World of Vacuum Technology

# Industry Solutions Composites

## 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.


More information on the industry side on the internet:
www.schmalz.com/composites

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## Applications

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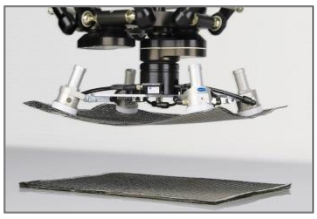

Innovative automation solutions for the composite industry: from handling dry fabrics to organo sheets and parts after curing.

http://www.schmalz.com/composites

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## Special Grippers

Page

**Needle Grippers SNG-AP** 14

- Needle diameter: 0.8 mm or 1.2 mm
- Number of needles: 10
- Needle stroke: 3 mm to 20 mm (variable)

Pneumatic needle gripper in compact, maintenance-friendly design for handling materials that are difficult to grip using vacuum such as composite textiles,etc.

**Needle Grippers SNGi-AE** 18

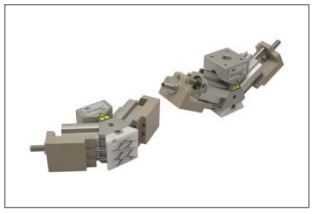
- Needle diameter: 0.8 mm or 1.2 mm
- Number of needles: 10
- Needle stroke: 3 mm to 20 mm (variable)

Electrical needle gripper in compact, maintenance-friendly design with continuously adjustable stroke and IO-Link interface for handling materials that are difficult to grip using vacuum such as composite textiles, etc.

**Needle Grippers SNG-V** 23

- Needle diameter: 1.2 mm
- Number of needles: 10
- Needle stroke: 0 mm to 7 mm (variable)

Needle gripper with intersecting needles and manual, continuously adjustable stroke for materials that are difficult to grip like composite textiles and much more.



**Needle Grippers SNG-V-HT** 26

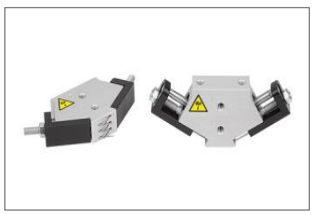
- Needle diameter: 1.2 mm
- Number of needles: 10
- Needle stroke: 0 mm to 7 mm (variable)

Needle grippers for the handling of hot, flexible or form unstable parts, such as thermoplastic fiber materials e.g. organic sheets.

**Needle Grippers SNG-V-HP** 30

- Needle diameter: 1.2 mm or 1.5 mm
- Number of needles: 6 or 10
- Needle stroke: 0 mm to 18 mm resp. 25 mm (variable)

Needle grippers for the handling of flexible, non-rigid or very porous workpieces which require high insertion forces and long strokes such as fiber and SMC materials.



**Needle Grippers SNG-V-S** 33

- Needle diameter: 0.8 mm/1.2 mm
- Number of needles: 6
- Needle stroke: 0 mm to 5 mm

Needle grippers with intersecting needles and variable stroke adjustment for porous and especially narrow materials. Very low weight for dynamic processes and small installation space.

# Contents


**Needle Grippers SNG-M** 36

- Needle diameter: 0.8 mm
- Number of needles: 4
- Needle stroke: 3.0 mm

Needle gripper with a compact design for materials which are difficult to handle with vacuum.

**Needle Grippers SNG-BV** 39

- Needle diameter: 1.2 mm or 0.8 mm vertical
- Number of needles: 10 and 4 vertical
- Needle stroke: 0 mm to 7 mm (variable) resp. 0 mm to 9 mm vertical
- Suction rate: 235 l/min

Combination gripper consisting of floating suction cup with integrated needle gripper for process-safe and energy-efficient destacking and handling of composite textiles.

**Composite Grippers SCG** 42

- Suction rate: 270 to 650 l/min
- Diameter suction plate: 40 and 60 mm
- Material suction plate: POM

Special gripper with integrated vacuum generation and high flow rate for handling fragile workpieces with unstable shapes.

**Composite Grippers SBS** 48

- Diameter: 20 to 100 mm
- Holding force: 2.0 to 55.5 N
- Rubber buffer on the bottom side of the suction pad

Floating suction cup for the very gentle handling or destacking of composite textiles.

**Vacuum Suction Pads** Page

**Flat Suction Pads SGPN** 52

- Diameter: 15 to 40 mm
- Material: FPM, HT1, NK, SI
- Connection nipple plugged into elastomer part

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

**Bellows Suction Pads FSGA (1.5 Folds)** 57

- Diameter: 11 to 78 mm
- Material: HT1, NBR, NK, SI
- Connection nipple plugged into elastomer part

Round universal suction pad with 1.5 folds, available in various materials for a wide range of requirements.

**Suction Plates for Prepregs SPL POM-NBR** 62

- Diameter: 40 to 115 mm
- Material sealing ring: NBR
- Support plate made of aluminum

Round suction plate with adaptable sealing ring for handling flexible materials such as prepreg or semi-finished products of fiber composite material.

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## Vacuum Clamping Systems


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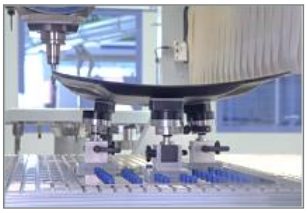

**3D-Clamping System**
**Basic Holding Fixture BHF** 64

Modular system for manual set up Consists of flexible mounting platform uni-Base and a variety of suction cups.

Universal clamping of complex shaped, rigid workpieces made of different materials.

**3D-Clamping System**
**Suction cup balance SSCB** 66

Position gripping and clamping system for handling and fixation of three dimensional components in manual or automated production processes for use e.g. (Bonding, welding, soldering, etc.) in car body construction, the aerospace industry and in all industries where 3D free-form surfaces must be gripped or fixed.


## Schmalz Business Units


Page

**Vacuum Gripping Systems** 68

Schmalz's complex vacuum gripping systems let you implement decisive productivity increases during automated processes.

The systems range from layer and vacuum area gripping systems to ready-to-install vacuum suction spiders for use in all areas of automation.

**Vacuum Handlings Systems** 69

Vacuum lifters provide an ergonomic working environment. They help prevent health problems caused by lifting and moving heavy loads. Schmalz offers vacuum lifters with perfectly coordinated crane systems made of aluminum components. This means the crane systems are particularly responsive and support ergonomic work with the vacuum lifters.


## Contact


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On site competence in more than 50 countries worldwide. You can find the contact information for our trade partner in your country at:

www.schmalz.com/salesnetwork

# Industry Solutions Composites
## Applications

Fiber-reinforced plastics, FRP, are strengthened by embedded carbon or glass fibers. Carbon-fiber reinforced plastics have a better ratio between strength and weight than steel or aluminum.This material is primarily used in the automotive, airospace and wind energy industries, but is also used in sporting goods, construction and other sectors.
The manufacturing processes for fiber composite workpieces place high demands on the vacuum technology. The alignment of the individual fibers affects the stiffness of the workpieces, so it is very important that the semi-finished products are handled gently to avoid disrupting the fiber orientation.

## Process Steps and Vacuum Solutions for Fiber Composites

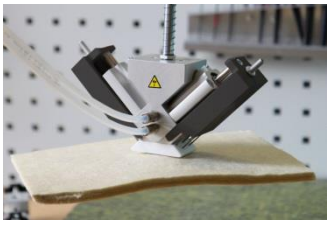
MANUFACTURING → REMOVAL → FINISHING

**RTM Process**

In the RTM manufacturing process, the FRP preform gets injected with a mixture of resin and hardener.

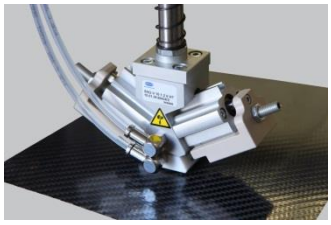
**Prepreg Processing**

The sticky Prepreg sheets, pre-impregnated with resin, are stacked in layers and then cured in a hot press.



**Hot Pressing of SMC**

The rubbery, doughty-like material already contains all the necessary ingredients for producing a FRP component. The semi-finished product is liquefied at high temperatures and then pressed into the desired shape.



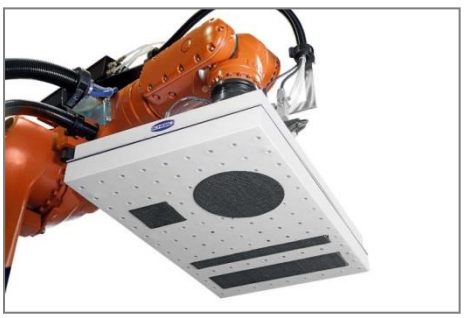
**Thermoplastic Processes**

In thermoplastic processes, organo sheets are first heated up, formed and often back-injected with plastic.

### Automated Gripping of Changing Cut-Outs

**Matrix gripper with intelligent control of the gripping areas**

- Selective control of individual suction cells
  - ➔ Flexible adaptation of alternating shapes to grip these out of the skeleton.
- Standard size modules can be combined to make larger grippers
  - ➔ Low configuration effort
- Lean control concept through IO-Link
  - ➔ easy system integration
- Increased system-availability and easy maintenance



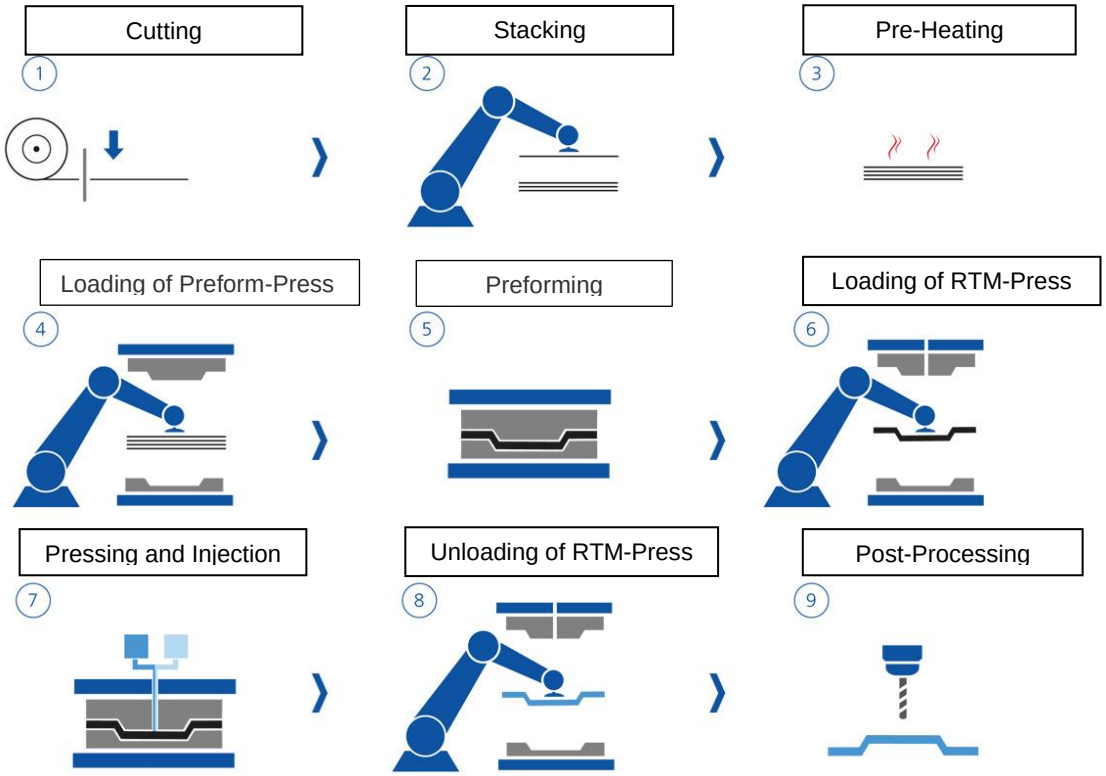
# Industry Solutions Composites
Applications

## RTM Process

While producing FRP parts in the RTM-process, a preform will take shapewhich is then impregnated in a press with a mixture of resin and hardener.

Just as the RTM process there are other similar manufacturing processes, such as wet molding. Unlike in the RTM procedure, the resin is applied before the pressing process, which means that the stack is pressed and cured in a wet state.

## Gripping Technology in Use During the RTM Process



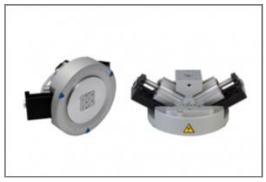

## Requirements for Gripping Technology

**Gripping porous textiles securily**
The composite grippers SCG and the needle grippers SNG are specifically suitable to handle sensitive textiles.

**Handling of cured workpieces out of the mould**
The cured workpieces, often still hot ,have to be gripped securely during removal from the RTM tool, without leaving marks. Suction cups made of HT1 are ideal for this process.

**Products for the use in the RTM-Process**


Needle Gripper


Needle Gripper SNG-BV


Composite Gripper SCG


Suction pads in material HT1

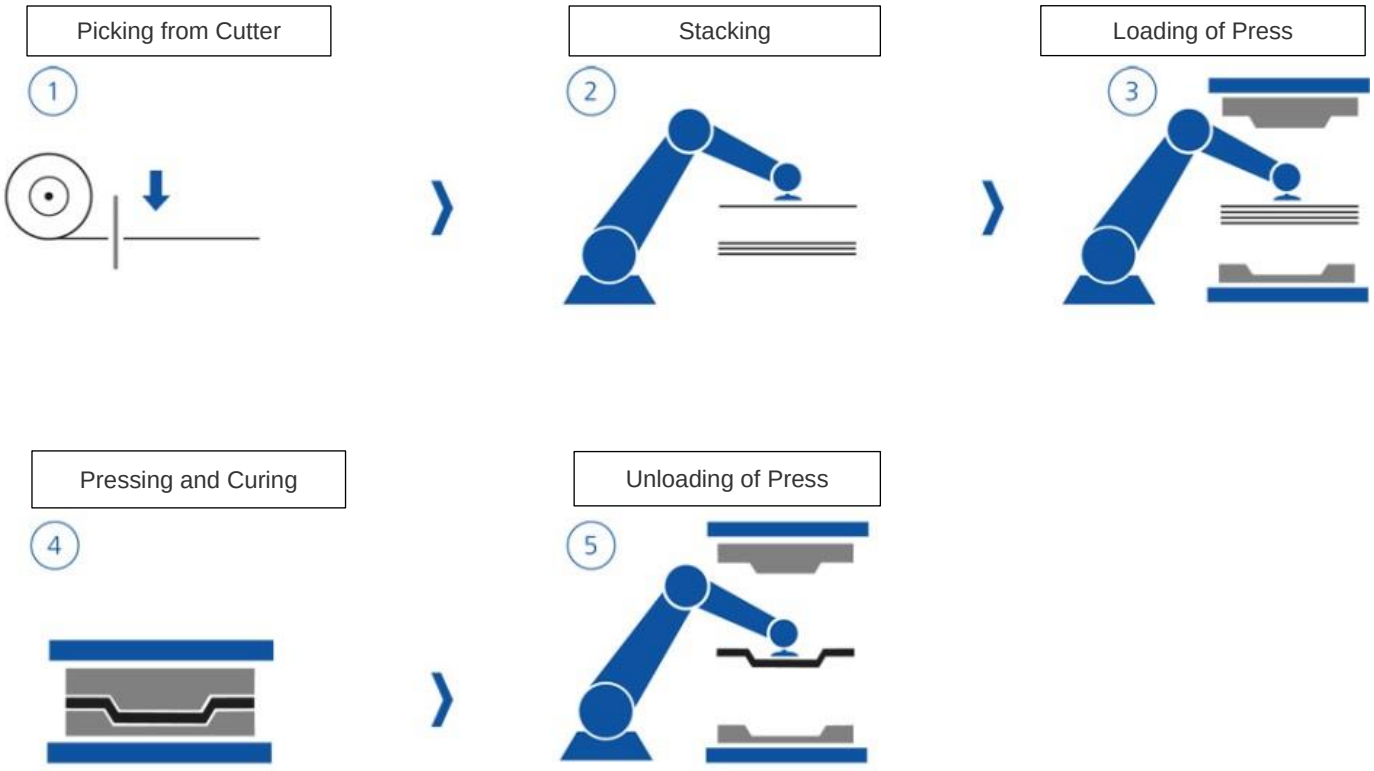

Matrix Gripper

# Industry Solutions Composites
Applications

## Prepreg Processing

The often tacky cut-out prepreg parts are stacked in a specific order and the commonly called “kits” are then placed into a press or an autoclave for curing.

## Vacuum Technology in Use During the Hot Pressing of Prepreg Materials




## Requirements for Vacuum Technology

**Tackiness of the workpiece**
Due to their prior impregnation with reactive resins the prepeg materials have a tacky surface.
**Gentle handling of sensitive workpieces**
The orientation of the fibers after curing is crucial for the result of the production process. Hence, fiber distortion needs to be avoided. The use of suction cups like SPL POM-NBR help with this gentle handling.

**Products for Use in Hot Pressing of Prepregs**

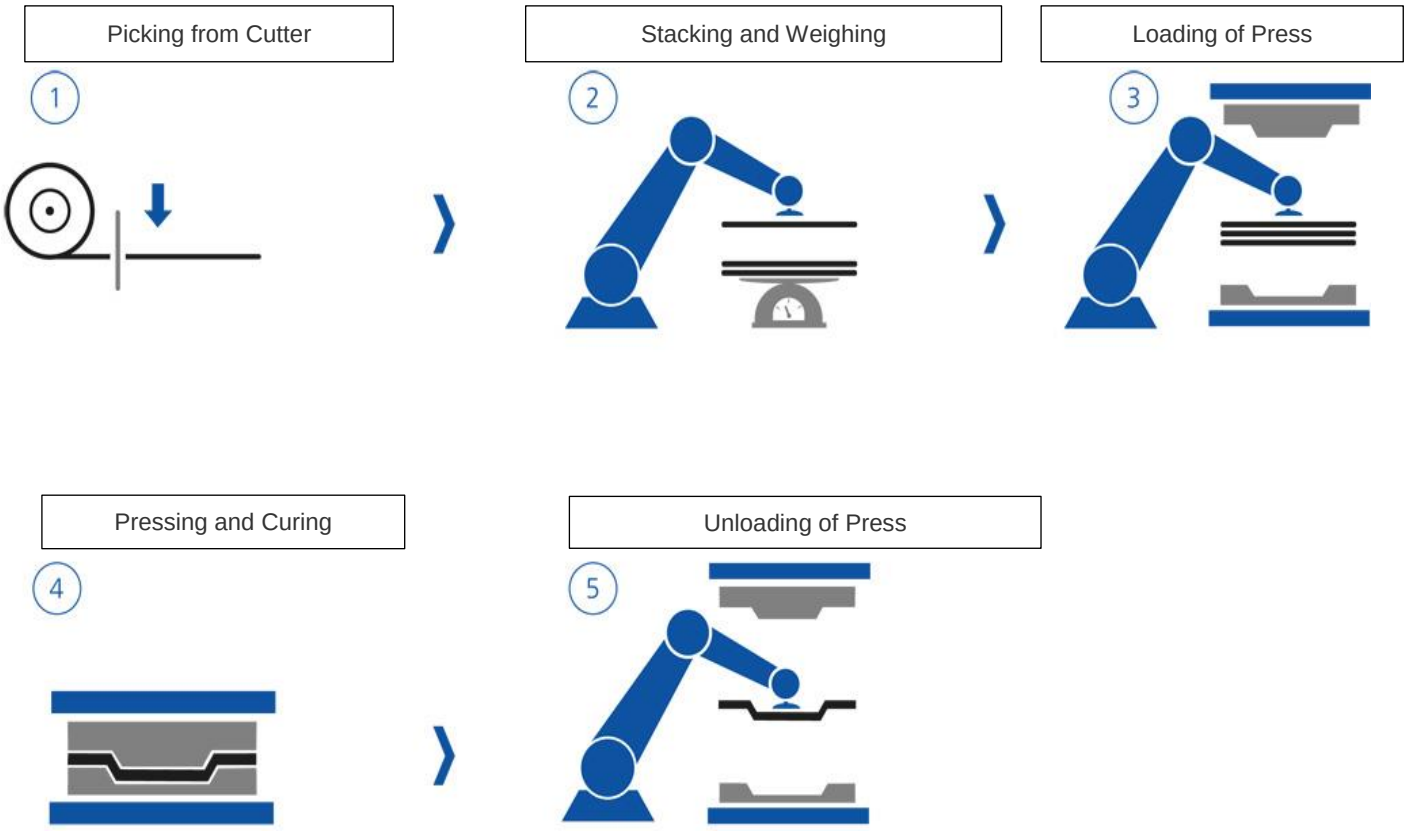

Suction Plates SPL POM-NBR


Matrix Gripper

## Hot Pressing of SMC

The tough and doughty-like material already contains all the necessary components, to produce a fiber-reinforced part. Under pressure and high temperatures the semi-finished product is pressed into the desired shape in an extrusion process.

## Gripping Technology in Use During Hot Pressing of SMC




## Requirements for Gripping Technology

**Tackiness of the workpiece**
SMC materials commonly have a tacky surface because of long, randomnly oriented fibers being embedded in a thermoset matrix.
**Resistance of the material**
The rubbery material can only be handled with difficulty using conventional grippers. Due to its difficulty to penetrate and the need to handle multiple layers at the same time, it requires high insertion forces and long needle strokes combined with insensitivity to adhesion.

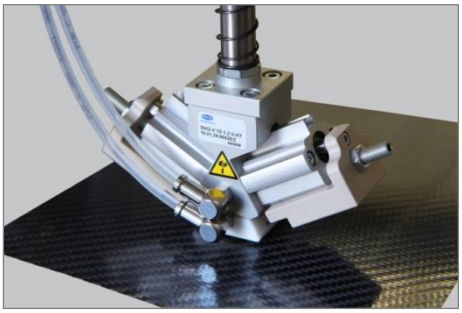
**Products for Use in Hot Pressing of SMC**

Needle Gripper SNG-V-HP

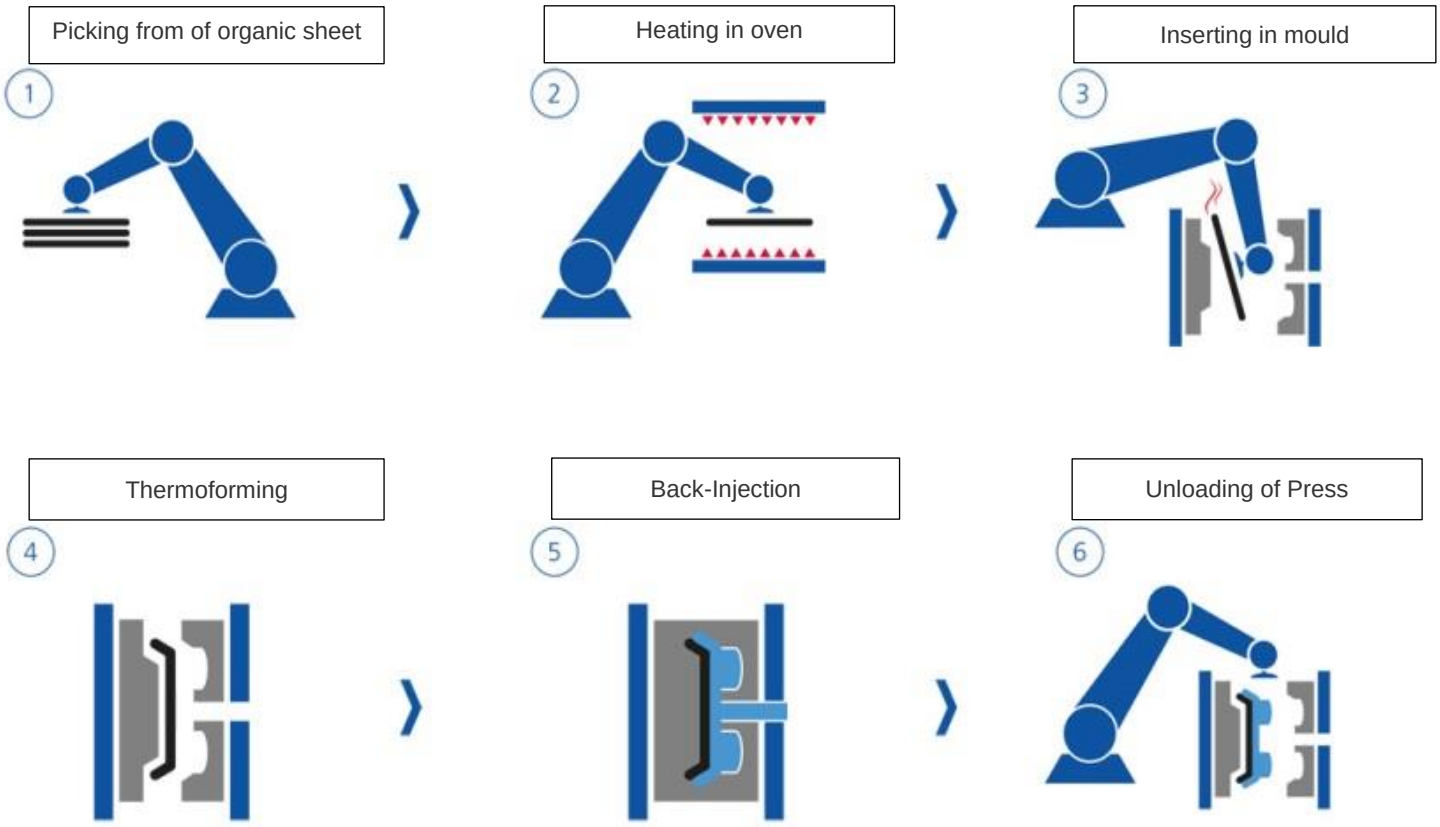
# Industry Solutions Composites
Applications

## Thermoplastic Processes

In thermoplastic processes, organo-sheets are first heated up to melting temperature, then molded and often additionally back-injected with plastic.



