	14	7
FSG 12 G1/8-IG	5.0	3.5	12.0	13.0	G1/8"-F	33.0	8.5	14	7
FSG 12 M5-AG	5.0	2.5	12.0	13.0	M5-M	26.0	5.0	7	7
FSG 14 G1/8-AG	5.4	3.5	14.5	15.5	G1/8"-M	28.8	7.5	14	9
FSG 14 G1/8-IG	5.4	3.5	14.5	15.5	G1/8"-F	34.8	8.5	14	9
FSG 14 M5-AG	5.4	2.5	14.5	15.5	M5-M	27.8	5.0	7	9
FSG 18 G1/8-AG	8.0	3.5	17.2	19.0	G1/8"-M	28.6	7.5	14	9
FSG 18 G1/8-IG	8.0	3.5	17.2	19.0	G1/8"-F	34.6	8.0	14	9
FSG 18 M5-AG	8.0	2.5	17.2	19.0	M5-M	27.6	5.0	7	9
FSG 20 G1/8-AG	10.5	3.5	20.0	21.0	G1/8"-M	28.1	7.5	14	9
FSG 20 G1/8-IG	10.5	3.5	20.0	21.0	G1/8"-F	34.1	8.0	14	9
FSG 20 M5-AG	10.5	2.5	20.0	21.0	M5-M	27.1	5.0	7	9
FSG 25 G1/8-AG	10.0	3.5	23.0	26.0	G1/8"-M	40.0	7.5	14	18
FSG 25 G1/8-IG	10.0	3.5	23.0	26.0	G1/8"-F	46.0	8.0	14	18
FSG 32 G1/4-AG	16.0	4.4	32.0	33.5	G1/4"-M	41.5	11.0	17	15
FSG 32 G1/4-IG	16.0	4.4	32.0	33.5	G1/4"-F	52.5	12.0	17	15

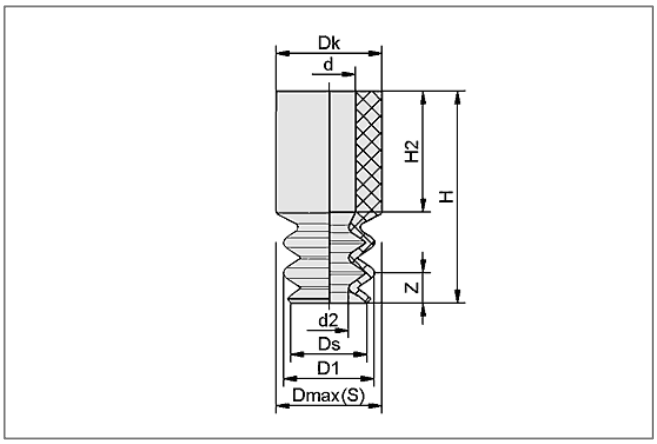
*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

Suction Cups for Packaging

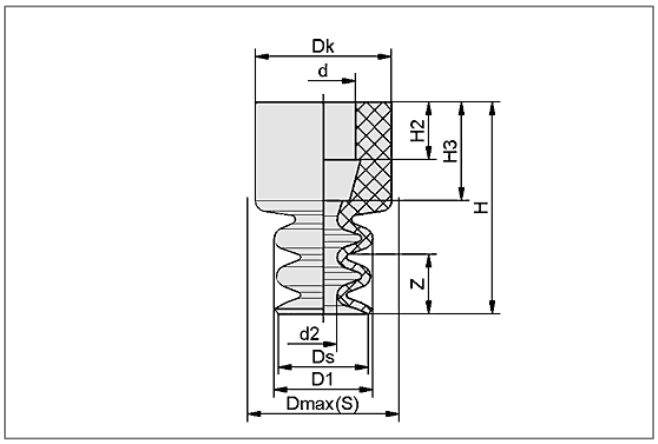
Bellows Suction Cups FSG (2.5 Folds)

Suction area (Ø) from 4 mm to 32 mm

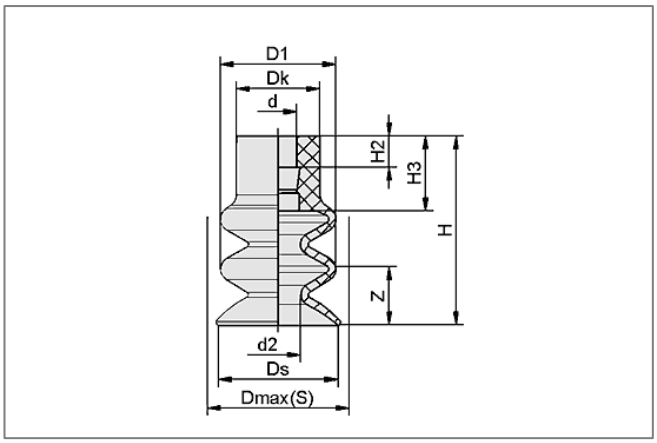
Design Data Bellows Suction Cups FG (2.5 Folds) – Spare Parts



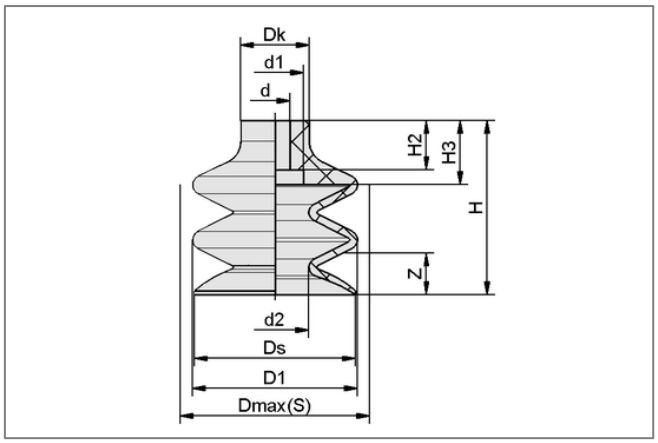
FG 4 to 5



FG 7 to 9



FG 12 to 25



FG 32

Type	Dimensions in mm*										
	d	d1	d2	D1	Dk	Dmax(S)	Ds	H	H2	H3	Z (Stroke)
FG 4	3.5	-	2.4	5.1	7	7.0	3.8	14.0	3.9	8.0	2
FG 5	3.5	-	2.6	6.0	7	7.0	5.0	14.0	8.0	-	2
FG 7	4.5	-	1.8	6.5	9	9.0	5.9	14.0	3.8	6.5	3
FG 9	4.5	-	4.1	8.9	9	9.5	9.0	15.0	3.8	8.2	3
FG 12	4.5	-	5.0	12.0	10	13.0	12.0	21.0	3.8	9.0	7
FG 14	4.5	-	5.4	13.9	10	15.5	14.5	22.8	3.8	9.0	9
FG 18	4.5	-	8.0	17.8	10	19.0	17.2	22.6	3.8	9.0	9
FG 20	4.5	-	10.5	20.0	10	21.0	20.0	22.1	3.8	9.0	9
FG 25	4.5	-	10.0	25.0	10	26.0	23.0	34.0	3.8	9.0	18
FG 32	8.0	15.0	16.0	32.4	18	33.5	32.0	37.5	13.0	17.0	15

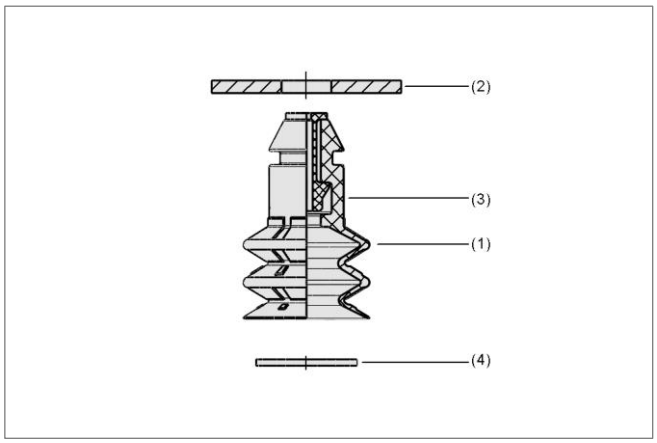
*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

Suction Cups for Packaging

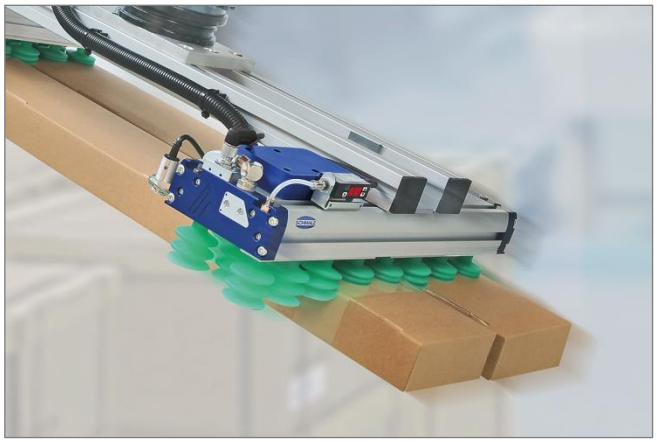
Bellows Suction Cups SPB2 (2.5 Folds) with push-in connector

Suction area Ø 20 mm and 40 mm

Bellows suction cups SPB2 (2.5 Folds)



System design bellows suction cups SPB2 (2.5 Folds)



Bellows suction cups SPB2 for handling cardboard boxes

Suitability for Industry-Specific Applications

Applications

- Round bellows suction cup with 2.5 folds for palletizing and depalletizing processes in the packaging industry
- Handling of packaging materials such as cardboard boxes, rigid and flexible packaging
- Handling of blister packaging, shrink-wrapped products, plastic bags or trays
- Use in large-area gripping systems and “dense array of suction cups” thanks to its plug-in function

Design

- Round bellows suction cup SPB2 (1) with 2.5 folds and soft, flexible sealing lip, integrated flow resistor (3) with diameters of 0.8 to 1.5 mm
- Material silicone
- Machine-side plug-in function (2) for simple installation
- Optional integration of filter screens (4) as a pre-filter (120 µm filter pore size)

Our Highlights...	Your Benefits...
• Flexible, adaptable sealing lip	> Excellent sealing performance when used for cardboard boxes and packaging material as well as on curved non-rigid surfaces
• Optional integration of flow resistors	> Ensures secure handling even if some cups are uncovered
• Soft fold geometry with a large stroke and low restoring force	> Use in large-area gripping systems and “dense array of suction cups”; compensation of height differences and damping effect with high suction force
• Tool-free installation thanks to the machine-side plug-in function	> Quick installation and removal of the suction cups minimizes maintenance and system downtime

Suction Cups for Packaging

Bellows Suction Cups SPB2 (2.5 Folds) with push-in connector

Suction area Ø 20 mm and 40 mm

Designation Bellows Suction Cups SPB2 (2.5 Folds)

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Flow restrictor		Product addition	
Example SPB2 20 SI-40 SW80 P:						
SPB2	**20**	**SI-40**	**SW80**		**P**	
SPB2	20	SI-40	SW80	0.8 mm	P	plug-in function
	40	SI-55	SW100	1.0 mm		
			SW130	1.3 mm		
			SW150	1.5 mm		

Ordering Data Bellows Suction Cups SPB2 (2.5 Folds)

The product is delivered as a ready-to-connect component.

Available spare parts: suction cup, flow resistor
Available accessories: Filter screen

Bellows Suction Cups SPB2 (2.5 Folds)

Type	Flow resistor SW...			
	0.8 mm	1.0 mm	1.3 mm	1.5 mm
SPB2 20 SI-40 P	10.01.06.03220	10.01.06.03221	10.01.06.03222	10.01.06.03223
SPB2 40 SI-55 P	10.01.06.03224	10.01.06.03225	10.01.06.03226	10.01.06.03227

Ordering Data Accessories Bellows Suction Cups SPB2 (2.5 Folds)

Type	Filter screen
SPB2 20 SI-40 P	10.01.06.02565
SPB2 40 SI-55 P	10.01.06.02572

Ordering Data Accessories Bellows Suction Cups SPB2 (2.5 Folds)

Type	Flow restrictor
SW 80 P	10.05.04.00090
SW 100 P	10.05.04.00091
SW 130 P	10.05.04.00092
SW 150 P	10.05.04.00093

Technical Data Bellows Suction Cups SPB2 (2.5 Folds)

Type	Suction force [N]*	Pull-off force [N]	Min curve radius [mm]	Volume [cm³]
SPB2 20 SI-40 P	4.9	8.0	25	2.5
SPB2 40 SI-55 P	14.9	40.0	75	22.0

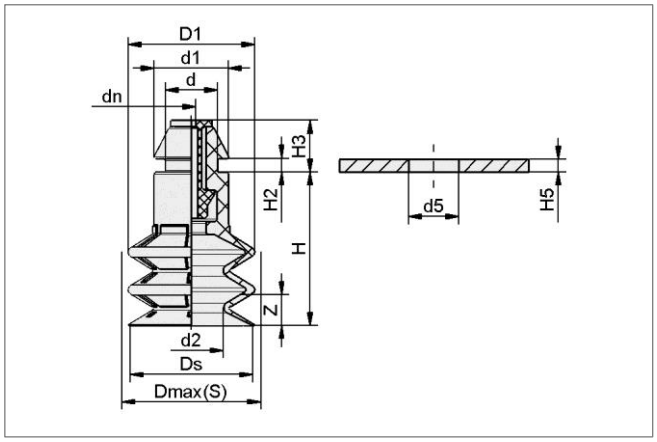
*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface – they do not include a safety factors

Suction Cups for Packaging

Bellows Suction Cups SPB2 (2.5 Folds) with push-in connector

Suction area Ø 20 mm and 40 mm

Design Data Bellows Suction Cups SPB2 (2.5 Folds)



SPB2 20…40 P

Type	Dimensions in mm*												
	d	d1	d2	d5	D1	Dmax(S)**	dn	Ds	H	H2	H3	H5	Z(Stroke)
SPB2 20 SI-40 P	8.5	11.8	10.2	7.9	20.0	20.5	0.8	19.6	24.3	2.2	8.2	2	9
SPB2 40 SI-55 P	12.5	15.7	17.8	11.5	43.5	44.6	0.8	42.7	47.0	2.2	8.2	2	20

*Acceptable dimensional tolerances for rubber parts concering to DIN ISO 3302-1 M3

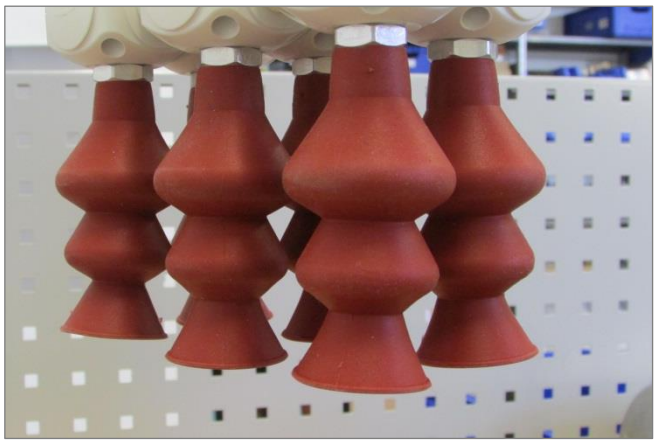
**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

Suction Cups for Eggs

Bellows Suction Cups FG-X

Process-stable and gentle handling of eggs

Bellows suction cups FG-X for handling eggs



Bellows suction cups FG-X expanded

Bellows suction cups FG-X on fresh eggs

Suitability for Industry-Specific Applications

Applications

- Handling of eggs in farm packing machines, grading machines and hatchery packing machines
- Unloading of eggs in egg breaking stations

Design

- Round bellows suction cup FGB with 2.5 folds and soft, flexible sealing lip
- Steep cone-shaped sealing lip for adaption on various egg grades

Our Highlights...	Your Benefits...
• FDA approved silicone	> Food safe suction cup material
• Steep cone-shaped sealing lip	> Secure handling of eggs due to increased holding force
• Extra-long stroke	> Maximized lifting effect immediately after touching the egg
• Cone-shaped bellows	> Increased lateral stability when suction cup is compressed

Suction Cups for Eggs

Bellows Suction Cups FG-X

Process-stable and gentle handling of eggs

Bellows Suction Cups FG-X

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness
Example FG-X 34 SI-30:		
FG-X	**34**	**SI-30**
FG-X	30	SI-30
	33	SI-35
	34	SI-50
	35	

Ordering Data Bellows Suction Cups FG-X

Suction cup FG-X (elastomer part) is supplied as an individual part. In order to receive a complete suction cup (elastomer part + connection element + accessories), the following ordering steps are required:

- Suction cup of type FG-X (step 1) – elastomer part, available in various diameters
- Connection element of type SA-NIP (step 2) – available with various threads on request

Available accessories: Connection nipple SA-NIP on request

Step 1: Bellows Suction Cups FG-X

Type	Part Number
FG-X-30-SI-35	10.01.06.00594
FGB-X-33-SI-50	10.01.06.01104
FG-X-34-SI-30	10.01.06.01106
FGA-X-35-SI-50	10.01.06.01108

Step 2: Connection Elements Bellows Suction Cups

Type	FG-X-30-SI-35	FGB-X-33-SI-50	FG-X-34-SI-30	FGA-X-35-SI-50
On request	--	--	--	--

Technical Data Bellows Suction Cups FG-X

Type	Suction force [N]*	Volume [cm³]	Recom. Internal hose diameter d [mm]
FG-X-30-SI-35	10	18	4
FGB-X-33-SI-50	11	19	4
FG-X-34-SI-30	11	18	4
FGA-X-35-SI-50	12	13	4

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface – they do not include a safety factor

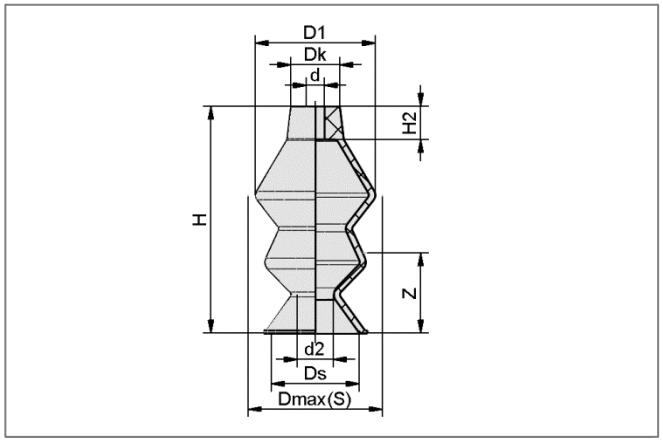
**The recommended hose diameter refers to a hose length of approx. 2 m

Suction Cups for Eggs

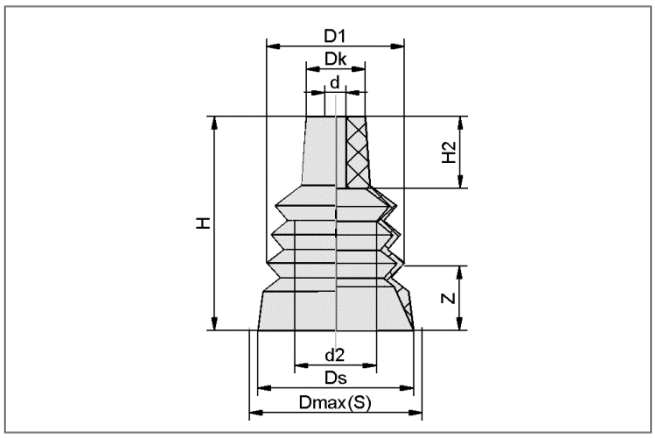
Bellows Suction Cups FG-X

Process-stable and gentle handling of eggs

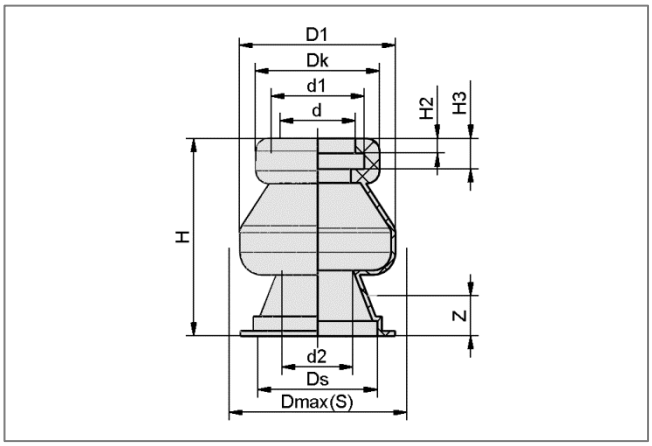
Design Data Bellows Suction Cups FG-X



FG-X 30 SI-35 + FG-X 34 SI-30



FGB-X 33 SI-50



FGA-X 35 SI-50

Type	Dimensions in mm*										
	d	d1	d2	D1	Dk	Dmax(S)	Ds	H	H2	H3	Z(Stroke)
FG-X 30 SI-35	4.5	-	13.5	42.0	13	45	27.0	73.0	12.0	-	37.5
FG-X 34 SI-30	6.0	-	13.5	41.5	16	45	32.0	78.0	12.0	-	42.5
FGB-X 33 SI-50	4.5	-	17.3	30.0	14	34	32.5	46.0	14.5	-	18.0
FGA-X 35 SI-50	17.6	6	18.0	36.0	29	42	26.5	42.6	4.0	21.5	19.5

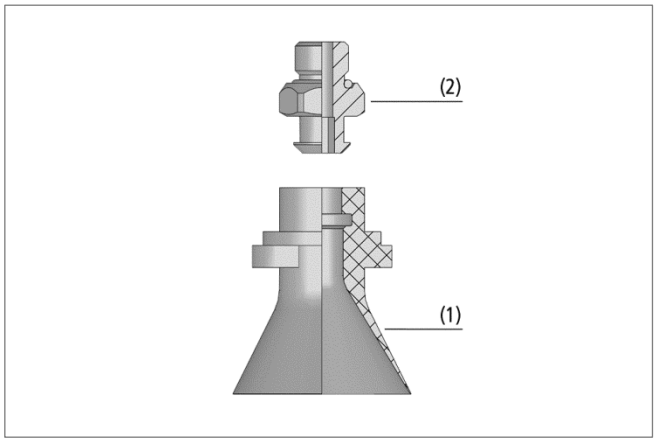
*Acceptable dimensional tolerances for rubber parts concering to DIN ISO 3302-1 M3

Suction Cups for Chocolate Candy

Chocolate Suction Cups SPG

Suction area Ø 14/25/33 mm

Chocolate suction cups SPG



System design chocolate suction cups SPG

Chocolate suction cups SPG being used for handling chocolates

Suitability for Industry-Specific Applications

Applications

- Bell-shaped suction cup for dynamic handling and packing of chocolates in combination with picker robots
- Direct handling of round, oval or square chocolates
- Handling of confectionery with structured surfaces or toppings
- Suitable for direct contact with food due to FDA-compliant material silicone
- Handling of round chocolates with maximum diameter of 35 mm and oval/square chocolates with maximum diagonal measurement of 30 mm

Design

- Suction cup (1) with extremely thin, soft sealing lip and tapered suction cup geometry
- Optimal sealing lip shape for handling workpieces with structured surfaces
- Use of one-piece insertable connection element (2), with G1/8“ male or female thread, for changing the suction cup quickly
- Connection element with male thread has integrated seal

Our Highlights...	Your Benefits...
• Extremely thin sealing lip	> Good sealing on decorated chocolates
• Tapered sealing lip share	> Even square chocolates are enclosed by suction cup; dynamic handling possible
• Large nominal flow	> Leakage compensation on highly-structured chocolates
• FDA-compliant material silicone	> Suitable for direct contact with food

Suction Cups for Chocolate Candy

Chocolate Suction Cups SPG

Suction area Ø 14/25/33 mm

Designation Code Chocolate Suction Cups SPG

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness
Example SPG 33 SI-45:		
SPG	**33**	**SI-45**
SPG	14	SI-45
	25	SI-55
	33	PVC-55

Ordering Data Chocolate Suction Cups SPG

Chocolate suction cup SPG (elastomer part) is supplied as an individual part. In order to receive a complete suction cup (elastomer part + connection element), the following ordering steps are required:

- Suction cup of SPG (step 1) - elastomer part
- Connection element of type SC (step 2) - available with various threads

Step 1: Chocolate Suction Cups SPG

Type*	Part Number
FG 14 SI-55 N016	10.01.06.01063
SPG 25 PVC-55 N016	10.01.19.00083
SPG 33 SI-45 SC040	10.01.19.00002
SPG 33 SI-55 SC040	10.01.19.00140

*Additional material specifications at beginning of the section "Vacuum Suction Cups"

Step 2: Connection Elements Chocolate Suction Cup SPG

Type	Part Number
SC 040 G1/8-AG	10.01.06.02490
SC 040 G1/8-IG	10.01.06.02482
SA-NIP N016 G1/8-AG	10.01.06.05735
SA-NIP N016 G1/8-IG	10.01.06.05731

Technical Data Chocolate Suction Cups SPG

Type	Volume [cm3]	Recommended internal hose [mm]	Max. diameter of the chocolates [mm]*	Weight of workpiece [g]**
FG 14 SI-55 N016	5.2	4	35	20
SPG 25 PVC-55 N016	5.4	4	34	20
SPG 33	7.6	4	35	20

*The suction force and operating vacuum are dependent on the geometry and surface characteristics of the chocolate. We recommend a maximum operating vacuum of -150 mbar.

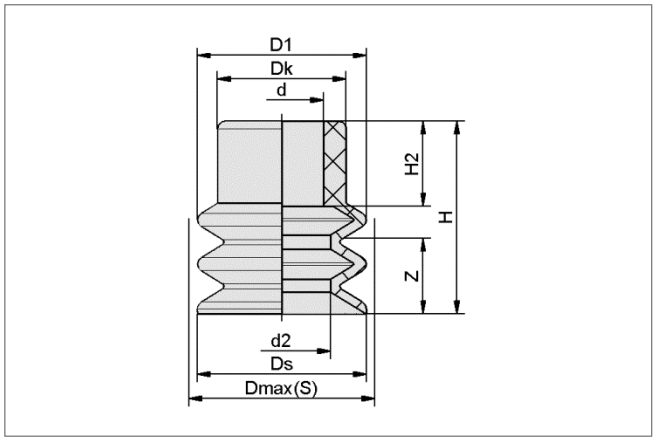
**For handling with high accelerations (up to 10g)

Suction Cups for Chocolate Candy

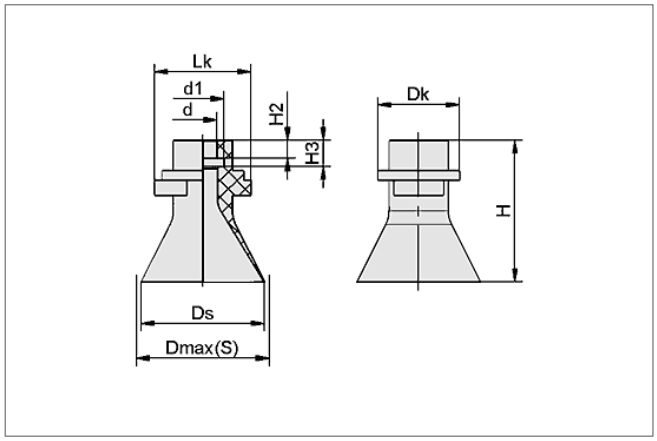
Chocolate Suction Cups SPG

Suction area Ø 14/25/33 mm

Design Data Chocolate Suction Cups SPG



FG 14 SI-55



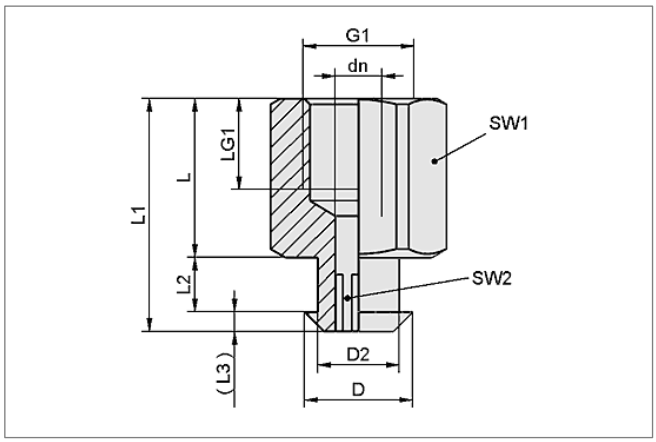
SPG 25…33

Type	Dimensions in mm*									
	d	d1	d2	Dk	Ds	D1	H	H2	Dmax(S)**	Z
FG 14 SI-55	5.0	-	8.7	10.0	13.7	13.7	18.5	9.3	14.0	4
SPG 25	4.0	-	-	10.0	24.5	-	28.0	19.9	25.0	-
SPG 33	7.3	11	-	15.5	32.3	-	38.0	4.8	35.0	-

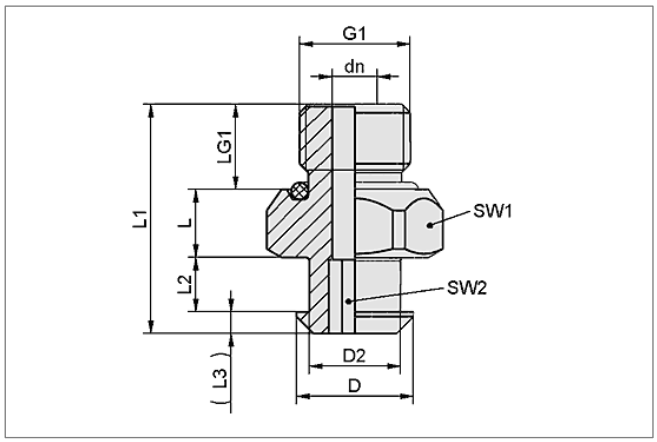
*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

Design data Connection Elements Chocolate Suction Cup SPG



Connection element SC 040 G1/8-IG / SA-NIP IG



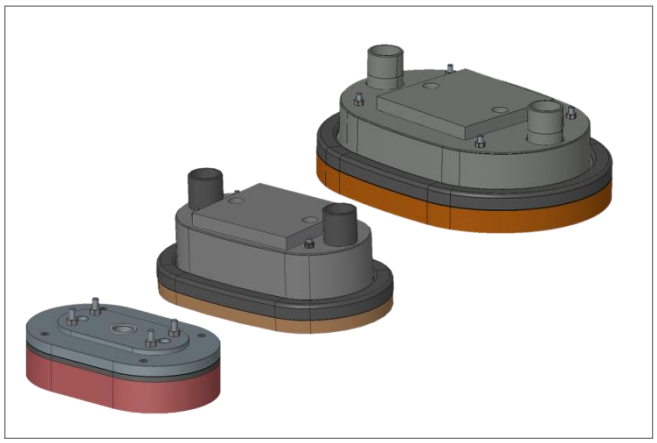
Connection element SC 040 G1/8-AG / SA-NIP AG

Type	Dimensions in mm										
	dn	D	D2	G1	L	L1	L2	L3	LG1	SW1	SW2
SC 040 G1/8-AG	4.0	10.3	8.0	G1/8"-M	6	25.2	4.8	1.9	7.5	14	4
SC 040 G1/8-IG	4.0	10.3	8.0	G1/8"-F	14	20.7	4.8	1.9	8.0	14	4
SA-NIP AG	3.5	6.5	5.8	G1/8“-M	6	20.0	4.0	2.5	7.5	14	-
SA-NIP IG	3.5	6.5	5.8	G1/8“-F	12	18.5	4.0	2.5	8.0	14	-

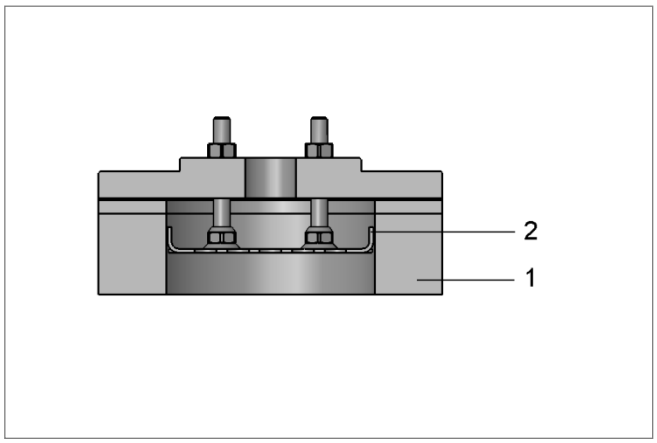
Suction Cups for Large Bags and Sacks

Sack Suction Gripper SG

For sacks up to 50kg



Sack Suction Gripper SG



System design Sack Suction Gripper SG with adjustable

Sack Suction Gripper SG for handling plastic sacks

Suitability for Industry-Specific Applications

Applications

- Automated handling of paper, plastic and woven sacks up to 50kg
- Palletizing and depalletizing of sacks in single-, row- & layer-pick

Design

- Oval sack gripper with foam-rubber seal (1) and integrated, adjustable support (2)
- Basic body with mounting threads and hose connector
- Replaceable foam-rubber seal

Our Highlights...	Your Benefits...
• Sack gripper with extra-flexible foam-rubber seal	> Optimum sealing to the surface of the bag or sack
• Adjustable support grid inside the sack gripper	> Adaptation of the gripper to differing sacks with differing filling levels

Suction Cups for Large Bags and Sacks

Sack Suction Gripper SG

For sacks up to 50kg

Ordering Data Sack Suction Gripper SG

Schmalz Sack Suction Gripper SG is delivered as a ready to connect product without vacuum generator.