## Gripping Technology for use in Thermoplastic Processes




## Requirements for Gripping Technology

**Temperature resistance**
The loading of the presses with semi-finished materials at more than 200°C is being done with the needle grippers SNG-V-HT or in some special cases with suction cups such as the hight-temp materials like HT2 and FPM.
**Instability of the workpiece**
Melted components lose their stability and therefore are difficult to handle. The SGPN suction cup has a flat, elongated sealing lip and a support structure at the bottom.
**Local cool-down**
When handling the still hot workpieces it is essential to avoid local cool-down in the contact area. This would have negative effects on the workpieces. Special needle grippers and vacuum suction cups minimize the risk of this happening.
**Contamination of the gripper**
A dirt-resistant design of the grippers prevents the contamination through melted matrix

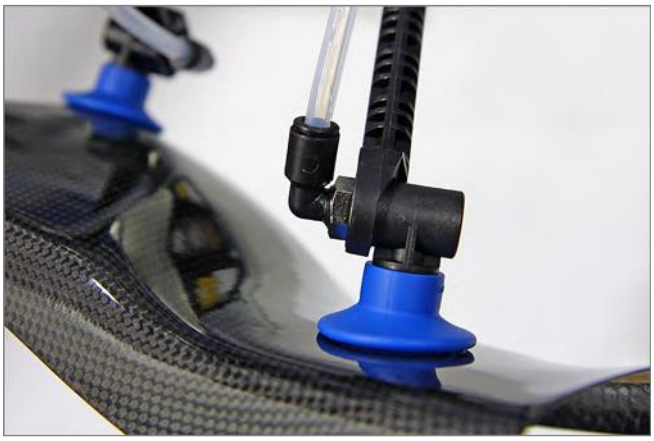
**Products for use in Thermoplastic Composites**


Needle Gripper SNG-V-HT

MANUFACTURING → REMOVAL → FINISHING

### Bellows suction pads FSGA used for picking curved parts out of the mould

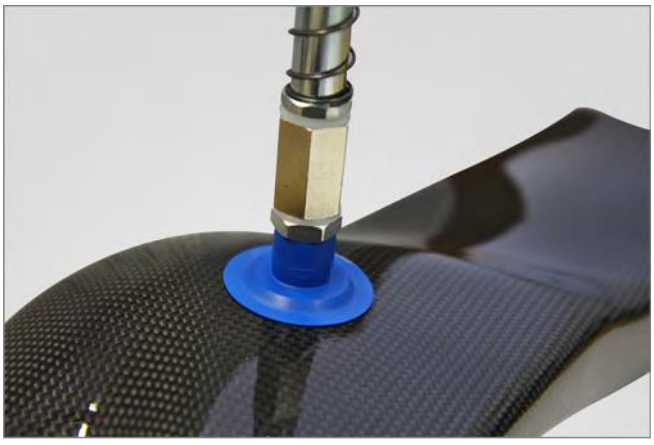
- High accelerations are possible due to high forces
- Bellows suction cups provide gentle handling and non-marking due to HT1 material



Bellows suction pads FSGA

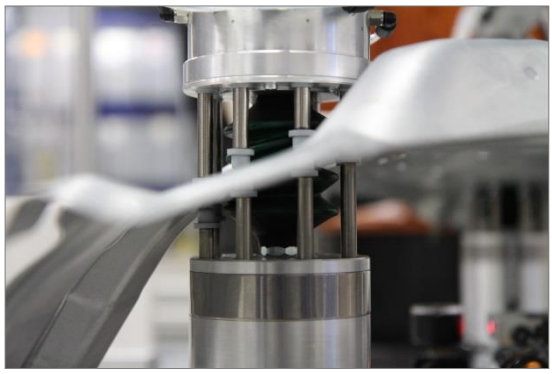
### Flat suction pads SGPN used for the handling of flat, thin or sensitive workpieces

- Very good sealing properties due to thin sealing lip
- Support structure at the bottom prevents material from being drawn in or putting stress on the workpiece
- Available also in mark-less material HT1 and high-temp material FPM for the handling of workpieces with tempera-tures up to 250°C



Flat suction pads SGPN

MANUFACTURING → REMOVAL → FINISHING



## Finishing Process of FRP Components

The last steps in processing give the workpiece its final shape. The workpieces must be held securely for processing in CNC machining centers or water jet cutting systems. These free-form surfaces are more difficult to process and present new challenges for clamping technology in particular.

**Products for the Finishing of FRP Components**

Basic Holding Fixture BHF

Suction Cup Balance SSCB

**Which Needle Gripper for which application?**

| | SNG-AP | SNGi-AE | SNG-V | SNG-V-HT | SNG-V-S | SNG-V-HP | SNG-M | SNG-BV |
|---|---|---|---|---|---|---|---|---|
| **Large stroke (>7 mm)** | ● | ● | O | O | O | ● | O | O |
| **Multilayer handling** | ● | ● | ● | ● | ● | ● | O | O |
| **High penetration force** | O | O | O | O | O | ● | O | O |
| **High temperature of workpiece** | O | O | O | ● | O | ◐ | O | O |
| **Tacky surfaces** | O | O | O | ● | O | ● | O | O |
| **Flexible materials** | O | O | ● | ● | ● | ● | ◐ | ● |
| **Workpiece with limited inherent stability** | ● | ● | ● | ● | ● | ● | ● | ● |
| **Destacking / separation** | O | O | O | O | O | O | O | ● |

● suitable ◑ suitable to a limited extent O not recommended

# Industry Solutions Composites

## Needle Grippers SNG-AP

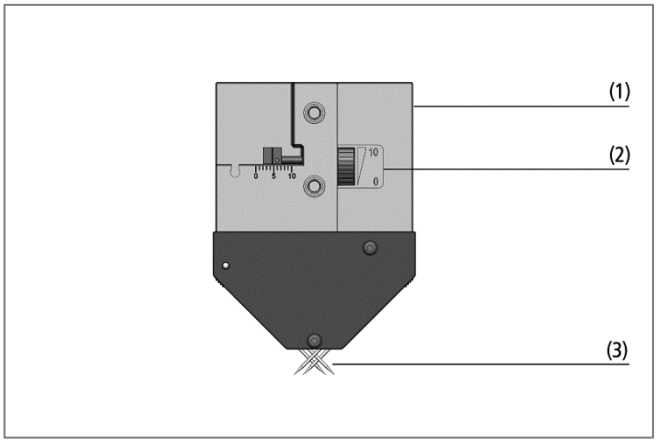
Needle stroke max. 3 mm to 20 mm (variable)

Needle grippers SNG-AP

### Suitability for Industry-Specific Applications

### Applications

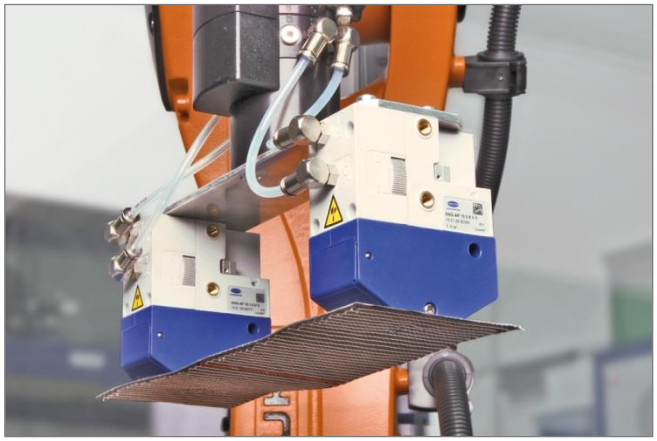
- Needle gripper for handling non-rigid and highly porous materials (primarily textiles)
- Handling materials that are difficult to grip using vacuum such as composite textiles, fleece, filter materials, insulation and foam materials, and much more




System design needle grippers SNG-AP

### Design

- Driven by double-acting pneumatic cylinder
- High-strength housing with lightweight design (1)
- 3 sizes with needle strokes of max. 3 mm, 10 mm or 20 mm
- 10 needles (3) with diameters of 0.8 mm or 1.2 mm (depending on the model)
- Insertion angle of 30° or 45° (depending on the model)
- Adjustment wheel (2) with scale for continuous, simultaneous stroke adjustment
- Optional sensors for monitoring the needle end positions
- Can also be mounted with the Schmalz holder system HTS



Needle grippers SNG-AP being used for handling composite textiles

| Our Highlights… | Your Benefits… |
|---|---|
| • Intersecting needles and small gripping area | > Safe handling, even of small and very unstable workpieces |
| • Low weight and double-acting pneumatic cylinder | > High acceleration for minimized cycle times |
| • Tool-free simultaneous needle stroke adjustment up to a maximum of 20 mm | > Individual adaptation to different workpiece geometries; fast start of operations and set-up time |
| • One central pneumatic drive | > Synchronous extension and retraction of the needles; reduces the need for couplings and hoses |
| • Blow-off function for fast and reliable load depositing | > High level of process reliability and exact positioning |
| • Quick and tool-free cleaning of the needles and replacing the needle modules | > Low maintenance |

# Needle Grippers SNG-AP

Needle stroke max. 3 mm to 20 mm (variable)

## Designation Code Needle Grippers SNG-AP

| Abbreviated designation | Number of needles | Needle diameter in mm | Product addition | Needle stroke in mm |
|---|---|---|---|---|
| **Example SNG-AP 10 0.8 V 3:** | | | | |
| **SNG-AP** | **10** | **0.8** | **V** | **3** |
| **SNG-AP** | 10 | 0.8<br>1.2 | V variable needle stroke | 3<br>10<br>20 |

## Ordering Data Needle Grippers SNG-AP

Needle gripper SNG-AP is delivered assembled. The assembly consists of:

- Gripper of type SNG-AP – available with various needle diameters and strokes

Available spare parts: needle module, maintenance cover
Available accessories: mounting plate, holder system, add-on kit with sensor

## Needle Grippers SNG-AP

| Type | Part Number |
|---|---|
| **SNG-AP 10 0.8 V 3** | 10.01.29.00340 |
| **SNG-AP 10 1.2 V 3** | 10.01.29.00377 |
| **SNG-AP 10 0.8 V 10** | 10.01.29.00361 |
| **SNG-AP 10 1.2 V 10** | 10.01.29.00381 |
| **SNG-AP 10 1.2 V 20** | 10.01.29.00362 |
| **SNG-AP 10 0.8 V 3** | 10.01.29.00340 |

## Ordering Data Accessories Needle Grippers SNG-AP

| Type | Mounting plate* | Holder system A2 | Holder system A3 | Add-on kit sensor ** |
|---|---|---|---|---|
| **SNG-AP 10 0.8 V 3** | 10.01.29.00403 | 10.01.29.00402 | 10.01.29.00322 | 10.01.29.00400 |
| **SNG-AP 10 1.2 V 3** | 10.01.29.00403 | 10.01.29.00402 | 10.01.29.00322 | 10.01.29.00400 |
| **SNG-AP 10 0.8 V 10** | 10.01.29.00403 | 10.01.29.00402 | 10.01.29.00322 | 10.01.29.00400 |
| **SNG-AP 10 1.2 V 10** | 10.01.29.00403 | 10.01.29.00402 | 10.01.29.00322 | 10.01.29.00400 |
| **SNG-AP 10 1.2 V 20** | 10.01.29.00403 | 10.01.29.00402 | 10.01.29.00322 | 10.01.29.00400 |

*Complete with mounting screws

**Set of sensor and mounting element

## Ordering Data Spare Parts Needle Grippers SNG-AP

| Type | Needle modules* | Maintenance cover ** |
|---|---|---|
| **SNG-AP 10 0.8 V 3** | 10.01.29.00405 | 10.01.29.00419 |
| **SNG-AP 10 1.2 V 3** | 10.01.29.00406 | 10.01.29.00419 |
| **SNG-AP 10 0.8 V 10** | 10.01.29.00407 | 10.01.29.00420 |
| **SNG-AP 10 1.2 V 10** | 10.01.29.00408 | 10.01.29.00420 |
| **SNG-AP 10 1.2 V 20** | 10.01.29.00409 | 10.01.29.00421 |

*Set of two needle modules

**Set of two covers

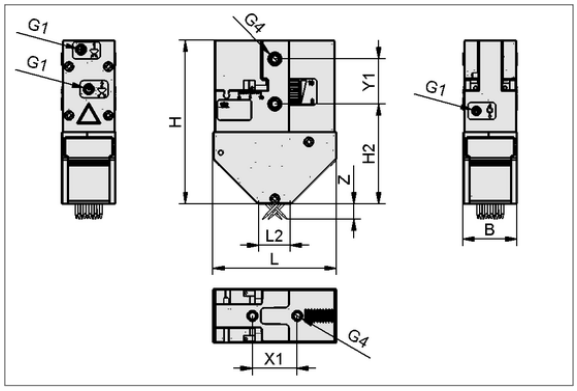
# Needle Grippers SNG-AP

Needle stroke max. 3 mm to 20 mm (variable)

## Technical Data Needle Grippers SNG-AP

| Type | Number of needles | Needle diameter [mm] | Additional function | Stroke [mm] | Operating pressure [bar] | Operating tempera-ture [°C] | Installation position | Weight [g] | Insertion angle [°] |
|---|---|---|---|---|---|---|---|---|---|
| **SNG-AP 10 0.8 V 3** | 10 | 0.8 | Variable stroke | 3 | 3...6 | 5...75 | Any | 190 | 30 |
| **SNG-AP 10 1.2 V 3** | 10 | 1.2 | Variable stroke | 3 | 3...6 | 5...75 | Any | 190 | 30 |
| **SNG-AP 10 0.8 V 10** | 10 | 0.8 | Variable stroke | 10 | 3...6 | 5...75 | Any | 225 | 45 |
| **SNG-AP 10 1.2 V 10** | 10 | 1.2 | Variable stroke | 10 | 3...6 | 5...75 | Any | 225 | 45 |
| **SNG-AP 10 1.2 V 20** | 10 | 1.2 | Variable stroke | 20 | 3...6 | 5...75 | Any | 400 | 45 |

## Design Data Needle Grippers SNG-AP



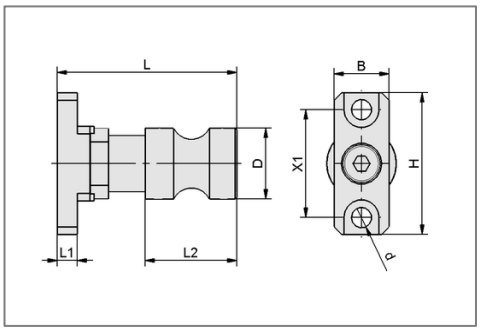

SNG-AP

| Type | Dimensions in mm | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | B | G1 | G4 | H | H2 | L | L2 | X1 | Y1 | Z |
| **SNG-AP 10 0.8 V 3** | 35 | M5-IG | M5-IG | 80.2 | 46.1 | 65 | 28 | 29 | 29 | 3 |
| **SNG-AP 10 1.2 V 3** | 35 | M5-IG | M5-IG | 80.2 | 46.1 | 65 | 28 | 29 | 29 | 3 |
| **SNG-AP 10 0.8 V 10** | 35 | M5-IG | M5-IG | 105.5 | 64.4 | 80 | 22 | 29 | 29 | 10 |
| **SNG-AP 10 1.2 V 10** | 35 | M5-IG | M5-IG | 105.5 | 64.0 | 80 | 22 | 29 | 29 | 10 |
| **SNG-AP 10 1.2 V 20** | 35 | M5-IG | M5-IG | 160.0 | 104.9 | 120 | 22 | 29 | 29 | 20 |

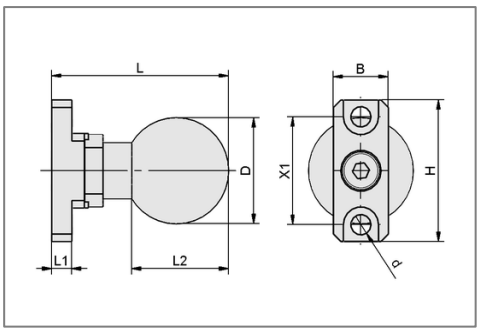
# Needle Grippers SNG-AP

Needle stroke max. 3 mm to 20 mm (variable)

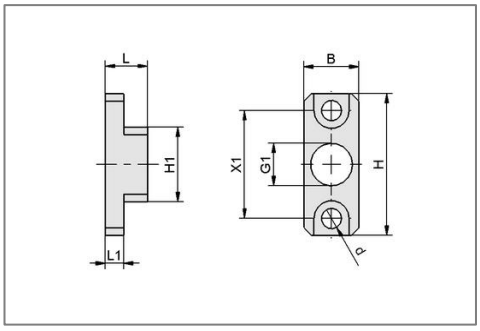
## Design Data Accessories Needle Grippers SNG-AP




HTS-A2 AP SNG




HTS-A3 AP SNG

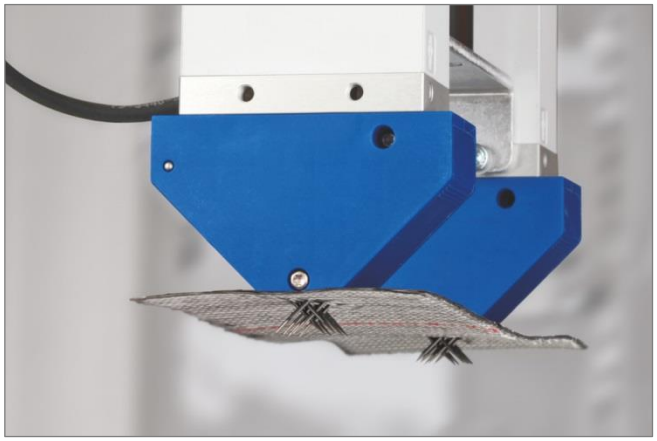



BEF-PL

| Type | Dimensions in mm | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | B | d | D | G1 | H | H1 | L | L1 | L2 | X1 |
| **HTS-A2 AP SNG** | 15 | 5.5 | 19.0 | - | 38 | - | 49.0 | 5.5 | 25.0 | 29 |
| **HTS-A3 AP SNG** | 15 | 5.5 | 28.5 | - | 38 | - | 48.3 | 5.5 | 26.4 | 29 |
| **BEF-PL 11.5x15x38 G1/4-IG SNG** | 15 | 5.5 | - | G1/4"-IG | 38 | 20 | 11.5 | 4.0 | - | 29 |

# Industry Solutions Composites

## Needle Grippers SNGi-AE



Needle grippers SNGi-AE being used for handling composite textiles

### Outstanding energy efficiency! The electrical needle grippers from Schmalz

Lightweight, thin or flexible materials are hard to grip and a real challenge for handling technology – but not for the new Schmalz needle grippers: The innovative grippers handle composite textiles, filter materials, fleece and foam safely and reliably. Crossed needles ensure an optimal grip. The electrical version SNGi-AE features impressive energy efficiency, as well as automatic needle stroke setting and an IO-Link interface for maximum process control.

## Design and highlights

**Housing with lightweight design and integrated electrical drive**
- Low power consumption

**Compressed-air connection for blow-off function**
- Fast, safe and precise depositing

**Intersecting needles**
- Powerful holding force with minimal operative surface area
- Gentle handling of the workpieces

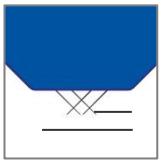
**LED status display**
- Fast identification of the operating mode

**IO-Link connection**
- M12 plug connector, 5-pin
- Allows comprehensive process control

**Tool-free quick access**
- Simple, fast needle cleaning and replacement of needle plugs

**Crossed needles for powerful holding force**
- Gripping concept with crossed needles and minimal operative surface area
- Powerful holding force, even with very unstable workpieces
- Can handle very small workpieces

**Energy-efficient electrical gripping**
- Low power consumption for low operating costs
- Easy connection to bus systems



**Freely adjustable needle stroke setting**
- Needle stroke can be preconfigurated using fixed definable process profiles – can be changed for each individual cycle
- Can handle individual layers and stacks

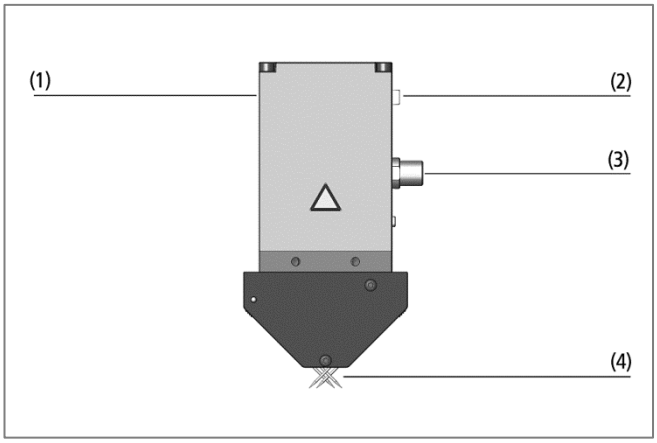
**IO-Link interface**
- Bidirectional communication with higher-level fieldbus systems
- Recorded condition data can be viewed and used up to the highest level of control
- Supports remote parameterization and remote diagnostics

# Industry Solutions Composites

## Needle Grippers SNGi-AE

Needle stroke max. 3 mm to 20 mm (variable)

Needle grippers SNGi-AE




System design needle grippers SNGi-AE

Needle grippers SNGi-AE being used for handling composite textiles

### Suitability for Industry-Specific Applications

### Applications

- Needle gripper for handling non-rigid and highly porous materials (primarily textiles)
- Handling materials that are difficult to grip using vacuum such as textiles, fleece, filter materials, insulation and foam materials, and much more
- Handling of single layers and complete stacks with various heights due to automatic stroke adjustment

### Design

- Electrically driven gripper
- High-strength housing with lightweight design (1)
- 3 sizes with needle strokes of max. 3 mm, 10 mm or 20 mm
- 10 needles (4) with diameters of 0.8 mm or 1.2 mm (depending on the model)
- Insertion angle of 30° or 45° (depending on the model)
- LED status display (2)
- IO-Link interface with M12 plug connection, 5-pin (3)
- Optional mounting with the Schmalz holder system HTS

| Our Highlights… | Your Benefits… |
|---|---|
| • Intersecting needles and small gripping area | > Safe handling, even of small and very unstable workpieces |
| • Needle stroke adjustable using definable process profiles | > Individual adaptation of different workpiece geometries |
| • Stroke can be adapted for each cycle; unlimited number of stroke sequences possible | > Allows handling of single layers and complete stacks with just one gripper |
| • Blow-off function for fast and exact release of workpieces | > High level of process reliability; short cycle times |
| • Continuous stroke monitoring | > Comprehensive process control available |
| • IO-Link interface | > Optimized start of operations |
| • Quick, tool-free cleaning and replacing the needle modules | > Low maintenance |
| • Low power consumption | > Easy connection to bus systems |

# Needle Grippers SNGi-AE

Needle stroke max. 3 mm to 20 mm (variable)

## Designation Code Needle Grippers SNGi-AE

| Abbreviated designation | Number of needles | Needle diameter in mm | Product addition | Needle stroke in mm | Product addition |
|---|---|---|---|---|---|
| **Example SNGi-AE 10 0.8 V 3 IOL:** | | | | | |
| **SNGi-AE** | 10 | 0.8 | V | 3 | IOL |
| **SNGi-AE** | 10 | 0.8<br>1.2 | V variable needle stroke | 3<br>10<br>20 | IOL IO-Link compatible |

## Ordering Data Needle Grippers SNGi-AE

Needle gripper SNGi-AE is delivered assembled. The assembly consists of:
- Gripper of type SNGi-AE – available with various needle diameters and strokes

Available spare parts: needle module, maintenance cover
Available accessories: mounting plate, holder system, connection cable, distributor

## Needle Grippers SNGi-AE

| Type | Part Number |
|---|---|
| **SNGi-AE 10 0.8 V 3 IOL** | 10.01.29.00390 |
| **SNGi-AE 10 1.2 V 3 IOL** | 10.01.29.00394 |
| **SNGi-AE 10 0.8 V 10 IOL** | 10.01.29.00392 |
| **SNGi-AE 10 1.2 V 10 IOL** | 10.01.29.00396 |
| **SNGi-AE 10 1.2 V 20 IOL** | 10.01.29.00393 |