Available spare parts: sealing frame

Sack Suction Gripper SG

Type	Part Number
SG-200x130-SWG-20	10.01.10.01118
SG-300x190-SWG-20	12.04.02.10038
SG-360x260-SWG-20	12.04.02.10028

Ordering Data Spare Parts Sack Suction Gripper SG – Sealing Frames

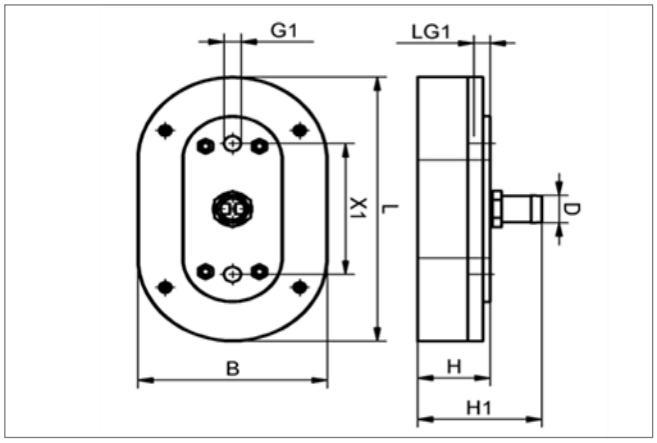
Type	Sealing frame DI-RA
SG-200x130-SWG-20	10.01.10.01115
SG-300x190-SWG-20	10.07.04.00051
SG-360x260-SWG-20	11.03.14.10098

*For spring-loaded sealing piston

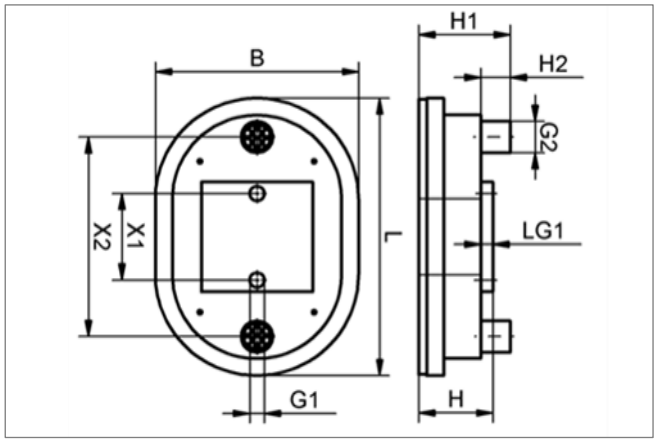
Technical Data Sack Suction Gripper SG

Type	Maximum load [kg]	Weight [kg]	Min. internal hose diameter d [mm]
SG-200x130-SWG-20	10	1.3	19
SG-300x190-SWG-20	35	4.5	1x 40 (plastic) bzw. 2x 40 (paper)
SG-360x260-SWG-20	50	6.3	1x 40 (plastic) bzw. 2x 40 (paper)

Design data Sack Suction Gripper SG



Sack Suction Gripper SG 200x130



Sack Suction Gripper SG 300x190 & SG 360x260

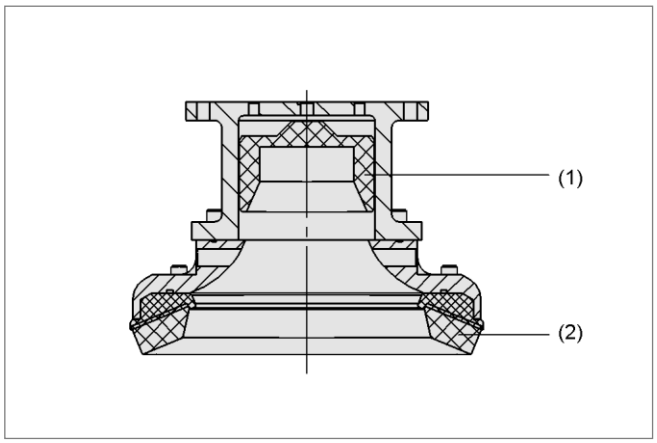
Type	Dimensions in mm									
	D	G1	G2	LG1	L	B	H	H1	X1	X2
SG-200x130-SWG-20	19	G1/4"-M	-	11	202	127	48.5	83.0	100	-
SG-300x190-SWG-20	-	G1/4"-M	G1 1/4"-M	15	296	186	99.0	121.0	110	200
SG-360x260-SWG-20	-	G1/4"-M	G1 1/4"-M	15	358	261	96.5	118.5	110	254

Suction Cups for Water Cooler Bottles

Schmalz Bottle Rack Loader SBRL

For water cooler bottles up to 20l

Bottle Rack Loader SBRL



System design SBRL

Bottle Rack Loader SBRL handling a water cooler bottle

Suitability for Industry-Specific Applications

Applications

- Automated handling of water cooler bottles with a capacity of up to 20 l
- Reliable loading and unloading of racks holding water cooler bottles (“bottle racks“)
- Automated handling of empty and filled water cooler bottles (incl. 90° swivelling)
- Complete rows or layers of water cooler bottles can be handled with the use of multi-grippers. Not suitable for handling any kind of interlayers

Design

- Gripper with integrated centering and stabilization of the neck of the bottle
- Spring-loaded sealing piston (1) to seal the bottle neck
- Suction cup SBRL with adaptable sealing profile (2)
- Attachment by universal robot flange plate
- Vacuum can optionally be generated either by directly attached vacuum ejector or by centrally positioned vacuum pump

Our Highlights...	Your Benefits...
• Adaptable sealing profile	> The shoulder of the water bottle is sealed securely, even if it is embossed or has raised surface textures
• Spring-loaded sealing piston	> Handling of empty and filled bottles. Handling of bottles in various formats
• Stable aluminium basic body	> Can be used with high acceleration at maximum load
• Entire surface of the shoulder of the bottle functions as suction area	> Maximum holding force even without mechanical support
• Integrated centering and stabilization of the neck of the bottle	> High repeat accuracy during the entire process

Suction Cups for Water Cooler Bottles

Schmalz Bottle Rack Loader SBRL

For water cooler bottles up to 20l

Ordering Data Bottle Rack Loader SBRL

Schmalz Bottle Rack Loader SBRL is delivered as a ready to connect product without vacuum generator.

Available spare parts: sealing washer DI-SCHE, sealing ring DR-ZK

Bottle Rack Loader SBRL

Type	Part Number
SBRL 230 O20	10.01.10.04379

Ordering Data Spare Parts Bottle Rack Loader SBRL

Type	Sealing washer DI-SCHE*	Sealing ring DR-ZK
SBRL 230 O20	10.01.10.04377	10.01.10.04300

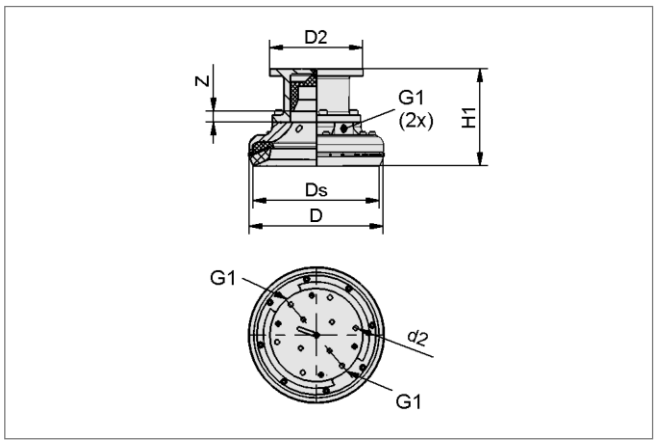
*For spring-loaded sealing piston

Technical Data Bottle Rack Loader SBRL

Type	Maximum load [kg]	Weight [kg]	Recom. internal hose diameter d [mm]	Recom. min. suction rate per gripper [m³/h]*
SBRL 230 O20	30	4.25	6	4

*Recommended operating point: Suction capacity 20 to 25 l/min with an degree of evacuation of -600mbar

Design Data Bottle Rack Loader SBRL



Bottle Rack Loader SBRL

Type	Dimensions in mm						
	d2	D	Ds	D2	G1	H1	Z (Stroke)
SBRL 230 O20	8.5	230	217.1	160	G1/4“-F	166	18.5

Overview of Section 3

Special Grippers

Special Gripper for Separation of Film

Floating Suction Cups SBS

100

- Diameter: 20 to 100 mm
- Holding force: 2.0 to 55,5 N
- Rubber buffers on the bottom side of the suction cup

Floating suction cup for process reliable separation and handling of paper and plastic film

Special Gripper for Handling of Cookie

Flow Grippers SCG

104

- Flow gripper with axial or side-ways mounting
- Suction cup with 1.5 folds made of fda compliant material silicone
- Diameter suction cup: 50 mm

Modular flow gripper with suction cup made of fda-compliant material for handling dry food products such as cookies, cakes and waffles.

Special Gripper for Separation of Film

Floating Suction Cups SBS

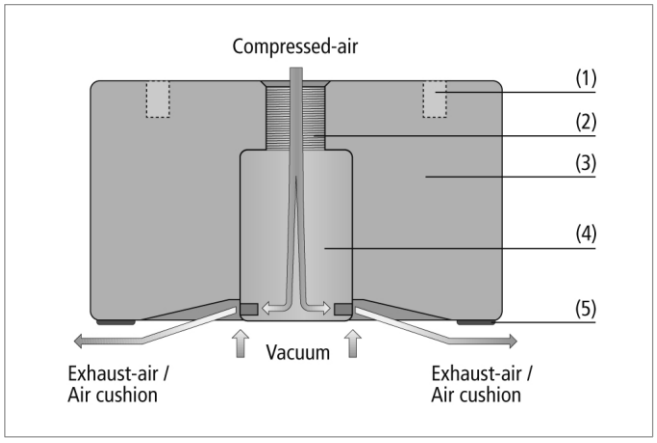
Diameter (Ø) from 20 mm to 100 mm

Suitability for Process-Specific Applications

Floating suction cups SBS

Applications

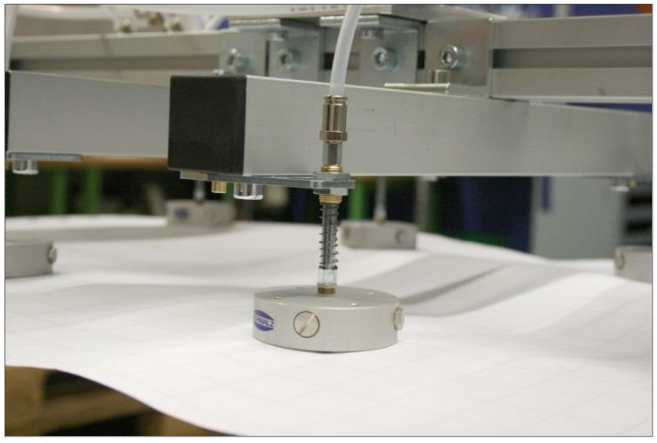
- Floating suction cups for separation of paper and plastic film
- Process reliable separation due to Bernoulli effect without any vacuum adhesion
- Floating suction cups SBS also usable for bakery wafers, crepes and pancakes (please contact us for version made of FDA approved material)



System design floating suction cups SBS

Design

- Available in diameters 20, 30, 40, 60 and 100 mm
- Connection via four mounting threads on the top side (1) or vertical compressed-air connection (2)
- Anodized aluminum body (3) incl. Bernoulli nozzle (4)
- Version with standard flow rate “SF” for air-tight to slightly porous parts and high flow rate “HF” with higher leakage compensation for porous workpieces
- Non-marking rubber buffers of special material HT1 on the bottom side of the SBS (5)



Floating suction cups SBS separated handling of paper

Our Highlights…	Your Benefits…
• Integrated vacuum generation on the Bernoulli principle	> Operating without ejector as ready to use unit
• Suction cup "floats" on an air cushion	> Low-contact handling
• High volume flow rate at a low vacuum	> Process reliable separation of paper & plastic film
• Elastomer buffers made of HT1 on the bottom side	> Absorption of lateral forces, non-marking material HT1

Special Gripper for Separation of Film

Floating Suction Cups SBS

Diameter (Ø) from 20 mm to 100 mm

Designation Code Floating Suction Cups SBS

Abbreviated designation	Diameter in mm	Streaming element	Connection thread mechanical	Product addition
Example SBS 20 SF M5-IG:				
SBS	**20**	**SF**	**M5-IG**	**H**
SBS	20 to 100	SF standard flow HF high flow	M5-IG (IG = female (F)) G1/8-IG	CS central support

Ordering Data Floating Suction Cups SBS

Floating suction cups SBS is delivered assembled in the desired diameter.

Available spare parts: rubber buffer

Floating Suction Cups SBS

Type	Part Number
SBS 20 SF M5-IG	10.01.01.12633
SBS 20 HF M5-IG	10.01.01.12650
SBS 30 SF M5-IG	10.01.01.12636
SBS 30 HF M5-IG	10.01.01.12651
SBS 40 SF G1/8-IG	10.01.01.12638
SBS 40 HF G1/8-IG	10.01.01.12653
SBS 60 SF G1/8-IG	10.01.01.12641
SBS 60 HF G1/8-IG	10.01.01.12655
SBS 100 SF G1/8-IG	10.01.01.12688
SBS 100 HF G1/8-IG	10.01.01.12689

Ordering Data Spare Parts Floating Suction Cups SBS

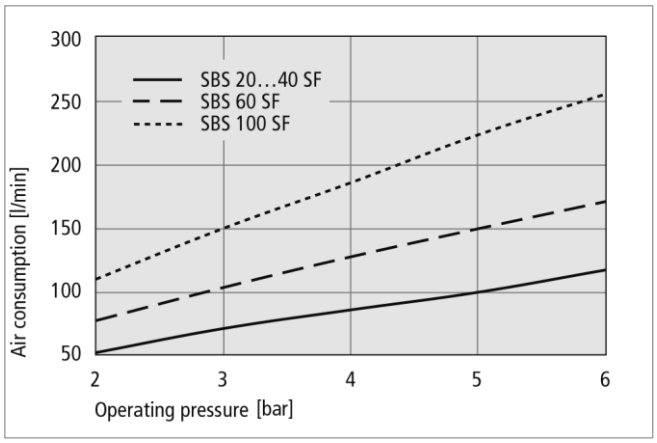
Type	Rubber buffer (3 pcs. required)
SBS 20 SF M5-IG	10.01.01.12585
SBS 20 HF M5-IG	10.01.01.12585
SBS 30 SF M5-IG	10.01.01.12585
SBS 30 HF M5-IG	10.01.01.12585
SBS 40 SF G1/8-IG	10.01.01.12593
SBS 40 HF G1/8-IG	10.01.01.12593
SBS 60 SF G1/8-IG	10.01.01.12593
SBS 60 HF G1/8-IG	10.01.01.12593
SBS 100 SF G1/8-IG	10.01.01.12593
SBS 100 HF G1/8-IG	10.01.01.12593

Special Gripper for Separation of Film

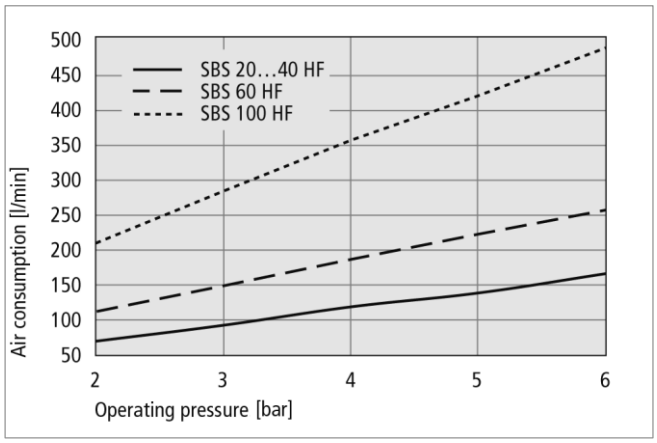
Floating Suction Cups SBS

Diameter (Ø) from 20 mm to 100 mm

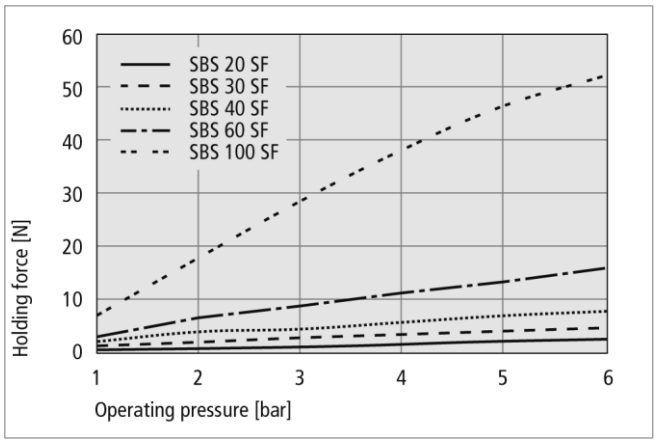
Performance Data Floating Suction Cups SBS



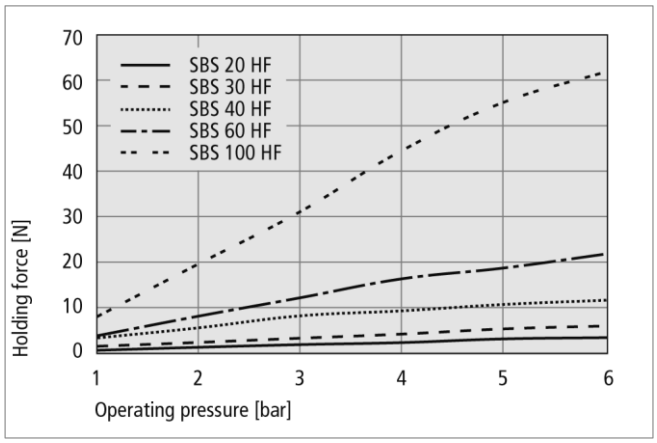
Air consumption SBS 20-100 SF



Air consumption SBS 20-100 HF



Holding force SBS 20-100 SF



Holding force SBS 20-100 HF

Special Gripper for Separation of Film

Floating Suction Cups SBS

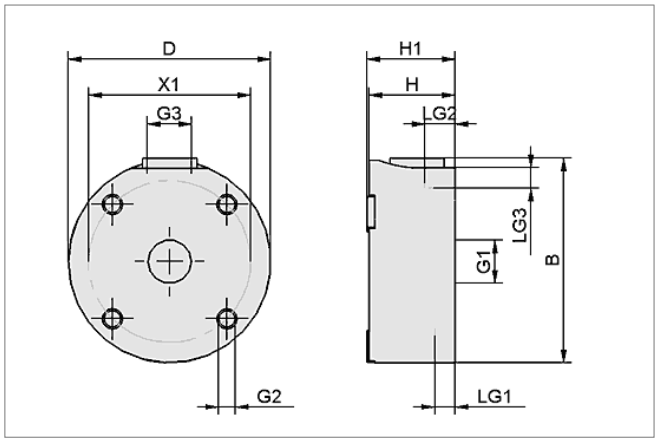
Diameter (Ø) from 20 mm to 100 mm

Technical Data Floating Suction Cups SBS

Type	Holding force [N]*	Air consumption [l/min]*	Operating pressure [bar]	Weight [g]
SBS 20 SF M5-IG	2.0	100	1…6	12
SBS 20 HF M5-IG	3.0	140	1…6	12
SBS 30 SF M5-IG	4.0	100	1…6	31
SBS 30 HF M5-IG	5.0	140	1…6	31
SBS 40 SF G1/8-IG	6.5	100	1…6	51
SBS 40 HF G1/8-IG	10.5	190	1…6	51
SBS 60 SF G1/8-IG	13.0	150	1…6	118
SBS 60 HF G1/8-IG	18.5	225	1…6	118
SBS 100 SF G1/8-IG	46.0	225	1…6	295
SBS 100 HF G1/8-IG	55.5	420	1…6	295

*The specified values are valid for a operating pressure of 5 bar

Design Data Floating Suction Cups SBS



SBS 20 to 100

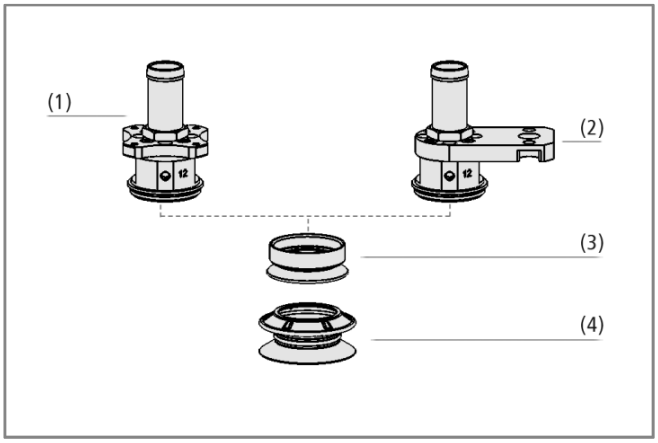
Type	Dimensions in mm										
	B	D	G1	G2	G3	H	H1	LG1	LG2	LG3	X1
SBS 20 SF M5-IG	22.2	20	M5-F	M3-F	M5-F	17	17.4	5	6	6	15
SBS 20 HF M5-IG	22.2	20	M5-F	M3-F	M5-F	17	17.4	5	6	6	15
SBS 30 SF M5-IG	32.0	30	M5-F	M4-F	M5-F	17	17.4	5	6	6	22
SBS 30 HF M5-IG	32.0	30	M5-F	M4-F	M5-F	17	17.4	5	6	6	22
SBS 40 SF G1/8-IG	41.0	40	G1/8“-F	M4-F	G1/8“-F	17	17.4	5	6	6	32
SBS 40 HF G1/8-IG	41.0	40	G1/8“-F	M4-F	G1/8“-F	17	17.4	5	6	6	32
SBS 60 SF G1/8-IG	61.6	60	G1/8“-F	M4-F	G1/8“-F	17	17.4	5	6	6	45
SBS 60 HF G1/8-IG	61.6	60	G1/8“-F	M4-F	G1/8“-F	17	17.4	5	6	6	45
SBS 100 SF G1/8-IG	101.0	100	G1/8“-F	M4-F	G1/8“-F	17	17.4	5	6	6	75
SBS 100 HF G1/8-IG	101.0	100	G1/8“-F	M4-F	G1/8“-F	17	17.4	5	6	6	75

Special Gripper for Handling of Cookie

Flow Grippers SCG

Suction capacity from 270 l/min to 650 l/min

Flow gripper SCG



System Design Flow gripper SCG

Flow gripper SCG for handling cookies

Suitability for Industry-Specific Applications

Applications

- Gripper solution for handling dry food products such as cookies, cakes and waffles
- Handling of products that require a high suction flow rate due to their surface or geometry
- The contact element made from FDA-compliant material allows for direct, repeated contact with food products

Design

- Main body made from anodized aluminum with integrated compressed air-operated vacuum generation
- Base model available for axial (1) or side mounting (2)
- Suction cup connection nipple made from POM (material: FDA-compliant) (3)
- Suction cup (4) with 1.5 folds (suction area Ø 50 mm) made from silicone (material: FDA-compliant); large shaft diameter for high flow rates
- Customer-specific suction areas on request

Our Highlights…	Your Benefits…
• Contact element made from FDA-compliant silicone material	> Suitable for direct use in the food product industry
• Very high suction flow rate	> Secure gripping even of porous, highly textured workpieces
• Compact suction bellows with 1.5 folds	> High lateral stability even with rapid acceleration
• Suction area with soft and flexible sealing lip	> Excellent sealing and damping on textured surfaces such as cookies with frosting
• Dust-resistant vacuum generator	> Long service intervals
• Suction cup can be disassembled without tools	> Easy to clean

Special Gripper for Handling of Cookie

Flow Grippers SCG

Suction capacity from 270 l/min to 650 l/min

Designation Code Flow Grippers SCG

Abbreviated designation	Performance class of ejector	Blow-off function	Possibility for mounting
Example SCG 1xE100 A MA:			
SCG	**1xE100**	**A**	**MA**
SCG	1xE100	A blow-off function	MA mounting axial MS mounting sideways

Ordering Data Flow Grippers SCG

The flow gripper SCG für dry food is supplied as an individual part (without suction cup). In order to receive a complete gripper the following ordering steps are required:

- Flow gripper (step1) – available for axial or sideways mounting
- Suction cup (step 2)

Available accessories: screw in push fitting (right-angle)

Step 1: Flow Grippers SCG

Type	Part Number
SCG 1xE100 A MA	10.01.30.00092
SCG 1xE100 A MS	10.01.30.00170

Step 2: Suction Cups

Type	Type	Part Number
SAUG-SCG 50 SI-HD	Suction cup (round)	10.01.30.00593

Ordering Data Accessories Flow Grippers SCG

Type	Part Number
STV-W G1/8-AG 6*	10.08.02.00288
STV-W M5-AG 6**	10.08.02.00296

*Suitable for compressed-air connection “Suction“

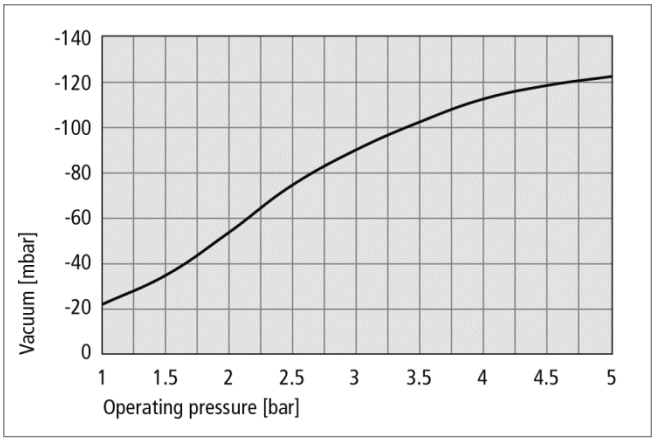
**Suitable for compressed-air connection “Blow off“

Special Gripper for Handling of Cookie

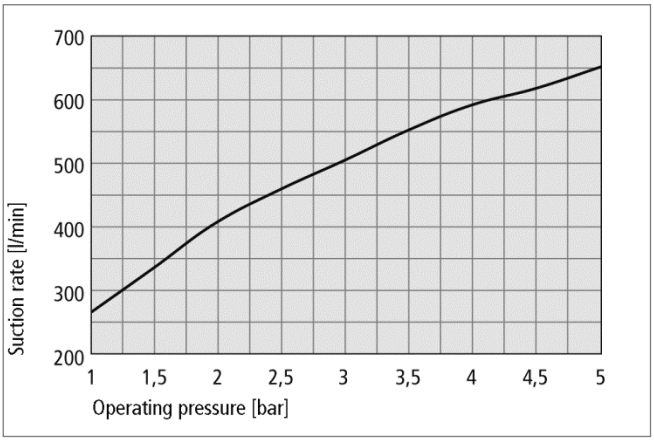
Flow Grippers SCG

Suction capacity from 270 l/min to 650 l/min

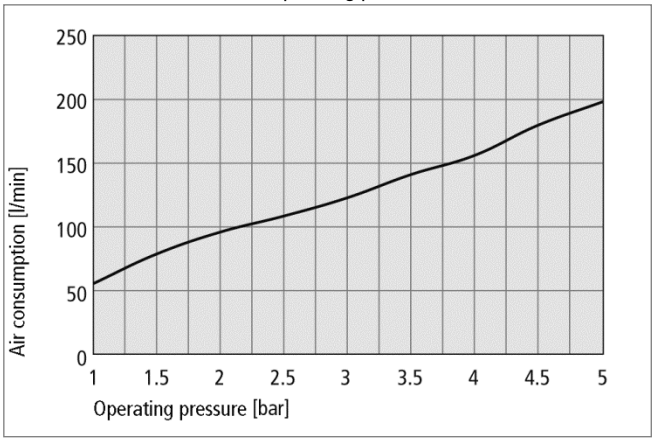
Performance Data Flow Grippers SCG



Achievable vacuum at various operating pressures



Suction rate at various operating pressures



Air consumption at various operating pressures

Technical Data Flow Grippers SCG

Type	Suction rate [l/min]	Air consumption [l/min]	Pressure rang (operating pressure) [bar]**	Operating temperature [°C]	Recom. int. hose diameter, suction [mm]	Recom. int. hose diameter, blow off [mm]	Weight [g]
SCG 1xE100 A MA	270…650	60…200	1.0...5.0	5...75	4	4	85
SCG 1xE100 A MS*	270…650	60…200	1.0...5.0	5...75	4	4	109

*Using the silencer reduces the suction flow specified above by approx. 9% and noise emissions by up to 12 dBA.

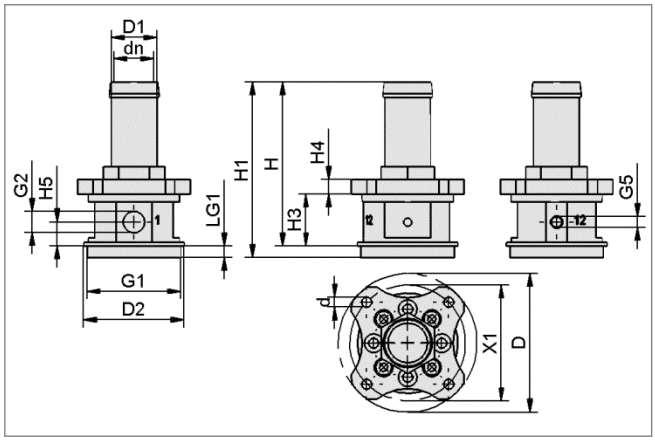
**The specified value can be equal for suction and blow-off. Operating pressures below 1 bar are possible but have to be tested individually.

Special Gripper for Handling of Cookie

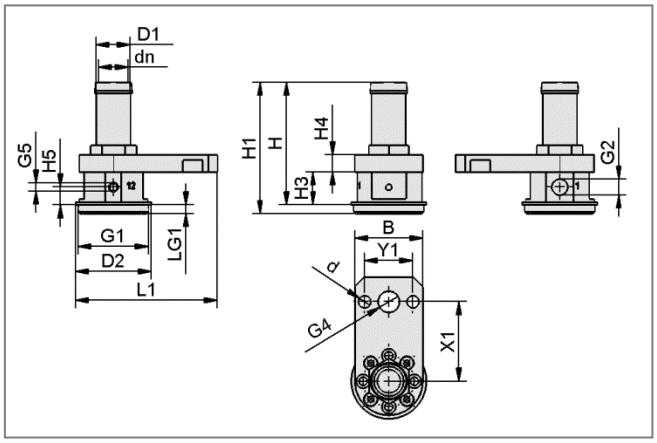
Flow Grippers SCG

Suction capacity from 270 l/min to 650 l/min

Design Data Flow Grippers SCG



SCG 1xE100 A MA

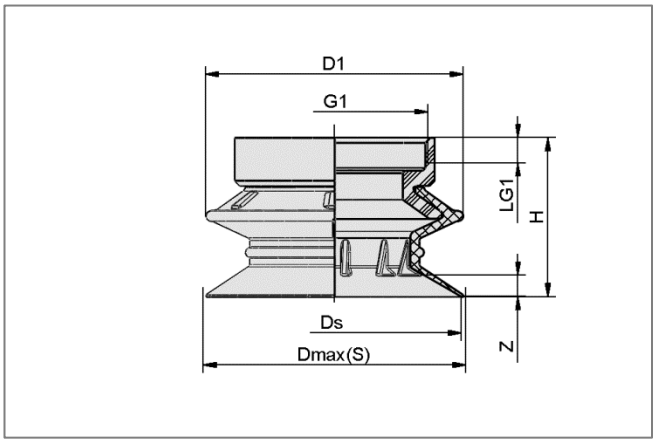


SCG 1xE100 A MS

Type	Dimensions in mm									
	B	d	dn	D	D1	D2	G1	G2	G4	G5
SCG 1xE100 A MA	-	4.0	12.5	55	18	39.8	M37x1-M	G1/8"-F	-	M5-F
SCG 1xE100 A MS	36	6.6	12.5	-	18	39.8	M37x1-M	G1/8"-F	G1/4“-F	M5-F

Type	Dimensions in mm								
	H	H1	H3	H4	H5	L1	LG1	Y1	X1
SCG 1xE100 A MA	65	69.6	20.6	6	9.5	-	4.5	-	46
SCG 1xE100 A MS	65	69.6	17.6	9	9.5	74.9	4.5	25.5	42

Design Data Suction Cups



SAUG-SCG 50 SI-HD

Type	Dimensions in mm						
	D1	Dmax(S)*	Ds	G1	H	LG1	Z
SAUG-SCG 50 SI-HD	51.0	51.5	50.3	M37x1-F	31.5	5.0	4.2

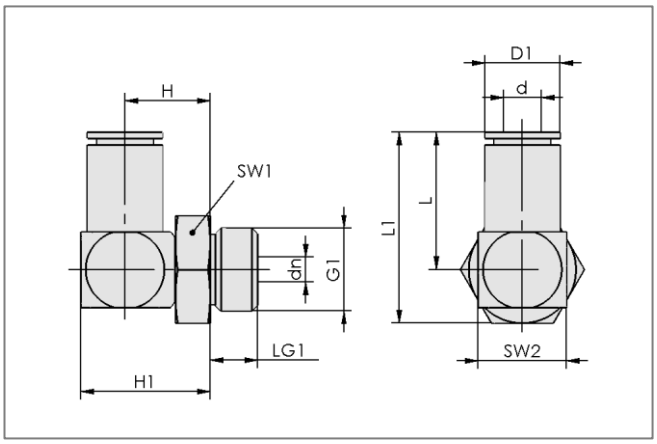
*External dimension of the suction cup when it is pressed against the workpiece by the vacuum

Special Gripper for Handling of Cookie

Flow Grippers SCG

Suction capacity from 270 l/min to 650 l/min

Design Data Accessories Composite Gripper SCG



STV-W

Type	Dimensions in mm										
	d	dn	D1	G1	H	H1	L	L1	LG1	SW1	SW2
STV-W G1/8-AG 6	6	4	11.5	G1/8”-M	12.5	16.5	20.8	27.5	6	13	8
STV-W M5-AG 6	6	4	11.5	M5-M	13.0	16.5	20.8	25.5	4	8	8

Overview of Section 4

Mounting Elements

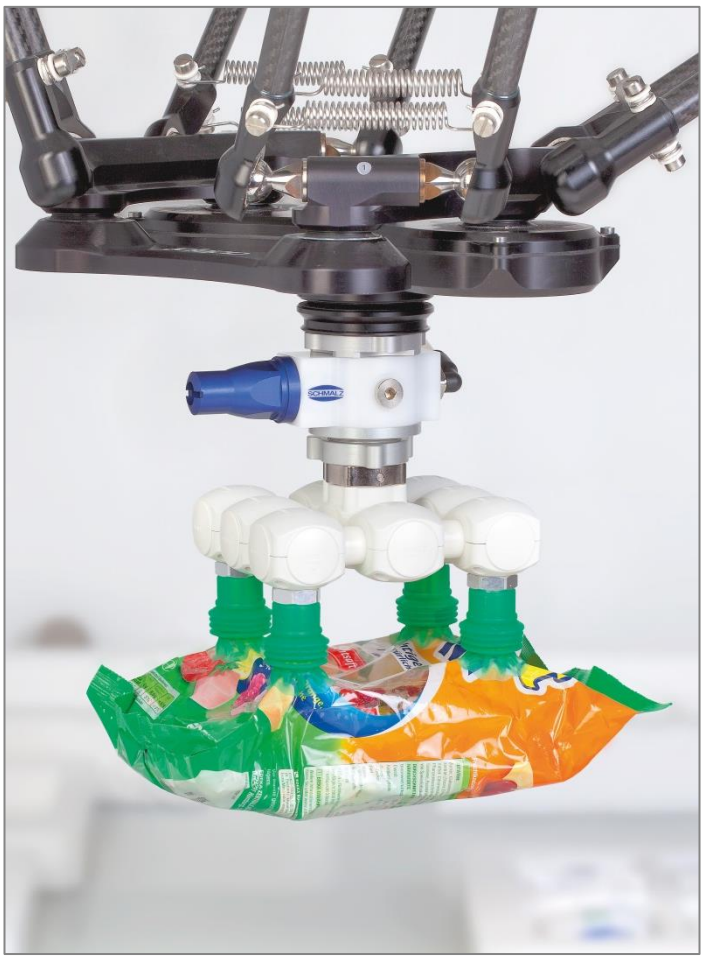
Vacuum End Effector VEE

Vacuum End Effector VEE

110

- Max. quantity of cups 12
- Max. payload 2.000g

Lightweight vacuum end effectors based on a modular system. Configuration of end effectors supported by online configurator.



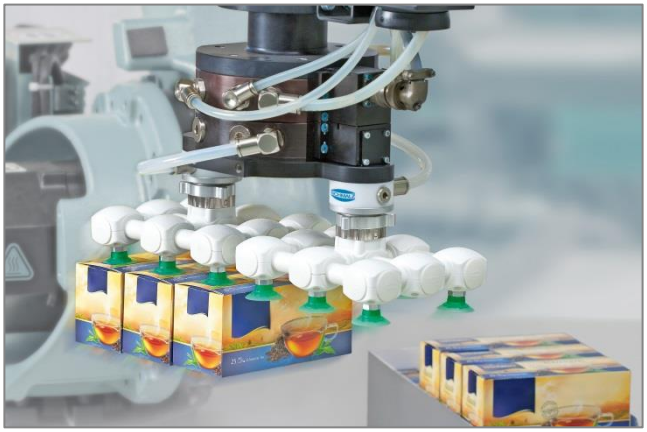
Vacuum end effector with vacuum module and bellows suction cups SPB4f handling flexible bags

Vacuum end effector with bellows suction cups SPB4f handling pouches with many wrinkles and a low filling degree

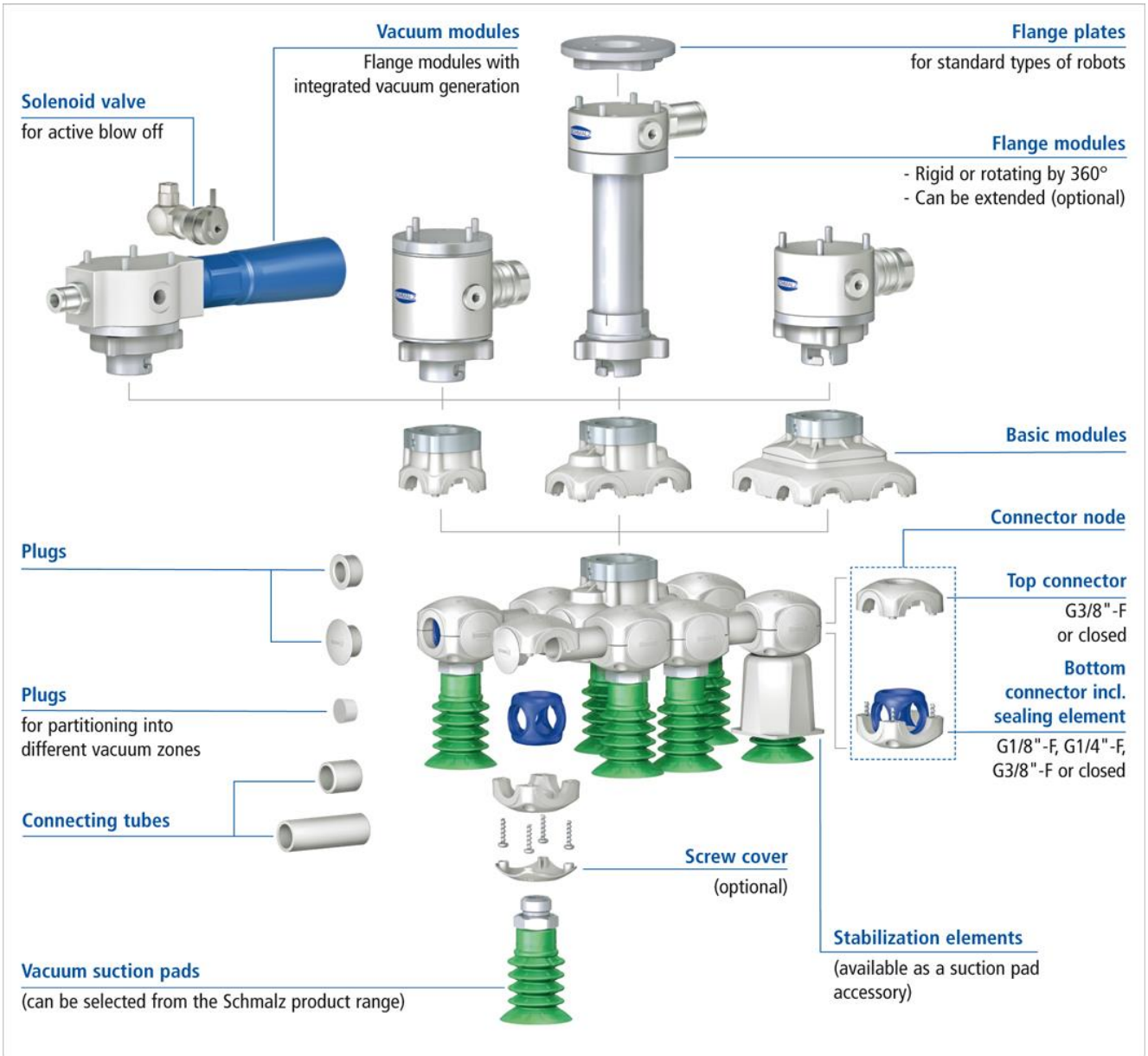
Vacuum end effector with bellows suction cups SPB4 and stabilization elements handling unstable flow-wrap packaging

System components for quick and cost-effective designing of vacuum end effectors for highspeed packaging processes

- Pick-and-place applications with Delta, SCARA and articulated robots
- Fully automated filling of cardboard boxes in case packers
- Primarily used in secondary packaging processes
- Transporting products into top-loading machines as well as in cardboard box and tray aligners
- Use in fexible packaging machines with frequent format changes



Vacuum end effector with flat suction cups SPF handling boxes of tea



Vacuum Suction Cups for the Packaging Industry

Flat suction cups SPF / Bellows suction cups SP(O)B1
For intrinsically stable and slightly unstable cardboard boxes and packaging

www.schmalz.com/**spf**
…/**spb1**
…/**spob1**

Bellows suction cups SPB4 (-F)
For bags and flexible packaging

www.schmalz.com/**spb4**
…/**spb4-f**

Flat suction cups SGPN
For films, blister packs and other sensitive packaging

www.schmalz.com/**sgpn**

Bellows suction cups FSG / FSGA
Universal suction cups for various packaging applications

www.schmalz.com/**fsg**
…/**fsga**

Vacuum Components

Vacuum End Effectors VEE

Overviem of VEE System

Flange plates FLAN-PL
Quick and easy connection of the flange module to the robot; available for connect-ional robot types and as an universal flange.

www.schmalz.com/**flan-pl**

Flange modules VEE-QCM
Quick-change adapters and vacuum connection; either horizontal or vertical (max. flow rate 60 m³/h). Rotary unit VEE-RU for continuous rotation of the end effector without decreasing the flow or winding up the hose available as an alternative.

www.schmalz.com/**vee-qcm**
…/**vee-ru**

Vacuum modules VEE-QCMV
Quick-change adapters with spacesaving integrated, energy-efficient vacuum generation using the Schmalz ecoPump (max. suction rate: 10.5 m³/h); with silencer or holder cap.

www.schmalz.com/**vee-qcmv**

Solenoid valve EMV for active blow off
Minimal cycle times with active blow off through a controlled compressed air pulse; available as an accessory for vacuum module VEE-QCMV.

www.schmalz.com/**emv**

Flange extensions VEE-FE
Option for flange modules for dipping into cardboard boxes or trays; available in three lengths. Can be swapped quickly thanks to the bayonet mount.

www.schmalz.com/**vee-fe**

Basic modules VEE-QCF
Tool-free connection of the end effector to the flange module and central vacuum feed; available as a 1-, 2-, or 4-connection module.

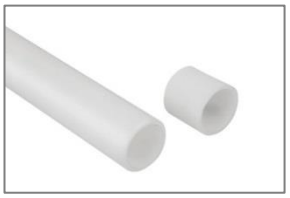
www.schmalz.com/**vee-qcf**

Top connector VEE- CO-U
Top half-shell for assembly of connection nodes; available in closed design or with connec-tion for additional vacuum feed (G3/8“-F).

www.schmalz.com/**vee-co-u**

Bottom connector VEE-CO-L
Bottom half-shell including sealing element and screws for assembly of connecting nodes; either closed or with connection for suction cup (G1/8“-F, G1/4“-F,G3/8“-F); optional screw cover available.

www.schmalz.com/**vee-co-l**



Connection tubes VEE -TU
Vacuum guide and variable connection of nodes; available in 18 mm an d 200 mm lengths. Pipe scissors for quick and safe cutting available as accessory.

www.schmalz.com/**vee-tu**

Plugs VEE-PL
For sealing unused connections on connector nodes, vacuum feed on the side and partitioning into different vacuum zones.

www.schmalz.com/**vee-pl**

Stabilization elements SPSE
Increases process speed by supporting the workpiece; availa-ble as an accessory for bellows suction cups.

www.schmalz.com/**vee-spse**

Tool center point VEE-TCP
For determining the robot tool position with a center point that can be flange mounted directly; suitable for the quick-change inter-faces of the flange mod-ules or vacuum modules.

www.schmalz.com/**vee-tcp**

Vacuum Components

Vacuum End Effectors VEE

Overviem of Highlights

Individual configuration

- Flexibly configurable, perfectly coordinated individual components
- Variable number and positioning of the suction cups
- Hose-free vacuum distribution
- Optional integrated vacuum generation available

Reduced construction and manufacturing efforts

- Online configurator for designing the end effector in just a few minutes including the creation of CAD data and parts lists
- Minimizes configuration and production time by more than 80 %
- Reduces manufacturing costs

Extremely lightweight

- Complete end effectors weighing as low as 150 g
- Designed for high-speed applications with accelerations up to 10 *g* (100 m/s²)

Outstanding hygiene properties

- FDA compliant material (high performance thermoplastic)
- Excellent resistance to alkaline agents

Assembly service

- Upon request, we can deliver your custom-configured vacuum end effector VEE as a complete unit

Configuring Rather Than Designing

VEE online configurator

With the VEE online configurator, you arrive at an individually tailored end effector solution with just a few mouse clicks.

Your benefits

- Live 3D preview of the configuration
- Creation of a 3D PDF data sheet including a parts list and CAD data
- Simple importing in your consisting construction
- Qiock request for proposal (RFP)

www.schmalz.com/**vee**

1 Enter workpiece data
2 Select the gripper layout
3 Select the vacuum suction cups
4 Define the suction cup positions
5 Select a connection
6 Generate 3D data - That´s all!

Starter Set

Whether for use directly in a robotic system or as handy design tool – with the VEE Starter Set you have all of the most important components for quickly assembling your effector right at your fingertips.

Contents

120-piece starter set with all of the components necessary for installing up to two VEE vacuum end effectors, including:

- 8 vacuum suction cups SPB4-30 for bags and flexible packaging
- Lockable quick-change adapter with bayonet mount

Supplied in a sturdy plastic case with detailed assembly Instructions.
Part no.: 10.01.36.00030

VEE Starter Set

www.schmalz.com/**vee-starterset**

Technical Data and Design Data

Technical Data

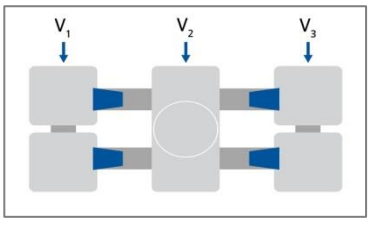
Specification	Vacuum end effectors from the VEE system
Max. rated flow	60 m³/h
Max. vacuum value	-980 mbar
Overpressure resistance	up to 3 bar
Temperature range	-25 °C to +80 °C
Material	High performance thermoplastic (compliant with FDA guidelines)
Max. load capacity	2.000 g

Design Data

Vacuum end effectors VEE can be freely configured within the framework values. When used in connection with our wide selection of suction cups, the possibilities are practically endless.

Specifications	Vacuum end effectors from the VEE system	
	Minimum configuration	**Maximum configuration**
Basic module	1-connection	4-connection
Suction cups connection thread	G1/8“-F, G1/4“-F, G3/8“-F	G1/8“-F, G1/4“-F, G3/8“-F
Gripper size (L/W)	38 x 38 mm	300 x 200 mm
Weight[1]	65 g	500 g
Qty. of suction cups	1	12
Workpiece sizes (L/W)	15 x 15 mm	400 x 300 mm

[1]without flange module and suction cup



Partitioning into multiple independent vacuum zones with plugs VEE-PL

Overview of Section 5

Vacuum Generators

Information

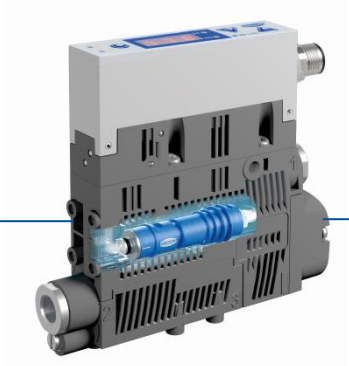
Vacuum Generators for Packaging Applications

Compact Ejectors

Compact Ejectors SCPS / SCPSi

Taking energy efficiency further

The new compact ejectors SCPS / SCPSi from Schmalz not only consume a minimal amount of energy, but also help operators to sustainably reduce the energy consumption of their entire process



Energy-efficient processes

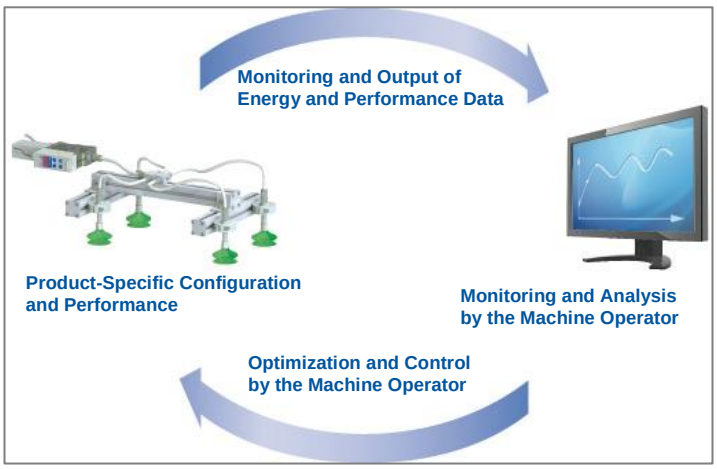
A clever solution: The integrated energy and process control of the Schmalz compact ejectors allows cost-effective operation under optimal process conditions.

Energy-efficient product

Optimized ejector core: The compact Ejectors SCPS / SCPSi with eco nozzle technology ensure minimal energy consumption by the product itself.

How the energy and process control works

As a pioneer in the field of intelligent process communication, Schmalz has implemented energy and process control in its compact ejectors. Three innovative function modules ensure a maximum efficiency boost in automated applications.



Measure, monitor and optimize your energy consumption

- The vacuum generators measure and monitor all energy and performance-related process data
- The existing IO-Link master can be used for bidirectional communication with higher-level field-bus systems
- The system operator can read out, monitor and optimize the data in the controller to reduce the energy consumption of the entire vacuum system “from afar”

Function module	**Energie Monitoring EM**	**Condition Monitoring CM**	**Predictive Maintenance PM**
Function	Energy monitoring	Condition monitoring	Predictive maintenance
Use	Energy consumption ↓	System availability ↑	Quality/performance of gripping systems ↑
Equipped ejector series	SX(M)Pi-PC SCPi/SMPi/SCPSi*	SX(M)Pi-PC SCPi/SMPi/SCPSi	SX(M)Pi-PC SCPi/SMPi/SCPSi*

*With external pressure sensor

Compact Ejectors

Compact Ejectors SCPS / SCPSi

Schmalz has optimized the energy efficiency of the compact ejectors SCPS / SCPSi even further. The new eco nozzle technology provides a considerably higher suction rate with minimal compressed air consumption.

Advantages of the new eco nozzle technology

up to -15%

Reduced compressed air consumption
Compressed air consumption reduced by 15% during active vacuum generation

-250 to -850 mbar

Expanded area of application
Large operating range of -250 to -850 mbar – ideal for airtight and porous workpieces

up to -10%

Faster evacuation
Accelerated process thanks to 10% reduction in the evacuation time to -600 mbar

up to +15%

Increased suction rate
Reliable handling processes for porous and flexible workpieces such as cardboard or bags thanks to the high suction capacity

More highlights

Condition Monitoring
- Improves system availability with continuous system monitoring (leak-tightness and vacuum)
- Allows faults to be detected and rectified even before the system is down

Energy Monitoring
- Measures and monitors the vacuum system's energy consumption
- Identifies excessive energy consumption
- Trend analysis per component, production cycle and shift

IO-Link interface
- Bidirectional communication with all current field-bus systems
- Recorded condition data can be viewed and used up to the highest level of control
- Supports remote parameterization and remote diagnostics

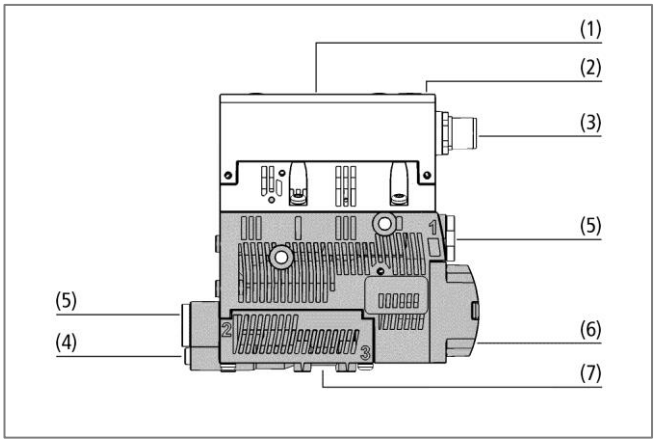
Automatic air saving function
- Decreases compressed air consumption by up to 80%
- Switches off the suction function once a safe vacuum value has been reached until the next cycle or until the vacuum falls below this value

Compact Ejectors

Compact Ejectors SCPS / SCPSi

Suction rate from 18 l/min to 69 l/min

Compact ejectors SCPS / SCPSi



System design compact ejectors SCPS / SCPSi

Centralized vacuum generation by means of compact ejector SCPSi

Suitability for Industry-Specific Applications

Applications

- Compact ejector for handling of airtight and slightly porous workpieces
- Generation and monitoring of vacuum in automated systems
- Use in robotic handling applications and on linear axes
- Pick-and-place applications with extremely short cycle times
- For systems that require highly dynamic gripping of work-pieces and where space is limited
- Typically for use in fully-automated small parts handling applications

Design

- Basic module made of high-strength plastic
- Display screen or LED bar display (1)
- Keyboard (2) makes it easy to set the system parameters
- Electrical connection via standard M12 plug (3)
- Integrated pneumatic valves for switching functions NO or NC
- Screw (4) to adjust blow off for lightweight pieces
- Pneumatic connections (G1/8") with protective screens (5)
- Open silencer (6)
- Can optionally be attached using DIN rails (7)

Our Highlights...	Your Benefits...
• Efficient eco nozzle technology	> Higher suction rate with minimal compressed air consumption
• Integrated air saving function	> Reduction of compressed air consumption by up to 80 %
• IO-Link device for communicating with an existing fieldbus via IO-Link master	> Simple and quick installation, device and process parameters can be transferred
• Brightly lit display screen or LED bar display	> Highly visible display of important vacuum parameters
• Large operating elements and an intuitive user menu	> Easy and time-saving manual adjustments on the ejector
• Compact size, made of extremely durable plastic	> Compact and durable unit; can be mounted directly on the handling system
• Automatic blow off function	> One less signal output is required per ejector

Compact Ejectors

Compact Ejectors SCPS / SCPSi

Suction rate from 18 l/min to 69 l/min

Designation Code Compact Ejectors SCPS / SCPSi

Abbreviated designation	Nozzle size	Connection	Idle position suction valve	Connection electrical	Switching function
Example SCPSi 2-07 G2 NO M12-5 PNP:					
SCPSi	**2-07**	**G2**	**NO**	**M12-5**	**PNP**
SCPS **SCPSi**	2-07 = 0.7 mm 2-09 = 0.9 mm 2-14 = 1.4 mm	G2 connection thread 2	NC normally closed NO normally open	M12-5 M12, 5-pole	PNP switches to plus

Ordering Data Compact Ejectors SCPS / SCPSi

Compact ejector SCPS / SCPSi is delivered as a ready to connect product (without connection cable).