## Ordering Data Accessories Needle Grippers SNGi-AE

| Type | Type | Part Number |
|---|---|---|
| **HTS-A2 AP SNG** | Holder system | 10.01.29.00402 |
| **HTS-A3 AP SNG** | Holder system | 10.01.29.00322 |
| **BEF-PL 11.5x15x38 G1/4-IG SNG*** | Mounting plate | 10.01.29.00403 |
| **ASK B-M12-5 5000 PUR GE**** | Connection cable | 21.04.05.00080 |
| **ASK-S B-M12-5 1000 M12-5 PUR***** | Connection cable | 21.04.05.00158 |
| **ASK-S B-M12-5 2000 M12-5 PUR****** | Connection cable | 21.04.05.00211 |
| **ASV IO-LINK 2xM12-4******* | Distributor | 10.02.02.04336 |

*Incl. mounting screws
**Confectionable, 5 m
***Class B, 1 m
****Class B, 2 m
*****Class A, 1 m + 0.3 m

## Ordering Data Spare Parts Needle Grippers SNGi-AE

| Type | Needle modules* | Maintenance cover** |
|---|---|---|
| **SNGi-AE 10 0.8 V 3 IOL** | 10.01.29.00405 | 10.01.29.00419 |
| **SNGi-AE 10 1.2 V 3 IOL** | 10.01.29.00406 | 10.01.29.00419 |
| **SNGi-AE 10 0.8 V 10 IOL** | 10.01.29.00407 | 10.01.29.00420 |
| **SNGi-AE 10 1.2 V 10 IOL** | 10.01.29.00408 | 10.01.29.00420 |
| **SNGi-AE 10 1.2 V 20 IOL** | 10.01.29.00409 | 10.01.29.00421 |

*Set of two needle modules
**Set of 2 covers

# Needle Grippers SNGi-AE

Needle stroke max. 3 mm to 20 mm (variable)

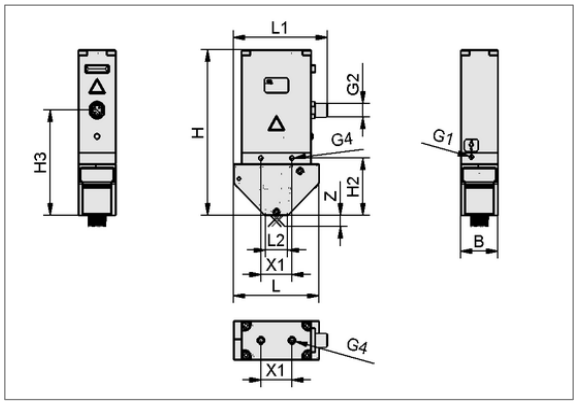
## Technical Data Needle Grippers SNGi-AE

| Type | Number of needles | Needle diameter [mm] | Additional function | Stroke [mm]* | Operating temperature [°C] | Weight [g] | Electrical connection | Protection IP | Voltage | Current cosumption [mA]** | Insertion angle [°] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **SNGi-AE 10 0.8 V 3 IOL** | 10 | 0.8 | Variable stroke | 3 | 5...50 | 500 | Male connect M12, 5 pol | IP 53 | 24V - DC | 900 | 30 |
| **SNGi-AE 10 1.2 V 3 IOL** | 10 | 1.2 | Variable stroke | 3 | 5...50 | 500 | Male connect M12, 5 pol | IP 53 | 24V - DC | 900 | 30 |
| **SNGi-AE 10 0.8 V 10 IOL** | 10 | 0.8 | Variable stroke | 10 | 5...50 | 515 | Male connect M12, 5 pol | IP 53 | 24V - DC | 900 | 45 |
| **SNGi-AE 10 1.2 V 10 IOL** | 10 | 1.2 | Variable stroke | 10 | 5...50 | 515 | Male connect M12, 5 pol | IP 53 | 24V - DC | 900 | 45 |
| **SNGi-AE 10 1.2 V 20 IOL** | 10 | 1.2 | Variable stroke | 20 | 5...50 | 600 | Male connect M12, 5 pol | IP 53 | 24V - DC | 900 | 45 |

*Needle speed: 8 mm/s

**Max. current consumption in normal operation 600 mA

## Design Data Needle Grippers SNGi-AE



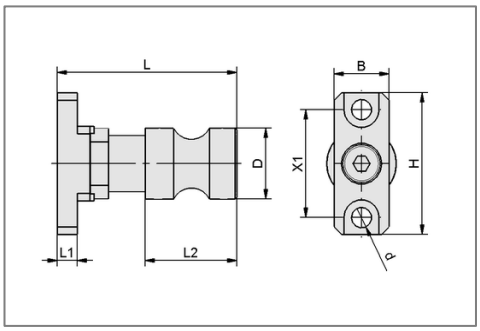

SNGi-AE

| Type | Dimensions in mm | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | B | G1 | G2 | G4 | H | H2 | H3 | L | L1 | L2 | X1 | Z |
| **SNGi-AE 10 0.8 V 3 IOL** | 35 | M5-IG | M12-AG | M5-IG | 140.0 | 40.2 | 83.2 | 65 | 80.0 | 28 | 29 | 3 |
| **SNGi-AE 10 1.2 V 3 IOL** | 35 | M5-IG | M12-AG | M5-IG | 140.0 | 40.2 | 83.2 | 65 | 80.0 | 28 | 29 | 3 |
| **SNGi-AE 10 0.8 V 10 IOL** | 35 | M5-IG | M12-AG | M5-IG | 151.5 | 51.5 | 94.5 | 80 | 87.5 | 22 | 29 | 10 |
| **SNGi-AE 10 1.2 V 10 IOL** | 35 | M5-IG | M12-AG | M5-IG | 151.5 | 51.5 | 94.5 | 80 | 87.5 | 22 | 29 | 10 |
| **SNGi-AE 10 1.2 V 20 IOL** | 35 | M5-IG | M12-AG | M5-IG | 178.0 | 78.2 | 121.0 | 120 | 107.5 | 22 | 29 | 20 |

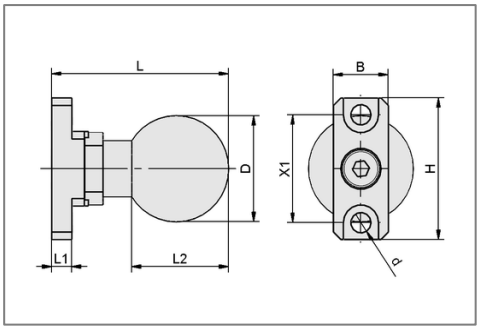
# Needle Grippers SNGi-AE

Needle stroke max. 3 mm to 20 mm (variable)

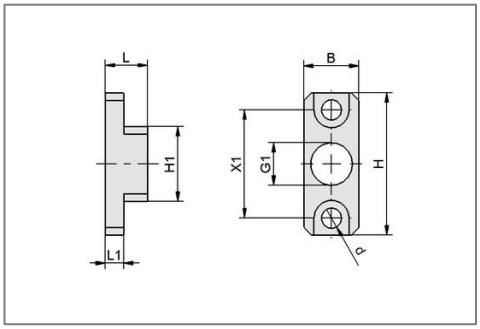
## Design Data Accessories Needle Grippers SNGi-AE




HTS-A2 AP SNG




HTS-A3 AP SNG




BEF-PL

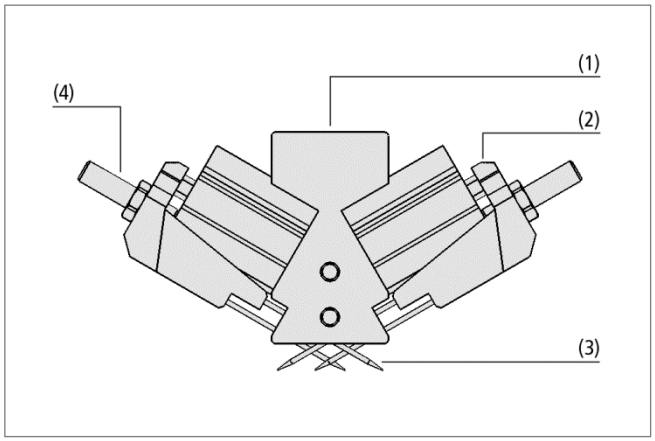
| Type | Dimensions in mm | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | B | d | D | G1 | H | H1 | L | L1 | L2 | X1 |
| **HTS-A2 AP SNG** | 15 | 5.5 | 19.0 | - | 38 | - | 49.0 | 5.5 | 25.0 | 29 |
| **HTS-A3 AP SNG** | 15 | 5.5 | 28.5 | - | 38 | - | 48.3 | 5.5 | 26.4 | 29 |
| **BEF-PL 11.5x15x38 G1/4-IG SNG** | 15 | 5.5 | - | G1/4"-IG | 38 | 20 | 11.5 | 4.0 | - | 29 |

# Industry Solutions Composites

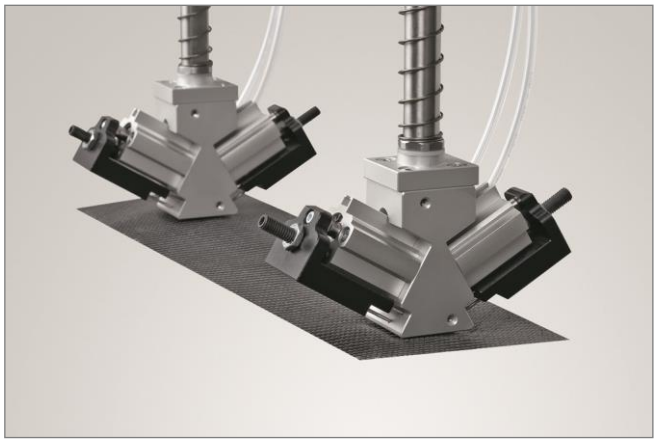
## Needle Grippers SNG-V

Needle stroke 0 mm to 7 mm (variable)

Needle grippers SNG-V




System design needle gripper SNG-V



Needle grippers SNG-V being used for handling composite textiles

### Suitability for Industry-Specific Applications

### Applications

- Needle gripper for handling non-rigid and highly porous materials (primarily textiles)
- Handling materials that are difficult to grip using vacuum such as composite textiles, fleece, filter materials, insulation and foam materials, and much more

### Design

- Robust aluminum housing (1)
- Drive via double-acting pneumatic cylinders (2)
- 10 needles with diameter 1.2mm (3)
- Insertion angle 30°
- Continuously variable stroke adjustment (4)
- Optional mounting with holder system HTS

| Our Highlights… | Your Benefits… |
|---|---|
| • Intersecting needles | > High holding force, even for flexible, non-rigid workpieces |
| • Minimized active contact surface | > Handling of small workpieces possible |
| • Double-acting pneumatic cylinders | > Very short cycle times |
| • Variable needle stroke | > Individual adjustment for different workpiece thick-nesses, sizes and shapes |
| • One pneumatic connection point for both pneumatic cylinders | > Saves pneumatic tubes and connectors; ensures synchro-nous movement of needles |

# Needle Grippers SNG-V

Needle stroke 0 mm to 7 mm (variable)

## Designation Code Needle Grippers SNG-V

| Abbreviated designation | Number of needles | Needle diameter in mm | Product addition |
|---|---|---|---|
| **Example SNG-V 10 1.2 V:** | | | |
| **SNG-V** | 10 | 1.2 | V |
| **SNG-V** | 10 | 1.2 | V variable needle stroke |

## Ordering Data Needle Grippers SNG-V

Needle gripper SNG-V is delivered assembled.

Available spare parts: needle module
Available accessories: mounting plate, holder system

## Needle Grippers SNG-V

| Type | Part Number |
|---|---|
| **SNG-V 10 1.2 V** | 10.01.29.00176 |

## Ordering Data Accessories Needle Grippers SNG-V

| Type | Mounting plate* | HTS-A2 SGM 30/40* | HTS-A3 SGM 30/40* |
|---|---|---|---|
| **SNG-V 10 1.2 V** | 10.01.29.00093 | 10.01.17.00169 | 10.01.17.00170 |

*Incl. mounting screws

## Ordering Data Spare Parts Needle Grippers SNG-V

| Type | Needle module* |
|---|---|
| **SNG-V 10 1.2 V** | 10.01.29.00238 |

*Set of two needle modules

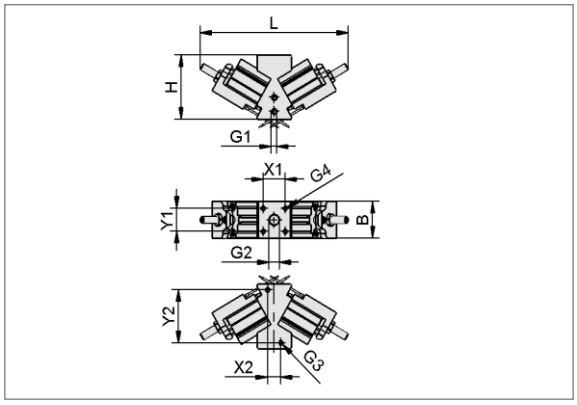
## Technical Data Needle Grippers SNG-V

| Type | Number of needles | Needle diameter [mm] | Stroke [mm] | Operating pressure [bar] | Operating temperature [°C] | Installation position | Weight [g] | Insertion angle [°] |
|---|---|---|---|---|---|---|---|---|
| **SNG-V 10 1.2 V** | 10 | 1.2 | 7 | 3…10 | 5…60 | Any | 265 | 30 |

# Needle Grippers SNG-V

Needle stroke 0 mm to 7 mm (variable)

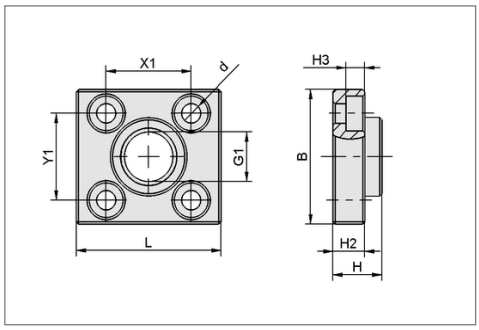
## Design Data Needle Grippers SNG-V




SNG-V 10 1.2V

| Type | Dimensions in mm | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | B | G1 | G2 | G3 | G4 | H | L | X1 | X2 | Y1 | Y2 |
| **SNG-V 10 1.2V** | 32 | M5-IG | G1/8“-IG | M4-IG | M4-IG | 56 | 149 | 29 | 12 | 20 | 46 |

## Design Data Accessories Needle Grippers SNG-V



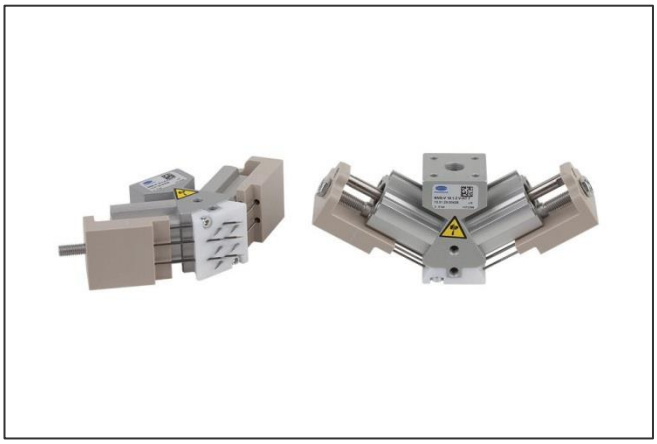

BEF-PL-34X31-G1/4-IG-SNG

| Type | Dimensions in mm | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | B | d | G1 | H | H2 | H3 | L | X1 | Y1 |
| **Mounting plate BEF-PL-34X31-G1/4-IG-SNG** | 31 | 4.5 | G1/4”-F | 11.5 | 7.5 | 4.4 | 34 | 20 | 20 |

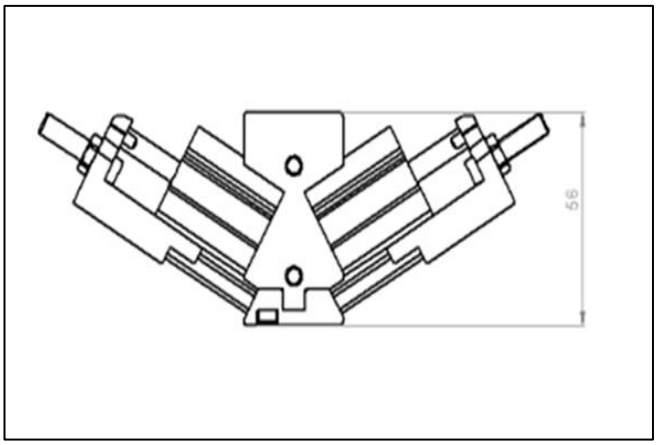
# Industry Solutions Composites

## Needle Grippers SNG-V-HT

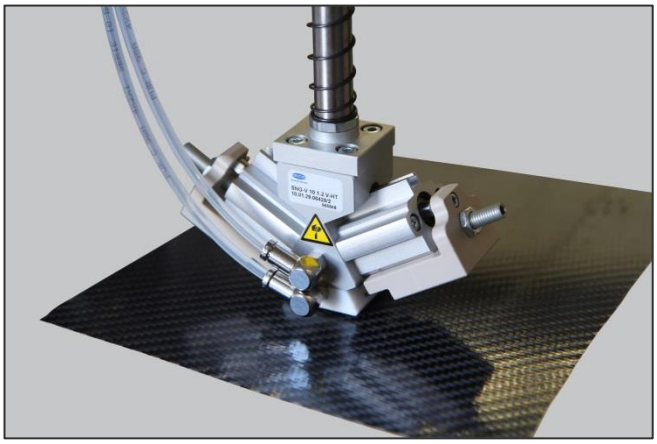
Needle stroke 0 mm to 7 mm (variable)



Needle gripper SNG-V-HT




Needle gripper SNG-V-HT



Needle gripper SNG-V-HT for high-temperature applications

### Suitability for Industry-Specific Applications

### Applications

- Needle gripper for handling of hot and flexible materials
- Handling of thermoplastic composite semi-finished products such as organo sheets

### Design

- Robust aluminum body, gripping surface made from Teflon and needle wedges from PEEK
- 10 needles with a diameter of 1.2 mm
- Insertion angle of 30 °
- Continuous stroke adjustment
- Double acting high-temperature pneumatic cylinder
- Optional mounting with holder system HTS

| Our Highlights… | Your Benefits… |
|---|---|
| • Gripping surface made of Teflon | > Reduction of adhesion and isolates against local cooling of the workpiece |
| • Handling of hot workpieces | > Secure gripping of workpieces at high temperatures |
| • Intersecting needles | > High holding force, even for flexible, non-rigid workpieces |
| • Minimized effective area | > Handling of small workpieces possible |
| • Double acting pneumatic cylinder | > Shortest cycle times |
| • Variable needle stroke | > Individual adaptation to different workpiece geometries |
| • Various mounting options | > Perfect adaptation to other mounting components |
| • Needle diameter 1.2 mm | > Easy penetration of workpiece |

# Needle Grippers SNG-V-HT

Needle stroke 0 mm to 7 mm (variable)

## Ordering Data Needle Grippers SNG-V-HT

| Type | Part Number |
|---|---|
| **SNG-V 10 1.2 V-HT** | 10.01.29.00428 |

## Ordering Data Spare Parts Needle Grippers SNG-V-HT

| Type | Description | Part Number |
|---|---|---|
| **BEF-PL-34X31-G1/4-IG-SNG** | Mounting plate 34x31 for G1/4" IG connection, including screws (suitable for all grippers) | 10.01.29.00093 |
| **HTS-A2 AP SNG** | Holder system HTS-A2 | 10.01.29.00402 |
| **HTS-A3 AP SNG** | Holder system HTS-A3 | 10.01.29.00322 |
| **BEF-PL 38x15x11.5 G1/4-IG SNG** | Mounting plate BEF-PL 11.5x15x38 G1/4-IG SNG | 10.01.29.00403 |

## Ordering Data Wearing Parts Set Needle Grippers SNG-V-HT

| Type | Description | Part Number |
|---|---|---|
| **ERS-SET SNG-V-HT 1.2** | 2 needle modules incl. needles | 10.01.29.00464 |
| **ERS-SET SNG-V-HT – gripping surface** | Gripping surface incl. screws | 10.01.29.00485 |

## Technical Data Needle Grippers SNG-V-HT

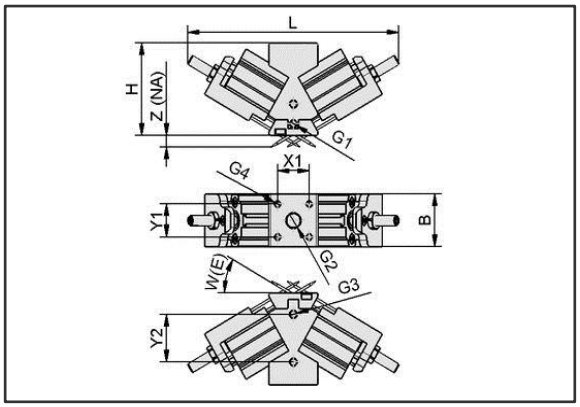
| Type | Number of needles | Needle diameter [mm] | Additional function | Stroke [mm] | Operating pressure [bar] | Operating temperature [°C]* | Mounting position | Weight [g] |
|---|---|---|---|---|---|---|---|---|
| **SNG-V 10 1.2 V-HT** | 10 | 1.2 | Variable stroke | 0…7 | 3…10 | 5…150 | any | 255 |

* max. Workpiece temperature up to 260 ° C

# Needle Grippers SNG-V-HT

Needle stroke 0 mm to 7 mm (variable)

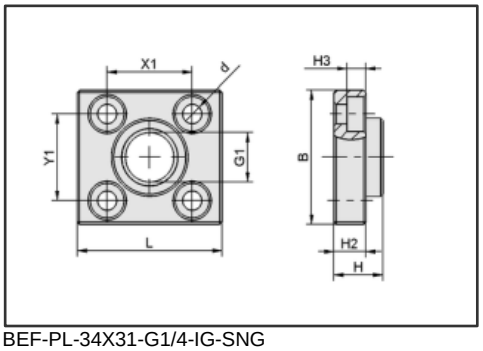
## Design Data Needle Grippers SNG-V-HT




SNG-V -HT

| Type | Dimensions in mm | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | B | G1 | G2 | G3 | G4 | H | L | X1, Y1 | X2 | Z | W |
| **SNG-V 10 1.2V-HT** | 32 | M5-IG | G1/8“-IG | M5-IG | M4-IG | 56 | 149 | 20 | 29 | 7 | 30° |

## Design Data Accessories Needle Grippers SNG-V



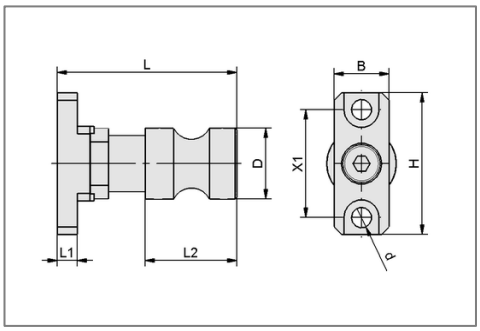

BEF-PL-34X31-G1/4-IG-SNG

| Type | Dimensions in mm | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | B | d | G1 | H | H2 | H3 | L | X1 | Y1 |
| **BEF-PL-34X31-G1/4-IG-SNG** | 31 | 4.5 | G1/4”-IG | 11.5 | 7.5 | 4.4 | 34 | 20 | 20 |

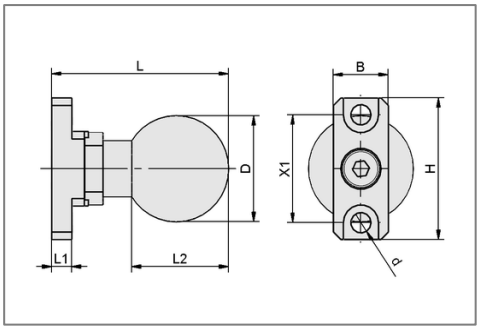
# Needle Grippers SNG-V-HT

Needle stroke 0 mm to 7mm (variable)

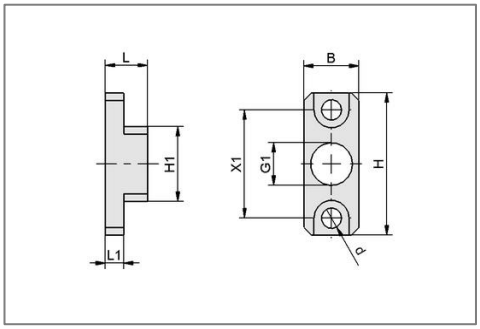
## Design Data Accessories Needle Grippers SNG-V-HT