Available accessories: connection cable, distributor, DIN rail mount, filter

Compact Ejectors SCPS / SCPSi

SCPS…		SCPSi…	
Type	**Part Number**	**Type**	**Part Numer**
SCPS 2-07 G2 NO M12-5 PNP	10.02.02.04359	SCPSi 2-07 G2 NO M12-5	10.02.02.04365
SCPS 2-07 G2 NC M12-5 PNP	10.02.02.04360	SCPSi 2-07 G2 NC M12-5	10.02.02.04366
SCPS 2-09 G2 NO M12-5 PNP	10.02.02.04361	SCPSi 2-09 G2 NO M12-5	10.02.02.04367
SCPS 2-09 G2 NC M12-5 PNP	10.02.02.04362	SCPSi 2-09 G2 NC M12-5	10.02.02.04368
SCPS 2-14 G2 NO M12-5 PNP	10.02.02.04363	SCPSi 2-14 G2 NO M12-5	10.02.02.04369
SCPS 2-14 G2 NC M12-5 PNP	10.02.02.04364	SCPSi 2-14 G2 NC M12-5	10.02.02.04370

Ordering Data Accessories Compact Ejectors SCPS / SCPSi

Type	Connection Cable	Distributor 2xM12	DIN Rail mount*	Filter 6/4	Filter 8/6
SCPS...	21.04.05.00080	10.02.02.03490	10.02.02.04149	10.07.01.00241	10.07.01.00245
SCPSi...	21.04.05.00080	10.02.02.03490	10.02.02.04149	10.07.01.00241	10.07.01.00245

*With mounting screws

Technical Data Compact Ejectors SCPS / SCPSi

Type	Nozzle size	Degree of evacuation [%]*	Max. suction rate [m³/h]*	Max. suction rate [l/min]*	Air consumption during evac. [m³/h]*	Air consumption during evac. [l/min]*	Air consumption blow off [m³/h]*
SCPS/SCPSi 2-07...	2-07	85	1.93	32.2	1.41	23.5	7.80
SCPS/SCPSi 2-09...	2-09	85	2.73	45.5	2.49	41.5	7.80
SCPS/SCPSi 2-14...	2-14	85	4.03	67.2	5.04	84.0	7.80

*At optimal operating pressure (4 bar)

Type	Noise level free [dB(A)]*	Noise level workpiece gripped [dB(A)]*	Operating pressure [bar]	Recomm. int. hose diameter com-pressed air [mm]**	Recomm. int. hose diameter vacuum [mm]**	Weight [kg]	Operating temperature [°C]
SCPS/SCPSi 2-07...	63	58	2...6	4	4	0.195	0...50
SCPS/SCPSi 2-09...	64	58	2...6	4	4	0.195	0...50
SCPS/SCPSi 2-14...	54	60	2...6	4	6	0.195	0...50

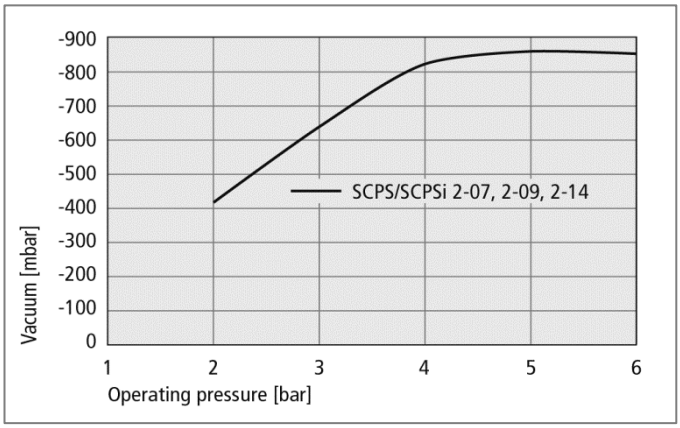
*At optimal operating pressure (4 bar)

**For max. length 2 m

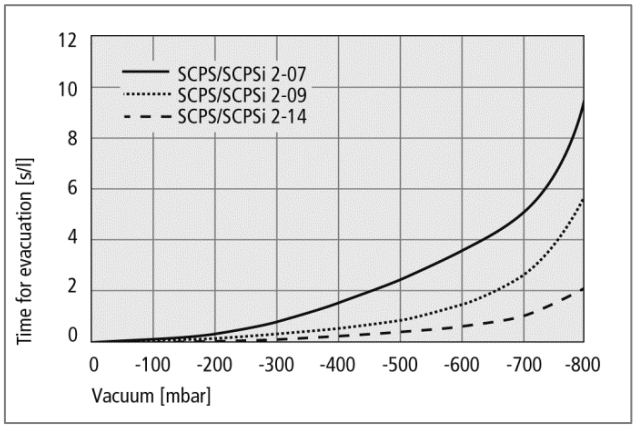
Compact Ejectors SCPS / SCPSi

Suction rate from 18 l/min to 69 l/min

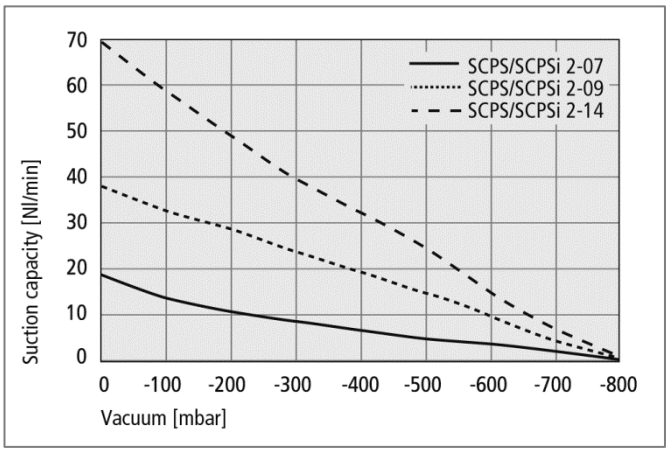
Performance Data Compact Ejectors SCPS / SCPSi



Achievable vacuum at various operating pressures



Evacuation times for various vacuum ranges



Suction capacity at various degrees of evacuation

Suction Capacity in l/min at Various Degrees of Evacuation

Type	Degree of evacuation in mbar									
	0	-50	-100	-200	-300	-400	-500	-600	-700	-800
SCPS/SCPSi 2-07	32.2	30.2	28.7	24.0	17.1	13.9	10.6	7.2	5.0	3.2
SCPS/SCPSi 2-09	45.5	42.5	39.4	34.8	27.6	20.9	15.9	12.3	7.6	4.6
SCPS/SCPSi 2-14	67.2	63.6	60.6	51.6	41.3	33.8	26.2	17.6	8.5	3.6

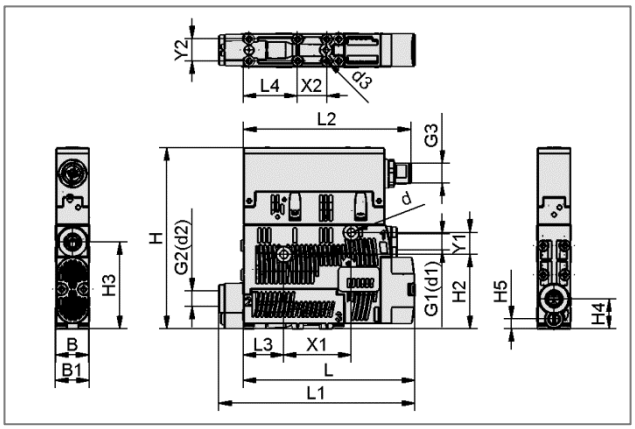
Evacuation Time in s/l for Various Vacuum Ranges

Type	Degree of evacuation in mbar								
	-50	-100	-200	-300	-400	-500	-600	-700	-800
SCPS/SCPSi 2-07	0.20	0.28	0.50	0.87	1.48	2.20	3.33	5.19	9.57
SCPS/SCPSi 2-09	0.19	0.24	0.37	0.56	0.88	1.27	1.80	2.85	6.44
SCPS/SCPSi 2-14	0.08	0.20	0.28	0.39	0.56	0.76	1.08	1.91	5.33

Compact Ejectors SCPS / SCPSi

Suction rate from 18 l/min to 69 l/min

Design Data Compact Ejectors SCPS / SCPSi



SCPS / SCPSi...

Type	Dimensions in mm											
	B	B1	d	d1	d2	d3	G1	G2	G3	H	H2	H3
SCPS...	18	18.6	4.4	6	6	2.6	G1/8"-F	G1/8"-F	M12x1-M	99	40.8	47.5
SCPSi...	18	18.6	4.4	6	6	2.6	G1/8"-F	G1/8"-F	M12x1-M	99	40.8	47.5

Type	Dimensions in mm										
	H4	H5	L	L1	L2	L3	L4	X1	X2	Y1	Y2
SCPS...	16.5	5.5	94	107.5	91.5	22	29.5	36.9	16	12	12
SCPSi...	16.5	5.5	94	107.5	91.5	22	29.4	36.9	16	12	12

Ejector Module

Ejector Module ecoPump SEP

Decentralized vacuum generation by means of ecoPump SEP during the handling of ampules

Fast, compact, powerful!
Vacuum generation right at the suction cup

The Schmalz ecoPump SEP is the ideal machine component for decentralized vacuum generation:

- Increased suction force thanks to installation right at target area
- New eco nozzle technology for high energy efficiency
- Short hose lines for fast evacuation
- Ideal for handling airtight and porous workpieces using two different characteristics (type HV or HF)
- Simple, space-saving installation: only requires a compressed air line; no vacuum line to suction cup needed
- Low system costs due to integration into existing designs and smaller hose diameters
- Fast removal, disassembly and cleaning without tools

Compact plastic housing for space-saving installation

Vacuum booster for maximum suction force without delays

Compressed air connection

Efficient eco nozzle technology

Simple, space-saving installation

Installation right at the suction cup

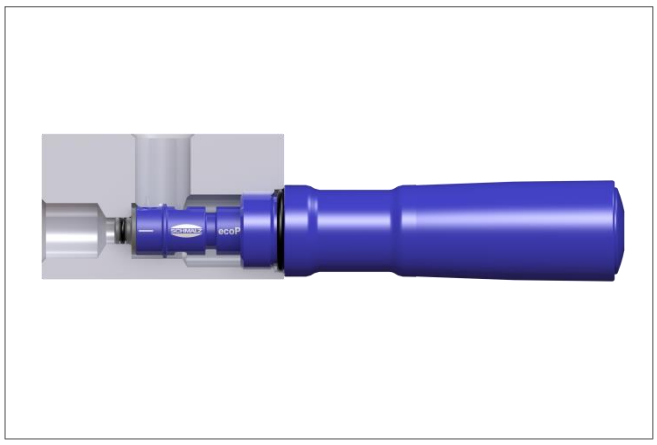
Thanks to threaded connections for compressed air and vacuum the ecoPump housing SFE provides a wide range of assembly options. The ecoPump can be disassembled and cleaned without tools.

Installation as an insert nozzle (on the machine side)

The ecoPump SEP can be inserted straight into a borehole on the machine side. The borehole shape is very simple to produce. For mounting the ecoPump a holder cap SHC or holder cap with silencer SHC SD (available as accessories) is required. The silencer reduces the sound level by 2 to 4 dB(A).

Installation at the suction cup with ecoPump housing SFE

Installation as insert nozzle with holder cap SHC



Installation as insert nozzle with holder cap with silencer SHC SD

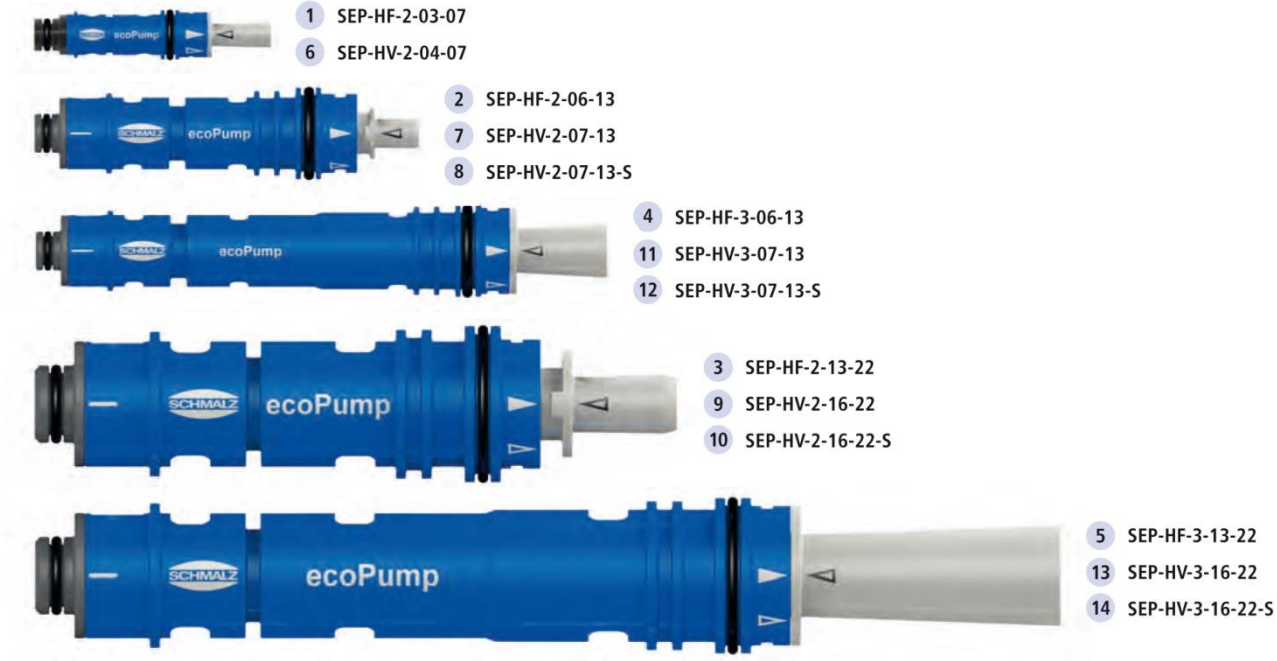
Ejector Module

Ejector Module ecoPump SEP

Selection Aid

Step 1 Define the area of application	Step 2 Define the distance from the suction point	Step 3 Select the performance class Max. suction capacity [l/min]	Max. vacuum [mbar]	Step 4 Air saving function can be implemented*	Product Recommendation Type Part no. / Illustration
Porous workpieces E.g. cardboard, non-rigid bags, particle boards → High-flow version (HF) with high suction flow rate	**Close to the suction cup** Short hose lines with low air volume → Two-stage nozzle	15	550	no	**SEP-HF-2-03-7** 10.02.01.01341 1
		42	700	no	**SEP-HF-2-06-13** 10.02.01.01343 2
		175	610	no	**SEP-HF-2-13-22** 10.02.01.01347 3
	Far away from the suction cup Long hose lines with high air volume → Three-stage nozzle	67	700	no	**SEP-HF-3-06-13** 10.02.01.01344 4
		298	610	no	**SEP-HF-3-13-22** 10.02.01.01348 5
Airtight workpieces E.g. ampules, syringes and vials, plastic injection-molded parts, sheet metal parts → High vacuum version (HV) with high vacuum level	**Close to the suction cup** Short hose lines with low air volume → Two-stage nozzle	13	790	no	**SEP-HV-2-04-7** 10.02.01.01393 6
		42	850	no	**SEP-HV-2-07-13** 10.02.01.01394 7
				yes	**SEP-HV-2-07-13-S** 10.02.01.01407 8
		153	900	no	**SEP-HV-2-16-22** 10.02.01.01396 9
				yes	**SEP-HV-2-16-22-S** 10.02.01.01410 10
	Far away from the suction cup Long hose lines with high air volume → Three-stage nozzle	77	850	no	**SEP-HV-3-07-13** 10.02.01.01395 11
				yes	**SEP-HV-3-07-13-S** 10.02.01.01407 12
		309	900	no	**SEP-HV-3-16-22** 10.02.01.01397 13
				yes	**SEP-HV-3-16-22-S** 10.02.01.01411 14

*Maintenance of the vacuum for airtight workpieces using additional safety non-return valve. An active blow-off pulse is required to release the workpiece.

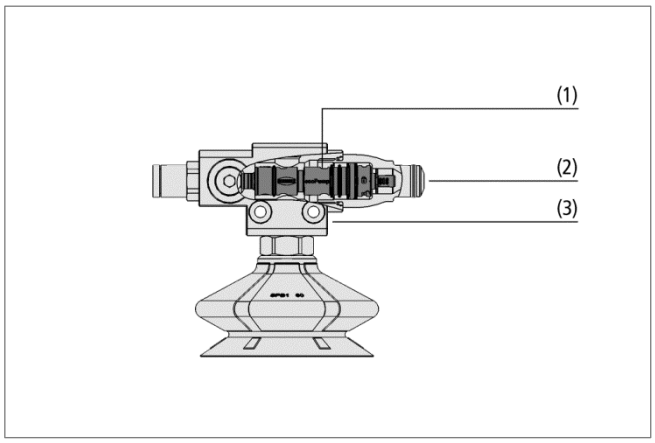


Ejector Module

Ejector Module ecoPump SEP

Suction rate up to 309 l/min

Ejector module ecoPump SEP



System design ejector modules ecoPump SEP

Vacuum generation by ejector modules SEP for handling ampoules

Suitability for Industry-Specific Applications

Applications

- Energy-efficient vacuum generator with Schmalz eco nozzle technology
- Direct installation in gripping tools without separate housing
- Integration of the vacuum generation as close as possible to the suction cup
- For use in the packaging industry, e.g. in carton erectors or multi-circuit systems

Design

- Compact, lightweight plastic ejector nozzle (1)
- Available in three performance classes and two versions with optimized air consumption for airtight (HV) or porous (HF) materials
- Available with optional holder cap SHC (2) for fixation of the ejector nozzle, alternatively with silencer SD or with ecoPump housing SFE (3)

Our Highlights...	Your Benefits...
• High suction capacity with low air consumption	> Energy-efficient vacuum generation
• Can be used for both airtight (HV) and porous (HF) workpieces	> Fast and reliable product selection for each application
• Fast, with powerful vacuum	> Quickly reaches working vacuum; reliable compensation for leakages
• Resistant to dirt	> Long service intervals, as well as simple, tool-free cleaning
• Lightweight and takes up little space	> Can be mounted directly on the suction cup
• One-piece nozzle fitting	> Fast and easy cleaning

Ejector Module

Ejector Module ecoPump SEP

Suction rate up to 309 l/min

Designation Code Ejector Module ecoPump SEP

Abbreviated designation	Version	Nozzle technology	Nozzle size	Hole diameter in mm	Additional function
Example SEP HF 2 03 7:					
SEP	**HF**	**2**	**03**	**7**	
SEP	HF High Flow HV High Volume	2 2-stage 3 3-stage	03 0.3 mm 04 0.4 mm 06 0.6 mm 07 0.7 mm 13 1.3 mm 16 1.6 mm	7 13 22	S Air saving function can be implemented

Ordering Data Ejector Module ecoPump SEP

Ejector module ecoPump SEP is delivered as a ready to connect product.

Available accessories: holder cap SHC, silencer SD, ecoPump housing SFE, mounting bracket, mounting set, quick exhaust valve

Ejector Module ecoPump SEP

Type	SEP HF for porous workpieces Part Number
SEP HF 2 03 7	10.02.01.01341
SEP HF 2 06 13	10.02.01.01343
SEP HF 3 06 13	10.02.01.01344
SEP HF 2 13 22	10.02.01.01347
SEP HF 3 13 22	10.02.01.01348

Type	SEP HV for airtight workpieces	
	Without safety non-return valve	With safety non-return valve (S)
SEP HV 2 04 7	10.02.01.01393	-
SEP HV 2 07 13	10.02.01.01394	10.02.01.01406
SEP HV 3 07 13	10.02.01.01395	10.02.01.01407
SEP HV 2 16 22	10.02.01.01396	10.02.01.01410
SEP HV 3 16 22	10.02.01.01397	10.02.01.01411

Ordering Data Basic Ejector (SEP, SFE, SHC, SD)

Type	Part Number	Type	Part Number
SBP HF 2 03 7	10.02.01.01715	**SBP HV 2 04 7**	10.02.01.01716
SBP HF 2 06 13	10.02.01.01717	**SBP HV 2 07 13**	10.02.01.01718
SBP HF 2 06 13 SD	10.02.01.01729	**SBP HV 2 07 13 SD**	10.02.01.01730
SBP HF 2 13 22	10.02.01.01723	**SBP HV 2 16 22**	10.02.01.01724
SBP HF 2 13 22 SD	10.02.01.01735	**SBP HV 2 16 22 SD**	10.02.01.01736
SBP HF 3 06 13	10.02.01.01720	**SBP HV 3 07 13**	10.02.01.01721
SBP HF 3 06 13 SD	10.02.01.01732	**SBP HV 3 07 13 SD**	10.02.01.01733
SBP HF 3 13 22	10.02.01.01726	**SBP HV 3 16 22**	10.02.01.01727
SBP HF 3 13 22 SD	10.02.01.01738	**SBP HV 3 16 22 SD**	10.02.01.01739

Ejector Module

Ejector Module ecoPump SEP

Suction rate up to 309 l/min

Ordering Data Accessories Ejector Module ecoPump SEP

Type	Holder cap SHC	Silencer SD*	ecoPump Fixation Element SFE	Mounting bracket BEF-WIN	Mounting set SET	Quick exhaust valve SEV
SEP...2...7	10.02.01.01510	-	10.02.01.01464	10.08.03.00313	-	-
SEP...2...13	10.02.01.01496	10.02.01.01498	10.02.01.01419	10.08.03.00314	10.02.01.01579	10.02.01.01519
SEP...3...13	10.02.01.01497	10.02.01.01498	10.02.01.01419	10.08.03.00314	10.02.01.01579	10.02.01.01519
SEP...2...22	10.02.01.01512	10.02.01.01517	10.02.01.01421	10.08.03.00315	10.02.01.01577	10.02.01.01471
SEP...3...22	10.02.01.01514	10.02.01.01517	10.02.01.01421	10.08.03.00315	10.02.01.01577	10.02.01.07471

*Only possible in combination with holder cap SHC

Technical Data Ejector Module ecoPump SEP

Type	Weight [g]	Operating temperature [°C]	Recom. int. hose diameter compr. air [mm]	Recom. int. hose diameter vacuum [mm]	Operating pressure [bar]	Noise level free [db(A)]*	Noise level workpiece gripped [db(A)]*
SEP...2...7	0.8	0...60	2	4	2.0...6.0	63	54
SEP...2...13	3.6	0...60	4	6	2.0...6.0	70	58
SEP...3...13	4.6	0...60	4	6	2.0...6.0	68	57
SEP...2...22	15.8	0...60	6	12	2.0...6.0	84	75
SEP...3...22	22.8	0...60	6	12	2.0...6.0	81	73

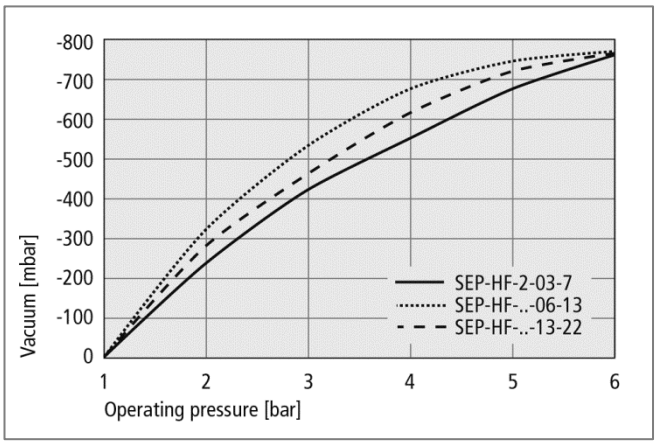
*Reduction of noise level by 2-4 db(A) due to holder cap SHC with silencer

Ejector Module

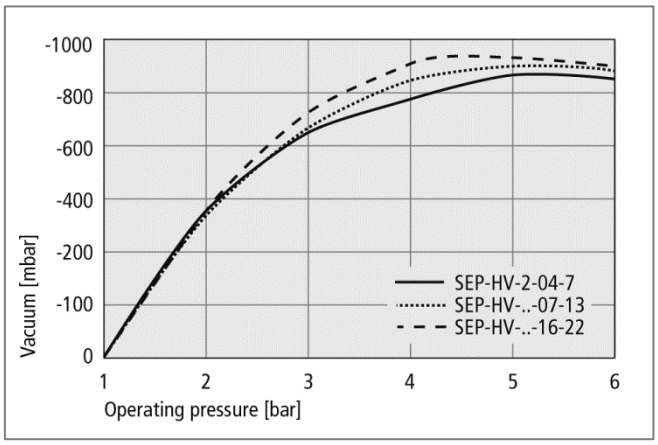
Ejector Module ecoPump SEP

Suction rate up to 309 l/min

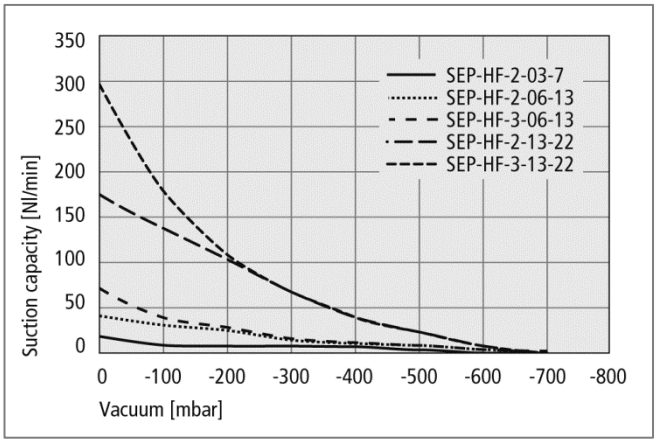
Performance Data Ejector Module ecoPump SEP



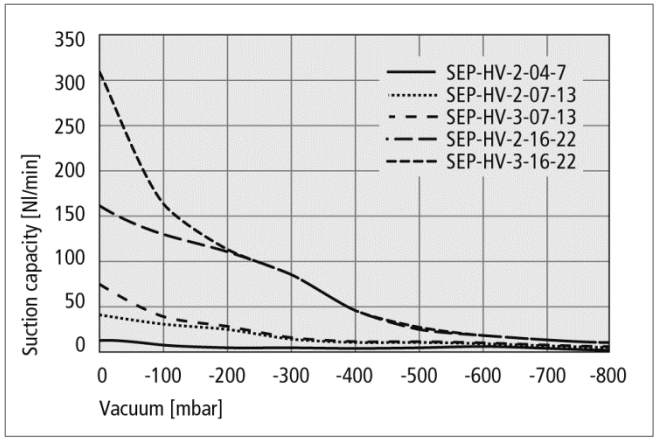
Achievable vacuum at various operating pressures (SEP HF)



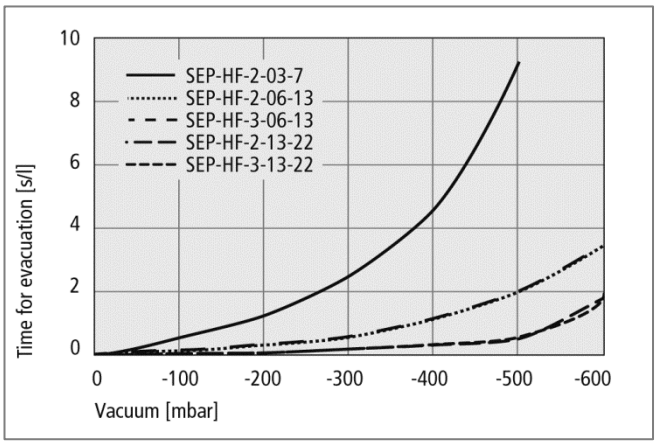
Achievable vacuum at various operating pressures (SEP HV)



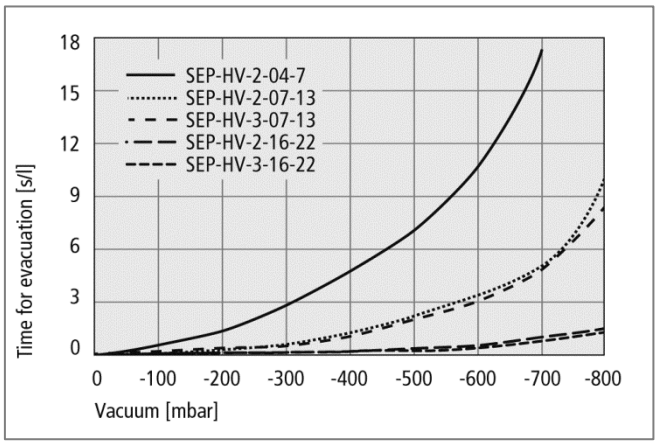
Suction capacity at various degrees of evacuation (SEP HF)



Suction capacity at various degrees of evacuation (SEP HV)



Evacuation times for various vacuum ranges (SEP HF)



Evacuation times for various vacuum ranges (SEP HV)

Ejector Module

Ejector Module ecoPump SEP

Suction rate up to 309 l/min

Suction Capacity in l/min at Various Degrees of Evacuation SEP HF

Type	Operating pressure [bar]	Max. vacuum [mbar]	Air consumption [l/min]	Degree of evacuation [mbar] 0	-100	-200	-300	-400	-500	-600	-700
SEP HF 2 03 7	3	410	4.0	12.6	5.1	3.8	2.6	0.6	-	-	-
	4	550	5.0	15.3	8.4	5.1	3.9	2.6	1.5	-	-
	5	670	6.0	16.5	10.8	6.1	4.8	3.8	2.6	1.5	-
SEP HF 2 06 13	3	530	14.7	36.9	29.4	15.5	9.2	5.2	1.2	-	-
	4	700	18.7	42.4	34.4	24.7	12.1	9.1	5.5	1.8	-
	5	750	22.8	45.9	38.4	30.6	21.6	10.6	7.7	4.4	1.7
SEP HF 3 06 13	3	530	14.7	57.4	30.4	17.0	9.2	5.2	1.2	-	-
	4	700	18.7	67.3	36.2	27.0	12.1	9.1	5.5	1.8	0.7
	5	750	22.8	74.6	45.3	32.7	21.6	10.6	7.7	4.4	1.7
SEP HF 2 13 22	3	460	58.6	158.6	122.8	76.1	48.3	21.0	-	-	-
	4	610	74.0	175.3	143.8	106.1	66.3	44.7	24.7	2.9	-
	5	720	89.5	180.7	158.6	129.0	89.1	49.4	34.9	19.3	4.9
SEP HF 3 13 22	3	460	58.6	253.7	128.2	76.1	48.3	21.0	-	-	-
	4	610	74.0	297.6	178.3	106.1	66.3	44.7	24.7	2.9	-
	5	720	89.5	325.6	187.3	129.0	89.1	49.4	34.9	19.3	4.9