HTS-A3 AP SNG




HTS-A2 AP SNG



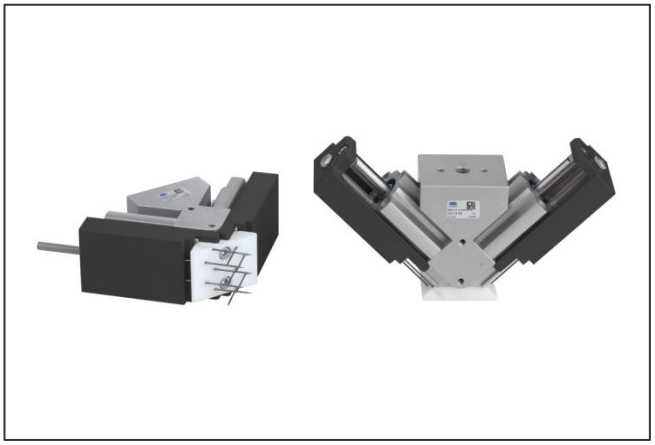

BEF-PL BEF-PL 38x15x11.5 G1/4-IG SNG

| Type | Dimensions in mm | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | B | D | H | L | L1 | L2 | d | G1 | X1 |
| **HTS-A2 AP SNG** | 15 | 19 | 38 | 49 | 5.5 | 25 | 5.5 | - | 29 |
| **HTS-A3 AP SNG** | 15 | 28,5 | 38 | 48,3 | 5.5 | 26.4 | 5.5 | - | 29 |
| **BEF-PL 38x15x11.5 G1/4-IGSNG** | 15 | - | 38 | 11,5 | 4.0 | | 5.5 | G1/4“-IG | 29 |

# Industry Solutions Composites

## Needle Grippers SNG-V-HP

Needle stroke max. 18 mm to 25 mm (variable)

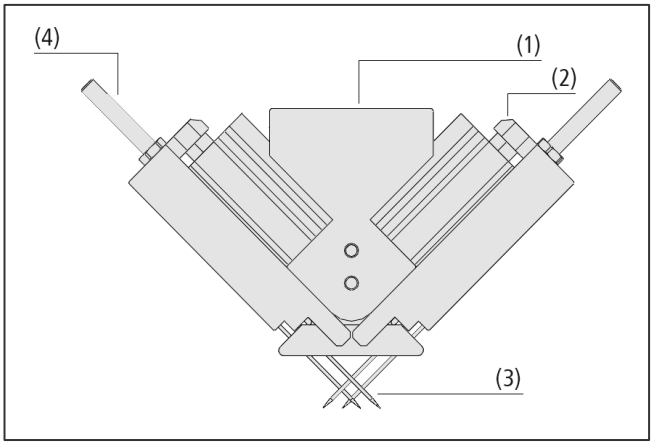


Needle grippers SNG-V

### Suitability for Industry-Specific Applications

### Applications

- Needle grippers for handling of non-rigid or highly porous materials
- Handling materials that are difficult to grip using vacuum such as composite textiles, SMC-materials, fleece….
- For applications that require very high penetration force,large needle strokes and handling of tacky material




System design needle gripper SNG-V

### Design

- Robust aluminum housing (1)
- Driven by double-acting pneumatic cylinders (2)
- 6 or 10 needles with 1.2 or 1.5 mm diameter (3)
- Insertion angle 45°
- Continuously variable stroke adjustment (4)
- PTFE bottom plate
- Optional mounting with holder system HTS

Needle grippers SNG-V being used for handling SMC materials

| Our Highlights… | Your Benefits… |
|---|---|
| • Up to 18 or 25 mm needle stroke | > Also suitable for handling of stacks |
| • Double-acting and large pneumatic cylinders | > High insertion force and short cycle time |
| • Intersecting needles | > High holding force, even for flexible, non-rigid workpieces |
| • PTFE bottom plate | > Reducing tendency of tacky material to stick to the gripper and insulate against local cooling of workpiece |
| • Minimized contact surface | > Handling of small workpieces possible |
| • Variable needle stroke | > Individual adjustment for different workpiece thick-nesses, sizes and shapes |
| • One pneumatic connection point for both pneumatic cylinders | > Saves pneumatic tubes and connectors; ensures syn-chronous movement of needles |

# Needle Grippers SNG-V-HP

Needle stroke max. 18 mm to 25 mm (variable)

## Ordering Data Needle Grippers SNG-V-HP

| Type | Part Number |
|---|---|
| **SNG-V 10 1.2 V-HP-18** | 10.01.29.00547 |
| **SNG-V 6 1.5 V-HP-25** | 10.01.29.00568 |

## Ordering Data Spare Parts Needle Grippers SNG-V-HP

| Type | Description | Part Number |
|---|---|---|
| **BEF-PL 11.5x15x38 G1/4-IG SNG** | Mounting plate | 10.01.29.00403 |
| **HTS-A2 AP SNG** | Holder system HTS-A2 | 10.01.29.00402 |
| **HTS-A3 AP SNG** | Holder system HTS-A3 | 10.01.29.00322 |

## Ordering Data – Set of Parts Subject to Wear Needle Grippers SNG-V-HP

| Type | Description | Part Number |
|---|---|---|
| **ERS-SET SNG-V-HP-10-1.2-18** | Spare parts set consists of 2 needle wedges with 5 needles each | 10.01.29.00550 |
| **ERS-SET SNG-V-HP- 6-1.5-25** | Spare parts set consists of 2 needle wedges with 3 needles each | 10.01.29.00576 |
| **ERS-SET-SNG-V-HP-HT-10-1.2-18** | Bottom plate incl. 2 screws | 10.01.29.00522 |
| **ERS-SET SNG-V-HP- 6-1.5-25** | Bottom plate incl. 2 screws | 10.01.29.00577 |

## Technical Data Needle Grippers SNG-V-HP

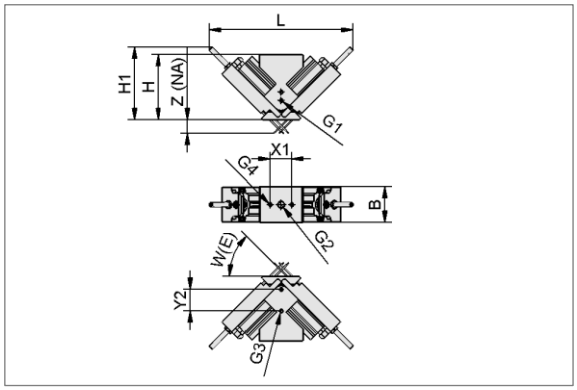
| Type | Number of needles | Needle diameter [mm] | Additional function | Stroke [mm] | Operating pressure [bar] | Operating temperature [°C] | Installation position | Weight [g] |
|---|---|---|---|---|---|---|---|---|
| **SNG-V 10 1.2 V-HP-18** | 10 | 1.2 | Variable stroke<br>High force | 0…18 | 3…7 | 5…80 * | any | 930 |
| **SNG-V 6 1.5 V-HP-25** | 6 | 1.5 | Variable stroke<br>High force | 0…25 | 3…7 | 5…60 | any | 1140 |

* With high temperature cylinder. Workpiece temperature up to 260 ° C possible with short-term contact and ambient temperature of max. 40°C

# Needle Grippers SNG-V-HP

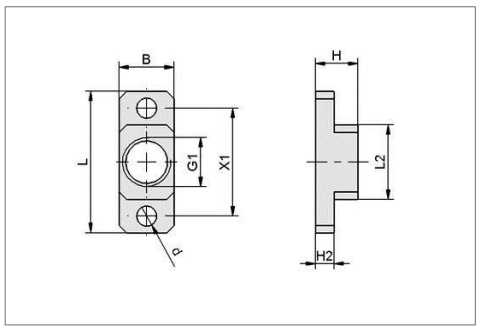
Needle stroke max. 18 mm to 25 mm (variable)

## Design Data Needle Grippers SNG-V-HP

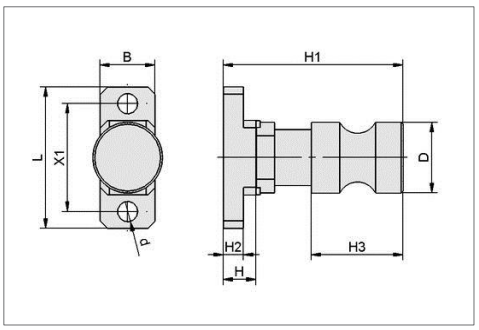



SNG-V-HP

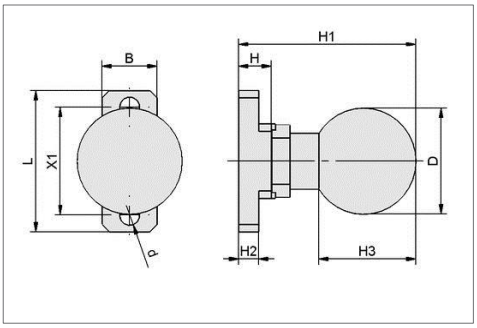
| Type | Dimensions in mm | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | B | G1 | G2 | G3 | G4 | H | H1 | L | X1 | Y2 | Z | W |
| **SNG-V 10 1.2 V-HP-18** | 48 | M5-IG | G1/8“-IG | M5-IG | M5-IG | 87.2 | 97,4 | 237 | 29 | 29 | 18 | 45° |
| **SNG-V 6 1.5 V-HP-25** | 48 | M5-IG | G1/8“-IG | M5-IG | M5-IG | 87.2 | 111,6 | 229 | 29 | 29 | 25 | 45° |




BEF-PL




HTS-A2 AP SNG

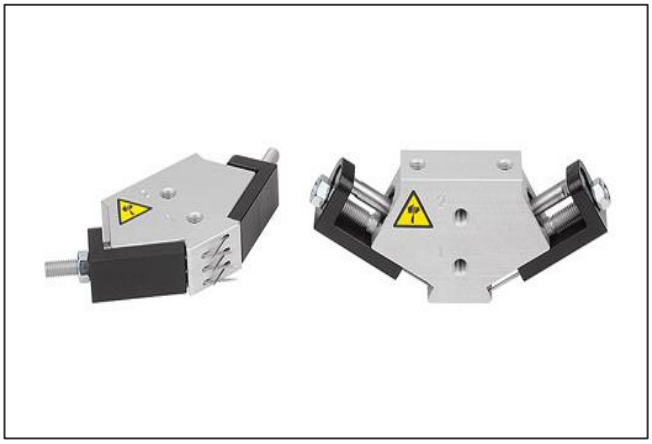



HTS-A3 AP SNG

| Type | Dimensions in mm | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | B | d | D | G1 | H | H1 | H2 | H3 | L | L2 | X1 |
| **BEF-PL 11.5x15x38 G1/4-IG SNG** | 15 | 5.5 | | G1/4“-IG | 11.5 | | 5 | | 38 | 20 | 29 |
| **HTS-A2 AP SNG** | 15 | 5.5 | 19 | | 8.9 | 49 | 5.5 | 25 | 38 | | 29 |
| **HTS-A3 AP SNG** | 15 | 5.5 | 28.5 | | 8.9 | 48.3 | 5.5 | 26.4 | 38 | | 29 |

# Needle Grippers SNG-V-S

Needle stroke 0 mm to 5 mm (variable)

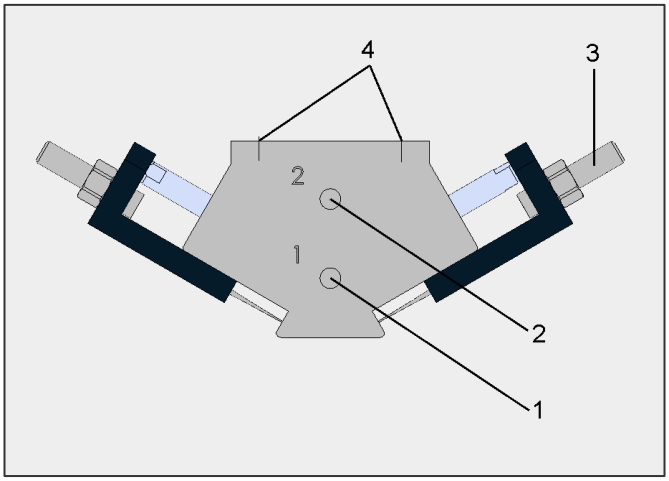


Needle grippers SNG-V-S

## Suitability for Industry-Specific Applications

## Applications

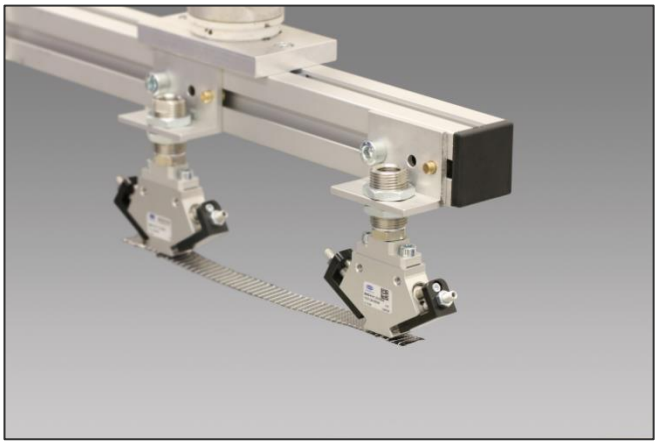
- Needle grippers for handling non-rigid or highly porous materials
- Process-safe handling of narrow, porous materials
- Low weight for use in dynamic processes




System design needle gripper SNG-V-S

## Design

- Robust aluminum housing, 15 mm wide
- 6 intersecting needles with diameter 0.8mm or 1.2 mm
- Insertion angle of 30°
- Double acting pneumatic cylinder with central compressed air connection: (1) „needle out“ + (2) „needle in“
- Continuously adjustable stroke 0 to 5 mm (3)
- Optional mounting with holder system HTS (4) – side and top



Needle grippers SNG-V-S for handling narrow and porous workpieces

| Our Highlights… | Your Benefits… |
|---|---|
| • Intersecting needles | > High holding force, even for flexible workpieces |
| • Minimized contact surface | > Possible to handle small and narrow workpieces |
| • Double-acting pneumatic cylinders | > Very short cycle times |
| • Variable needle stroke | > Individual adaptation to different workpiece geometries |
| • Different mounting possibilities | > Perfect adaptation to further mounting elements |

# Needle Grippers SNG-V-S

Needle stroke 0 mm to 5 mm (variable)

## Ordering Data Needle Grippers SNG-V-S

| Type | Part Number |
|---|---|
| **SNG-V 6 0.8 V-S-5** | 10.01.29.00555 |
| **SNG-V 6 1.2 V-S-5** | 10.01.29.00539 |

## Ordering Data Spare Parts Needle Grippers SNG-V-S

| Type | Description | Part Number |
|---|---|---|
| **HTS-A2 AP SNG** | Holder system HTS-A2 | 10.01.29.00402 |
| **HTS-A3 AP SNG** | Holder system HTS-A3 | 10.01.29.00322 |
| **BEF-PL 38x15x11.5 G1/4-IG SNG** | Mounting plate / BEF-PL 11.5x15x38 G1/4-IG SNG | 10.01.29.00403 |
| **STV-W M5-AG 6** | Screw plug Elbow fitting | 10.08.02.00296 |

## Ordering Data – Wear Parts Set

| Type | For needle gripper | Description | Part Number |
|---|---|---|---|
| **ERS-SET SNG-V 0.8 5** | 10.01.29.00555 | 2 needle modules incl. needles of 0.8 mm | 10.01.29.00546 |
| **ERS-SET SNG-V 1.2 5** | 10.01.29.00539 | 2 needle modules incl. needles of 1.2 mm | 10.01.29.00556 |

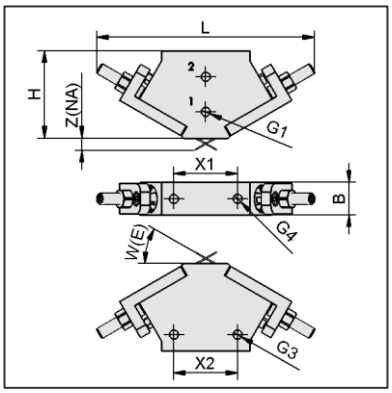
## Technical Data Needle Grippers SNG-V-S

| Type | Number of needles | Needle Diameter [mm] | Mounting | Stroke [mm] | Operating pressure [bar] | Operating temperature [°C]* | Mounting position | Weight [g] |
|---|---|---|---|---|---|---|---|---|
| **SNG-V 6 0.8 V-S-5** | 6 | 0.8 | 2 x M5 | 0…5 | 3…6 | 5…60 | any | 85 |
| **SNG-V 6 1.2 V-S-5** | 6 | 1.2 | 2 x M5 | 0…5 | 3…6 | 5…60 | any | 85 |

# Needle Grippers SNG-V-S

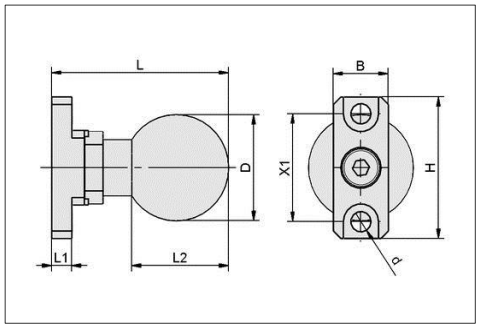
Needle stroke 0 mm to 5 mm (variable)

## Design Data Needle Grippers SNG-V-S

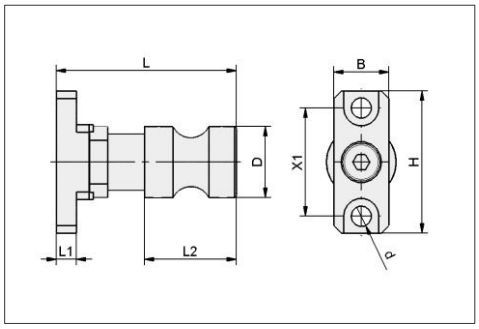



SNG-V-S

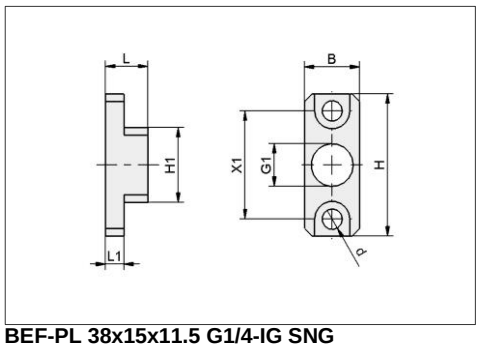
| Type | Dimensions in mm | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | B | G1 | G3 | G4 | H | L | X1 | X2 | Z | W |
| **SNG-V 6 0.8 V-S-5** | 15 | M5-IG | M5-IG | M5-IG | 39.8 | 115 | 29 | 29 | 5 | 30° |
| **SNG-V 6 1.2 V-S-5** | 15 | M5-IG | M5-IG | M5-IG | 39.8 | 115 | 29 | 29 | 5 | 30° |




**HTS-A3 AP SNG**




**HTS-A2 AP SNG**




**BEF-PL 38x15x11.5 G1/4-IG SNG**

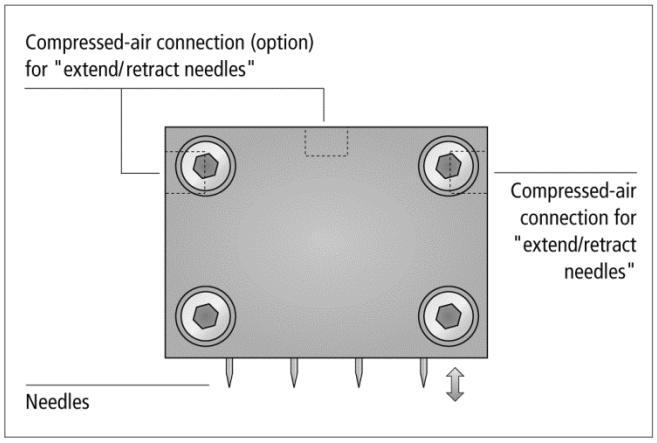
| Type | Dimensions in mm | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | B | D | H | L | L1 | L2 | d | G1 | X1 |
| **HTS-A2 AP SNG** | 15 | 19 | 38 | 49 | 5.5 | 25 | 5.5 | - | 29 |
| **HTS-A3 AP SNG** | 15 | 28.5 | 38 | 48.3 | 5.5 | 26.4 | 5.5 | - | 29 |
| **BEF-PL 38x15x11.5 G1/4-IG SNG** | 15 | - | 38 | 11.5 | 4.0 | | 5.5 | G1/4“-IG | 29 |

# Industry Solutions Composites

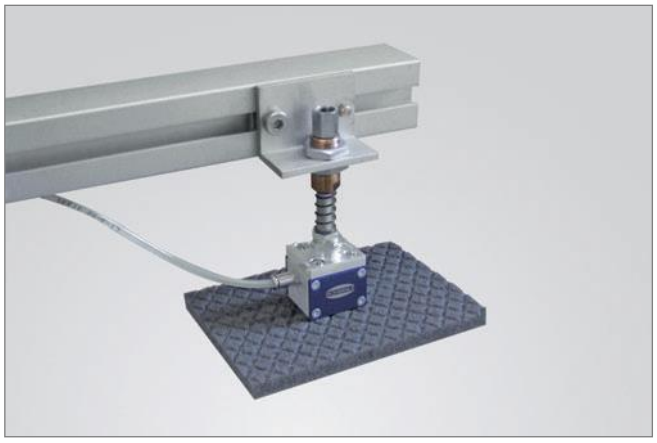
## Needle Grippers SNG-M

Needle stroke of 3 mm


Needle grippers SNG-M




System design needle grippers SNG-M



Needle grippers SNG-M being used for handling structured foam material

### Suitability for Industry-Specific Applications

### Applications

- Needle gripper for handling of flexible, non-rigid components
- Handling of materials which are difficult to grip with vacuum, such as composite fabrics, fleece, filters, woven fiberglass or carbon-fiber, woven aramide, foam materials etc.

### Design

- Robust aluminum housing
- 4 needles
- Activated by compressed-air, needles retracted by springs
- Insertion angle 30°

| Our Highlights… | Your Benefits… |
|---|---|
| • Very small size | > Optimal for installation in restricted spaces |
| • Needles retracted by springs | > Only one control signal |
| • Synchronized extension of the needles | > Safe handling of the workpieces |
| • Optionally available with adapter flange plate | > Perfect adaptation to other mounting components |

# Needle Grippers SNG-M

Needle stroke of 3 mm

## Designation Code Needle Grippers SNG-M

| Abbreviated designation | Number of needles | Needle diameter in mm |
|---|---|---|
| **Example SNG-M 4 0.8:** | | |
| **SNG-M** | 4 | 0.8 |
| **SNG-M** | 4 | 0.8 |

## Ordering Data Needle Grippers SNG-M

Needle gripper SNG-M is delivered assembled. The assembly consists of:
- Gripper of type SNG-M

Available spare parts: needle piston
Available accessories: mounting plate

## Needle Grippers SNG-M

| Type* | Part Number |
|---|---|
| **SNG-M 4 0.8** | 10.01.29.00001 |

*Note: Suitable screw in push fittings can be found under „Screw in push fittings“ in section „Filters and Connections“

## Ordering Data Spare Parts and Accessories Needle Grippers SNG-M

| Type | Needle piston* |
|---|---|
| **SNG-M 4 0.8** | 10.01.29.00094 |

*Set of 4 needles with guide pistons and springs

| Type | Mounting plate* |
|---|---|
| **SNG-M 4 0.8** | 10.01.29.00093 |

*Complete with mounting screws

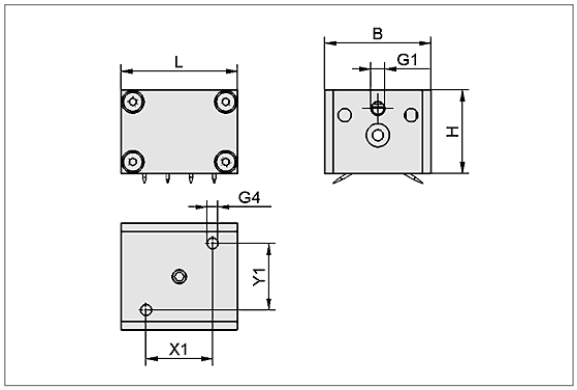
## Technical Data Needle Grippers SNG-M

| Type | Number of needles | Needle diameter [mm] | Stroke [mm] | Operating pressure [bar] | Operating temperature [°C] | Installation position | Weight [g] |
|---|---|---|---|---|---|---|---|
| **SNG-M 4 0.8** | 4 | 0.8 | 3 | 4...6 | 5...60 | Any | 80 |

# Needle Grippers SNG-M

Needle stroke of 3 mm

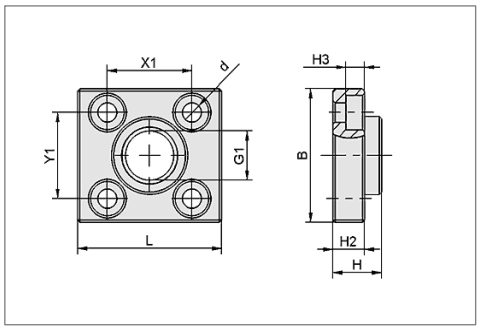
## Design Data Needle Grippers SNG-M




SNG-M 4 0.8

| Type | Dimensions in mm | | | | | | |
|---|---|---|---|---|---|---|---|
| | B | G1 | G4 | H | L | X1 | Y1 |
| **SNG-M 4 0.8** | 32 | M5-IG | M4-IG | 25 | 35 | 20 | 20 |

## Design Data Accessories Needle Grippers SNG-M




BEF-PL SNG

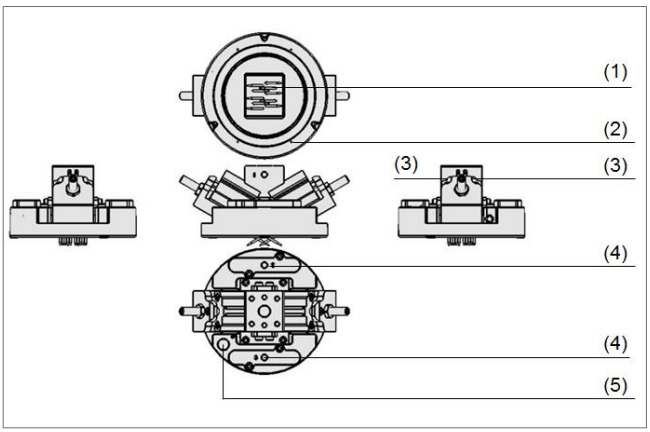
| Type | Dimensions in mm | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | B | d | G1 | H | H2 | H3 | L | X1 | Y1 |
| **Mounting plate BEF-PL SNG** | 31 | 4.5 | G1/4”-IG | 11.5 | 7.5 | 4.4 | 34 | 20 | 20 |

# Industry Solutions Composites

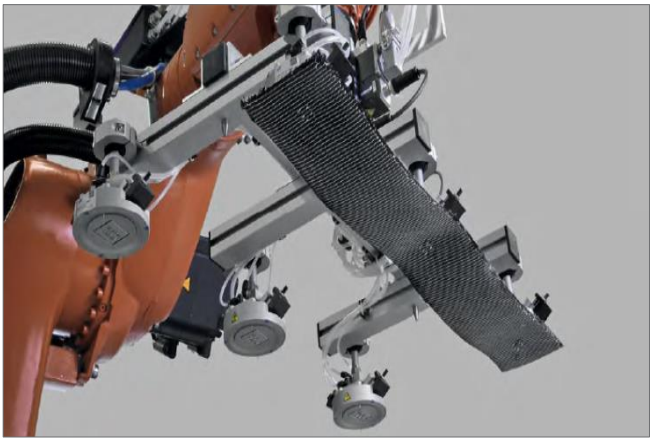
## Needle Grippers SNG-BV

Needle stroke 0 mm to 7 mm (variable)

Needle grippers SNG-BV




System design needle grippers SNG-BV



Needle gripper SNG-BV handling composite textiles

### Suitability for Industry-Specific Applications

### Applications

- Combined operating principles of needle gripper and floating suction pad
- Reliable separation of composite textiles with floating suction pad SBS
- Needle gripper SNG-V for energy-optimized handling of porous and fragile textiles and semi-finished products
- Precise handling by vertical needles

### Design

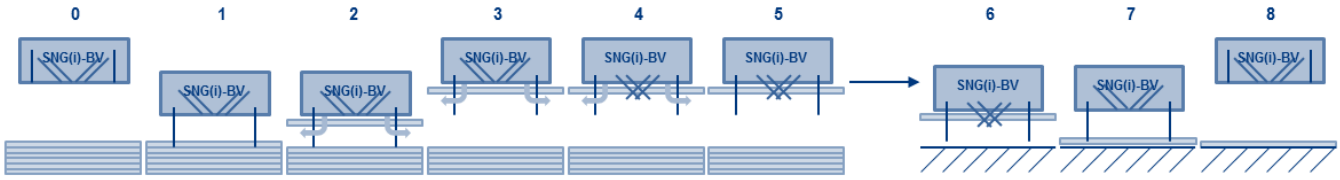
- 10 intersecting needles with diameter of 1.2 mm and insertion angle of 30° (1)
- Vertical single-acting needles (2), compressed air connection (4)
- Compressed air connections for interseting needles extension/retraction (3)
- Compressed air connection for floating suction pad SBS (5)

| Our Highlights… | Your Benefits… |
|---|---|
| • Floating suction pad with Bernoulli principle | > Reliable separation |
| • Gripping of the work piece with intersecting needles | > Secure handling of fragile workpieces and no compressed air consumption during the handling process |
| • Adjustable needle stroke for intersecting needles | > Individual adjustment to different thickness workpieces |
| • Four needles extract vertically to fix and accurately handle the workpiece. | > Air flow of closely positioned SBS floating suction pads does not influence the position of the workpiece |
| • Handling with and without suction pad SBS possible | > Flexible sequence of operations in the gripper |

# Needle Grippers SNG-BV

Needle stroke 0 mm to 7 mm (variable)

## Designation Code Needle Grippers SNG-BV




- Precise pick (1, 2) & place ensured by vertical needles ( 6, 7)
- Reliable seperation by SBS Suction Pad (2)
- Energy optimized gripping and conveyance (intersecting needles take over from floating suction pad SBS) thus no compressed air consumption during transport (4, 5, 6)

## Ordering Data Needle Grippers SNG-BV

| Type | Part Number |
|---|---|
| **SNG-BV 10 1.2 V 7 100SF** | 10.01.29.00481 |

## Ordering Data Spare Parts Needle Grippers SNG-BV

| Type | Description | Part Number |
|---|---|---|
| **BEF-PL-34X31-G1/4-IG-SNG** | Mounting plate 34x31 with mounting screws for connection G1/4“ IG (suitable to all grippers) | 10.01.29.00093 |
| **ERS-SET SNG-V-1.2 (intersecting needles)** | 2 Needle wedges with needles | 10.01.29.00238 |
| **ERS-SET SNG-M 0.8 (vertical needles)** | 4 Needle pistons with needles | 10.01.29.00094 |
| **GUMM-PUF 4x8** | Elastomer buffer made of the material HT1 | 10.01.01.12593 |

## Technical Data – complete gripper

| Type | Operating temperatur [°C] | Weight [g] |
|---|---|---|
| **Needle gripper SNG-BV** | 5…60 | 600 |

## Technical Data – individual components

| Type | Number of needles | Needle diame-ter [mm] | Additional function | Stroke [mm] | Operating pressure [bar] | Insertion angle [°] |
|---|---|---|---|---|---|---|
| **Intersecting needles** | 10 | 1.2 | Variable stroke, double acting | 0…7 | 3…7 | 30 |
| **Vertical positioning needles** | 4 | 0.8 | Single acting | 0…9 | 4…6 | 90 |

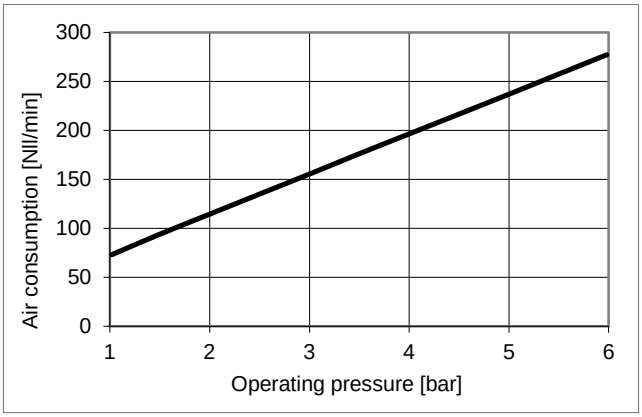
| Floating Suction Cups (SBS) | Holding Force [N]* | Air consumption [l/min]* | Operating pressure [bar] |
|---|---|---|---|
| | 42 | 235 | 1…6 |

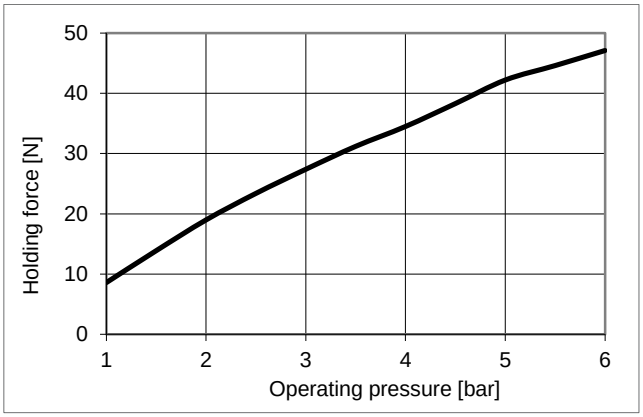
*at operating pressure of 5 bar

# Needle Grippers SNG-BV

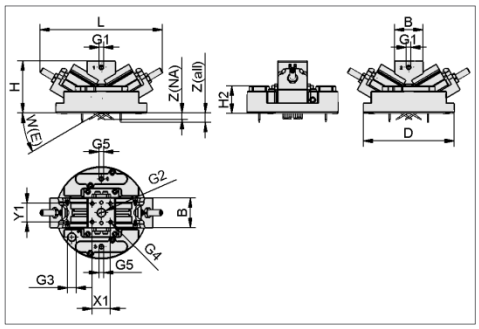
Needle stroke 0 mm to 7 mm (variable)

## Performance Data Floating Suction Pad SBS



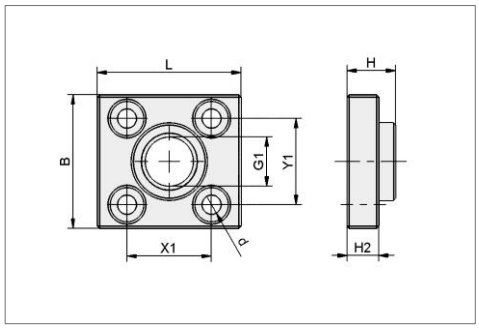

## Design Data Needle Grippers SNG-BV




SNG-BV

| Type | Dimensions in mm | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | B | D | H | H2 | L | X1 | Y1 | W (E) | Z(NA) | Z(all) | G1 | G2 | G3 | G4 | G5 |
| **SNG-BV 10 1.2 V 7 100 SF** | 32 | 100 | 56 | 29.7 | 149 | 20 | 20 | 30° | 7 | 10 | M5-IG | G1/8-IG | G1/8-IG | M4-IG | M5-IG |

## Design Data Accessories Needle Grippers SNG-BV




BEF-PL-34X31-G1/4-IG-SNG

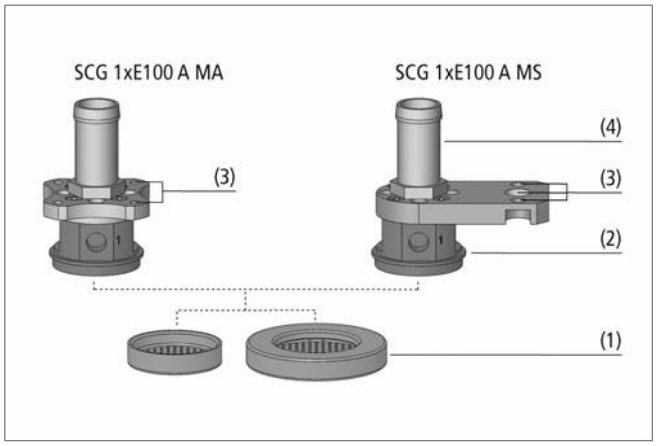
| Type | Dimensions in mm | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | B | d | G1 | H | H2 | H3 | L | X1 | Y1 |
| **BEF-PL-34X31-G1/4-IG-SNG** | 31 | 4.5 | G1/4“-IG | 11.5 | 7.5 | 4.4 | 34 | 20 | 20 |

# Industry Solutions Composites

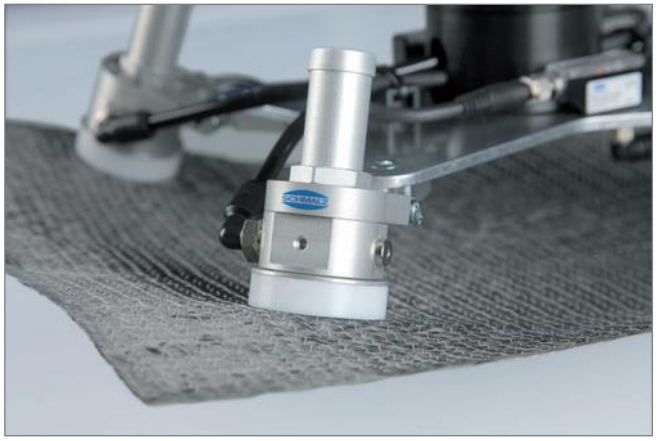
## Composite Grippers SCG

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

Composite grippers SCG




System design composite grippers SCG



Composite grippers SCG being used for handling composites

### Suitability for Industry-Specific Applications

### Applications

- Gripper for handling of composite materials
- Handling of non-rigid and flexible workpieces
- Handling of extremely thin, sensitive foils

### Design

- Quick-change contact surfaces (1) with various diameters
- Anodized aluminum main body with integrated vacuum generation (2)
- Base model with capability for axial mounting (MA) or sideways mounting (MS) (3)
- Controlled exhaust air (4)
- Two compressed-air connections for suction and blow-off
- Versions with silencer available as complete assembly or silencer seperately as an accessory

| Our Highlights… | Your Benefits… |
|---|---|
| • Suction surface with suction openings placed close to each other | > Prevents the workpiece from being sucked in or damaged |
| • Integrated vacuum generation | > Compact, ready-to-connect gripper unit |
| • Very high suction rate | > Safe gripping, even with porous materials |
| • High suction rate with minimum air consumption | > Low operating costs |
| • Controlled air discharge | > No contamination of process area |
| • Axial or side mounting of gripper | > Flexible mounting possibilities |

# Composite Grippers SCG

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

## Designation Code Composite Grippers SCG

| Abbreviated designation | Performance class of ejector | Blow-off function | Possibility for mounting | Silencer |
|---|---|---|---|---|
| **Example SCG 1xE100 A MA SDA:** | | | | |
| **SCG** | 1xE100 | A | MA | SDA |
| **SCG** | 1xE100 | A blow-off function | MA mounting axial<br>MS mounting sideways | SDA silencer axial |

## Ordering Data Composite Grippers SCG

Composite-Gripper SCG is supplied as an individual part (without suction surface). In order to receive a complete gripper the following ordering steps are required:
Composite-Gripper SCG (step 1) – available for axial or sideways mounting
Suction surface of type SAUG-FL (step 2) – available in various dimensions

Available accessories: Screw in push fitting (right-angle), component for discharging exhaust air

### Step 1: Composite Grippers SCG

| Type | Part Number |
|---|---|
| **SCG 1xE100 A MA** | 10.01.30.00092 |
| **SCG 1xE100 A MA SDA** | 10.01.30.00359 |
| **SCG 1xE100 A MS** | 10.01.30.00170 |
| **SCG 1xE100 A MS SDA** | 10.01.30.00360 |
| **SD G3/8-AG 80 SCG** | 10.01.30.00352 |

### Step 2: Suction area Composite Grippers SCG

| Type | Part Number |
|---|---|
| **SAUG-FL SCG 40 POM** | 10.01.30.00030 |
| **SAUG-FL SCG 60 POM** | 10.01.30.00031 |

## Ordering Data Accessories Composite Grippers SCG

| Type | Part Number |
|---|---|
| **STV-W G1/8-AG 6 KU*** | 10.08.02.00288 |
| **SAUG-FL SCG 40 POM**** | 10.01.30.00030 |
| **STV-W M5-AG 6 KU** | 10.08.02.00296 |
| **SAUG-FL SCG 40 POM** | 10.01.30.00030 |
| **ABL-FUEHR 19.5x46** | 10.01.30.00087 |

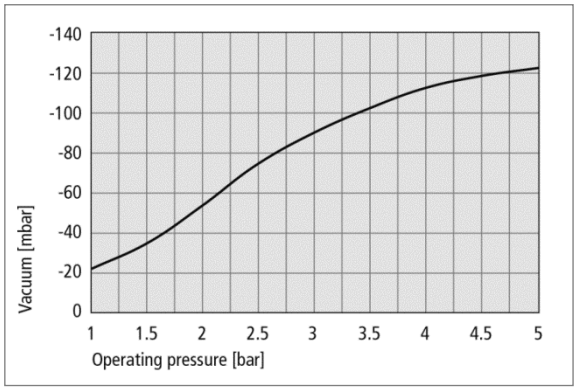
*Suitable for compressed-air connection “Suction“

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

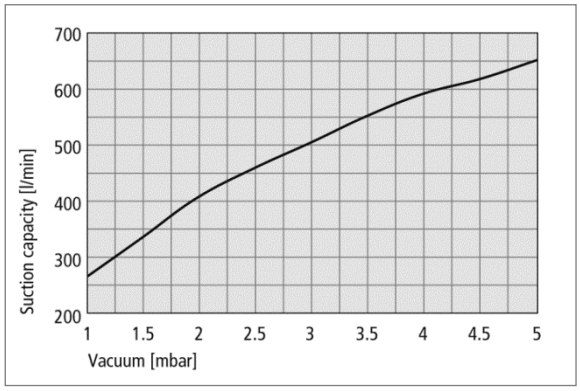
## Composite Grippers SCG

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

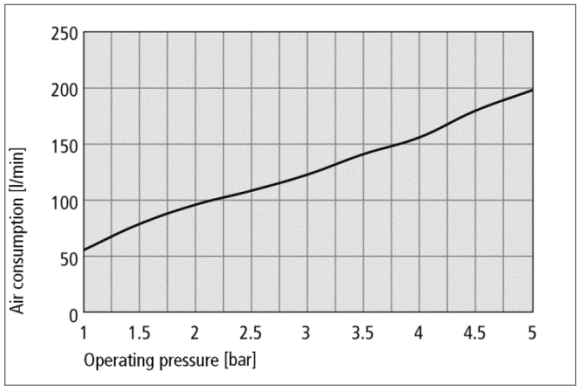
### Technical Data Composite Gripper SCG



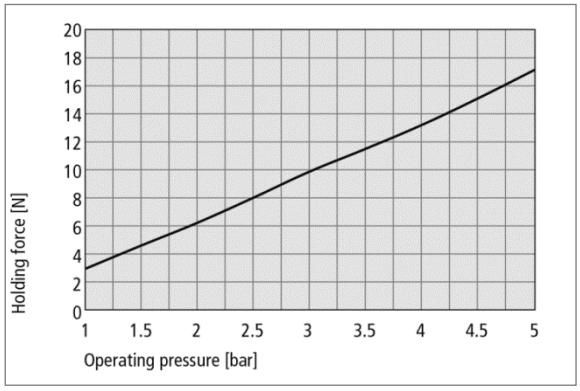

Achievable vacuum at various operating pressures



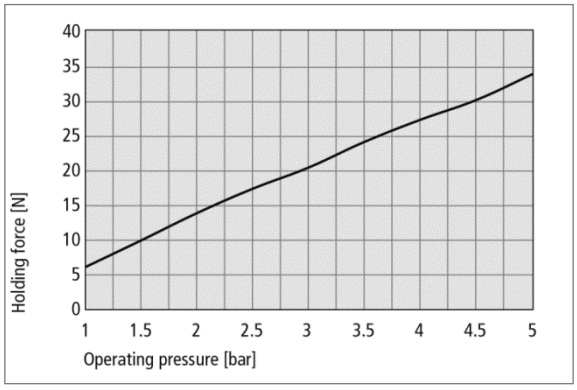

Suction rate at various operating pressures




Air consumption at various operating pressures




Holding force with suction area 40 at various operating pressures




Holding force with suction area 60 at various operating pressures

## Composite Grippers SCG

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

### Technical Data Composite Grippers SCG

| Type | Suction rate [l/min] | Air consumption [l/min] | Operating pressure [bar]* | Operating temperature [°C] | Recom. int. hose diam., suction [mm] | Recom. int. hose diam., blow off [mm] | Weight [g] |
|---|---|---|---|---|---|---|---|
| **SCG 1xE100 A MA** | 270…650 | 60…220 | 1...5 | 5...75 | 4 | 4 | 85 |
| **SCG 1xE100 A MS** | 270…650 | 60…220 | 1...5 | 5...75 | 4 | 4 | 109 |
| **SCG 1xE100 A MA SDA** | 270…650 | 60…220 | 1...5 | 5...75 | 4 | 4 | 180 |
| **SCG 1xE100 A MS SDA** | 270…650 | 60…220 | 1...5 | 5...75 | 4 | 4 | 224 |

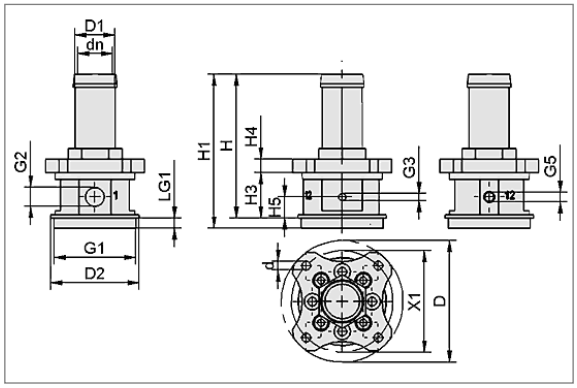
*The specified value can be equal for suction and blow-off. Operating pressures below 1 bar are possible but have to be tested individually.

### Technical Data Silencer for Composite Grippers SCG

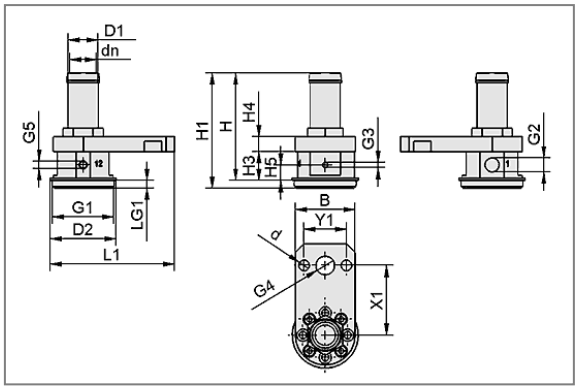
| Type | Sound absorption [dBA]* | Air consumption [l/min] | Operating pressure [bar]* | Operating temperature [°C] | Weight [g] |
|---|---|---|---|---|---|
| **SD G3/8-AG 80 SCG** | up to 12 dBA | 60…220 | 1...5 | 5...75 | 94.5 |

*Silencer reduces volume flow by up to 9%

### Design Data Composite Grippers SCG




SCG 1xE 100 A MA




SCG 1xE 100 A MS

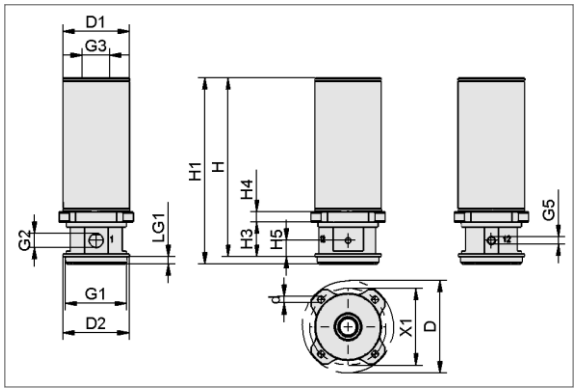
| Type | Dimensions in mm | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | B | d | dn | D | D1 | D2 | G1 | G2 | G3 | G4 |
| **SCG 1xE100 A MA** | - | 4.0 | 15.8 | 55 | 18 | 39.8 | M37x1-AG | G1/8"-IG | M4-IG | - |
| **SCG 1xE100 A MA SDA** | - | 4.0 | - | 55 | 40 | 39.8 | M37x1-AG | G1/8"-IG | G3/8"-IG | - |
| **SCG 1xE100 A MS** | 36 | 6.6 | 15.8 | - | 18 | 39.8 | M37x1-AG | G1/8"-IG | M4-IG | G1/4"-IG |
| **SCG 1xE100 A MS SDA** | 36 | 6.6 | - | - | 40 | 39.8 | M37x1-AG | G1/8"-IG | G3/8"-IG | G1/4"-IG |
| **SD G3/8-AG 80 SCG** | - | - | - | 40 | - | - | G3/8"-AG | G3/8"-IG | - | - |

| Type | Dimensions in mm | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | G5 | H | H1 | H3 | H4 | H5 | L1 | LG1 | Y1 | X1 |
| **SCG 1xE100 A MA** | M5-IG | 65 | 69.6 | 20.6 | 6 | 9.5 | - | 4.5 | - | 46 |
| **SCG 1xE100 A MA SDA** | M5-IG | 107 | 111.1 | 20.6 | 6 | 9.6 | - | 4.5 | - | 46 |
| **SCG 1xE100 A MS** | M5-IG | 65 | 69.6 | 17.6 | 9 | 9.5 | 74.9 | 4.5 | 25.5 | 42 |
| **SCG 1xE100 A MS SDA** | M5-IG | 107 | 111.1 | 17.6 | 9 | 9.6 | 74.9 | 4.5 | 25.5 | 42 |
| **SD G3/8-AG 80 SCG** | - | - | - | - | - | - | - | 7.5 | - | - |