Suction Capacity in l/min at Various Degrees of Evacuation SEP HV

Type	Operating pressure [bar]	Max. vacuum [mbar]	Air consumption [l/min]	Degree of evacuation [mbar] 0	-100	-200	-300	-400	-500	-600	-700
SEP HV 2 04 7	3	640	5.2	10.8	6.2	3.5	2.8	2.3	1.8	1.3	-
	4	790	6.5	13.2	9.5	4.4	3.4	2.9	2.3	1.7	1.2
	5	860	7.8	14.8	11.3	6.9	3.3	2.8	2.1	1.5	1.1
SEP HV 2 07 13	3	630	18.6	37.8	27.5	14.5	7.9	5.4	2.7	1.1	-
	4	850	23.5	42.5	33.7	25.0	13.8	8.8	7.3	4.6	2.7
	5	900	28.5	45.5	37.6	31.2	23.1	14.0	7.6	4.9	3.1
SEP HV 3 07 13	3	630	18.6	64.6	31.3	16.6	9.3	7.2	4.3	1.2	-
	4	850	23.5	76.8	37.2	27.0	16.6	9.3	7.6	5.1	3.1
	5	900	28.5	86.8	50.6	33.6	26.6	17.0	7.3	4.6	2.7
SEP HV 2 16 22	3	720	82.0	144.8	119.7	87.7	53.3	31.0	19.6	5.7	-
	4	900	103.0	152.6	137.4	112.7	81.2	43.0	25.6	17.7	11.1
	5	910	124.7	151.1	133.8	116.2	93.2	65.9	37.1	17.6	10.9
SEP HV 3 16 22	3	720	82.0	270.0	122.0	95.5	57.6	34.7	21.8	10.4	2.3
	4	900	103.0	308.8	155.1	115.5	88.9	50.5	27.5	18.2	11.1
	5	910	124.7	330.9	201.3	112.7	97.9	70.0	43.9	22.0	9.7

Ejector Module

Ejector Module ecoPump SEP

Suction rate up to 309 l/min

Evacuation Time in s/l for Various Vacuum Ranges SEP HF

Type	Operating pressure [bar]	Max. vacuum [mbar]	Air consumption [l/min]	Degree of evacuation [mbar] -100	-200	-300	-400	-500	-600	-700	-800
SEP HF 2 03 7	3	410	4.0	0.62	1.70	3.42	11.13	-	-	-	-
	4	550	5.0	0.48	1.27	2.51	4.59	9.26	-	-	-
	5	670	6.0	0.42	1.06	2.03	3.42	5.64	10.43	-	-
SEP HF 2 06 13	3	530	14.7	0.14	0.36	0.88	1.74	3.96		-	-
	4	700	18.7	0.10	0.27	0.55	1.18	2.01	3.47	-	-
	5	750	22.8	0.09	0.23	0.43	0.82	1.63	2.65	4.23	-
SEP HF 3 06 13	3	530	14.7	0.14	0.36	0.88	1.74	3.96	-	-	-
	4	700	18.7	0.10	0.27	0.55	1.18	2.01	3.47	-	-
	5	750	22.8	0.09	0.23	0.43	0.82	1.63	2.65	4.23	-
SEP HF 2 13 22	3	460	58.6	0.05	0.10	0.18	0.38	-	-	-	-
	4	610	74.0	0.04	0.08	0.14	0.23	0.42	1.84	-	-
	5	720	89.5	0.05	0.09	0.13	0.22	0.35	0.57	1.26	-
SEP HF 3 13 22	3	460	58.6	0.05	0.10	0.19	0.41	-	-	-	-
	4	610	74.0	0.04	0.08	0.14	0.24	0.46	-	-	-
	5	720	89.5	0.03	0.07	0.11	0.19	0.34	0.59	-	-

Evacuation Time in s/l for Various Vacuum Ranges SEP HV

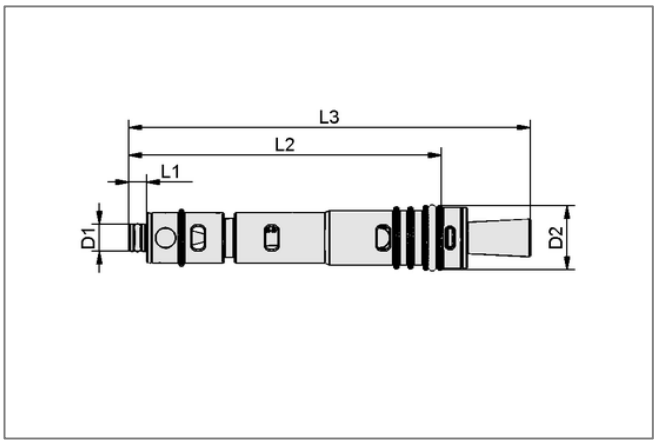
Type	Operating pressure [bar]	Max. vacuum [mbar]	Air consumption [l/min]	Degree of evacuation [mbar] -100	-200	-300	-400	-500	-600	-700	-800
SEP HV 2 04 7	3	640	5.2	0.73	1.96	3.79	6.47	10.37	18.45	-	-
	4	790	6.5	0.53	1.34	2.79	4.71	7.16	10.68	17.73	-
	5	860	7.8	0.54	1.10	2.34	4.42	7.28	11.30	17.79	29.10
SEP HV 2 07 13	3	630	18.6	0.13	0.39	1.01	1.98	3.58	8.59	-	-
	4	850	23.5	0.09	0.26	0.56	1.22	2.08	3.21	5.09	9.71
	5	900	28.5	0.06	0.18	0.37	0.69	1.38	2.51	4.21	7.69
SEP HV 3 07 13	3	630	18.6	0.15	0.41	1.05	1.99	3.36	6.04	-	-
	4	850	23.5	0.11	0.28	0.53	1.11	1.94	3.01	4.71	8.47
	5	900	28.5	0.07	0.19	0.36	0.61	1.32	2.50	4.11	7.52
SEP HV 2 16 22	3	720	82.0	0.06	0.10	0.17	0.31	0.50	0.89	-	-
	4	900	103.0	0.06	0.09	0.14	0.23	0.40	0.61	0.94	1.49
	5	910	124.7	0.05	0.08	0.12	0.18	0.27	0.49	0.83	1.54
SEP HV 3 16 22	3	720	82.0	0.04	0.09	0.16	0.29	0.48	0.83	-	-
	4	900	103.0	0.04	0.08	0.12	0.21	0.36	0.58	0.90	1.46
	5	910	124.7	0.04	0.07	0.11	0.17	0.27	0.48	0.81	1.51

Ejector Module

Ejector Module ecoPump SEP

Suction rate up to 309 l/min

Design Data Ejector Module ecoPump SEP



ecoPump SEP

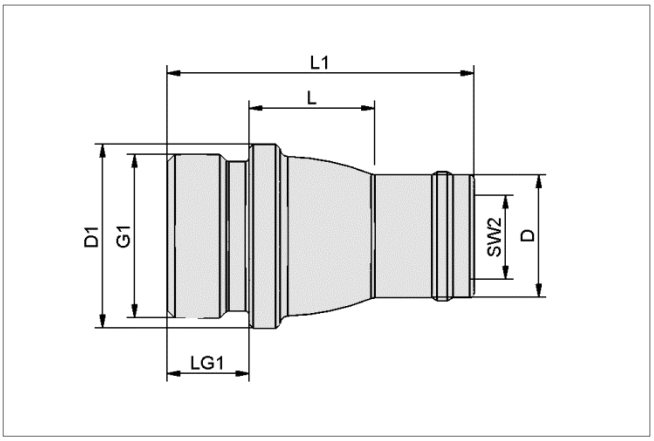
Type	Dimensions in mm				
	D1	D2	L1	L2	L3
SEP...2...7	4.4	6.8	3.5	20.1	33.0
SEP...2...13	5.4	12.8	5.0	41.5	55.5
SEP...3...13	5.4	12.8	5.0	63.5	81.5
SEP...2...22	10.8	21.8	8.0	67.5	92.0
SEP...3...22	10.8	21.8	8.0	103.0	146.0

Ejector Module

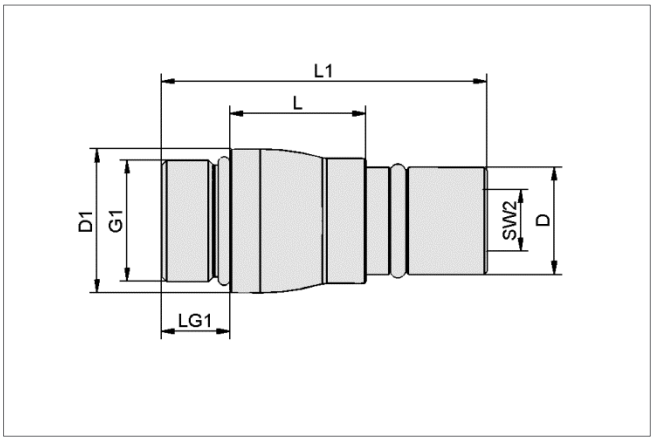
Ejector Module ecoPump SEP

Suction rate up to 309 l/min

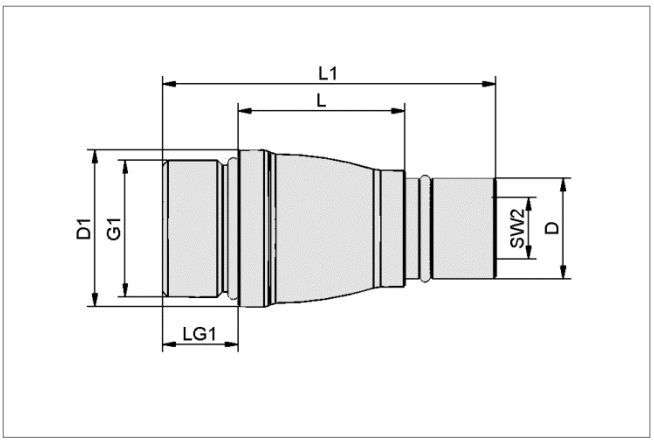
Design Data Holder Cap SHC



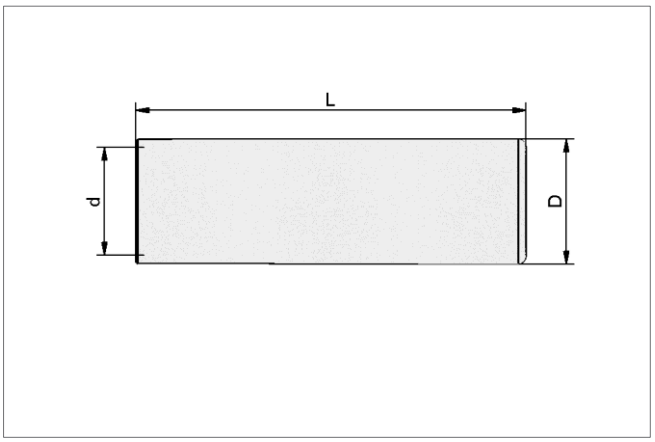
SHC 2 7



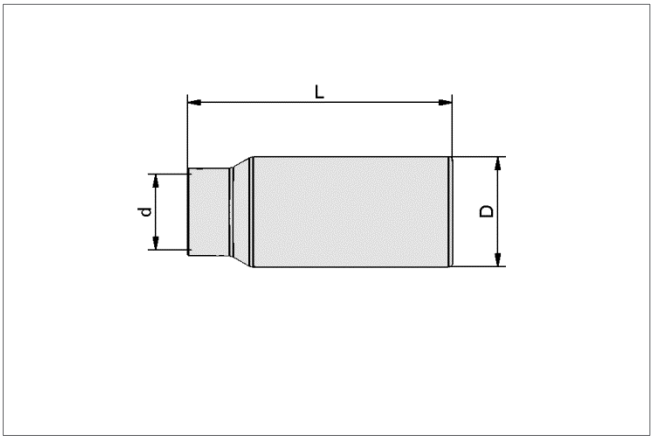
SHC 2/3 13



SHC 2/3 22



SD 16.5x51.5 SHC 13



SD 29x70 SHC 22

Ejector Module

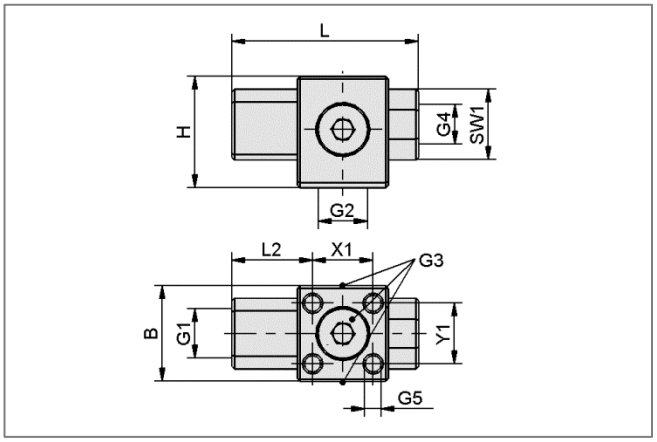
Ejector Module ecoPump SEP

Suction rate up to 309 l/min

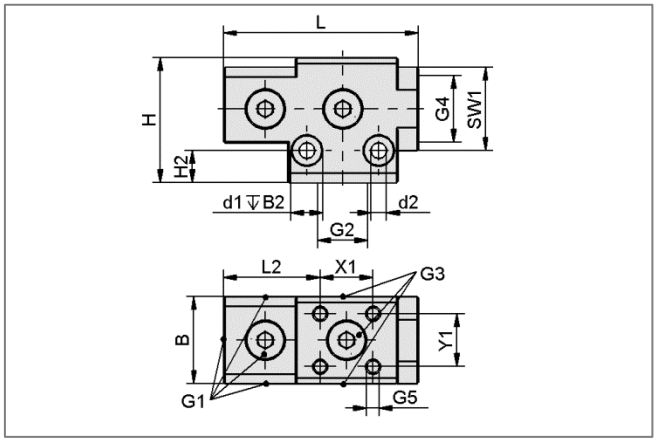
Design Data Holder Cap SHC

Type	Dimension in mm							
	d	D	D1	G1	L	L1	LG1	SW2
SHC 2 7	-	9	6	M8x0.5-M	6	15	4	4
SHC 2 13	-	14	19	M16x1-M	18	43	9	8
SHC 3 13	-	14	19	M16x1-M	37	62	9	8
SHC 2 22	-	20	31	M27x1.5-M	33	66	15	12
SHC 3 22	-	20	31	M27x1.5-M	73	106	15	14
SD 16.5x51.5 SHC 13	14	17	-	-	52	-	-	-
SD 29x70 SHC 22	20	29	-	-	70	-	-	-

Design Data Housing ecoPump SFE



SFE 7



SFE 13 and 22

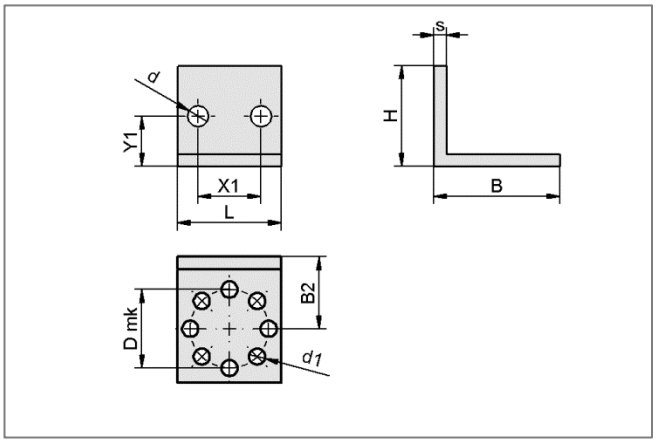
Typ	Dimension in mm															
	B	B2	d1	d2	G1	G2	G3	G4	G5	H	H2	L	L2	SW1	X1	Y1
SFE 7	19	-	-	-	G1/8"-F	G1/8"-F	G1/8"-F	M8x0.5-F	M4-F	22	-	37	16	14	12	12
SFE 13	23	4.4	8	4.2	G1/8"-F	G1/4"-F	G1/8"-F	M16x1-F	M4-F	33	9	52	26	22	14	14
SFE 22	35	6.4	11	6.4	G1/4"-F	G3/8"-F	G1/4"-F	M27x1.5-F	M6-F	44	10	88	35	32	22	22

Ejector Module

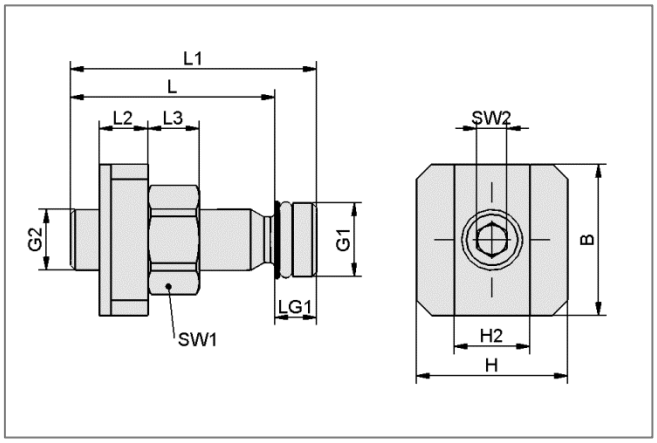
Ejector Module ecoPump SEP

Suction rate up to 309 l/min

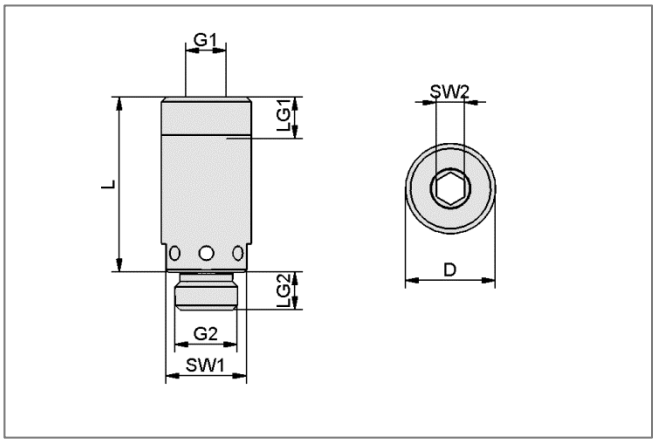
Design Data Accessories Ejector Modules ecoPump SEP



BEF-WIN



SET



SEV

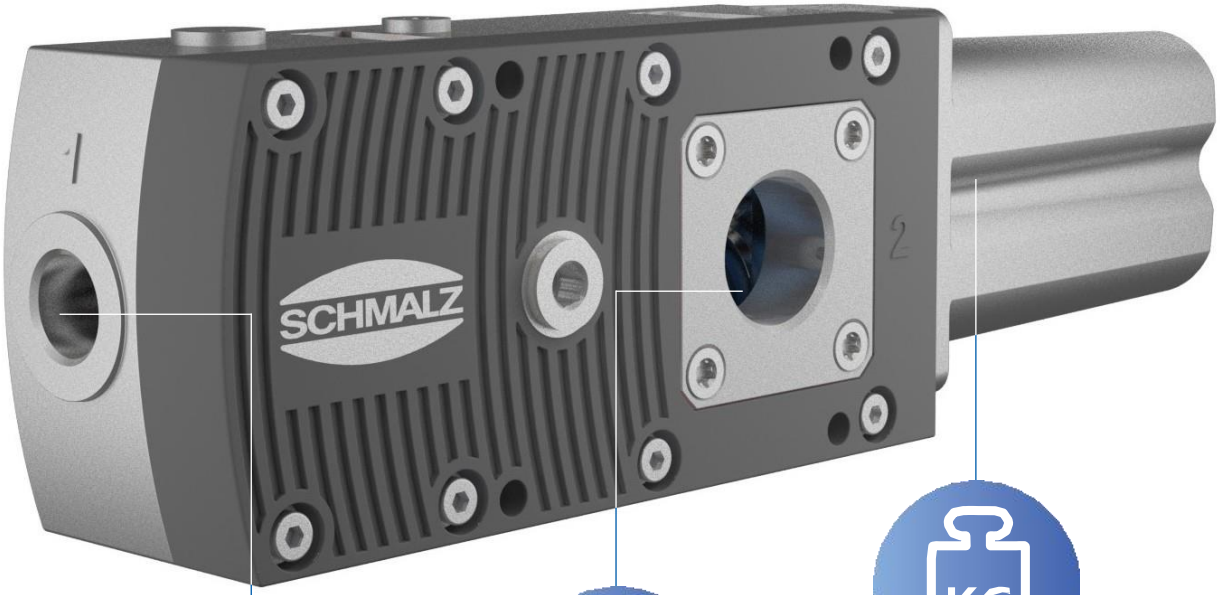
Type	Dimension in mm										
	B	B2	d	d1	D	D mk	G1	G2	H	H2	L
BEF-WIN 30x40x25.5 4 SFE-7	30	40.0	6	5	-	17	-	-	40	-	26
BEF-WIN 36x40x27 5 SFE-13	36	41.3	6	5	-	20	-	-	40	-	27
BEF-WIN 50x40x41 5 SFE-22	50	28.5	8	6	-	31	-	-	40	-	41
SET SFE 13	20	-	-	-	-	-	G1/8"-M	M8-M	20	10	27
SET SFE 22	20	-	-	-	-	-	G1/4"-F	M8-M	20	10	34
SEV G1/8-IG G1/8-AG	-	-	-	-	19	-	G1/8"-F	G1/8"-M	-	-	40
SEV G1/8-IG G1/4-AG	-	-	-	-	19	-	G1/8"-F	G1/4"-M	-	-	37

Type	Dimension in mm									
	L1	L2	L3	LG1	LG2	s	SW1	SW2	X1	Y1
BEF-WIN 30x40x25.5 4 SFE-7	-	-	-	-	-	4	-	-	15	20
BEF-WIN 36x40x27 5 SFE-13	-	-	-	-	-	5	-	-	17	20
BEF-WIN 50x40x41 5 SFE-22	-	-	-	-	-	5	-	-	25	20
SET SFE 13	33	6	7	6	-	-	13	4	-	-
SET SFE 22	34	6	7	7	-	-	13	5	-	-
SEV G1/8-IG G1/8-AG	-	-	-	7	8	-	17	6	-	-
SEV G1/8-IG G1/4-AG	-	-	-	9	8	-	17	6	-	-

Basic Ejectors SBPL

Power – when you need it

Suction rate from 290 l/min to 1,140 l/min



Innovatives Produktdesign

- Up to 50% lighter
- Very simple maintenance

Concentrated Power

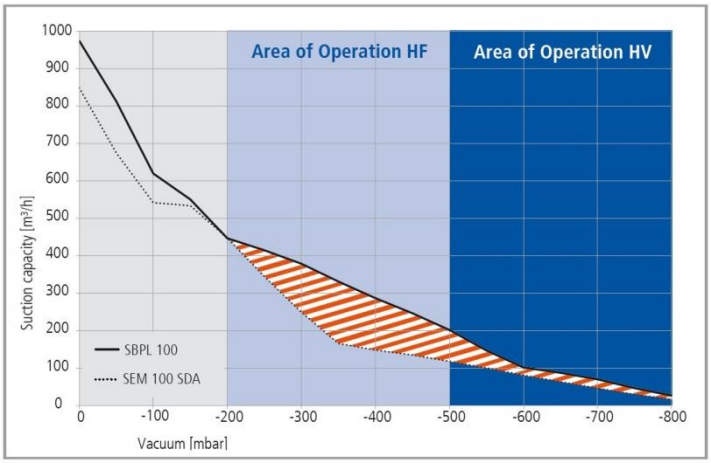
- Up to 100% more suction volume in the area of operation compared to single-stage vacuum generators
  > HF version (up to -500 mbar) for porous workpieces
  > HV version (from -500 mbar) for airtight workpieces

Efficient Eco Nozzle Technology

- Multi-stage venturi principle
- Ideal combination of suction capacity and energy efficiency
- Minimal cycle time through quick evacuation

Our Solution for Quick and Safe Handling of Challenging Workpieces

The new basic ejector SBPL is the strongest product of our ejector range. This vacuum generator has been designed for maximum efficiency. This way the SBPL can unfold its performance more effectively and more powerful – right when you need it. When operating between -200 and -600 mbar the SBPL´s suction rate is almost twice that of its predecessor. This cuts evacuation times and thus minimizes cycle times. Additionaly our engineers have put their focus on weight reduction, resulting in a decrease of up to 50%. Innovative product design makes maintenance considerably easier. Eco nozzle technology makes the SBPL more versatile in application, which creates more freedom in system design.



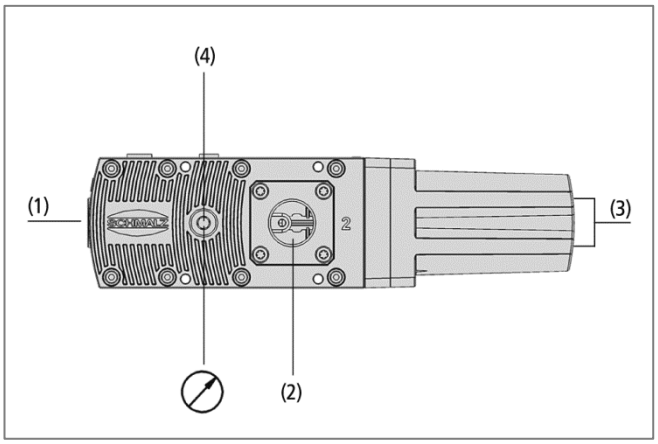
Suction performance of the SBPL compared to its predecessor

Basic Ejectors SBPL

Power – when you need it

Suction rate from 290 l/min to 1,140 l/min

Basic ejectors SBPL



System design basic ejectors SBPL

Centralized vacuum generation by means of basic ejectors SBPL

Suitability for Industry-Specific Applications

Applications

- Basic ejector with highest suction rate for handling cardboard, packaging materials, insulation materials and other porous workpieces
- For processes that require high flow rates at minimized energy consumption

Design

- Basic body and nozzle system made of high-strength plastic
- Pneumatic connections for compressed air (1), vacuum (2) and exhaust air (silencer) (3)
- Connections for valve, vacuum switch or vacuum manometer (4)
- Optional accessories: vacuum switch, vacuum manometer, quick-release valves, electromagnetic valves, filter, exhaust duct

Our Highlights...	Your Benefits...
• Ejector family with high suction capacity	> Quick and safe handling of porous workpieces
• Area of operation for air tight (HV) or porous (HF) work-pieces	> Reduced air consumption due to an optimized ejector operating area
• Integrated eco nozzle tech-nology	> Highest energy efficiency in vacuum generation
• Fast, with powerful vacuum	> Quickly reaches working vacuum
• Modular product design	> Quick and easy maintenance

Basic Ejectors SBPL

Power – when you need it

Suction rate from 290 l/min to 1,140 l/min

Designation Code Basic Ejectors SBPL

Abbreviated designation	Size	Version	Special thread
Example SBPL 100 HF:			
SBPL	**100**	**HF**	
SBPL	25 50 75 100 125 150	HF High Flow HV…..High Vacuum	NPT

Ordering Data Basic Ejectors SBPL

The basic ejector SBPL is delivered as a ready to connect product.

Available accessories: vacuum manometer, quick-release valves, electromagnetic valves, mounting bracket

Basic Ejectors SBPL

SBPL 25		SBPL 50		SBPL 75	
Type	**Part Number**	**Type**	**Part Number**	**Type**	**Part Number**
SBPL 25 HF	10.02.01.01596	**SBPL 50 HF**	10.02.01.01597	**SBPL 75 HF**	10.02.01.01650
SBPL 25 HV	10.02.01.01586	**SBPL 50 HV**	10.02.01.01590	**SBPL 75 HV**	10.02.01.01649
SBPL 25 HF NPT	10.02.01.01604	**SBPL 50 HF NPT**	10.02.01.01605	**SBPL 75 HF NPT**	10.02.01.01654
SBPL 25 HV NPT	10.02.01.01600	**SBPL 50 HV NPT**	10.02.01.01601	**SBPL 75 HV NPT**	10.02.01.01653

SBPL 100		SBPL 125		SBPL 150	
Type	**Part Number**	**Type**	**Part Number**	**Type**	**Part Number**
SBPL 100 HF	10.02.01.01598	**SBPL 125 HF**	10.02.01.01652	**SBPL 150 HF**	10.02.01.01599
SBPL 100 HV	10.02.01.01591	**SBPL 125 HV**	10.02.01.01651	**SBPL 150 HV**	10.02.01.01592
SBPL 100 HF NPT	10.02.01.01606	**SBPL 125 HF NPT**	10.02.01.01656	**SBPL 150 HF NPT**	10.02.01.01607
SBPL 100 HV NPT	10.02.01.01602	**SBPL 125 HV NPT**	10.02.01.01655	**SBPL 150 HV NPT**	10.02.01.01603

Ordering Data Accessories Basic Ejectors SBPL

Type	Type	Part Number
Vacuum gauge (electronic)	VAM-D 30x30 VP10 G1/8-AG	10.07.02.00055
Vacuum gauge	VAM 40 V H	10.07.02.00035
Solenoid valve for blow-off	EMV 2.5 24V-DC 3/2 NC K-2P	10.05.01.00366
Quick exhaust valve	SEV G1/8-IG G1/8-AG	10.02.01.01471
Mounting bracket	BEF-WIN 25x77x72 3 SBPL	10.02.01.01705

Basic Ejectors SBPL

Power – when you need it

Suction rate from 290 l/min to 1,140 l/min

Technical Data Basic Ejectors SBPL

Type	Degree of evacuation [%]	Max. suction rate [l/min]*	Max. suction rate [m³/h]*	Air consumpt. during evac. [l/min]**	Air consumpt. during evac. [m³/h]**	Noise level free [dB]
SBPL 25 HF…	60	290 (325)	18.0 (19.5)	80	5.0	61
SBPL 25 HV…	90	300 (330)	18.5 (19.8)	105	6.5	65
SBPL 50 HF…	60	500 (650)	30.5 (39.0)	160	9.8	65
SBPL 50 HV…	90	510 (660)	31.0 (39.6)	210	13.0	66
SBPL 75 HF…	60	710 (975)	43.5 (58.5)	230	14.0	67
SBPL 75 HV…	90	720 (990)	44.0 (59.4)	305	18.8	68
SBPL 100 HF…	60	860 (1300)	53.0 (78.0)	300	18.5	69
SBPL 100 HV…	90	870 (1320)	53.5 (79.2)	395	24.5	70
SBPL 125 HF…	60	1010 (1625)	62.0 (97.5)	370	22.8	70
SBPL 125 HV…	90	1010 (1650)	62.0 (99.0)	470	29.0	72
SBPL 150 HF…	60	1120 (1950)	69.0 (117.0)	435	26.8	71
SBPL 150 HV…	90	1140 (1980)	70.0 (118.8)	545	33.5	73

*The information regarding the suction capacity are values measured under operating conditions. The value in brackets represents the calculated suction capacity of the installed ejector modules. The measured value should always be applied for designs.