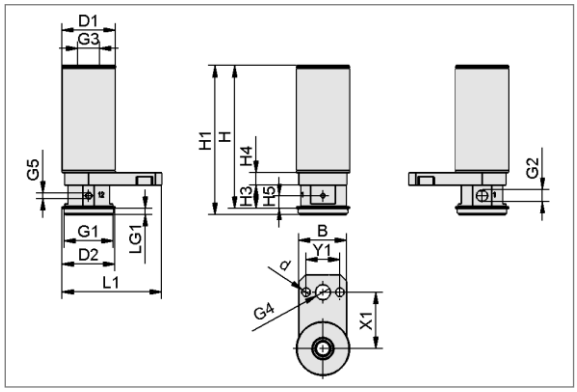
## Composite Grippers SCG

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

### Design Data Composite Grippers SCG –SDA Versions




SCG 1xE100 A MA SDA

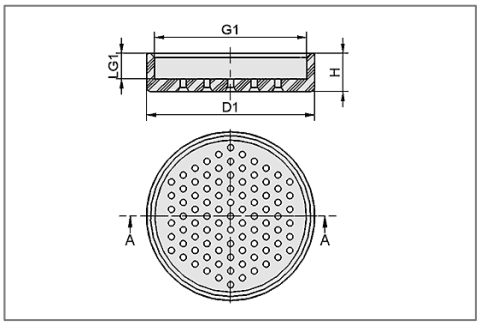



SCG 1xE100 A MS SDA

| Type | Dimensions in mm | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | B | d | dn | D | D1 | D2 | G1 | G2 | G3 | G4 |
| SCG 1xE100 A MA SDA | - | 4.0 | - | 55 | 40 | 39.8 | M37x1-AG | G1/8“-IG | G3/8“-IG | - |
| SCG 1xE100 A MS SDA | 36 | 6.6 | - | - | 40 | 39.8 | M37x1-AG | G1/8“-IG | G3/8“-IG | G1/4“-IG |

| Type | Dimensions in mm | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | G5 | H | H1 | H3 | H4 | H5 | L1 | LG1 | Y1 | X1 |
| SCG 1xE100 A MA SDA | M5-IG | 106.6 | 111.1 | 20.6 | 6.0 | 9.5 | - | 4.5 | - | 4.6 |
| SCG 1xE100 A MS SDA | M5-IG | 106.6 | 111.1 | 17.6 | 9.0 | 9.5 | 74.9 | 4.5 | 25.5 | 42.0 |

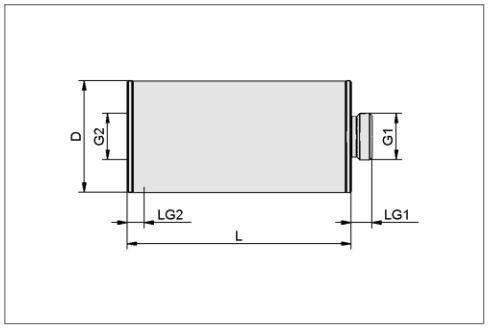
### Design Data Suction Area for Composite Gripper SCG




Suction area SAUG-FL

| Type | Dimensions in mm | | | | |
|---|---|---|---|---|---|
| | D1 | G1 | H | LG1 | Weight [g] |
| SAUG-FL SCG 40 POM | 40 | M37x1-AG | 9.5 | 6.5 | 6.5 |
| SAUG-FL SCG 60 POM | 60 | M37x1-AG | 9.5 | 6.5 | 16.0 |

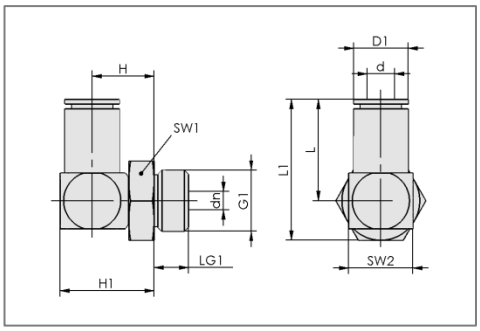
### Design Data Silencer SD for Composite Gripper SCG




Silencer SD

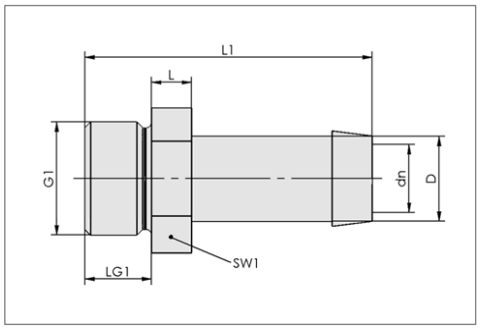
| Type | Dimensions in mm | | | | | |
|---|---|---|---|---|---|---|
| | D | G1 | G2 | L | LG2 | Weight [g] |
| **SD G3/8-AG 80 SCG** | 40 | G3/8“-AG | G3/8”-IG | 80 | 6 | 94.5 |

### Design Data Accessories Composite Gripper SCG




Screw in push fitting STV-W

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




Discharging exhaust air ABL-FUEHR

| Type | Dimensions in mm | | | | | | |
|---|---|---|---|---|---|---|---|
| | dn | D | G1 | L | L1 | LG1 | SW1 |
| **ABL-FUEHR 19.5x46** | 12.5 | 19.5 | G3/8”-AG | 5.0 | 46.0 | 7.5 | 19.0 |

# Industry Solutions Composites

## Floating Suction Pads SBS

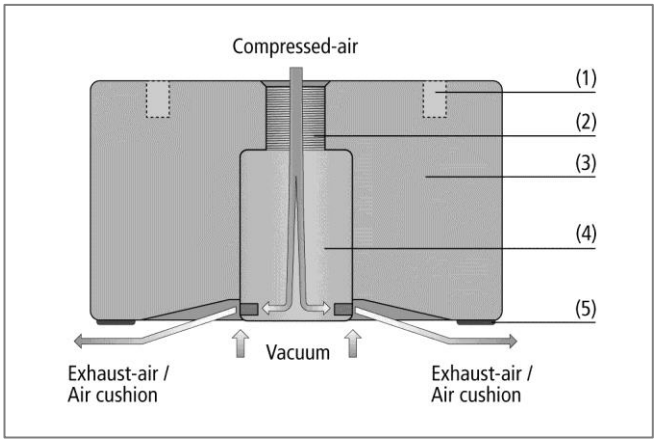
Diameter (Ø) from 20 mm to 100 mm

Floating suction pads SBS

### Suitability for Industry-Specific Applications

### Applications

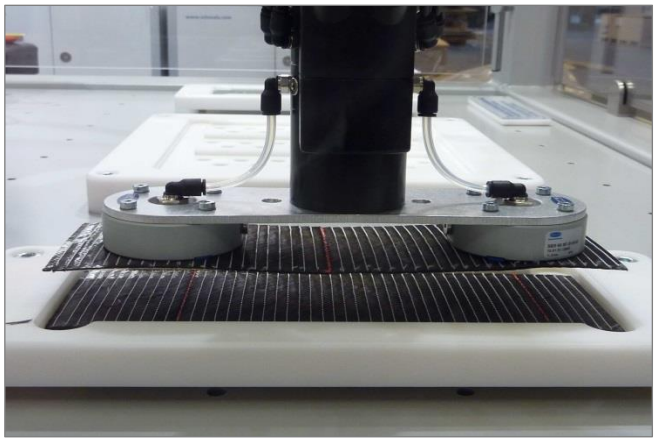
- Floating suction pads for the gentle low-contact handling of porous dry fabrics and prepregs
- Separation and destacking of porous material like dry fabrics




System design floating suction pads SBS

### Design

- Connection directly via four mounting threads on the top side (1) or via the vertical compressed-air connection (2)
- Horizontal compressed-air connection (closed with a plug)
- Anodized aluminum body with integrated Bernoulli nozzle (3)
- Streaming element (4) in two versions: Standard-Flow SF for airtight and slightly porous parts and High Flow HF with higher leakage compensation for porous workpieces
- Mark-free rubber buffer of special material HT1 on the bottom side of the suction pad (5)



Floating suction pads SBS for the handling of dry fabrics

| Our Highlights… | Your Benefits… |
|---|---|
| • Integrated vacuum generation on the Bernoulli principle | > Operation without ejector |
| • Suction pad “floats“ on an air cushion | > Low-contact handling |
| • High volume flow rate at a low vacuum | > Very good compensation of leakages |
| • No air is drawn in through the workpiece | > Reliable separation of thin, porous workpieces |
| • Elastomer buffer made of HT1 on the bottom side | > Absorption of lateral forces |

# Floating Suction Pads SBS

Diameter (Ø) from 20 mm to 100 mm

## Designation Code Floating Suction Pads SBS

| Abbreviated designation | Diameter in mm | Streaming element | Connection thread mechanical | Product addition |
|---|---|---|---|---|
| **Example SBS 20 SF M5-IG:** | | | | |
| **SBS** | 20 | SF | M5-IG | |
| **SBS** | 20<br>30<br>40<br>60<br>100 | HF high flow<br>SF standard flow | M5-IG (IG = female (F))<br>G1/8-IG | CS central support |

## Ordering Data Floating Suction Pads SBS

Floating suction pad SBS is delivered assembled. The assembly consists of:
Floating suction pad of type SBS – available in various diameters
Elastomer buffer made of the material HT1

Available spare parts: rubber buffer, central support

## Floating Suction Pads 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 40 SF G1/8-IG CS** | 10.01.01.12776 |
| **SBS 60 SF G1/8-IG** | 10.01.01.12641 |
| **SBS 60 HF G1/8-IG** | 10.01.01.12655 |
| **SBS 60 SF G1/8-IG CS** | 10.01.01.12777 |
| **SBS 100 SF G1/8-IG** | 10.01.01.12688 |
| **SBS 100 HF G1/8-IG** | 10.01.01.12689 |

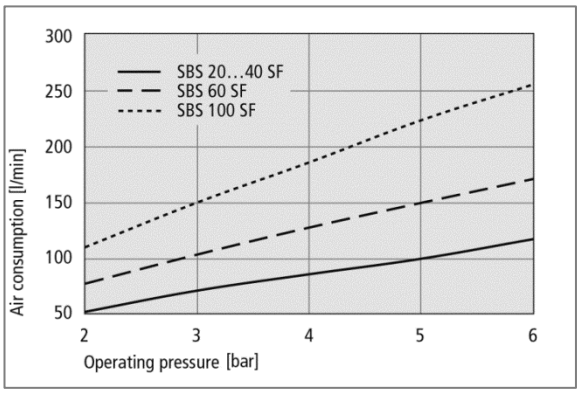
## Ordering Data Spare Parts Floating Suction Pads SBS

| Type | Rubber buffer | Central support |
|---|---|---|
| **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 40 SF G1/8-IG CS** | 10.01.01.12593 | 10.01.01.12780 |
| **SBS 60 SF G1/8-IG** | 10.01.01.12593 | - |
| **SBS 60 HF G1/8-IG** | 10.01.01.12593 | - |
| **SBS 60 SF G1/8-IG CS** | 10.01.01.12593 | 10.01.01.12780 |
| **SBS 100 SF G1/8-IG** | 10.01.01.12593 | - |
| **SBS 100 HF G1/8-IG** | 10.01.01.12593 | - |

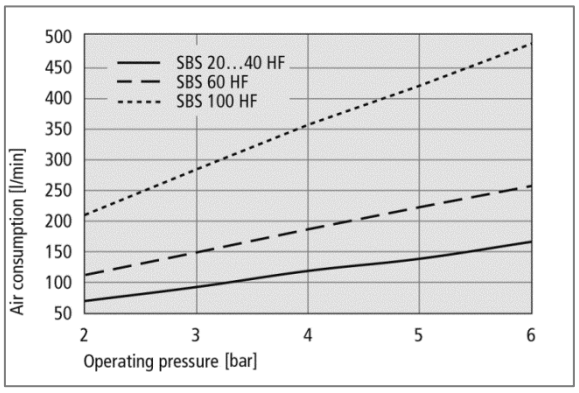
# Floating Suction Pads SBS

Diameter (Ø) from 20 mm to 100 mm

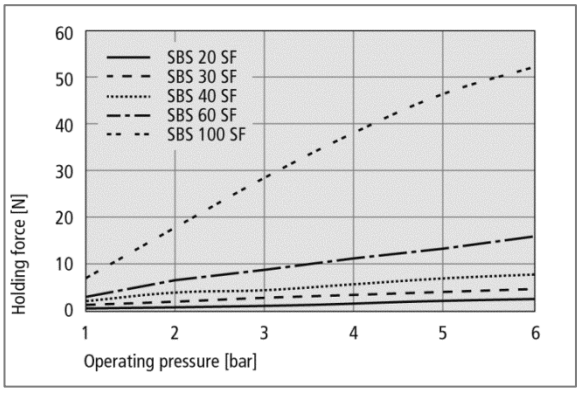
## Performance Data Floating Suction Pads SBS



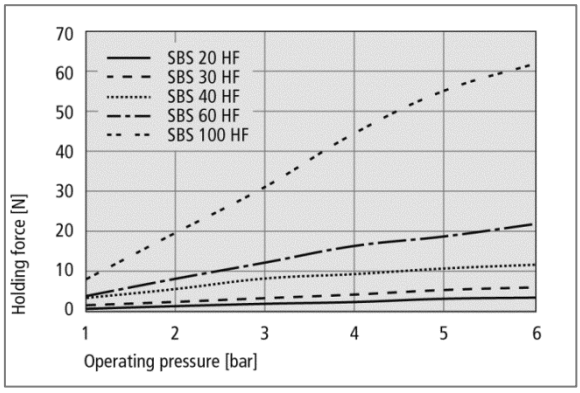

Air consumption SBS 20-100 SF




Air consumption SBS 20-100 HF




Holding force SBS 20-100 SF




Holding force SBS 20-100 HF

## Technical Data Floating Suction Pads SBS

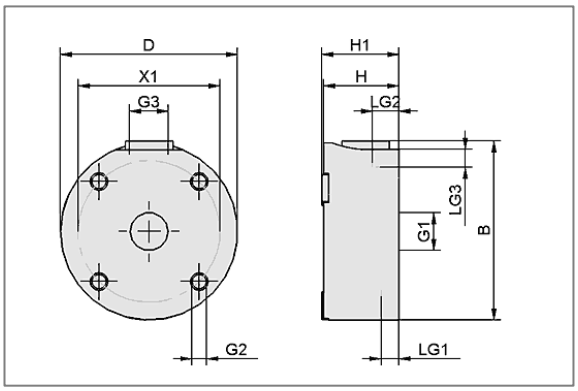
| Type | Holding force [N]* | Air consumption [l/min] * | Operating pressure [bar] | Weight [g] |
|---|---|---|---|---|
| **SBS 20 SF M5-IG** | 2.0 | 100 | 1...6 | 12 |
| **SBS 20 HF M5-IG** | 3.0 | 140 | 1...6 | 12 |
| **SBS 30 SF M5-IG** | 4.0 | 100 | 1...6 | 31 |
| **SBS 30 HF M5-IG** | 5.0 | 140 | 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 40 SF G1/8-IG CS** | 6.5 | 100 | 1...6 | 53 |
| **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 60 SF G1/8-IG CS** | 13.0 | 150 | 1...6 | 120 |
| **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 an operating pressure of 5 bar

# Floating Suction Pads SBS

Diameter (Ø) from 20 mm to 100 mm

## Design Data Floating Suction Pads SBS




SBS 20 to 100

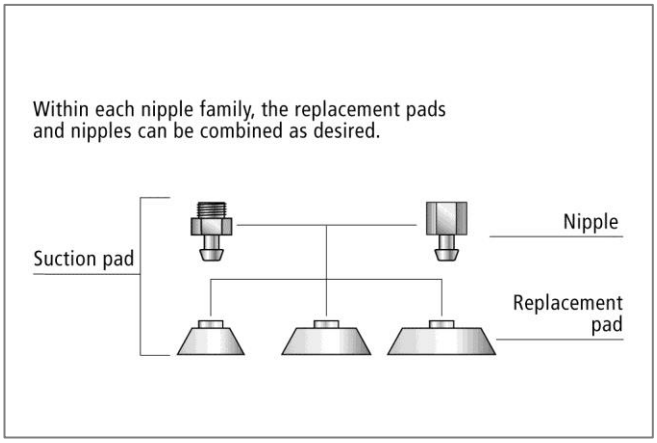
| Type | Dimensions in mm | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | B | D | G1 | G2 | G3 | H | H1 | LG1 | LG2 | LG3 | X1 |
| **SBS 20 SF M5-IG** | 22.2 | 20 | M5-IG | M3-IG | M5-IG | 17 | 17.4 | 5 | 6 | 6 | 15 |
| **SBS 20 HF M5-IG** | 22.2 | 20 | M5-IG | M3-IG | M5-IG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

# Industry Solutions Composites

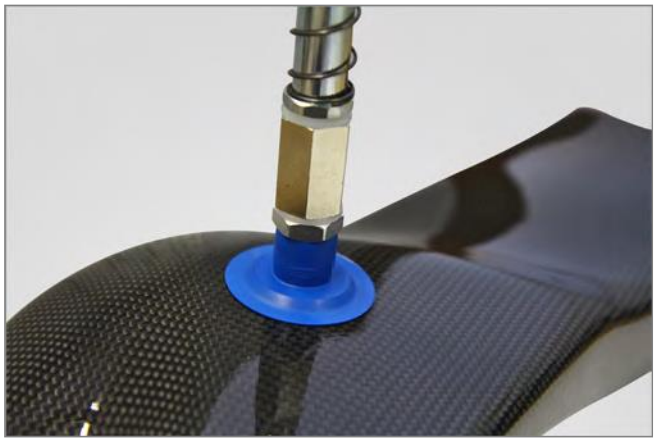
## Flat Suction Pads SGPN

Suction area (Ø) from 15 mm to 40 mm

Flat suction pads SGPN




System design flat suction pads SGPN



Flat suction pads SGPN being used for handling cured CFRP parts

### Suitability for Industry-Specific Applications

### Applications

- Round flat suction pad for handling of thin and flexible material like prepregs
- Handling of various composite materials
- Gentle handling due to flat, long-tapered sealing lip and inner support. No drawing in of material and preventing from leaving bumps on the workpiece

### Design

- Robust, wear-resistant suction pad SGPN with single sealing lip, consisting of suction pad SGP and connection nipple
- Nipple plugged into pad

| Our Highlights… | Your Benefits… |
|---|---|
| • Flat, long-tapered sealing lip and inner support | > No “drawing-in“ into the suction pad, i.e. very suitable for prepregs and foils |
| • 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 |
| • Material: HT1 | > Cup leaves no marks on the workpiece; even at high temperatures |
| • Material FPM | > Handling of material at temperatures up to 250°C like hot organo sheets |

# Flat Suction Pads SGPN

Suction area (Ø) from 15 mm to 40 mm

## Designation Code Flat Suction Pads 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<br>to<br>40 | HT1-60<br>NK-40<br>SI-50<br>FPM-65 | M5-AG (AG = male (M))<br>G1/8-AG<br>G1/8-IG (IG = female (F))<br>G1/4-AG<br>G1/4-IG |

## Ordering Data Flat Suction Pads SGPN

Flat suction pad SGPN (elastomer part + connection nipple) is delivered unassembled. The delivery consists of:
Suction pad 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 pad SGP, connection nipple SA-NIP

## Flat Suction Pads SGPN

| Type | Fluorocaoutchouc FPM 65±5ShA | High temp material HT1 60±5ShA | Natural Rubber NK 40±5ShA | Silicone SI 50±5ShA |
|---|---|---|---|---|
| **SGPN 15 M5-AG** | - | 10.01.01.12396 | 10.01.01.11977 | 10.01.01.11980 |
| **SGPN 15 G1/8-AG** | 10.01.01.12921 | 10.01.01.12397 | 10.01.01.10315 | 10.01.01.11981 |
| **SGPN 15 G1/8-IG** | 10.01.01.13047 | 10.01.01.12398 | 10.01.01.10181 | 10.01.01.11982 |
| **SGPN 20 M5-AG** | - | - | 10.01.01.11978 | 10.01.01.11983 |
| **SGPN 20 G1/8-AG** | 10.01.01.12922 | - | 10.01.01.10316 | 10.01.01.11984 |
| **SGPN 20 G1/8-IG** | 10.01.01.13048 | - | 10.01.01.10180 | 10.01.01.11985 |
| **SGPN 24 M5-AG** | - | 10.01.01.12403 | 10.01.01.11979 | 10.01.01.11986 |
| **SGPN 24 G1/8-AG** | - | 10.01.01.12404 | 10.01.01.10317 | 10.01.01.11987 |
| **SGPN 24 G1/8-IG** | - | 10.01.01.12405 | 10.01.01.10182 | 10.01.01.11988 |
| **SGPN 30 G1/4-AG** | - | 10.01.01.12399 | 10.01.01.00791 | 10.01.01.11989 |
| **SGPN 30 G1/4-IG** | - | 10.01.01.12400 | 10.01.01.00790 | 10.01.01.11990 |
| **SGPN 34 G1/4-AG** | 10.01.01.12920 | - | 10.01.01.10831 | - |
| **SGPN 34 G1/4-IG** | 10.01.01.13046 | - | 10.01.01.10830 | - |
| **SGPN 35 G1/4-AG** | - | 10.01.01.12848 | 10.01.01.00793 | 10.01.01.12785 |
| **SGPN 35 G1/4-IG** | - | 10.01.01.12849 | 10.01.01.00792 | 10.01.01.12787 |
| **SGPN 40 G1/8-AG** | - | 10.01.01.12847 | 10.01.01.11739 | 10.01.01.12773 |
| **SGPN 40 G1/4-AG** | - | 10.01.01.12845 | 10.01.01.00795 | 10.01.01.12775 |
| **SGPN 40 G1/4-IG** | - | 10.01.01.12846 | 10.01.01.00794 | 10.01.01.12774 |

# Flat Suction Pads SGPN

Suction area (Ø) from 15 mm to 40 mm

## Ordering Data Spare Parts Suction Pads and Connection Nipples

| Type | Fluorocaoutchouc FPM 65±5ShA | High temp material HT1 60±5ShA | Natural Rubber NK 40±5ShA | Silicone SI 50±5ShA |
|---|---|---|---|---|
| **SGP 15** | 10.01.01.12908 | 10.01.01.12394 | 10.01.01.10318 | 10.01.01.10574 |
| **SGP 20** | 10.01.01.12909 | - | 10.01.01.10319 | 10.01.01.11571 |
| **SGP 24** | - | 10.01.01.12402 | 10.01.01.10320 | 10.01.01.10577 |
| **SGP 30** | - | 10.01.01.12395 | 10.01.01.00787 | 10.01.01.01064 |
| **SGP 34** | 10.01.01.12919 | | 10.01.01.10829 | - |
| **SGP 35** | - | 10.01.01.12811 | 10.01.01.00788 | 10.01.01.12784 |
| **SGP 40** | - | 10.01.01.12812 | 10.01.01.00789 | 10.01.01.12772 |

| Type | Connection nipple | Artikel-Nr. |
|---|---|---|
| **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-AG DN350 | 10.01.06.05735 |
| **SGPN 20 G1/8-IG** | SA-NIP N016 G1/8-IG DN350 | 10.01.06.05731 |
| **SGPN 24 M5-AG** | SA-NIP N016 M5-AG 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 DN350 | 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 N034 G1/4-AG DN550 | 10.01.01.00820 |
| **SGPN 35 G1/4-IG** | SA-NIP N034 G1/4-IG DN550 | 10.01.01.00819 |
| **SGPN 40 G1/8-AG** | SA-NIP N035 G1/8-AG DN500 | 10.01.01.11738 |
| **SGPN 40 G1/4-AG** | SA-NIP N035 G1/4-AG DN550 | 10.01.01.00822 |
| **SGPN 40 G1/4-IG** | SA-NIP N035 G1/4-IG DN550 | 10.01.01.00821 |

## Technical Data Flat Suction Pads SGPN

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

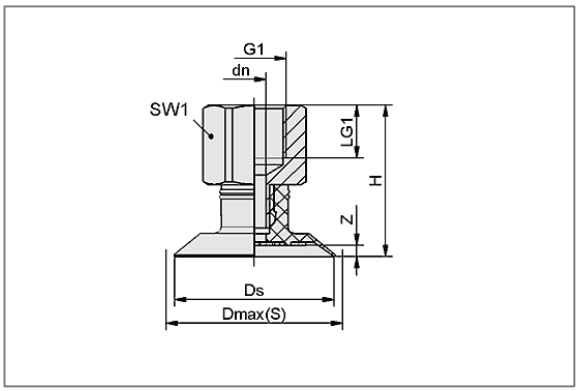
*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface – they do not include a safety factor