**At optimal operating pressure

Type	Noise level workpiece gripped [dB]	Pressure range (operating pressure) [bar]	Recomm. int. hose diameter compr. air [mm]***	Recomm. int. hose diameter vacuum [mm]***	Weight [kg]	Operating temperature [°C]
SBPL 25 HF…	54	2.0…6.0	4	20	0.8	0…60
SBPL 25 HV…	55	2.0…6.0	4	20	0.8	0…60
SBPL 50 HF…	55	2.0…6.0	6	25	0.8	0…60
SBPL 50 HV…	59	2.0…6.0	6	25	0.8	0…60
SBPL 75 HF…	57	2.0…6.0	6	32	1.1	0…60
SBPL 75 HV…	62	2.0…6.0	6	32	1.1	0…60
SBPL 100 HF…	58	2.0…6.0	6	32	1.1	0…60
SBPL 100 HV…	64	2.0…6.0	6	32	1.1	0…60
SBPL 125 HF…	60	2.0…6.0	9	32	1.5	0…60
SBPL 125 HV…	65	2.0…6.0	9	32	1.5	0…60
SBPL 150 HF…	61	2.0…6.0	9	32	1.5	0…60
SBPL 150 HV…	66	2.0…6.0	9	32	1.5	0…60

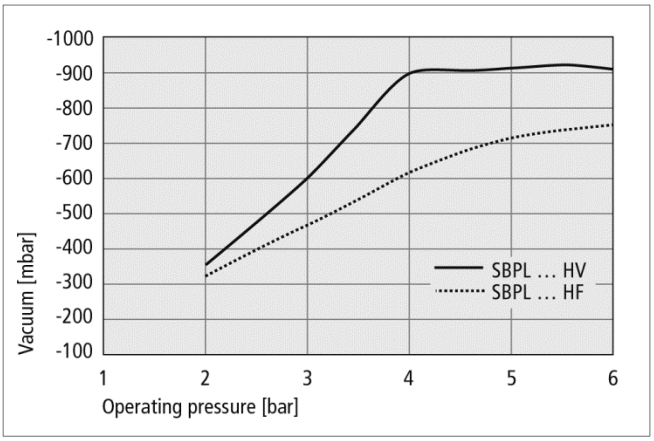
***For max. length 2 m

Basic Ejectors SBPL

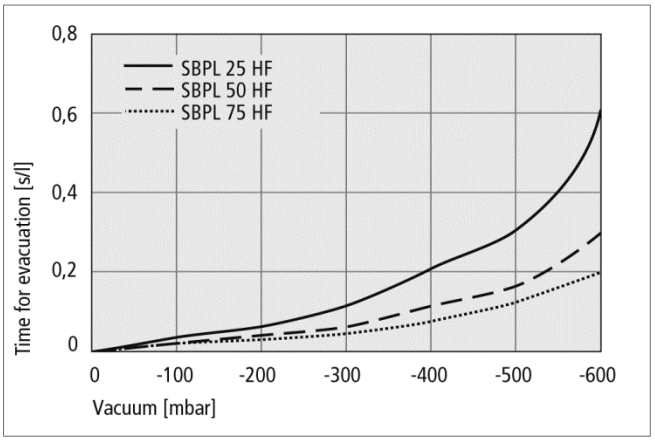
Power – when you need it

Suction rate from 290 l/min to 1,140 l/min

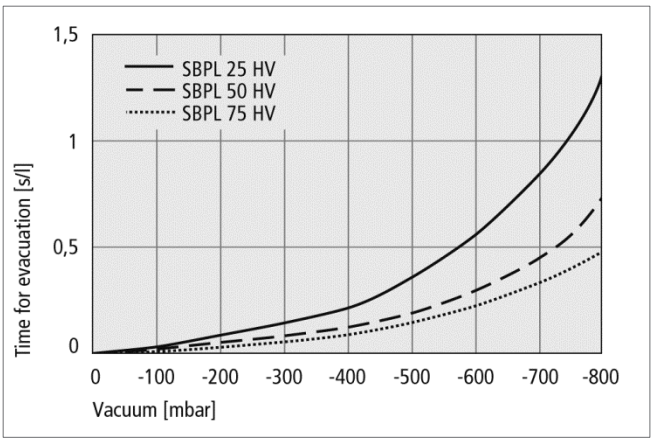
Performance Data Basic Ejectors SBPL



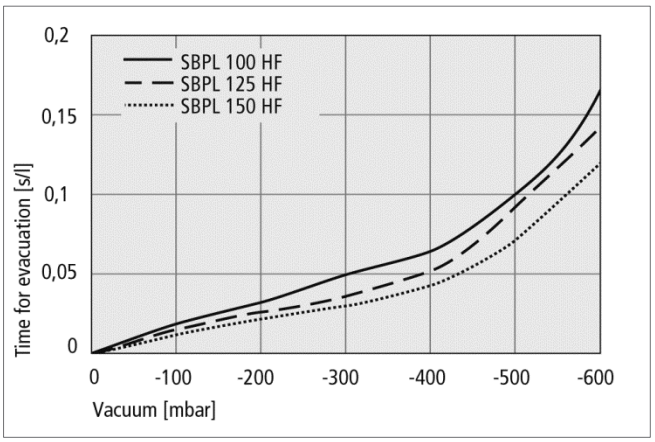
Achievable vacuum at various vacuum ranges



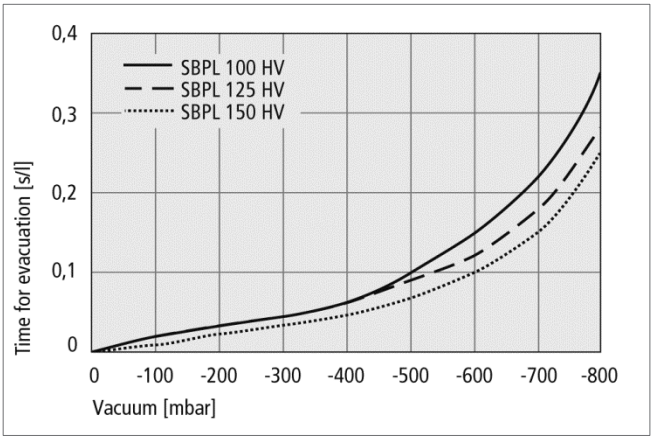
Evacuation times for various vacuum ranges



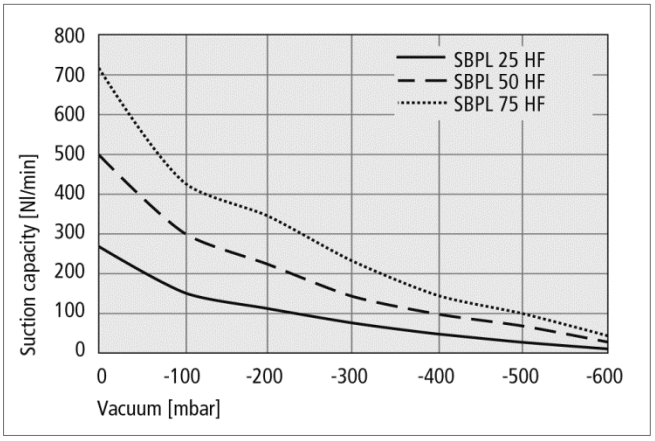
Evacuation times for various vacuum ranges



Evacuation times for various vacuum ranges



Evacuation times for various vacuum ranges



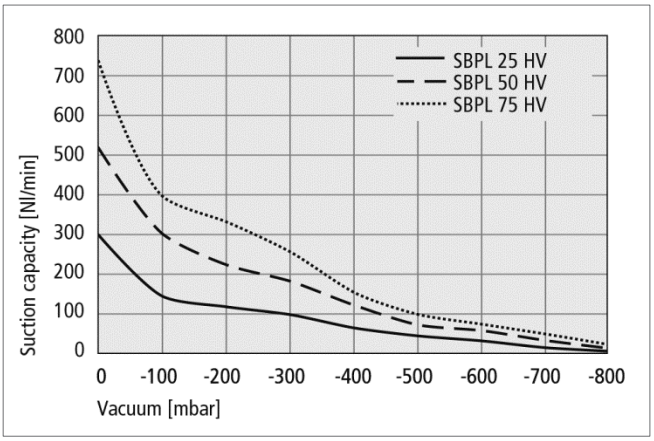
Suction capacity at various degrees of evacuation

Basic Ejectors SBPL

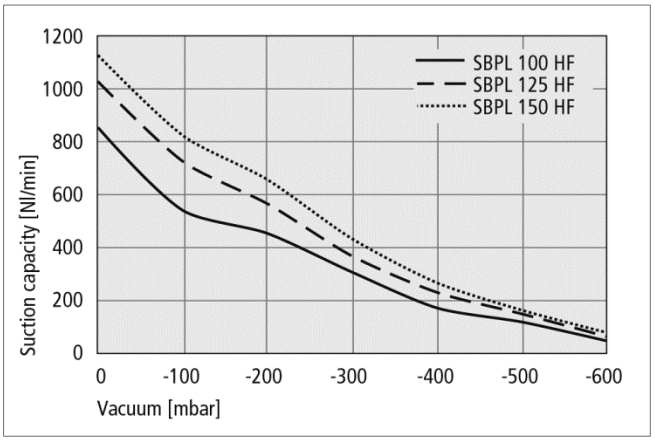
Power – when you need it

Suction rate from 290 l/min to 1,140 l/min

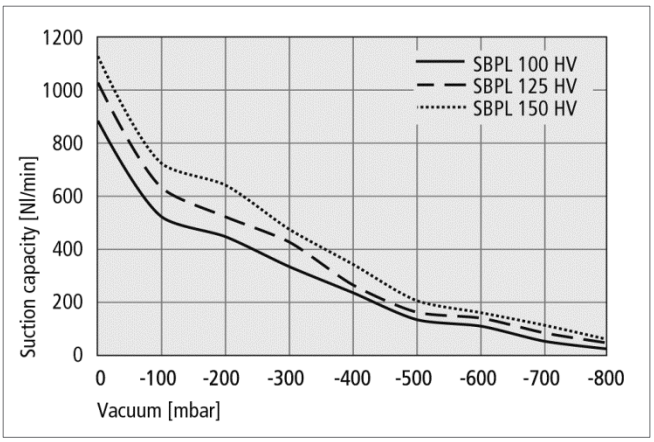
Performance Data Basic Ejectors SBPL



Suction capacity at various degrees of evacuation



Suction capacity at various degrees of evacuation



Suction capacity at various degrees of evacuation

Evacuation Time in s/l for Various Vacuum Ranges

Type	Degree of evacuation in mbar								
	-50	-100	-200	-300	-400	-500	-600	-700	-800
SBPL 25 HF	0.020	0.030	0.060	0.110	0.210	0.350	0.610	-	-
SBPL 25 HV	0.030	0.040	0.080	0.120	0.190	0.320	0.540	0.840	1.380
SBPL 50 HF	0.010	0.020	0.040	0.060	0.110	0.180	0.300	-	-
SBPL 50 HV	0.020	0.030	0.050	0.070	0.110	0.180	0.280	0.430	0.710
SBPL 75 HF	0.010	0.020	0.003	0.040	0.070	0.120	0.200	-	-
SBPL 75 HV	0.000	0.000	0.000	0.100	0.200	0.350	0.650	1.200	2.300
SBPL 100 HF	0.020	0.020	0.030	0.040	0.060	0.100	0.160	-	-
SBPL 100 HV	0.020	0.020	0.030	0.040	0.060	0.100	0.150	0.220	0.350
SBPL 125 HF	0.010	0.015	0.025	0.035	0.055	0.090	0.140	-	-
SBPL 125 HV	0.020	0.020	0.030	0.040	0.060	0.090	0.120	0.180	0.280
SBPL 150 HF	0.010	0.010	0.020	0.030	0.040	0.070	0.120	-	-
SBPL 150 HV	0.010	0.010	0.020	0.030	0.040	0.070	0.100	0.150	0.250

Basic Ejectors SBPL

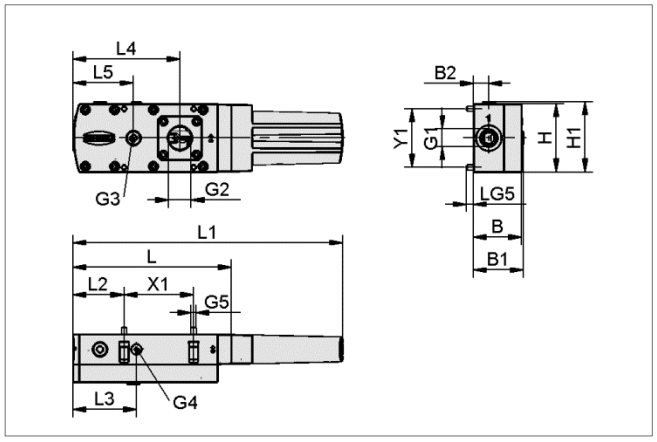
Power – when you need it

Suction rate from 290 l/min to 1,140 l/min

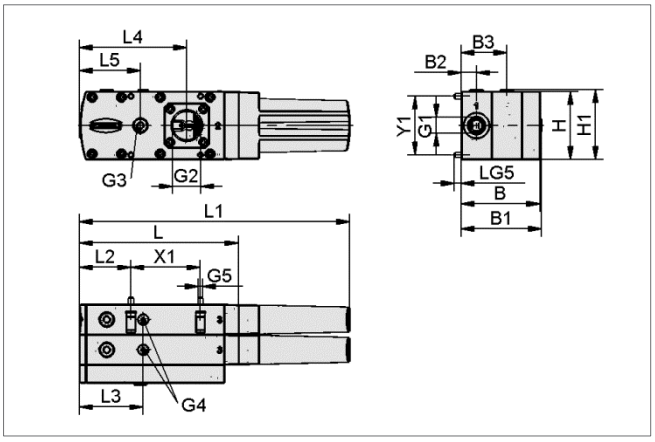
Suction Capacity in l/min at Various Degrees of Evacuation

Type	Degree of evacuation in mbar								
	-50	-100	-200	-300	-400	-500	-600	-700	-800
SBPL 25 HF	210	150	130	85	50	30	10	-	-
SBPL 25 HV	225	150	125	100	70	50	35	20	7.5
SBPL 50 HF	375	300	240	165	100	70	20	-	-
SBPL 50 HV	400	300	230	190	120	70	55	35	15.0
SBPL 75 HF	550	425	350	240	145	100	30	-	-
SBPL 75 HV	540	400	340	270	165	100	83	57	25.0
SBPL 100 HF	680	570	465	305	190	125	50	-	-
SBPL 100 HV	650	520	450	350	220	135	110	75	35.0
SBPL 125 HF	820	720	580	380	235	150	60	-	-
SBPL 125 HV	760	620	530	425	245	170	140	95	45.0
SBPL 150 HF	890	805	670	425	275	175	70	-	-
SBPL 150 HV	850	720	635	475	265	205	160	110	40.0

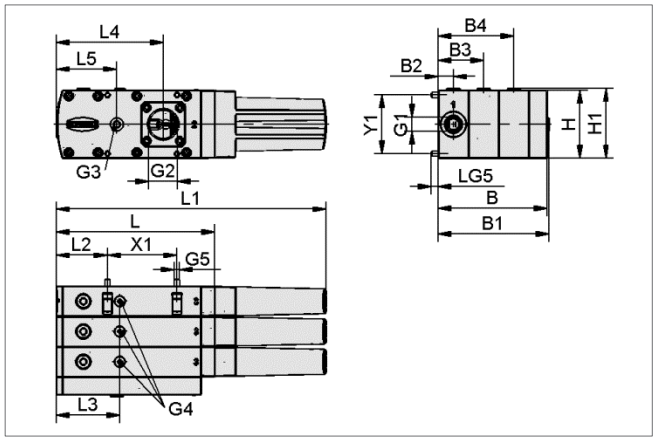
Design Data Basic Ejectors SBPL



SBPL 25/50…



SBPL 75/100…



SBPL 125/150…

Basic Ejectors SBPL

Power – when you need it

Suction rate from 290 l/min to 1,140 l/min

Design Data Basic Ejectors SBPL

Type	Dimensions in mm										
	B	B1	B2	B3	B4	G1	G2	G3	G4	G5	H
SBPL 25 HF	51	53	16	-	-	G3/8“-F	G3/4“-F	G1/4“-F	G1/8“-F	M5-M	72
SBPL 25 HV	51	53	16	-	-	G3/8“-F	G3/4“-F	G1/4“-F	G1/8“-F	M5-M	72
SBPL 25 HF NPT	51	53	16	-	-	NPT3/8-F	NPT3/4-F	NPT1/4-F	G1/8“-F	M5-M	72
SBPL 25 HV NPT	51	53	16	-	-	NPT3/8-F	NPT3/4-F	NPT1/4-F	G1/8“-F	M5-M	72
SBPL 50 HF	51	53	16	-	-	G3/8“-F	G3/4“-F	G1/4“-F	G1/8“-F	M5-M	72
SBPL 50 HV	51	53	16	-	-	G3/8“-F	G3/4“-F	G1/4“-F	G1/8“-F	M5-M	72
SBPL 50 HF NPT	51	53	16	-	-	NPT3/8-F	NPT3/4-F	NPT1/4-F	G1/8“-F	M5-M	72
SBPL 50 HV NPT	51	53	16	-	-	NPT3/8-F	NPT3/4-F	NPT1/4-F	G1/8“-F	M5-M	72
SBPL 75 HF	83	85	16	48	-	G3/8“-F	G1“-F	G1/4“-F	G1/8“-F	M5-M	72
SBPL 75 HV	83	85	16	48	-	G3/8“-F	G1“-F	G1/4“-F	G1/8“-F	M5-M	72
SBPL 75 HF NPT	83	85	16	48	-	NPT3/8-F	NPT1-F	NPT1/4-F	G1/8“-F	M5-M	72
SBPL 75 HV NPT	83	85	16	48	-	NPT3/8-F	NPT1-F	NPT1/4-F	G1/8“-F	M5-M	72
SBPL 100 HF	83	85	16	48	-	G3/8“-F	G1“-F	G1/4“-F	G1/8“-F	M5-M	72
SBPL 100 HV	83	85	16	48	-	G3/8“-F	G1“-F	G1/4“-F	G1/8“-F	M5-M	72
SBPL 100 HF NPT	83	85	16	48	-	NPT3/8-F	NPT1-F	NPT1/4-F	G1/8“-F	M5-M	72
SBPL 100 HV NPT	83	85	16	48	-	NPT3/8-F	NPT1-F	NPT1/4-F	G1/8“-F	M5-M	72
SBPL 125 HF	115	117	16	48	80	G3/8“-F	G1“-F	G1/4“-F	G1/8“-F	M5-M	72
SBPL 125 HV	115	117	16	48	80	G3/8“-F	G1“-F	G1/4“-F	G1/8“-F	M5-M	72
SBPL 125 HF NPT	115	117	16	48	80	NPT3/8-F	NPT1-F	NPT1/4-F	G1/8“-F	M5-M	72
SBPL 125 HV NPT	115	117	16	48	80	NPT3/8-F	NPT1-F	NPT1/4-F	G1/8“-F	M5-M	72
SBPL 150 HF	115	117	16	48	80	G3/8“-F	G1“-F	G1/4“-F	G1/8“-F	M5-M	72
SBPL 150 HV	115	117	16	48	80	G3/8“-F	G1“-F	G1/4“-F	G1/8“-F	M5-M	72
SBPL 150 HF NPT	115	117	16	48	80	NPT3/8-F	NPT1-F	NPT1/4-F	G1/8“-F	M5-M	72
SBPL 150 HV NPT	115	117	16	48	80	NPT3/8-F	NPT1-F	NPT1/4-F	G1/8“-F	M5-M	72

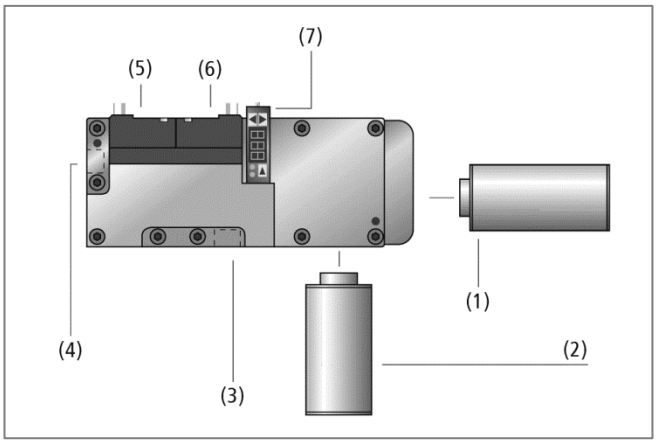
Type	Dimension in mm									
	H1	L	L1	L2	L3	L4	L5	LG5	X1	Y1
SBPL 25 HF	74	168	285	54	67	113	64	7.4	74	62
SBPL 25 HV	74	168	285	54	67	113	64	7.4	74	62
SBPL 25 HF NPT	74	168	285	54	67	113	64	7.4	74	62
SBPL 25 HV NPT	74	168	285	54	67	113	64	7.4	74	62
SBPL 50 HF	74	168	285	54	67	113	64	7.4	74	62
SBPL 50 HV	74	168	285	54	67	113	64	7.4	74	62
SBPL 50 HF NPT	74	168	285	54	67	113	64	7.4	74	62
SBPL 50 HV NPT	74	168	285	54	67	113	64	7.4	74	62
SBPL 75 HF	74	168	285	54	67	113	64	7.4	74	62
SBPL 75 HV	74	168	285	54	67	113	64	7.4	74	62
SBPL 75 HF NPT	74	168	285	54	67	113	64	7.4	74	62
SBPL 75 HV NPT	74	168	285	54	67	113	64	7.4	74	62
SBPL 100 HF	74	168	285	54	67	113	64	7.4	74	62
SBPL 100 HV	74	168	285	54	67	113	64	7.4	74	62
SBPL 100 HF NPT	74	168	285	54	67	113	64	7.4	74	62
SBPL 100 HV NPT	74	168	285	54	67	113	64	7.4	74	62
SBPL 125 HF	74	168	285	54	67	113	64	7.4	74	62
SBPL 125 HV	74	168	285	54	67	113	64	7.4	74	62
SBPL 125 HF NPT	74	168	285	54	67	113	64	7.4	74	62
SBPL 125 HV NPT	74	168	285	54	67	113	64	7.4	74	62
SBPL 150 HF	74	168	285	54	67	113	64	7.4	74	62
SBPL 150 HV	74	168	285	54	67	113	64	7.4	74	62
SBPL 150 HF NPT	74	168	285	54	67	113	64	7.4	74	62
SBPL 150 HV NPT	74	168	285	54	67	113	64	7.4	74	62

Multi-Stage Ejectors

Multi-Stage Ejectors SEM-C with Additional Functions

Suction rate from 338 l/min to 673 l/min

Multi-stage ejectors SEM-C with additional functions



System design multi-stage ejectors SEM-C with additional functions

Central vacuum generation by multistage ejectors SEM-C for particle board or cardboard

Suitability for Industry-Specific Applications

Applications

- Multi-stage ejector with integrated valve technology and system monitoring for handling of cardboard, packing materials, insulating materials and other porous items

Design

- Aluminium nozzle system
- Gaskets and valve flaps made of NBR
- Silencer can be mounted axially (1) or on the side (2)
- Functional mounting plate with suction valve (5) (NO or NC) and blow-off valve NC (6)
- Optional vacuum switch (7)
- Vacuum-connection (3)
- Compressed-air connection (4)

Our Highlights...	Your Benefits...
• Ejector family with a very high suction capacity	> Fast and safe handling of all porous materials
• Multi-stage ejector nozzle with high efficiency	> Fast evacuation in the lower vacuum range, cost reductions and shorter cycle times
• Integrated control valves and vacuum switch	> Compact unit for space-saving Installation
• Optional automatic air-saving function	> Lower energy consumption when handling air-tight parts

Multi-Stage Ejectors

Multi-Stage Ejectors SEM-C with Additional Functions

Suction rate from 338 l/min to 673 l/min

Designation Code Multi-Stage Ejectors SEM-C with Additional Functions

Abbreviated designation	Size	Version	Idle position suction valve	Blow off- and safety non-return valve	System monitoring
Example SEM-C 25 SD NO AS VD:					
SEM-C	**25**	**SD**	**NO**	**AS**	**VD**
SEM-C	25 50 100	SD silencer	NC normally closed NO normally open	AS blow off-and safety non-return valve	VD digital vacuum switch

Ordering Data Multi-Stage Ejectors SEM-C with Additional Functions

Multi-stage ejector SEM-C is delivered as a ready to connect product (without connection cable).

Available spare parts: silencer
Available accessories: connection cable, distributor

Multi-Stage Ejectors SEM-C with Additional Functions

Type	Part Number
SEM-C 25 SD NO AS	10.02.02.03204
SEM-C 25 SD NC AS	10.02.02.03203
SEM-C 25 SD NO AS VD	10.02.02.03206
SEM-C 25 SD NC AS VD	10.02.02.03205
SEM-C 50 SD NO AS	10.02.02.02966
SEM-C 50 SD NC AS	10.02.02.03207
SEM-C 50 SD NO AS VD	10.02.02.03057
SEM-C 50 SD NC AS VD	10.02.02.03208
SEM-C 100 SD NO AS	10.02.02.03209
SEM-C 100 SD NC AS	10.02.02.03215
SEM-C 100 SD NO AS VD	10.02.02.03211
SEM-C 100 SD NC AS VD	10.02.02.03210

Ordering Data Spare Parts Multi-Stage Ejectors SEM-C with Additional Functions

Type	Silencer*
SEM-C 25 SD NO AS	10.02.01.00309
SEM-C 25 SD NC AS	10.02.01.00309
SEM-C 25 SD NO AS VD	10.02.01.00309
SEM-C 25 SD NC AS VD	10.02.01.00309
SEM-C 50 SD NO AS	10.02.01.00312
SEM-C 50 SD NC AS	10.02.01.00312
SEM-C 50 SD NO AS VD	10.02.01.00312
SEM-C 50 SD NC AS VD	10.02.01.00312
SEM-C 100 SD NO AS	10.02.01.00312
SEM-C 100 SD NC AS	10.02.01.00312
SEM-C 100 SD NO AS VD	10.02.01.00312
SEM-C 100 SD NC AS VD	10.02.01.00312

*The silencers can be mounted axially or on the side, as desired

Multi-Stage Ejectors

Multi-Stage Ejectors SEM-C with Additional Functions

Suction rate from 338 l/min to 673 l/min

Ordering Data Accessories Multi-Stage Ejectors SEM-C with Additional Functions

Type*	Connection cable for solenoid valves* (5 m, PVC)	Distributor for air saving function**	Connection cable for vacuum switch (5 m, straight, PUR)	Connection cable for vacuum switch (5 m, 90°, PUR)
SEM-C 25 SD NO AS	21.04.06.00084	-	-	-
SEM-C 25 SD NC AS	21.04.06.00084	-	-	-
SEM-C 25 SD NO AS VD	21.04.06.00084	10.02.02.01291	10.06.02.00031	10.06.02.00032
SEM-C 25 SD NC AS VD	21.04.06.00084	10.02.02.01287	10.06.02.00031	10.06.02.00032
SEM-C 50 SD NO AS	21.04.06.00084	-	-	-
SEM-C 50 SD NC AS	21.04.06.00084	-	-	-
SEM-C 50 SD NO AS VD	21.04.06.00084	10.02.02.01291	10.06.02.00031	10.06.02.00032
SEM-C 50 SD NC AS VD	21.04.06.00084	10.02.02.01287	10.06.02.00031	10.06.02.00032
SEM-C 100 SD NO AS	21.04.06.00084	-	-	-
SEM-C 100 SD NC AS	21.04.06.00084	-	-	-
SEM-C 100 SD NO AS VD	21.04.06.00084	10.02.02.01291	10.06.02.00031	10.06.02.00032
SEM-C 100 SD NC AS VD	21.04.06.00084	10.02.02.01287	10.06.02.00031	10.06.02.00032

*Order 2 x per ejector

**Required for the automatic air-saving function; must be ordered separately as an accessory. No further cables then required!