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

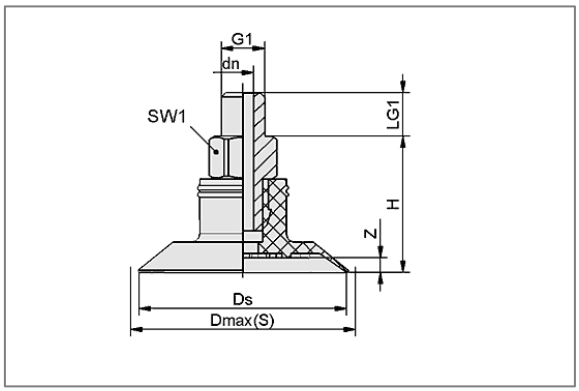
# Flat Suction Pads SGPN

Suction area (Ø) from 15 mm to 40 mm

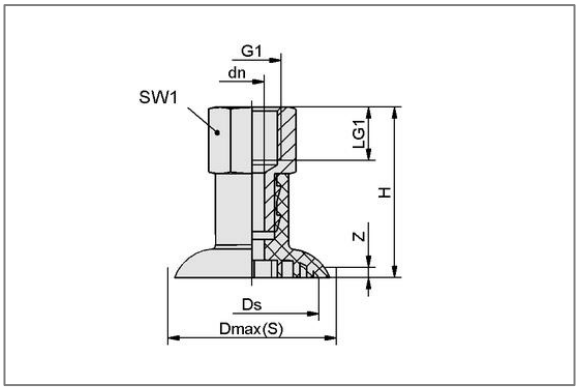
## Design Data Flat Suction Pads SGPN



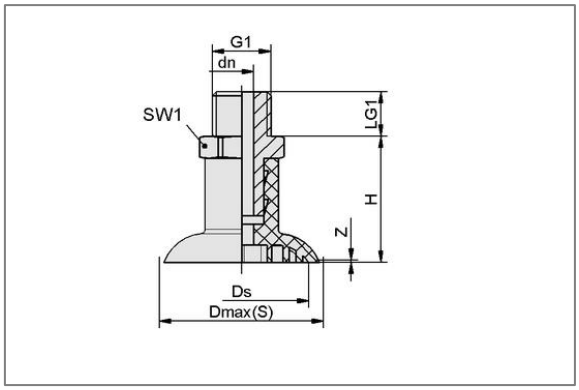

SGPN 15 to 40 IG




SGPN 15 to 40 AG




SGPN 35 IG




SGPN 35 AG

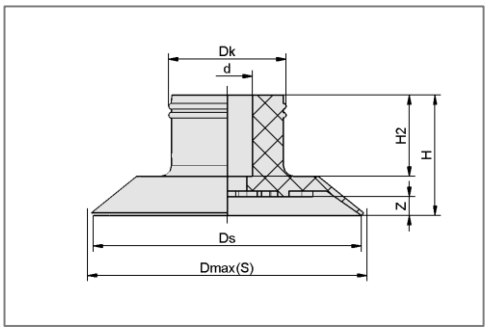
| Type | Dimensions in mm* | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | dn | Dmax(S) | Ds | G1 | H | LG1 | SW1 | Z (Stroke) |
| **SGPN 15 M5-AG** | 2.5 | 15.5 | 14.5 | M5-AG | 15.0 | 5.0 | 7 | 0.9 |
| **SGPN 15 G1/8-AG** | 3.5 | 15.5 | 14.5 | G1/8"-AG | 16.0 | 7.5 | 14 | 0.9 |
| **SGPN 15 G1/8-IG** | 3.5 | 15.5 | 14.5 | G1/8"-IG | 22.0 | 8.0 | 14 | 0.9 |
| **SGPN 20 M5-AG** | 2.5 | 22.0 | 20.0 | M5-AG | 15.4 | 5.0 | 7 | 1.5 |
| **SGPN 20 G1/8-AG** | 3.5 | 22.0 | 20.0 | G1/8"-AG | 16.4 | 7.5 | 14 | 1.5 |
| **SGPN 20 G1/8-IG** | 3.5 | 22.0 | 20.0 | G1/8"-IG | 22.4 | 8.0 | 14 | 1.5 |
| **SGPN 24 M5-AG** | 2.5 | 25.5 | 24.0 | M5-AG | 15.8 | 5.0 | 7 | 1.7 |
| **SGPN 24 G1/8-AG** | 3.5 | 25.5 | 24.0 | G1/8"-AG | 16.8 | 7. 5 | 14 | 1.7 |
| **SGPN 24 G1/8-IG** | 3.5 | 25.5 | 24.0 | G1/8"-IG | 22.8 | 8.0 | 14 | 1.7 |
| **SGPN 30 G1/4-AG** | 5.5 | 32.0 | 30.0 | G1/4"-AG | 27.2 | 10.0 | 17 | 2.0 |
| **SGPN 30 G1/4-IG** | 5.5 | 32.0 | 30.0 | G1/4"-IG | 37.2 | 12.0 | 17 | 2.0 |
| **SGPN 34 G1/4-AG** | 5.5 | 37.5 | 34.0 | G1/4"-AG | 28.0 | 10.0 | 17 | 1.4 |
| **SGPN 34 G1/4-IG** | 5.5 | 37.5 | 34.0 | G1/4"-IG | 38.0 | 12.0 | 17 | 1.4 |
| **SGPN 35 G1/4-AG** | 5.5 | 35.0 | 34.0 | G1/4"-AG | 28.6 | 10.0 | 17 | 0.5 |
| **SGPN 35 G1/4-IG** | 5.5 | 35.0 | 34.0 | G1/4"-IG | 38.5 | 12.0 | 17 | 0.5 |
| **SGPN 40 G1/8-AG** | 5.0 | 42.0 | 40.0 | G1/8"-AG | 25.6 | 10.0 | 17 | 2.3 |
| **SGPN 40 G1/4-AG** | 5.0 | 42.0 | 40.0 | G1/4"-AG | 25.6 | 10.0 | 17 | 2.3 |
| **SGPN 40 G1/4-IG** | 5.0 | 42.0 | 40.0 | G1/4"-IG | 35.6 | 12.0 | 17 | 2.3 |

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

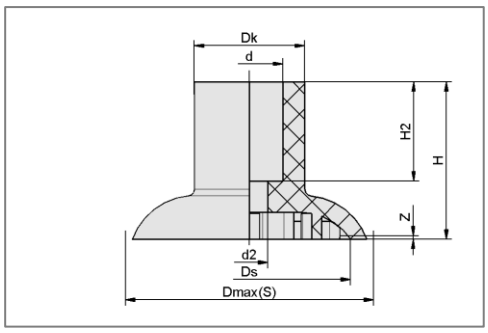
# Flat Suction Pads SGPN

Suction area (Ø) from 15 mm to 40 mm

## Design Data Accessories Flat Suction Pads 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 |

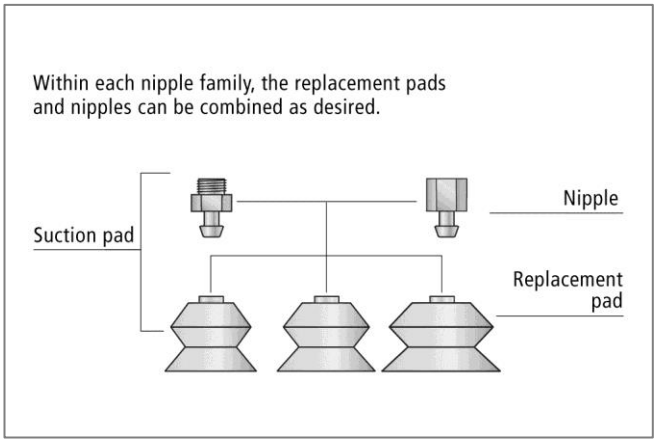
*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

# Industry Solutions Composites

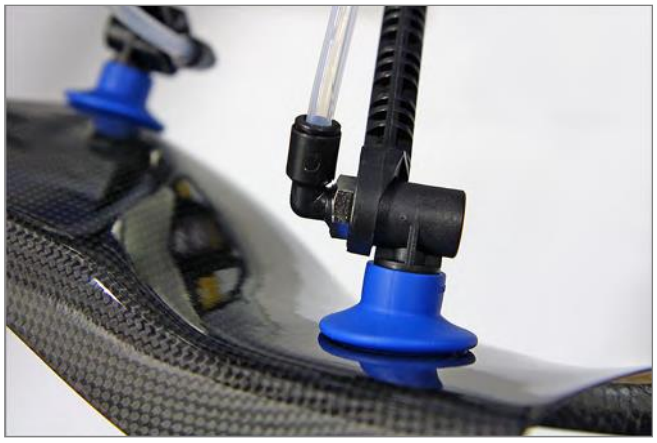
## Bellows Suction Pads FSGA (1.5 Folds)

Suction area (Ø) from 11 mm to 78 mm

Bellows suction pads FSGA (1.5 folds)




System design bellows suction pads FSGA (1.5 folds)



Bellows suction pads FSGA being used for handling curved CFRP parts

### Suitability for Industry-Specific Applications

### Applications

- Round, bellows suction pad with 1.5 folds for handling of extremely sensitve workpieces (optimum damping effect due to folds and smooth sealing lip)
- Handling of workpieces with uneven surfaces, such as pipes (folds permit optimal adaptation to concave and convex surfaces)

### Design

- Robust, wear-resistant suction pad FSGA with single sealing lip consisting of suction pad FGA with 1.5 folds and connection nipple
- All nipples plugged in
- Suction pads with a diameter of 25 mm or more with supports on the bottom

| 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 |

# Belows Suction Pads FSGA (1.5 Folds)

Suction area (Ø) from 11 mm to 78 mm

## Designation Code Bellows Suction Pads FSGA (1.5 Folds)

| Abbreviated designation | Suction area (Ø) in mm | Material and Shore hardness | Connection thread |
|---|---|---|---|
| **Example FSGA 14 HT1-60 G1/8-IG:** | | | |
| **FSGA** | **14** | **HT1-60** | **G1/8-IG** |
| **FSGA** | 11<br>to<br>78 | HT1-60<br>NBR-55<br>NK-45<br>SI-55 | M5-AG (AG = male (M))<br>G1/8-AG<br>G1/8-IG (IG = female (F))<br>G1/4-AG<br>G1/4-IG |

## Ordering Data Bellows Suction Pads FSGA (1.5 Folds)

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

- Suction pad 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 pad FGA, connection nipple SA-NIP

## Bellows Suction Pads FSGA (1.5 Folds)

| Type | Suction pad material / hardness in Shore A | | | |
|---|---|---|---|---|
| | High temp material<br>HT1 60±5ShA | Perbunan<br>NBR 55±5ShA | Natural Rubber<br>NK 45±5ShA | Silicone<br>SI 55±5ShA |
| **FSGA 11 G1/8-AG** | 10.01.06.01226 | 10.01.06.00075 | 10.01.06.00408 | 10.01.06.00085 |
| **FSGA 11 G1/8-IG** | 10.01.06.01232 | 10.01.06.00061 | 10.01.06.00407 | 10.01.06.00068 |
| **FSGA 11 M5-AG** | 10.01.06.01227 | 10.01.06.00076 | 10.01.06.00406 | 10.01.06.00086 |
| **FSGA 14 G1/8-AG** | 10.01.06.00932 | 10.01.06.00381 | 10.01.06.00387 | 10.01.06.00384 |
| **FSGA 14 G1/8-IG** | 10.01.06.00948 | 10.01.06.00380 | 10.01.06.00386 | 10.01.06.00383 |
| **FSGA 14 M5-AG** | 10.01.06.00933 | 10.01.06.00379 | 10.01.06.00385 | 10.01.06.00382 |
| **FSGA 16 G1/8-AG** | 10.01.06.01228 | 10.01.06.00077 | 10.01.06.00411 | 10.01.06.00087 |
| **FSGA 16 G1/8-IG** | 10.01.06.01233 | 10.01.06.00062 | 10.01.06.00410 | 10.01.06.00069 |
| **FSGA 16 M5-AG** | 10.01.06.01229 | 10.01.06.00078 | 10.01.06.00409 | 10.01.06.00088 |
| **FSGA 20 G1/8-AG** | 10.01.06.00936 | 10.01.06.00390 | 10.01.06.00396 | 10.01.06.00393 |
| **FSGA 20 G1/8-IG** | 10.01.06.00952 | 10.01.06.00389 | 10.01.06.00395 | 10.01.06.00392 |
| **FSGA 20 M5-AG** | 10.01.06.00937 | 10.01.06.00388 | 10.01.06.00394 | 10.01.06.00391 |
| **FSGA 22 G1/8-AG** | 10.01.06.01230 | 10.01.06.00079 | 10.01.06.00414 | 10.01.06.00089 |
| **FSGA 22 G1/8-IG** | 10.01.06.01234 | 10.01.06.00063 | 10.01.06.00413 | 10.01.06.00070 |
| **FSGA 22 M5-AG** | 10.01.06.01231 | 10.01.06.00080 | 10.01.06.00412 | 10.01.06.00090 |
| **FSGA 25 G1/8-AG** | 10.01.06.00940 | 10.01.06.00399 | 10.01.06.00405 | 10.01.06.00402 |
| **FSGA 25 G1/8-IG** | 10.01.06.00956 | 10.01.06.00398 | 10.01.06.00404 | 10.01.06.00401 |
| **FSGA 33 G1/4-AG** | 10.01.06.00941 | 10.01.06.00081 | 10.01.06.00330 | 10.01.06.00091 |
| **FSGA 33 G1/4-IG** | 10.01.06.00957 | 10.01.06.00064 | 10.01.06.00415 | 10.01.06.00071 |
| **FSGA 43 G1/4-AG** | 10.01.06.00942 | 10.01.06.00082 | 10.01.06.00418 | 10.01.06.00092 |
| **FSGA 43 G1/4-IG** | 10.01.06.00958 | 10.01.06.00065 | 10.01.06.00417 | 10.01.06.00072 |
| **FSGA 53 G1/4-AG** | 10.01.06.00943 | 10.01.06.00083 | 10.01.06.00326 | 10.01.06.00093 |
| **FSGA 53 G1/4-IG** | 10.01.06.00977 | 10.01.06.00066 | 10.01.06.00419 | 10.01.06.00073 |
| **FSGA 63 G1/4-AG** | 10.01.06.02476 | 10.01.06.00685 | 10.01.06.00687 | 10.01.06.00686 |
| **FSGA 63 G1/4-IG** | 10.01.06.02477 | 10.01.06.00691 | 10.01.06.00693 | 10.01.06.00692 |
| **FSGA 78 G1/4-AG** | 10.01.06.02478 | 10.01.06.00084 | 10.01.06.00340 | 10.01.06.00094 |
| **FSGA 78 G1/4-IG** | 10.01.06.02479 | 10.01.06.00067 | 10.01.06.00421 | 10.01.06.00074 |

# Belows Suction Pads FSGA (1.5 Folds)

Suction area (Ø) from 11 mm to 78 mm

## Ordering Data Spare Parts Suction Pads

| Type | Suction pad material / hardness in Shore A<br>High temp material<br>HT1 60±5ShA | <br>Perbunan<br>NBR 55±5ShA | <br>Natural Rubber<br>NK 45±5ShA | <br>Silicone<br>SI 55±5ShA |
|---|---|---|---|---|
| **FGA 11** | 10.01.06.01247 | 10.01.06.00095 | 10.01.06.00423 | 10.01.06.00098 |
| **FGA 14** | 10.01.06.00868 | 10.01.06.00370 | 10.01.06.00372 | 10.01.06.00371 |
| **FGA 16** | 10.01.06.01248 | 10.01.06.00096 | 10.01.06.00424 | 10.01.06.00099 |
| **FGA 20** | 10.01.06.00870 | 10.01.06.00373 | 10.01.06.00375 | 10.01.06.00374 |
| **FGA 22** | 10.01.06.01249 | 10.01.06.00097 | 10.01.06.00425 | 10.01.06.00100 |
| **FGA 25** | 10.01.06.00872 | 10.01.06.00376 | 10.01.06.00378 | 10.01.06.00377 |
| **FGA 33** | 10.01.06.00873 | 10.01.06.00130 | 10.01.06.00426 | 10.01.06.00126 |
| **FGA 43** | 10.01.06.00874 | 10.01.06.00131 | 10.01.06.00427 | 10.01.06.00127 |
| **FGA 53** | 10.01.06.00875 | 10.01.06.00132 | 10.01.06.00428 | 10.01.06.00128 |
| **FGA 63** | 10.01.06.02473 | 10.01.06.00688 | 10.01.06.00690 | 10.01.06.00689 |
| **FGA 78** | 10.01.06.02474 | 10.01.06.00133 | 10.01.06.00429 | 10.01.06.00129 |

## Ordering Data Spare Parts Suction Pad Nipples

| Type | Suction pad nipples [AG] | | Suction pad 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 |
| **FSGA 43 G1/4** | SA-NIP N018 G1/4-AG | 10.01.06.01065 | SA-NIP N018 G1/4-IG | 10.01.06.01066 |
| **FSGA 53 G1/4** | SA-NIP N018 G1/4-AG | 10.01.06.01065 | SA-NIP N018 G1/4-IG | 10.01.06.01066 |
| **FSGA 63 G1/4** | SA-NIP N018 G1/4-AG | 10.01.06.01065 | SA-NIP N018 G1/4-IG | 10.01.06.01066 |
| **FSGA 78 G1/4** | SA-NIP N019 G1/4-AG | 10.01.06.01959 | SA-NIP N019 G1/4-IG | 10.01.06.01960 |

## Technical Data Bellows Suction Pads 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 |
| **FSGA 43** | 22.80 | 64.5 | 9.250 | 60 | 6 | N 018 |
| **FSGA 53** | 51.30 | 95.0 | 26.250 | 75 | 6 | N 018 |
| **FSGA 63** | 85.00 | 135.0 | 39.000 | 75 | 6 | N 018 |
| **FSGA 78** | 137.40 | 218.0 | 76.000 | 70 | 6 | N 019 |

*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%

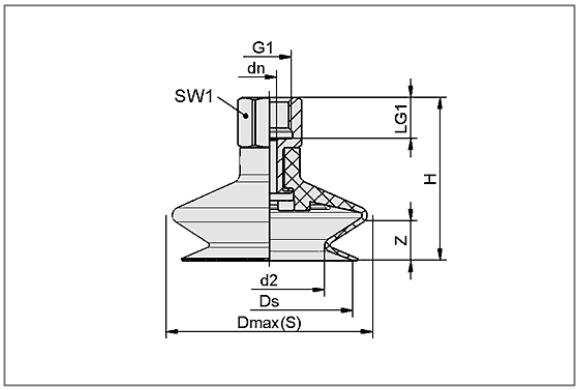
***The recommended hose diameter refers to a hose length of approx. 2 m

# Industry Solutions Composites

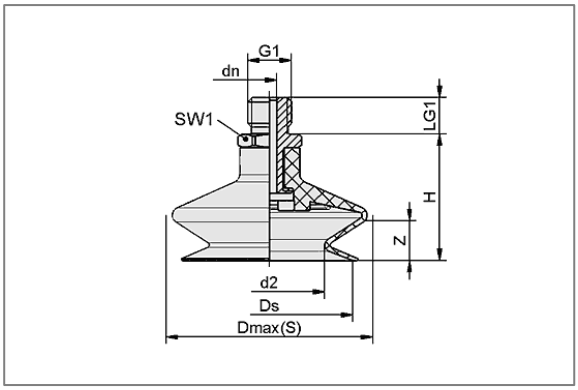
## Belows Suction Pads FSGA (1.5 Folds)

Suction area (Ø) from 11 mm to 78 mm

### Design Data Bellows Suction Pads FSGA (1.5 Folds)




FSGA 11 to 78 IG




FSGA 11 to 78 AG

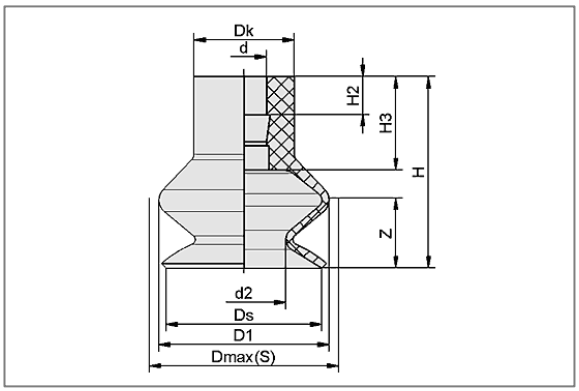
| Type | Dimensions in mm* | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | d2 | dn | Dmax (S) | Ds | G1 | H | LG1 | SW1 | Z(Stroke) |
| **FSGA 11 G1/8-AG** | 5.1 | 3.5 | 13.0 | 10.4 | G1/8"-AG | 22.0 | 7.5 | 14 | 4 |
| **FSGA 11 G1/8-IG** | 5.1 | 3.5 | 13.0 | 10.4 | G1/8"-IG | 28.0 | 8.0 | 14 | 4 |
| **FSGA 11 M5-AG** | 5.1 | 2.5 | 13.0 | 10.4 | M5-AG | 21.0 | 5.0 | 7 | 4 |
| **FSGA 14 G1/8-AG** | 5.0 | 3.5 | 14.5 | 12.5 | G1/8"-AG | 21.5 | 7.5 | 14 | 5 |
| **FSGA 14 G1/8-IG** | 5.0 | 3.5 | 14.5 | 12.5 | G1/8"-IG | 27.5 | 8.0 | 14 | 5 |
| **FSGA 14 M5-AG** | 5.0 | 2.5 | 14.5 | 12.5 | M5-AG | 20.5 | 5.0 | 7 | 5 |
| **FSGA 16 G1/8-AG** | 8.4 | 3.5 | 18.5 | 15.6 | G1/8"-AG | 25.2 | 7.5 | 14 | 7 |
| **FSGA 16 G1/8-IG** | 8.4 | 3.5 | 18.5 | 15.6 | G1/8"-IG | 31.2 | 8.0 | 14 | 7 |
| **FSGA 16 M5-AG** | 8.4 | 2.5 | 18.5 | 15.6 | M5-AG | 24.2 | 5.0 | 7 | 7 |
| **FSGA 20 G1/8-AG** | 11.0 | 3.5 | 21.0 | 18.1 | G1/8"-AG | 21.2 | 7.5 | 14 | 5 |
| **FSGA 20 G1/8-IG** | 11.0 | 3.5 | 21.0 | 18.1 | G1/8"-IG | 27.2 | 8.0 | 14 | 5 |
| **FSGA 20 M5-AG** | 11.0 | 2.5 | 21.0 | 18.1 | M5-AG | 20.2 | 5.0 | 7 | 5 |
| **FSGA 22 G1/8-AG** | 11.7 | 3.5 | 25.0 | 21.5 | G1/8"-AG | 25.0 | 7.5 | 14 | 6 |
| **FSGA 22 G1/8-IG** | 11.7 | 3.5 | 25.0 | 21.5 | G1/8"-IG | 31.0 | 8.0 | 14 | 6 |
| **FSGA 22 M5-AG** | 11.7 | 2.5 | 25.0 | 21.5 | M5-AG | 24.0 | 5.0 | 7 | 6 |
| **FSGA 25 G1/8-AG** | 9.9 | 3.5 | 26.5 | 22.5 | G1/8"-AG | 29.0 | 7.5 | 14 | 9 |
| **FSGA 25 G1/8-IG** | 9.9 | 3.5 | 26.5 | 22.5 | G1/8"-IG | 35.0 | 8.0 | 14 | 9 |
| **FSGA 33 G1/4-AG** | 17.0 | 4.4 | 38.0 | 30.0 | G1/4"-AG | 31.0 | 11.0 | 17 | 9 |
| **FSGA 33 G1/4-IG** | 17.0 | 4.4 | 38.0 | 30.0 | G1/4"-IG | 42.0 | 12.0 | 17 | 9 |
| **FSGA 43 G1/4-AG** | 21.9 | 4.4 | 47.5 | 38.0 | G1/4"-AG | 31.6 | 11.0 | 17 | 10 |
| **FSGA 43 G1/4-IG** | 21.9 | 4.4 | 47.5 | 38.0 | G1/4"-IG | 42.6 | 12.0 | 17 | 10 |
| **FSGA 53 G1/4-AG** | 33.0 | 4.4 | 60.0 | 50.0 | G1/4"-AG | 38.0 | 11.0 | 17 | 12 |
| **FSGA 53 G1/4-IG** | 33.0 | 4.4 | 60.0 | 50.0 | G1/4"-IG | 49.0 | 12.0 | 17 | 12 |
| **FSGA 63 G1/4-AG** | 44.5 | 4.4 | 68.0 | 60.0 | G1/4"-AG | 38.0 | 11.0 | 17 | 14 |
| **FSGA 63 G1/4-IG** | 44.5 | 4.4 | 68.0 | 60.0 | G1/4"-IG | 49.0 | 12.0 | 17 | 14 |
| **FSGA 78 G1/4-AG** | 54.0 | 8.2 | 84.5 | 74.0 | G1/4"-AG | 53.0 | 11.0 | 21 | 14 |
| **FSGA 78 G1/4-IG** | 54.0 | 8.2 | 84.5 | 74.0 | G1/4"-IG | 62.0 | 12.0 | 21 | 14 |

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

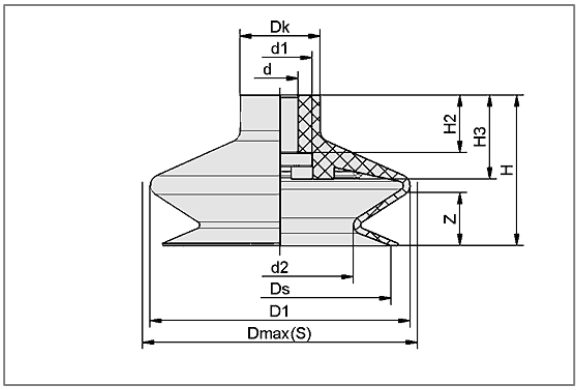
# Belows Suction Pads FSGA (1.5 Folds)