Technical Data Multi-Stage Ejectors SEM-C with Additional Functions

Type	Degree of evacuation [%]	Max. suction rate [l/min]	Max. suction rate [m³/h]]	Air consumpt. during evac. [l/min]*	Air consumpt. during evac. [m³/h]*	Noise level free [dB]
SEM-C 25 SD NO AS	87	338	20.2	100	6.0	80
SEM-C 25 SD NC AS	87	338	20.2	100	6.0	80
SEM-C 25 SD NO AS VD	87	338	20.2	100	6.0	80
SEM-C 25 SD NC AS VD	87	338	20.2	100	6.0	80
SEM-C 50 SD NO AS	86	554	33.2	190	11.4	84
SEM-C 50 SD NC AS	86	554	33.2	190	11.4	84
SEM-C 50 SD NO AS VD	86	554	33.2	190	11.4	84
SEM-C 50 SD NC AS VD	86	544	33.2	190	11.4	84
SEM-C 100 SD NO AS	81	673	40.3	246	14.8	83
SEM-C 100 SD NC AS	81	673	40.3	246	14.8	83
SEM-C 100 SD NO AS VD	81	673	40.3	246	14.8	83
SEM-C 100 SD NC AS VD	81	673	40.3	246	14.8	83

*At optimal operating pressure

Type	Noise level workp. gripped [dB]	Operating pressure [bar]	Recomm. int. hose diameter compr. air [mm]**	Recomm. int. hose diameter vacuum [mm]**	Weight [kg]	Operating temperature [°C]
SEM-C 25 SD NO AS	70	5	4	20	1.6	0...50
SEM-C 25 SD NC AS	70	5	4	20	1.6	0...50
SEM-C 25 SD NO AS VD	70	5	4	20	1.7	0...50
SEM-C 25 SD NC AS VD	70	5	4	20	1.7	0...50
SEM-C 50 SD NO AS	60	5	6	25	1.9	0...50
SEM-C 50 SD NC AS	60	5	6	25	1.9	0...50
SEM-C 50 SD NO AS VD	60	5	6	25	2.0	0...50
SEM-C 50 SD NC AS VD	60	5	6	25	2.0	0...50
SEM-C 100 SD NO AS	63	5	6	32	2.2	0...50
SEM-C 100 SD NC AS	63	5	6	32	2.2	0...50
SEM-C 100 SD NO AS VD	63	5	6	32	2.2	0...50
SEM-C 100 SD NC AS VD	63	5	6	32	2.2	0...50

*At optimal operating pressure

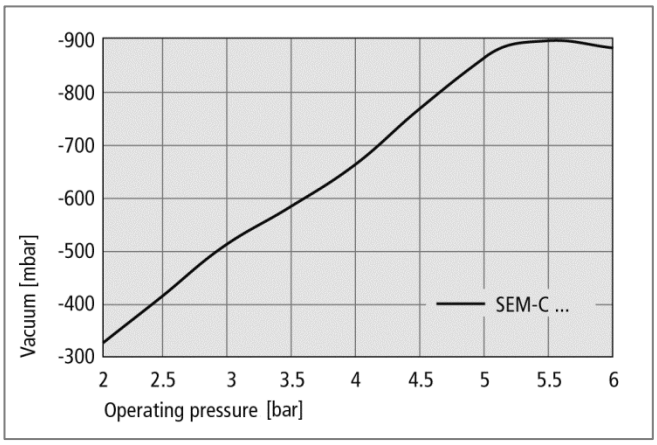
**For max. length 2 m

Multi-Stage Ejectors

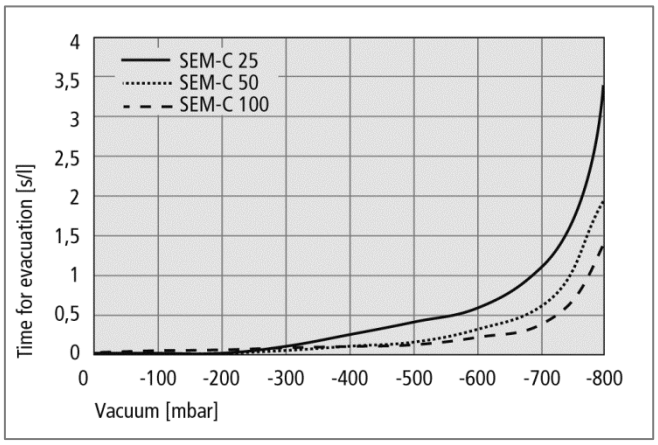
Multi-Stage Ejectors SEM-C with Additional Functions

Suction rate from 338 l/min to 673 l/min

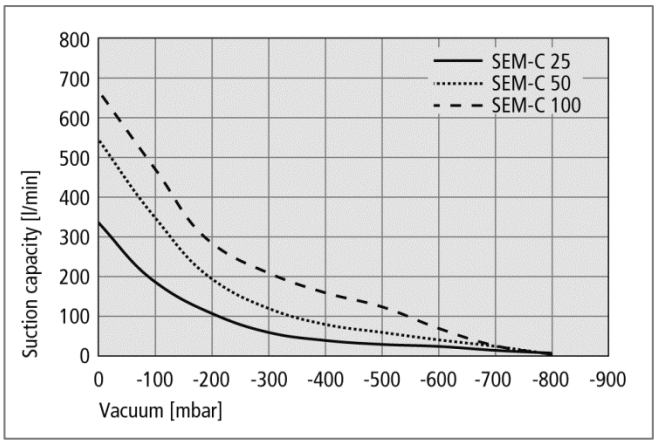
Performance Data Multi-Stage Ejectors SEM-C with Additional Functions



Achievable vacuum at various operating pressures



Evacuation times for various vacuum ranges



Suction capacity at various degrees of evacuation

Suction Capacity in l/min at Various Degrees of Evacuation

Type	Degree of evacuation in mbar									
	0	-50	-100	-200	-300	-400	-500	-600	-700	-800
SEM-C 25 SD	338	263	199	104	66	47	34	24	16	11
SEM-C 50 SD	554	460	349	195	123	87	63	41	21	8
SEM-C 100 SD	673	580	471	289	205	164	127	75	20	7

Evacuation Time in s/l for Various Vacuum Ranges

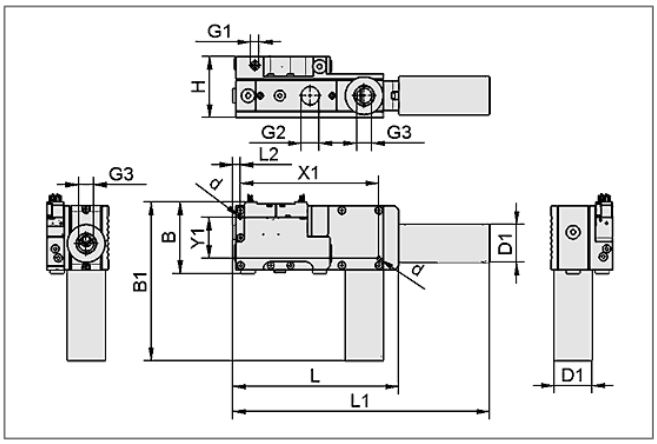
Type	Degree of evacuation in mbar								
	-50	-100	-200	-300	-400	-500	-600	-700	-800
SEM-C 25 SD	0.03	0.06	0.08	0.13	0.26	0.42	0.66	1.18	3.44
SEM-C 50 SD	0.02	0.05	0.06	0.09	0.13	0.19	0.32	0.64	1.93
SEM-C 100 SD	0.03	0.05	0.06	0.08	0.13	0.17	0.23	0.4	1.34

Multi-Stage Ejectors

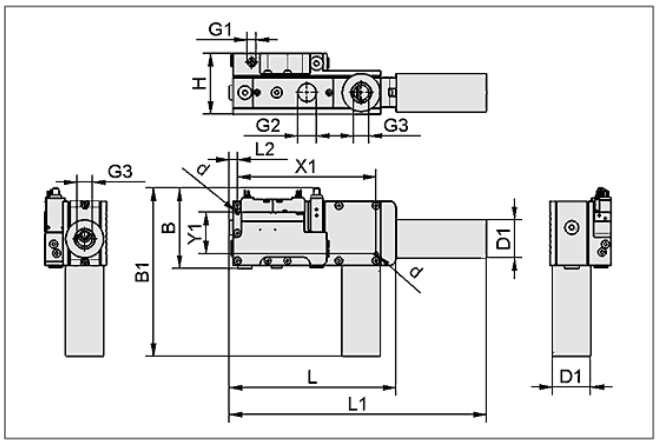
Multi-Stage Ejectors SEM-C with Additional Functions

Suction rate from 338 l/min to 673 l/min

Design Data Multi-Stage Ejectors SEM-C with Additional Functions



SEM-C 25 to 100 SD NO/NC AS



SEM-C 25 to 100 SD NO/NC AS VD

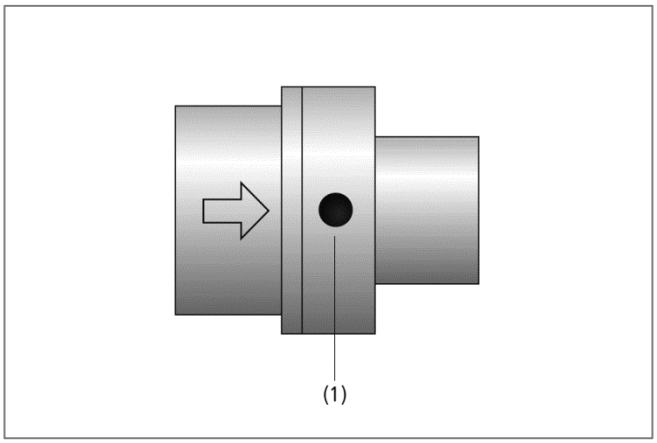
Type	Dimensions in mm												
	B	B1	d	D1	G1	G2	G3	H	L	L1	L2	X1	Y1
SEM-C 25 SD NO AS	95	170	5.5	40	G1/4"-F	G1/2"-F	G1/2"-F	70	200	280	11	183	55
SEM-C 25 SD NC AS	95	170	5.5	40	G1/4"-F	G1/2"-F	G1/2"-F	70	200	280	11	183	55
SEM-C 25 SD NO AS VD	117	192	5.5	40	G1/4"-F	G1/2"-F	G1/2"-F	70	200	280	11	183	55
SEM-C 25 SD NC AS VD	117	192	5.5	40	G1/4"-F	G1/2"-F	G1/2"-F	70	200	280	11	183	55
SEM-C 50 SD NO AS	95	210	5.5	50	G1/4"-F	G3/4"-F	G3/4"-F	80	220	340	11	183	55
SEM-C 50 SD NC AS	95	210	5.5	50	G1/4"-F	G3/4"-F	G3/4"-F	80	220	340	11	183	55
SEM-C 50 SD NO AS VD	117	232	5.5	50	G1/4"-F	G3/4"-F	G3/4"-F	80	220	340	11	183	55
SEM-C 50 SD NC AS VD	117	232	5.5	50	G1/4"-F	G3/4"-F	G3/4"-F	80	220	340	11	183	55
SEM-C 100 SD NO AS	95	210	5.5	50	G1/4"-F	G1"-F	G3/4"-F	90	220	340	11	183	55
SEM-C 100 SD NC AS	95	210	5.5	50	G1/4"-F	G1"-F	G3/4"-F	90	220	340	11	183	55
SEM-C 100 SD NO AS VD	117	232	5.5	50	G1/4"-F	G1"-F	G3/4"-F	90	220	340	11	183	55
SEM-C 100 SD NC AS VD	117	232	5.5	50	G1/4"-F	G1"-F	G3/4"-F	90	220	340	11	183	55

Feed Ejectors

Feed Ejectors SEC

Suction rate from 215 l/min to 8,640 l/min

Feed ejector SEC



System design feed ejectors SEC

Vacuum generation with feed ejector SEC for transporting granulates

Suitability for Industry-Specific Applications

Applications

- Gripping of very porous materials such as foams, paper and bakery products
- Conveyance of light solids, such as coffee, tea, rice and other filing materials

Design

- Body made of anodized aluminum or stainless steel
- Straight vacuum passage
- Compressed air enters at the side (1), through an annular gap

Our Highlights...	Your Benefits...
• Special ejector with straight vacuum passage for very high volume flow rates at low vacuum values	> Handling of very porous materials and low-loss transport of bulk goods; high efficiency
• Various models with different performance figures	> Optimum range of sizes for all applications

Feed Ejectors

Feed Ejectors SEC

Suction rate from 215 l/min to 8,640 l/min

Designation Code Feed Ejectors SEC

Abbreviated designation	Nozzle Size
Example SEC-100:	
SEC	**100**
SEC	60 = 6.0 mm 100 = 10.0 mm 200 = 20.0 mm 400 = 40.0 mm 750 = 75.0 mm

Ordering Data Feed Ejectors SEC

Ejector SEC is delivered as a ready to connect product.

Feed Ejectors SEC

Type	Part Number
SEC-60	10.02.01.01079
SEC-60 A2	10.02.01.01155
SEC-100	10.02.01.00078
SEC-100 A2	10.02.01.01691
SEC-200	10.02.01.00079
SEC-200 A2	10.02.01.01326
SEC-400	10.02.01.00080
SEC-400 A2	10.02.01.01620
SEC-750	10.02.01.00081

Technical Data Feed Ejectors SEC

Type	Nozzle-Ø [mm]	Max. vacuum [mbar]	Max. suction rate [l/min]*	Max. suction rate [m³/h]	Air consumpt. during evac. [l/min]*	Air consumpt. during evac. [m³/h]*	Pressure range (operating pressure) [bar]	Weight [kg]	Operating temperature [°C]
SEC-60	6	-245	215	12.9	110	6.6	2.0…5.0	0.040	-20…80
SEC-60 A2	6	-245	215	12.9	110	6.6	2.0…5.0	0.091	-20…80
SEC-100	10	-185	610	36.6	135	8.1	2.0…6.0	0.070	-20…80
SEC-100 A2	10	-185	610	36.6	135	8.1	2.0…6.0	0.206	-20…80
SEC-200	20	-85	1375	82.5	290	17.4	2.0…6.0	0.180	-20…80
SEC-200 A2	20	-85	1375	82.5	290	17.4	2.0…6.0	0.511	-20…80
SEC-400	40	-35	2250	135.0	445	26.7	2.0…6.0	0.525	-20…80
SEC-400 A2	40	-35	2250	135.0	445	26.7	1.9…5.9	1.475	-20…80
SEC-750	75	-5	8640	518.4	770	46.2	2.0…6.0	2.350	-20…80

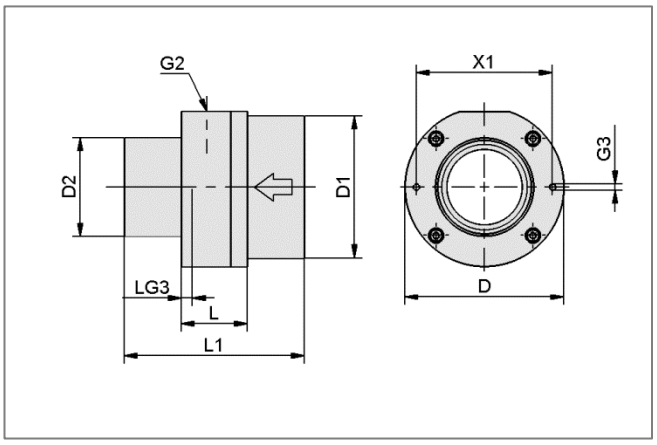
*At optimal pressure of approx. 4.5 bar

Feed Ejectors

Feed Ejectors SEC

Suction rate from 215 l/min to 8,640 l/min

Design Data Feed Ejectors SEC



SEC 60 to 750

Type	Dimensions in mm								
	D	D1	D2	G2	G3	L	L1	LG3	X1
SEC-60	32	12.5	12.5	M5-F	M3-F	14	44.0	5	25
SEC-60 A2	32	12.5	12.5	M5-F	M3-F	14	44.0	5	25
SEC-100	37	19.0	19.0	G1/8"-F	M4-F	21	70.0	8	29
SEC-100 A2	37	19.0	19.0	G1/8"-F	M4-F	21	70.0	8	29
SEC-200	50	38.0	32.0	G1/4"-F	M4-F	30	90.0	12	42
SEC-200 A2	50	38.0	32.0	G1/4"-F	M4-F	30	90.0	12	42
SEC-400	84	75.0	52.0	G3/8"-F	M4-F	35	95.0	14	72
SEC-400 A2	84	75.0	52.0	G3/8"-F	M4-F	35	95.0	14	72
SEC-750	140	125.0	100.0	G1/2"-F	M6-F	65	180.0	6	126

Overview of Section 6

Vacuum Gripping Systems

Area Gripping Systems for Handling of Packaging

Vacuum Area Gripping Systems FXP / FMP

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- With integrated ejector (FXP)
- Modular design
- Sealing element: foam

Flexible Vacuum Area Gripping Systems with very soft foam sealing element for gentle handling of glass with low surface pressure.

Vacuum Layer Gripping Systems SPZ

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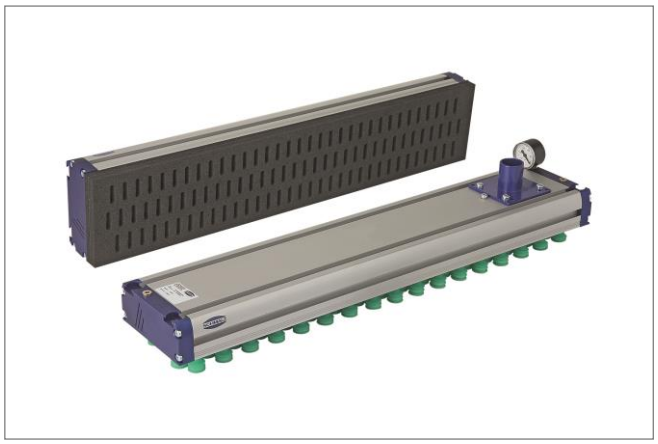
- Layer handling
- Modular design

Vacuum Layer Gripping System for packing and palletizing/depalletizing applications of container glass.

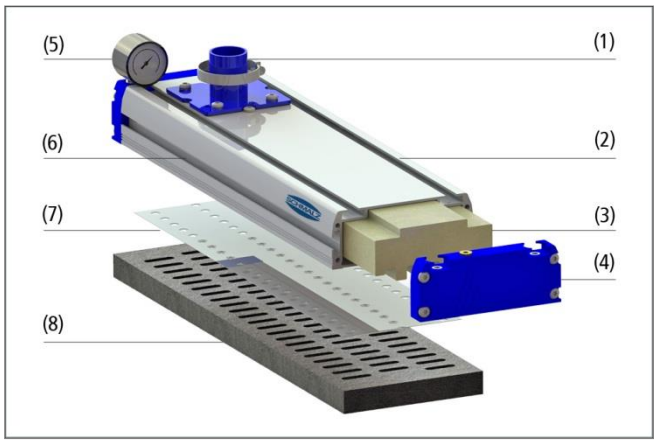
Vacuum Gripping Systems

Vacuum Area Gripping Systems FXP / FMP

Flexible and Powerful



Vacuum area gripping systems FXP / FMP



System design vacuum area gripping systems FMP with foam

Vacuum area gripping system with two FXP units for handling boxes

Suitability for Process-Specific Applications

Applications

- Universal gripper for handling of cardboard boxes, empty resp. filled jars and cans
- Handling of products which do not cover the entire suction surface by using the integrated valve technology of the gripper
- Handling of rigid packaging like cans by using the foam seal
- Handling of flexible packaging like cardboard by using suction cups
- Ideal for use on robots due to its low weight

Design

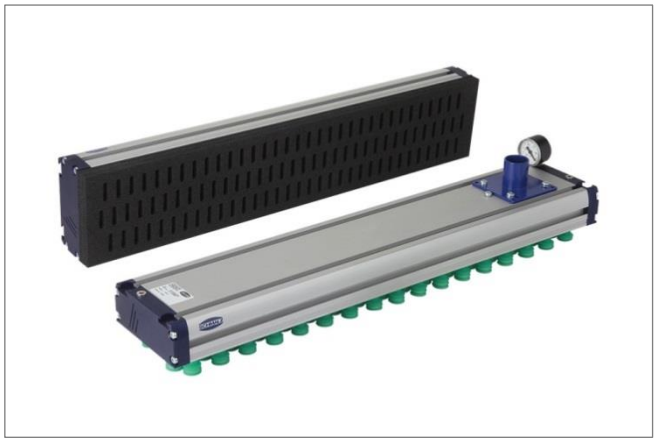
- FMP with vacuum connector (1) for external vacuum generation, FXP with integrated pneumatic vacuum generator
- Basic body (2) made from an anodized aluminum
- Vacuum booster (3) for low evacuation times
- End cover (4) with connections for blow-off and separation functions as well as attachment point for the vacuum switch and vacuum gauge (5)
- T-groove (6) on the side for attaching proximity sensors for workpiece recognition and cycle time optimization
- Valve film (7) with self-cleaning effect for easy replacement
- Durable sealing foam (8) with outstanding sealing properties and low return force and with optimized adhesive film for simple and fast foam replacement

Our Highlights...	Your Benefits...
• Integrated valve technology (available as either flow resistors or check valves)	> Flexible gripping system to adapt to different workpiece shapes and sizes
• FXP with integrated ejector and additional functions	> Minimization of system costs and installation times
• Soft sealing foam with individual suction cells	> Safe handling of rigid packaging like multiple cans and jars
• Gripper plate with suction cups	> Process reliable handling of flexible packaging (e.g. cardboard)
• Sealing Foam with Quick-Change Adhesive Film	> Fast and easy replacement of spare foam
• Low weight	> High accelerations and low cycle times

Vacuum Gripping Systems

Vacuum Area Gripping Systems FXP / FMP

Flexible and Powerful



Vacuum area gripping systems FXP / FMP

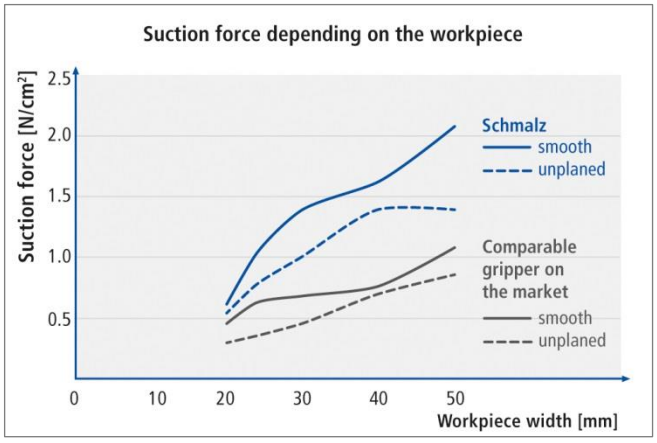
Application

- Universal gripper for handling workpieces regardless of size, geometry, material and surface
- Handling of workpieces made from various materials, such as wood (coated or unplaned), packaging (boxes, bags or cans), metal sheets, glass, plastics, CFRP, etc.
- Handling of porous workpieces with gaps
- Handling of workpieces with an undefined pick-up position
- Ideal for use on robots due to its low weight

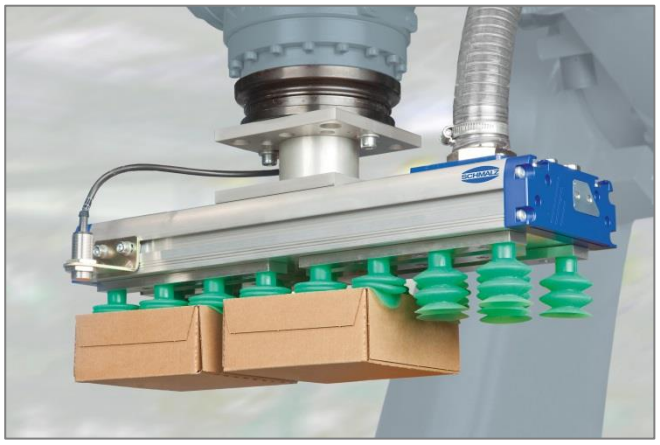
Highlights

86 % More Power

A benchmark test indicates that the FXP / FMP series from Schmalz generates an 86 % higher suction force on average than comparable grippers on the market. This is due to innovative features such as vacuum boosters, leak-free check valves and sealing foam with high suction cell density.



Comparison of suction forces for the example of FMP



More holding force even with partly covered suction plate

Unique Flexibility

Handling of workpieces wider than 20 mm, regardless of material, geometry, surface and position

High Energy Efficiency

Optimization of the flow ensures that energy is used more efficiently, which permanently reduces operating costs

Low Weight

Maximum acceleration within the process and reducing system costs by use of smaller robots

Low Sound Level

Low-noise operation with a sound level of only 74 dB(A)

Minimal Maintenance

Easy retooling of flow technology and fast replacement of sealing elements

Vacuum Gripping Systems

Vacuum Area Gripping Systems FXP / FMP

Modular Design with Individually Adapted Vacuum Generation

FXP: Integrated Vacuum Generation

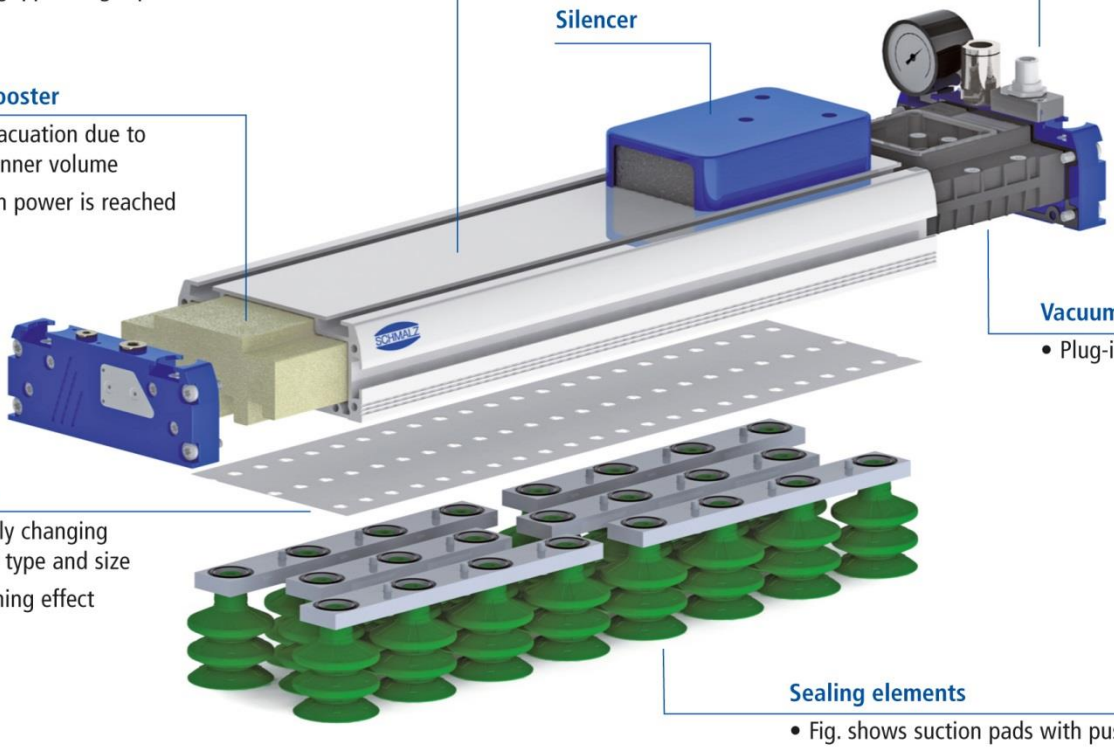
As a unit that is ready for connection, the area gripping system FXP is equipped with a plug-in ejector for vacuum generation. It can be individually configured and quickly retooled in case of changing application conditions. The modular design ensures easy maintenance and enables the integration of additional functions for energy and process optimization directly in the gripper.

Aluminum base section
- High stiffness and low weight
- Lateral T-slots for attaching sensors
- Integrated air duct for separation
- Variable gripper length possible

End cover with integrated functions
- Compressed air connection, vacuum gauge and control valves for picking up / blowing off (optional)

Silencer

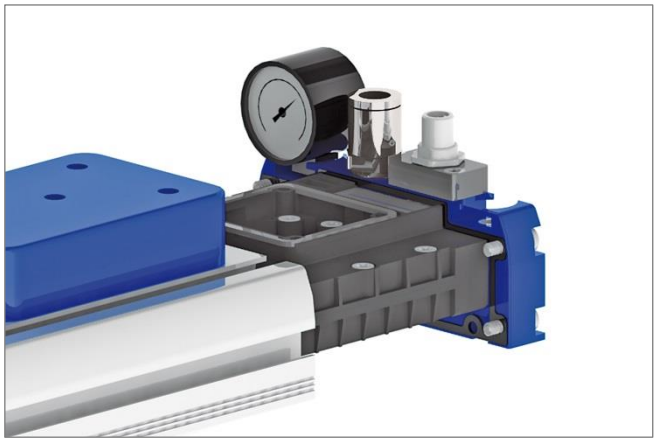
Vacuum Booster
- Faster evacuation due to reduced inner volume
- Maximum power is reached instantly



Vacuum generation
- Plug-in ejector

Valve film
- For quickly changing the valve type and size
- Self-cleaning effect

Sealing elements
- Fig. shows suction pads with push-in function
- Also available with sealing foam with optimized adhesive film



Integrated Plug-in Ejector

- Optimized ejector performance: with comparatively low maximum vacuum, the ejector generates a high volume flow and thus provides high holding forces, especially for applications with porous workpieces
- Fast evacuation and high suction flow even at low vacuum values
- Control valves integrated into the end cover for controlling the suction and blow off functions (optional)
- Silencer for reducing the sound level to 74 dB(A)
- Ready to connect unit, easy to clean

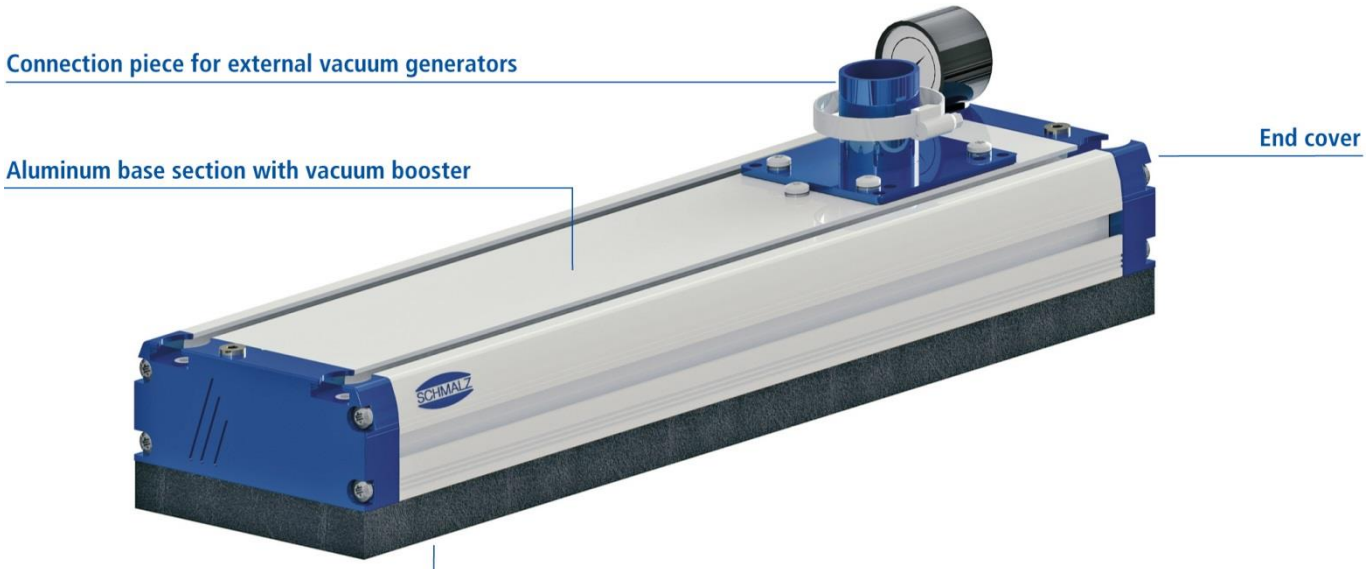
Vacuum Gripping Systems

Vacuum Area Gripping Systems FXP / FMP

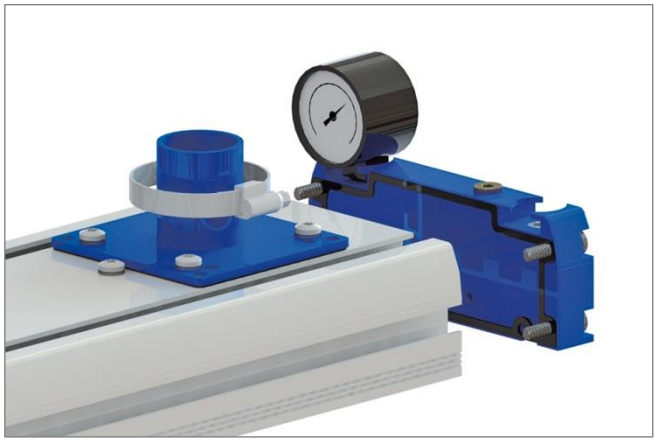
Modular Design with Individually Adapted Vacuum Generation

FMP: External Vacuum Generation

The area gripping system FMP has the same modular design as the type FXP, but is equipped with a connection piece for external vacuum generators. It is therefore suitable for use in combination with powerful pumps and blowers.



• Fig. shows sealing foam



Connection Piece for External Vacuum Generation

- Allows use of an electrical vacuum generator (blower or pump)
- Suitable for handling very porous or warped workpieces due to high flow rate

Selection Aid

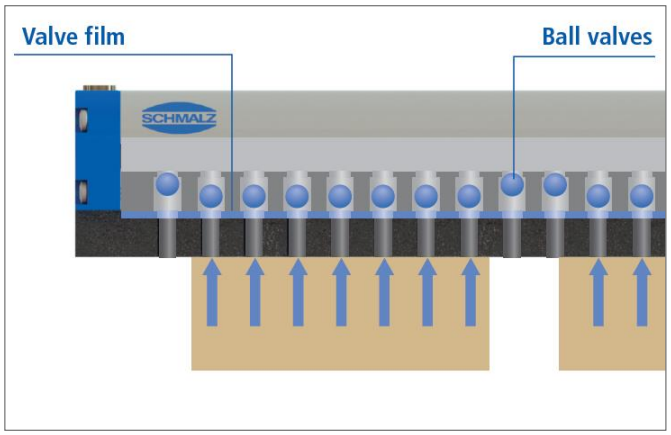
Application features	FXP	FMP
Minimization of interfering edges caused by hoses and attached vacuum generator (integration of functions)	✓	
Easy mounting and quick connection of the gripper	✓	
Minimal system costs (investment costs including vacuum generation, hoses and controller)	✓	
Minimal operating costs (because of the option of electrical vacuum generation), especially for applications with multiple grippers		✓
Handling of highly porous workpieces		✓

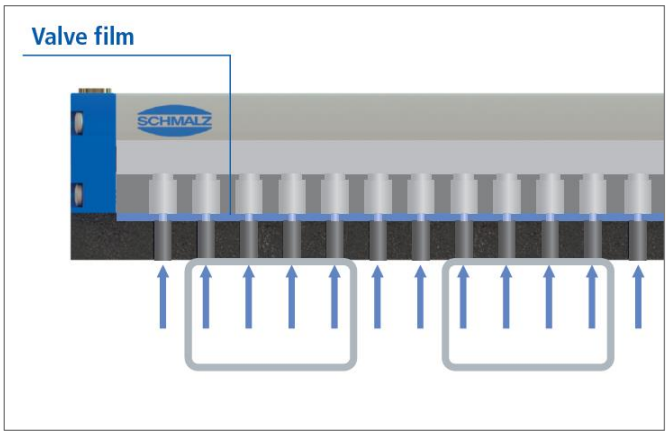
Vacuum Gripping Systems

Vacuum Area Gripping Systems FXP / FMP

Innovative Valve Technology

Valve type and size can be changed easily and quickly in case of changing requirements





Check Valves SVK

- Ball valves integrated in the base section for closing off uncovered suction cells
- Leak-free integrated, resulting in a higher vacuum as well as improved energy efficiency and holding force
- Valve film with clover shape for high flow rate and quick picking up and blowing off
- Proper functioning ensured even with unplaned surface

Flow Restrictors SW

- Valve film with integrated flow restrictors to minimize leakage losses due to uncovered suction cells
- Suitable for swiveling operations and high accelerations
- Different flow diameters available (optional)

Selection Aid

Application features	SVK	SW
Smooth and airtight workpieces (e.g. metal sheets, glass, coated wood)	✓	✓
Porous workpieces (e.g. boxes, sacks, uncoated wood)	✓	
Structured surfaces	✓	
Workpieces with low gripper coverage (e.g. pipes, sections)	✓	
Minimum cycle times (active blow off)	✓	
Optimization of energy efficiency	✓	
Swiveling movements >45°		✓

Vacuum Gripping Systems

Vacuum Area Gripping Systems FXP / FMP

Flexible, Quick-Change Sealing Elements

Sealing foam and suction cups can be changed quickly and easily due to the optimized adhesive film and the push-in function

Sealing Foam with Quick-Change Adhesive Film

- Optimal adjustment capabilities
- Quick rebound for short cycle times
- Replaceable without adhesive residue and without the need to clean the sheet
- Intended for workpieces wider than 20 mm (in the design with 5 suction rows, on request)
- With optional filter mat

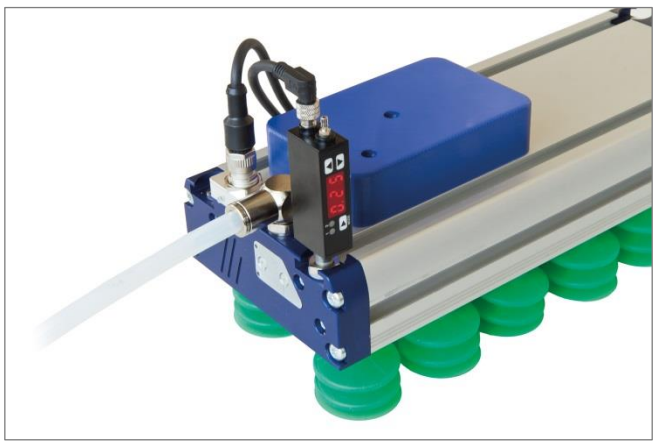
Suction Cups with Push-in Function

- Optimal height compensation and damping effect
- Quick replacement due to the push-in mechanism
- Diameters 20 mm and 40 mm
- Made from FDA-compliant silicone
- With optional insert filter

Selection Aid

Application features	Sealing foam	Suction cups
Rigid workpieces such as sheets, metal sheets, boards, sections and pallets	✓	
Flexible workpieces such as cardboard boxes, sacks, bags and trays		✓
Elongated workpieces such as strips, sections, boards	✓	
Workpieces with rough and structured surface	✓	
Handling of smaller product layers such as jars (open or closed) and cans with a continuous edge	✓	

Additional Functions, Compactly Integrated



End Cover with Integrated Functions

Minimization of system costs and installation times through integration of:

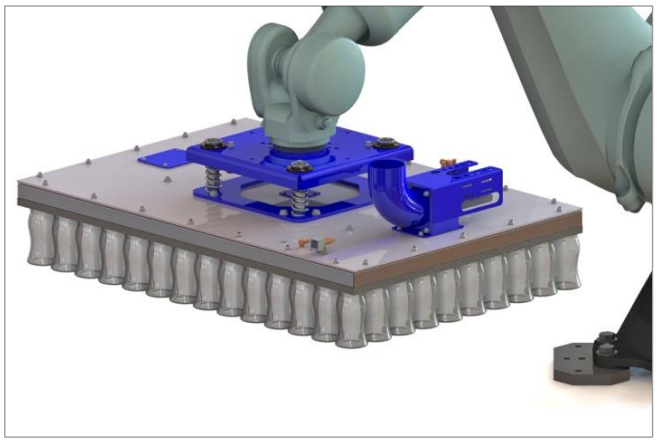
- Compressed air connection for ejector supply (type FXP)
- Control valves for switching the suction and blow off fuctions on/off (optional for type FXP-S)
- Connection for the blow off and separation functions
- Option to attach a vacuum gauge or vacuum switch

Vacuum Gripping Systems

Vacuum Layer Gripping Systems SPZ

Efficient Palletizing and Depalletizing

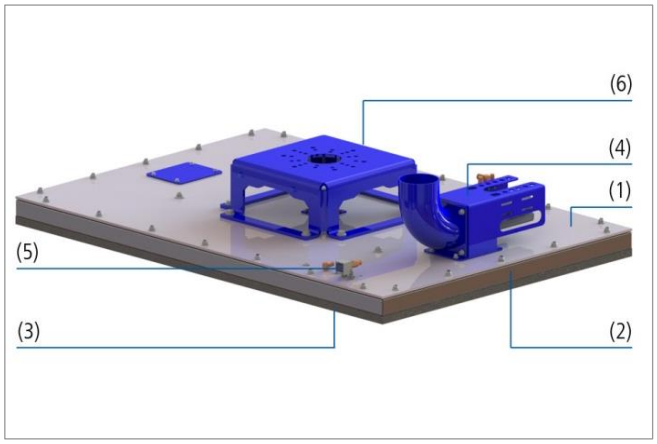
Suitability for Process-Specific Applications



Vacuum layer gripping systems SPZ

Applications

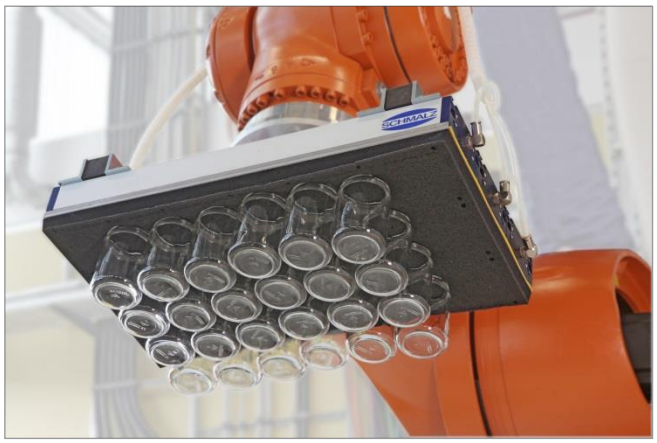
- Complete gripping system for process-safe layered palletizing and depalletizing of container glass (depalletizing only in combination with the optional spring-mounted flange module)
- For use in automated preparing, filling, packaging and commissioning processes
- Also suitable for handling layers with gaps, mixed layers, intermediate layers and pallets
- High accelerations with low cycle times



System design vacuum layer gripping systems SPZ

Design

- Main body with various mounting holes (1)
- Suction box made of folded and welded stainless steel (2)
- Sealing plate made of coned foam (3), can be replaced quickly due to quick-change adhesive film
- Valve technology (4)
- Vacuum switch for monitoring the vacuum values (using the two-color display screen) and additional control functions (5)
- Standard flange module (6) (spring-mounted flange module optional)
- External vacuum generation (not shown in the picture)



Vacuum layer gripping systems SPZ for handling of container glass

Our Highlights...	Your Benefits...
• Sealing plate made of flexible coned foam	> Optimal adjustment to the shapes of the workpiece
• Modular design	> Flexible system build to the specific application
• Standardized grid pattern designed for common container glass opening diameters larger than 50 mm	> Tested, perfectly matched overall system including blower and hose connections (10 m hose for connecting the blower)
• Other grids for additional opening diameters are available (optional)	> Customer-specific dimensions and adaptation possible upon request

Please contact our specialists for detailed information. Our experienced system consultants are available to answer your questions in person. You can count on professional project planning and the expert realization of your vacuum solution.
Additional information can be found on www.schmalz.com.

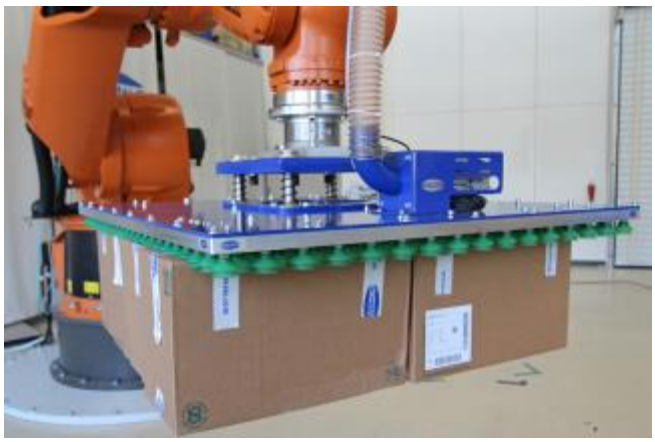
Vacuum Gripping Systems

Vacuum Layer Gripping Systems SPZ

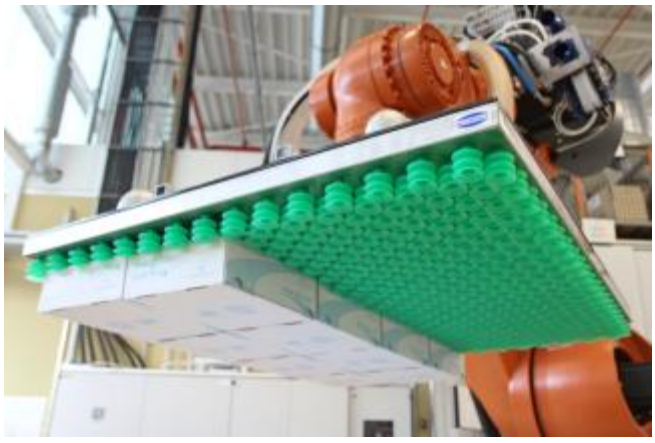
Efficient Palletizing and Depalletizing

Application

- Complete suction gripper system for process-safe, palletizing and de-palletizing of layers of card-board boxes (de-palletizing only in combination with optional spring-mounted flange module with 50 mm stroke to compensate for position inclinations)
- Use in automated providing, packaging and order picking processes
- Also suitable for handling incomplete layers, mixed layers, intermediate layers and pallets



Layer gripping system for handling cardboard boxes (aluminum construction with individual dimensions, screw-in suction cups)



Layer gripping system with e.g. two suction zones for handling cardboard boxes (sheet metal construction with individual dimensions, push-in suction cups)

Layer gripping system for handling cardboard boxes (aluminum construction with individual dimensions, screw-in suction cups)

Layer gripping system for handling cardboard boxes and pallets with several suction zones (interlocking construction, push-in suction cups)

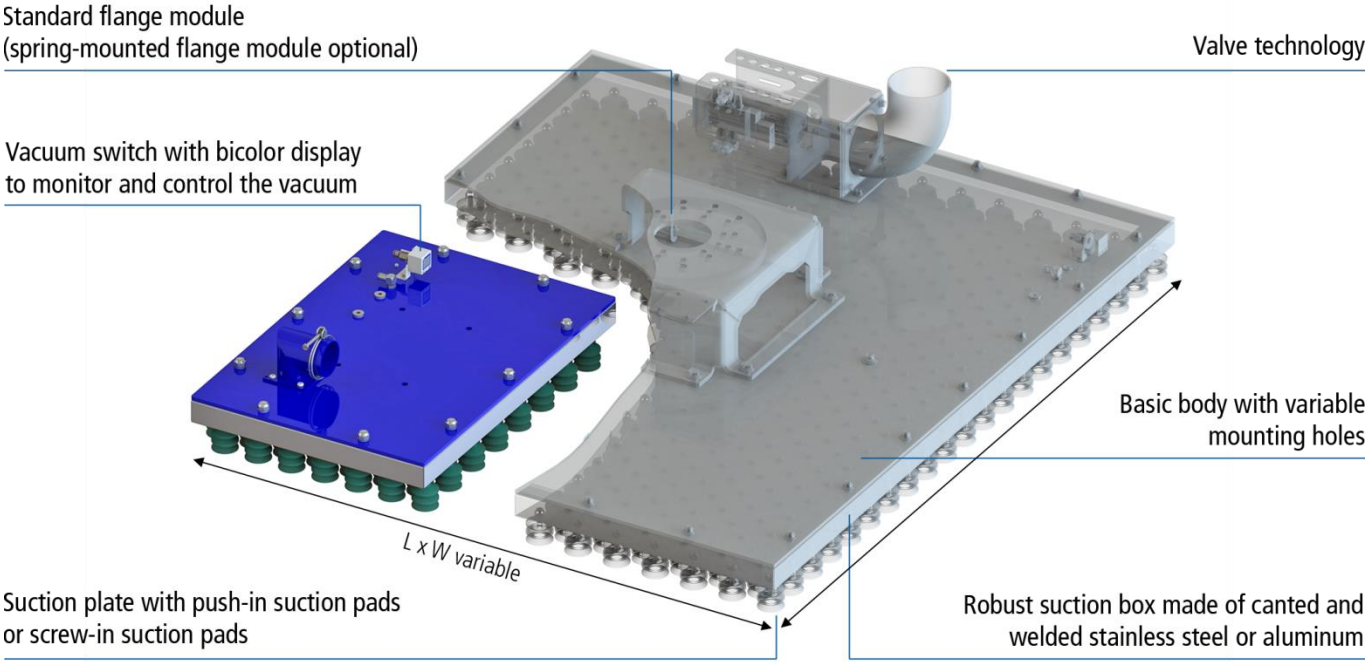
Pallet clamping of the layer gripping system in use

Vacuum Gripping Systems

Vacuum Layer Gripping Systems SPZ

Efficient Palletizing and Depalletizing

Design with Suction Box



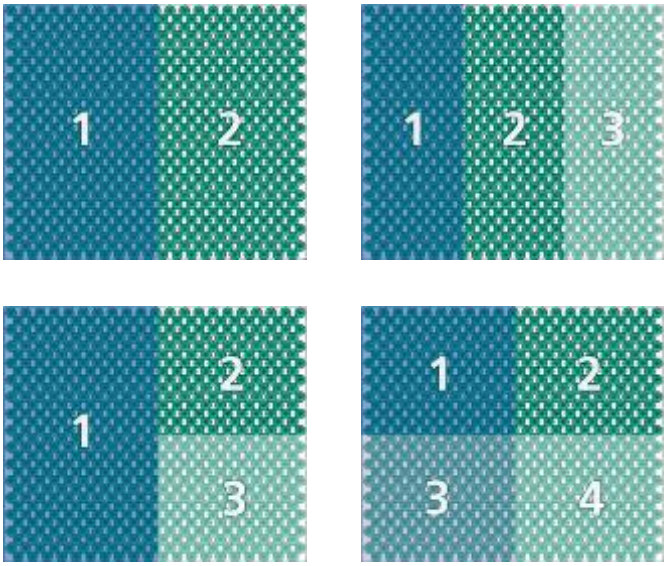
Optional Expansion Possibilities

- External vacuum generation, on request with energy saving control by frequency converter
- Mechanical pallet clamping for safe handling of pallets
- Deep-freezing version for the use at temperatures down to -30 ° C

Creation of Suction Zones

The modular design allows flexible segmentation of the layer gripping system into independent, individually controllable suction zones.
Your benefits:

- Formation of layers and partial layers
- Minimization of leakage
- Optimization of energy consumption



Example configurations of gripping systems with different suction zones

Comprehensive Suction Cup Range

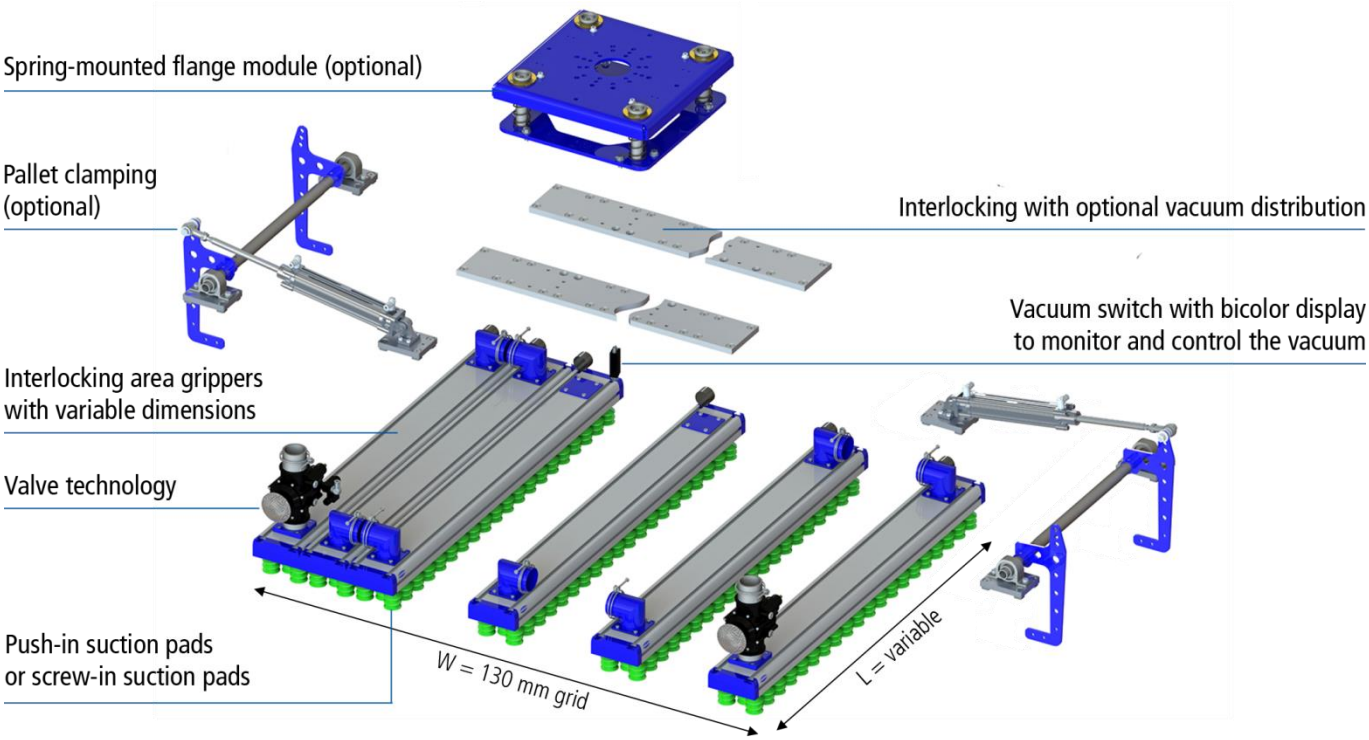
As a component manufacturer Schmalz offers the right suction cup for any packaging.

Vacuum Gripping Systems

Vacuum Layer Gripping Systems SPZ

Efficient Palletizing and Depalletizing

Design with Interlocking Area Grippers



Optional Expansion Possibilities

- External vacuum generation, on request with energy saving control by frequency converter
- Mechanical pallet clamping for safe handling of pallets
- Deep-freezing version for the use at temperatures down to -30° C

Your Benefits

- Optimum adjustment to the workpiece due to suction plate or area grippers with push-in suction cups or screw-in suction cups
- Tested, coordinated overall system including blower and hose connections
- Modular design with standardized grids
- Various standard options such as flange connections, pallet clamping and intermediate layer handling
- Customer specific dimensions and adjustments easy to implement
- Short delivery time and global support

Overview of Section 7

Vacuum Handling Systems for Logistics

Vacuum Handling Systems for Logistics

Vacuum Tube Lifters JumboFlex

- Manual operation
- Lifting capacity 20 to 50kg

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Vacuum Tube Lifter JumboFlex for fast manually controlled palletizing & depalletizing as well as ergonomic handling tasks in logistics centers.
The vacuum lifter JumboFlex is perfect for frequent, very quick transfers of more lightweight goods with a weight of up to 50 kg. The vacuum tube lifter JumboFlex is the perfect handling solution which can be operated ergonomically and easily by using only one hand.

Vacuum Handling Systems for Logistics

Vacuum Tube Lifters JumboFlex

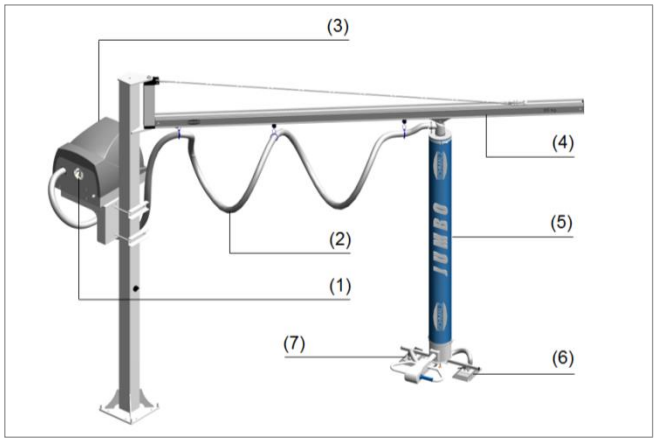
Lift Capacity from 20kg up to 50kg

Suitability for Process-Specific Applications

Vacuum tube lifters JumboFlex

Applications

- Frequent and fast handling of various packages like boxes, pails, barrels and sacks
- Used for manual palletizing at the end of low to medium speed packaging lines
- Used for eliminating strenuous and harmful physical overload in logistics processes
- The Vacuum tube lifter Jumbo Flex enables a safe and ergonomic handling process by using only one hand for control and one hand for product orientation if needed



System design vacuum tube lifters Jumbo incl. crane system

Design

- Due to special function principle only one vacuum generator (1) for the lifting movement and the gripping of the workpiece is necessary
- (2) Vacuum feed hose
- (3) Accessories such as silencer box
- Vacuum operated lifting unit by special lifting tube (5)
- Gripper can be equipped with different suction cups (6)
- (7) Operating unit

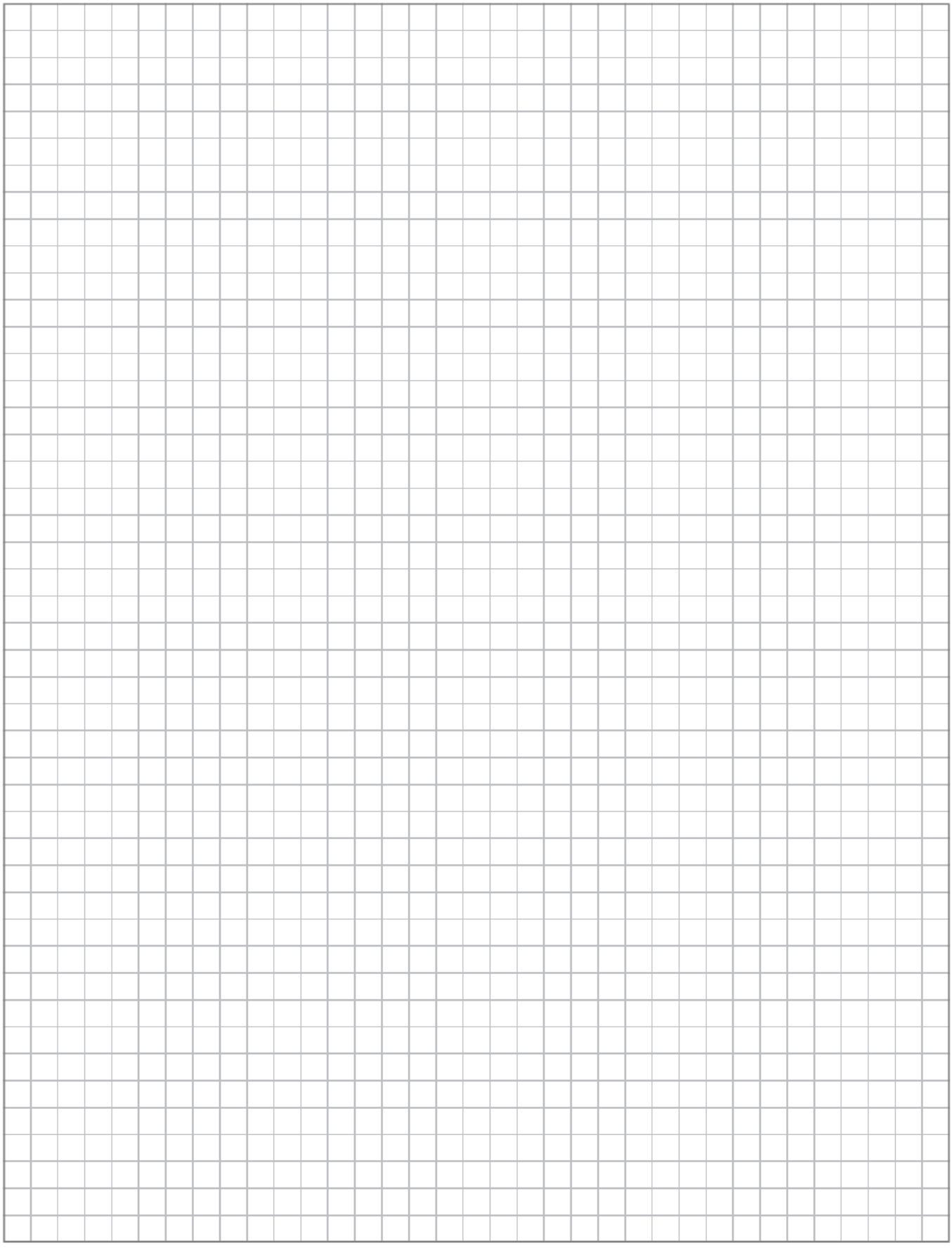
Vacuum tube lifters Jumbo Flex being used for handling boxes

Our Highlights…	Your Benefits…
• Vacuum only operation	> Handling of boxes, pails and sacks without any additional equipment such as chain hoist or manipulator
• Special rotary handle	> Fast, safe and ergonomic handling
• Various different vacuum head available	> Reliable gripping of various products
• Optional available crane system build to your requirements	> Turnkey solution with minimum integration and installation efforts

Please contact our specialists for detailed information. Our experienced system consultants are available to answer your questions in person. You can count on professional project planning and the expert realization of your vacuum solution.
Additional information can be found on www.schmalz.com

Notes

Notes



Notes

World of Vacuum Technology

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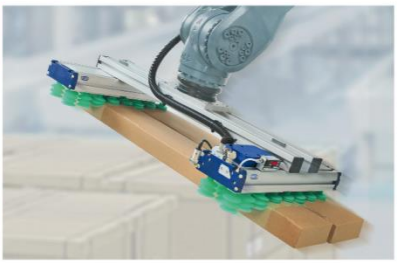

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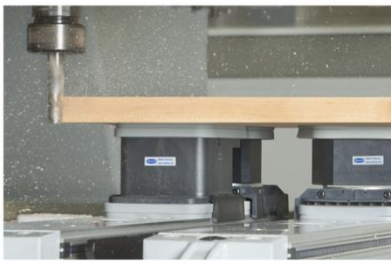

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