Suction area (Ø) from 11 mm to 78 mm

## Design Data Bellows Suction Pads FGA – Spare Parts for FSGA




FGA 11 to 25




FGA 33 to 78

| 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 |
| **FGA 43** | 8.0 | 14.5 | 21.9 | 45.9 | 18 | 47.5 | 38.0 | 27.6 | 13.0 | 17.1 | 10 |
| **FGA 53** | 8.0 | 14.5 | 33.0 | 58.6 | 18 | 60.0 | 50.0 | 34.0 | 13.0 | 19.0 | 12 |
| **FGA 63** | 8.0 | 14.5 | 44.5 | 67.0 | 18 | 68.0 | 60.0 | 34.0 | 13.0 | 18.8 | 14 |
| **FGA 78** | 11.8 | 21.8 | 54.0 | 83.0 | 25 | 84.5 | 74.0 | 47.0 | 19.7 | 31.4 | 14 |

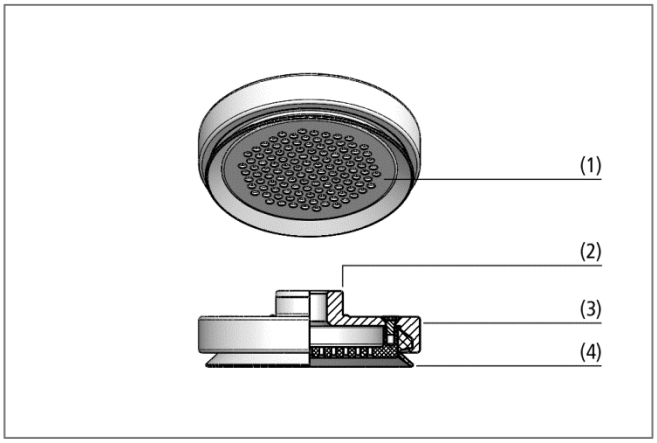
*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

# Industry Solutions Composites

## Prepreg Suction Plates SPL POM-NBR

Suction area (Ø) from 40 mm to 115 mm

Suction plates SPL POM-NBR




System design suction plate SPL POM-NBR

Suction plate SPL POM-NBR being used for handling composite textiles

### Suitability for Industry-Specific Applications

### Applications

- Suction plates for handling flexible materials e.g. prepregs or semi-finished products made of fiber composite material such as CFRP, GFRP
- Handling of sensitive workpieces that must not be deformed such as foils
- Prevention of fiber displacement by “sucking in” (no influence on the fiber orientation)
- Handling free of permanent mechanical marks

### Design

- Robust body made of aluminum (3); low construction height with spanner flat (2) for assembly
- Sealing ring (4) made of NBR
- Internal support made of POM with suction openings for evenly vacuum distribution (1)

| Our Highlights… | Your Benefits… |
|---|---|
| • Inner support for flat handling of flexible materials | > No “drawing in” of workpieces into the suction plate (no permanent deformation) |
| • Evenly vacuum distribution due to air extraction holes | > Reduced energy consumption and higher resistance to lateral forces |
| • Large air extraction holes for high flow rates | > Evenly flow and low surface pressure; no damage of sensitive workpieces |
| • Sealing ring for good sealing and increased friction | > Use with electric or pneumatic vacuum generators |

# Industry Solutions Composites

## Prepreg Suction Plates SPL POM-NBR

Suction area (Ø) from 40 mm to 115 mm

### Designation Code Suction Plates SPL POM-NBR

| Abbreviated designation | Suction area Ø in mm | Material | Connection thread |
|---|---|---|---|
| **Example SPL 40 POM-NBR G1/8-IG:** | | | |
| **SPL** | **40** | **POM-NBR** | **G1/8-IG** |
| **SPL** | 40<br>70<br>115 | POM-NBR | G1/8-IG (IG= female (F))<br>G1/4-IG |

### Ordering Data Suction Plates SPL POM-NBR

Suction plate SPL POM-NBR (sealing ring + support plate) is available with different diameters and is delivered as a ready to connect product.

### Suction Plates SPL POM-NBR

| Type | Part Number |
|---|---|
| **SPL 40 POM-NBR G1/8-IG** | 10.01.01.13104 |
| **SPL 70 POM-NBR G1/4-IG** | 10.01.01.13107 |
| **SPL 115 POM-NBR G1/4-IG** | 10.01.01.13110 |

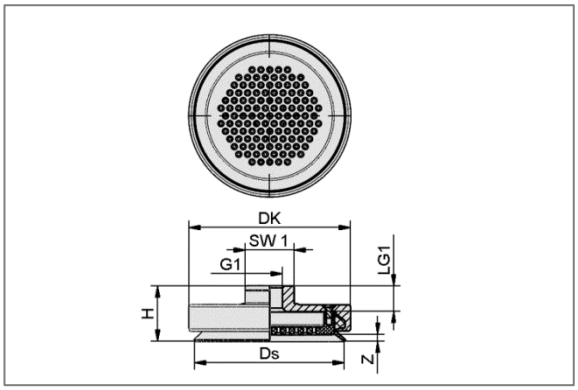
### Technical Data SPL POM-NBR

| Type | Suction force [N]* | Volume [cm³] | Recom. internal hose diameter d [mm]** |
|---|---|---|---|
| **SPL 40 POM-NBR G1/8-IG** | 70 | 5 | 4 |
| **SPL 70 POM-NBR G1/4-IG** | 217 | 24 | 6 |
| **SPL 115 POM-NBR G1/4-IG** | 600 | 91 | 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 safety factors

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

### Design Data Suction Plates SPL POM-NBR




SPL POM-NBR

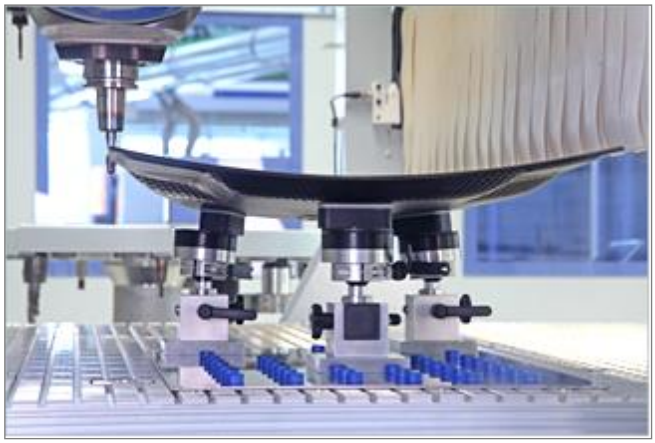
| Type | Dimensions in mm* | | | | | | |
|---|---|---|---|---|---|---|---|
| | Dk | Ds | G1 | H | LG1 | SW1 | Z (Stroke) |
| **SPL 40 POM-NBR G1/8-IG** | 42 | 39 | G1/8“-IG | 20.5 | 9.5 | 17 | 2 |
| **SPL 70 POM-NBR G1/4-IG** | 73 | 68 | G1/4“-IG | 24.5 | 11.5 | 22 | 3 |
| **SPL 115 POM-NBR G1/4-IG** | 118 | 113 | G1/4“-IG | 30.5 | 12.0 | 22 | 4 |

*Acceptable dimensional tolerances for rubber sealings according to DIN ISO 3302-1 M3

# Industry Solutions Composites

## Basic Holding Fixture BHF

Vacuum clamping system for manual 3D clamping

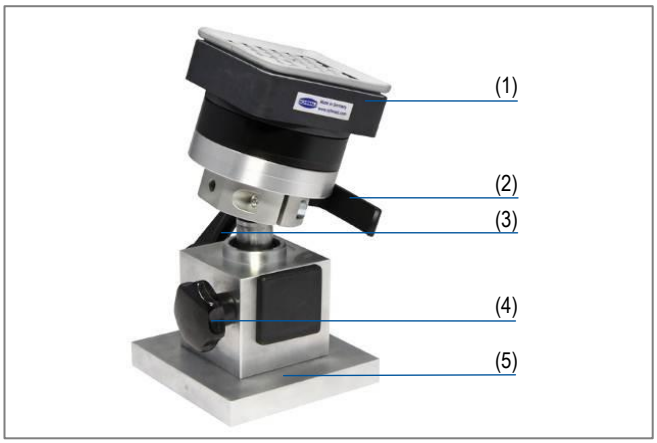


Basic holding fixture BHF for manual 3D clamping

### Suitability for Industry-Specific Applications

### Applications

- Vacuum clamping system for manual fixing of 3D free-form surfaces with complex geometry
- Used for manual processing or finishing of components, for example during sawing, drilling or sanding processes
- The BHF is positioned by hand on the machine table or workbench and manually adapted to the workpiece geometry
- Suitable for rigid workpieces
- Adjustable along the z, A and C-axes (manual)




System design basic holding fixture BHF

### Design

- Uni-Base suction pad mounting (5) with star grip (4) for adjusting the BHF to the desired height; can be fixed in any position using the clamping lever (3).
- Innospann suction cups (1) or bellows suction pads with pneumatic clamping are available as end pieces
- Flexible adaptation of the suction pad end piece to the work-piece using the ball joint; can be fixed in any position by using the clamping lever (2)
- Magnetic baseplate (Steel-Plate) for flexible positioning and preliminary clamping of the BHF, even without operating vacuum
- Also suitable for use on T-slot tables or other kinds of ma-chine tables

### Our Highlights…

- High holding force
- The suction pad end pieces are available in a variety of geometries with different functions
- Variance can be adjusted easily
- The BHF can be preliminarily mounted onto the machine table magnetically
- Different mountings are possible in the base plate

### Your Benefits…

> Process-safe and slip-free clamping of workpieces
> Optimum adaptation to a wide range of geometries and surfaces
> Set-up work is reduced to a minimum
> Simple and safe set-up of the components without clamping force (operating vacuum)
> Suitable for all standard machine tables

# Basic Holding Fixture BHF

Vacuum clamping system for manual 3D clamping

## Ordering Data Basic Holding Fixture

- A complete clamping system consists of Uni-Base suction cup mounting (step 1) and suction cups (step 2)

## Step 1: Select Suction Cup Mounting Uni-Base

Uni-Base for Innospann Steel-Plate

### Uni-Base UB

- For smooth surfaces with hose connection (UB…G) or for Innospan Steel-Plate (UB…ISST)
- Pre-fastening on machine table using vacuum or magnetic force

**Ordering Data Uni-Base**

| Type | Stroke [mm] | Swivel angle [degrees] | Part Number |
|---|---|---|---|
| **UB 135x135x156 29.5 15 G** | 30 | max. 15° | 10.01.15.00571 |
| **UB 135x135x156 29.5 15 ISST** | 30 | max. 15° | 10.01.15.00564 |

## Step 2: Select Suction Cup

SCB 63x119 KG-60 NBR 10 IS BHF

### Suction Cup Balance SCB

- Suction cup with angle compensation for 3D freeform surfaces
- Depressurized fixed workpiece support

**Ordering Data Suction Cup**

| Type | Suction area Ø [mm] | Stroke [mm] | Workpiece angle [degrees] | Part Number |
|---|---|---|---|---|
| **SCB 63x119 KG-60 NBR 10 IS BHF** | 63 | 10 | max. 10° | 10.01.15.00572 |
| **SCB 117x125 PYR-85 NBR 15 IS BHF** | 117 | 8 | max. 15° | 10.01.15.00719 |

SCB 117x125 PYR-85 NBR 15 IS BHF

**Ordering Data Spare Parts**

| Type | Suitable for… | Part Number |
|---|---|---|
| **Bellows suction pad SABT-C** | SCB 63x119 KG-60 NBR 10 IS BHF | 10.01.06.01878 |

RSC 85x120 VU1 40 IS BHF

### Reference Suction Cup - RSC

- Reference suction cup with angle compensation for 3D freeform surfaces
- Rounded surface for referencing

**Ordering Data Reference Suction Cup**

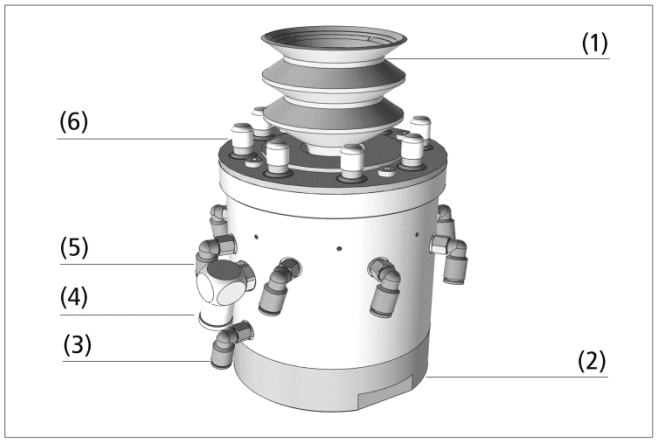
| Type | Suction area Ø [mm] | Stroke [mm] | Workpiece angle [degrees] | Part Number |
|---|---|---|---|---|
| **RSC 85x120 VU1 40 IS BHF** | 85 | 17.5 | max. 40° | 10.01.15.00587 |

# Industry Solutions Composites

## Suction cup balance SSCB

Vacuum clamping system for manual 3D clamping

Suction cup balance SSCB




System construction suction cup balance SSCB

SSCB – handling of a body part

### Suitability for Industry-Specific Applications

### Applications

- Gripping and clamping system working with maximum accuracy for handling and clamping of 3D-parts in manual or automated manufacturing processes
- To be used in assembly and joining processes (gluing, welding, brazing, etc.) in bodyshop applications, aerospace industry and all industries in which 3D free-form surfaces have to be gripped or clamped
- Making product lines more flexible to reduce setup times → reduction of batch sizes for a more precise match of the production output with the market demand

### Design

- Flexible bellows suction cup (1) for adapting perfectly to the workpiece
- Aluminum main body (2)
- Compressed air supply (3) for spring force
- Vacuum supply (4) for suction cup
- Compressed air supply (5) for releasing positioning pins
- Positioning pins (6) with padded tips that are gentle on the workpiece

| Our Highlights… | Your Benefits… |
|---|---|
| • End effector for precise positioning of workpieces | > Flexible set-up of gripping and clamping systems e.g. for assembly processes |
| • Software controlled reproduction of 3D-free-form surfaces using a 2D-reference surface | > Fully automated setup process for gripping and clamping systems |
| • Positioning pins are individually controlled and can be locked single or centrally | > Automated and immediate adaption to the workpiece contour |
| • Special material for the tip of the positioning pin | > Accurate and secure fixation of sheet metals and other complex shaped parts |

# Suction cup balance SSCB

Vacuum clamping system for manual 3D clamping

## Ordering Data Cup Balance SSCB

| Type | clamping of the positioning bolts | overall dimension SSCB [mm] | article-no |
|---|---|---|---|
| **SSCB 60x171 VU1 30-M6-IG FSG-EP** | single | 94x171 | 10.01.15.00850 |
| **SSCB 60x171 VU1 30-M6-IG FSG-ZP** | central | 94x171 | 10.01.15.00922 |

## Ordering Data Accessories

| Type | description | article-no. |
|---|---|---|
| **FSG 60 VU1 – G1/4 AG** | **Suction cup with sealing ring and washer support** | **10.01.15.00953** |
| **KAPP 7x10.5 SSCB** | Cap (round) to be used on the positioning pins | 10.01.15.00918 |

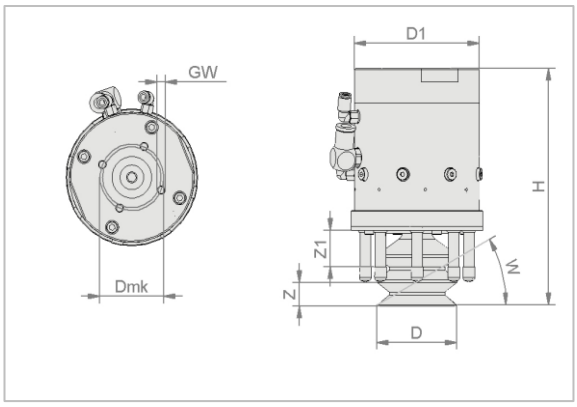
## Technical Data

| Type | Suction force [N]* | Pull-off force [N]** | Min. work-piece radius [mm] (con-vex) | Operating pressure positioning pins [bar] | | Max. normal force positioning pins [N] | Vacuum supply Connector Ø (outside/inside) | Compressed air access Connector Ø (outside/inside) |
|---|---|---|---|---|---|---|---|---|
| | | | | Compressed air fixation | Comressed air springforce | | | |
| **SSCB 60x171VU1 30-M6-IG FSG-EP** | 61,0 | 100 | 50 | 6 | Max. 2 | 400 | 1 x 8/6 | 9 x 4/2 |
| **SSCB 60x171VU1 30-M6-IG FSG -ZP** | 61,0 | 100 | 50 | 6 | Max. 2 | 400 | 1 x 8/6 | 2 x 4/2 |

**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

## Design Data Suction Plates

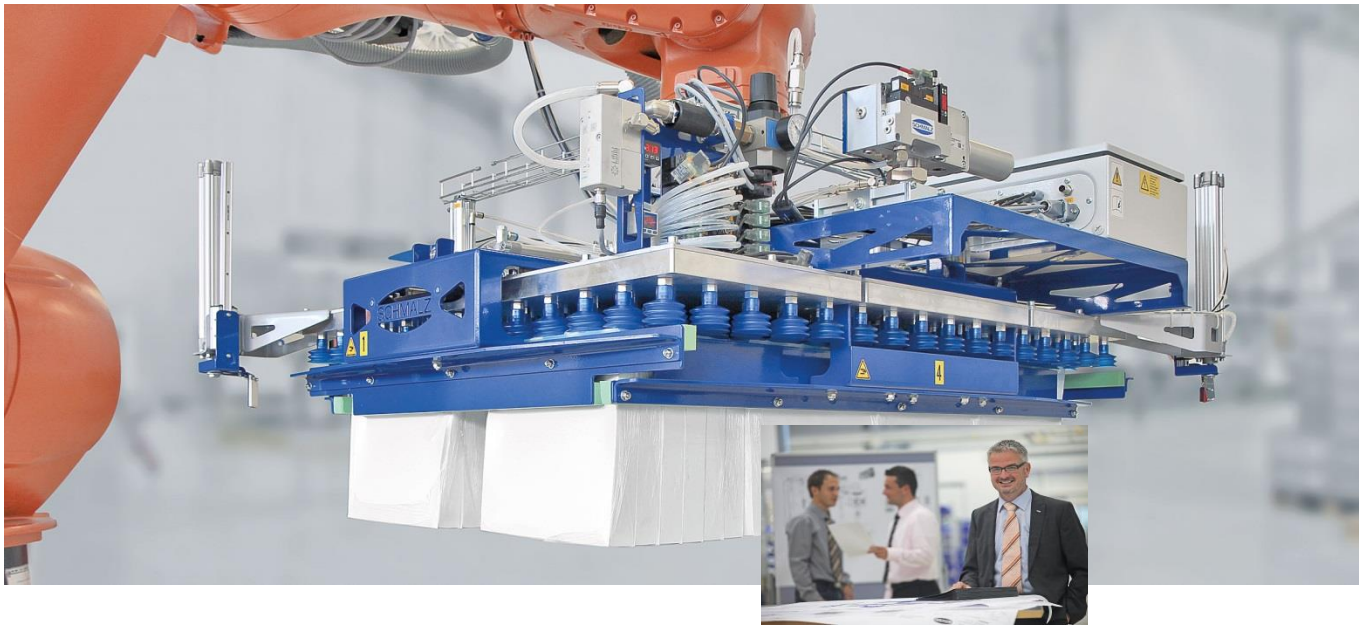



SSCB 60x171 VU1 30-M6-IG FSG…

| Type | D [mm] | D1 [mm] | H [mm] | Z [mm] | Z1 [mm] max. | W max. | GW | Dmk [mm] |
|---|---|---|---|---|---|---|---|---|
| **SSCB 60x171 VU1 30-M6-IG FSG-EP** | 60 | 94 | 171 | 30 | 46 | 30° | 4x M6 | 48 |
| **SSCB 60x171 VU1 30-M6-IG FSG ZP** | **60** | **94** | **171** | **30** | **46** | **30°** | **4x M6** | **48** |

# Industry Solutions Composites

## Vacuum Gripping Systems

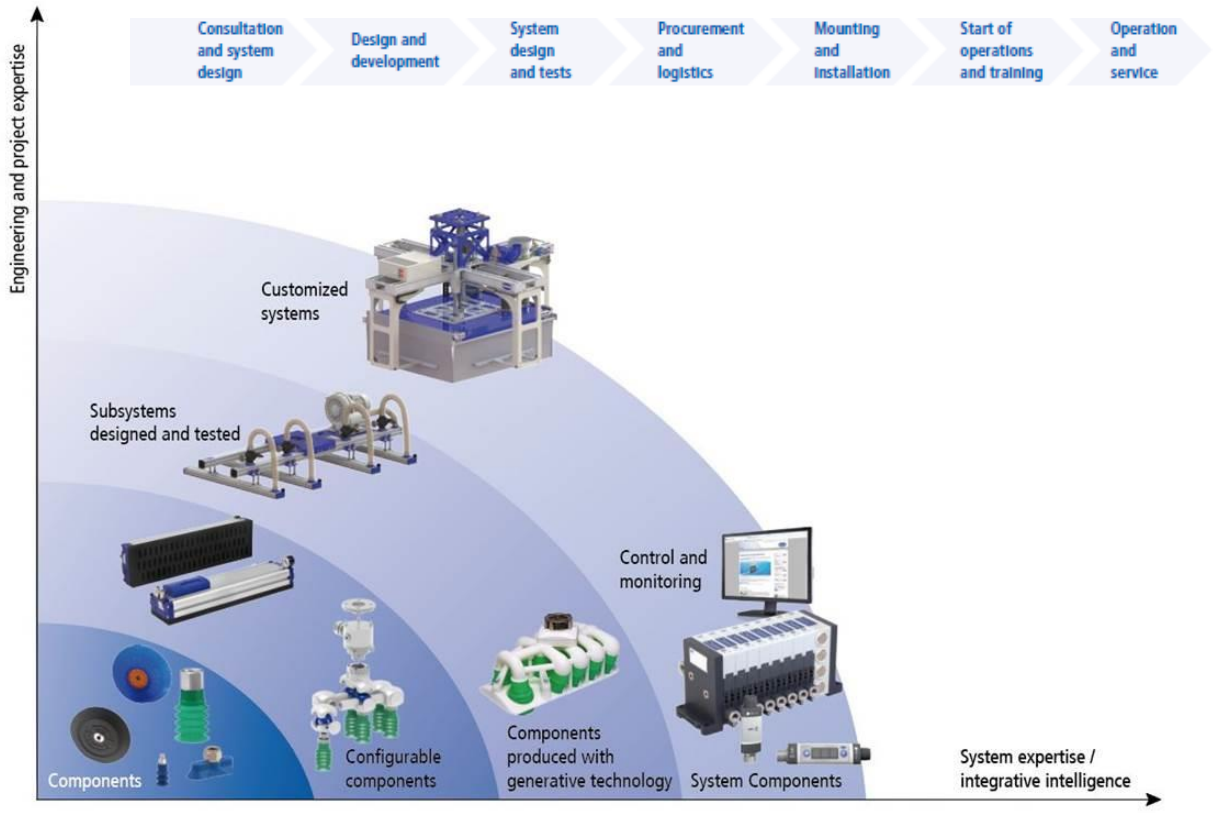




Our system consultants and designers have extensive knowledge in the field of vacuum technology, combined with decades of technical experience and plant engineering internationally. We understand your application requirements, leave it in our hands.

### Services with Added Value Throughout the Entire Life Cycle

Schmalz's complex vacuum gripping systems let you implement decisive productivity increases during automated processes. These gripping systems range from Layer Grippers and Vacuum Area Grippers to ready-to-install Vacuum Suction Spiders to be used in any area of the automation process.



# Industry Solutions Composites

## Vacuum handling systems

Vacuum lifters provide an ergonomic working environment. They help prevent health problems caused by lifting and moving heavy loads. Schmalz offers vacuum lifters with perfectly coordinated crane systems made of aluminum components. This means the crane systems are particularly responsive and support ergonomic work with the vacuum lifters.

Schmalz divides its product portfolio of vacuum lifters into vacuum tube lifters of the type Jumbo and vacuum lifting devices of the type VacuMaster.

### Tube Lifter Jumbo

Move goods weighing up to 300 kg quickly and easily

Lifting unit, operating unit, suction pads and vacuum generator configurable
Lifting and lowering the load using vacuum

### Lifting Device VacuMaster

Move heavy loads weghing up to serveral tons ergonomically and securely

Basic modules, operator handles, load beams and suction plates configurable
Lifting and lowering the load using a chain hoist

### Crane Systems

Aluminum crane systems and jib cranes for indoors

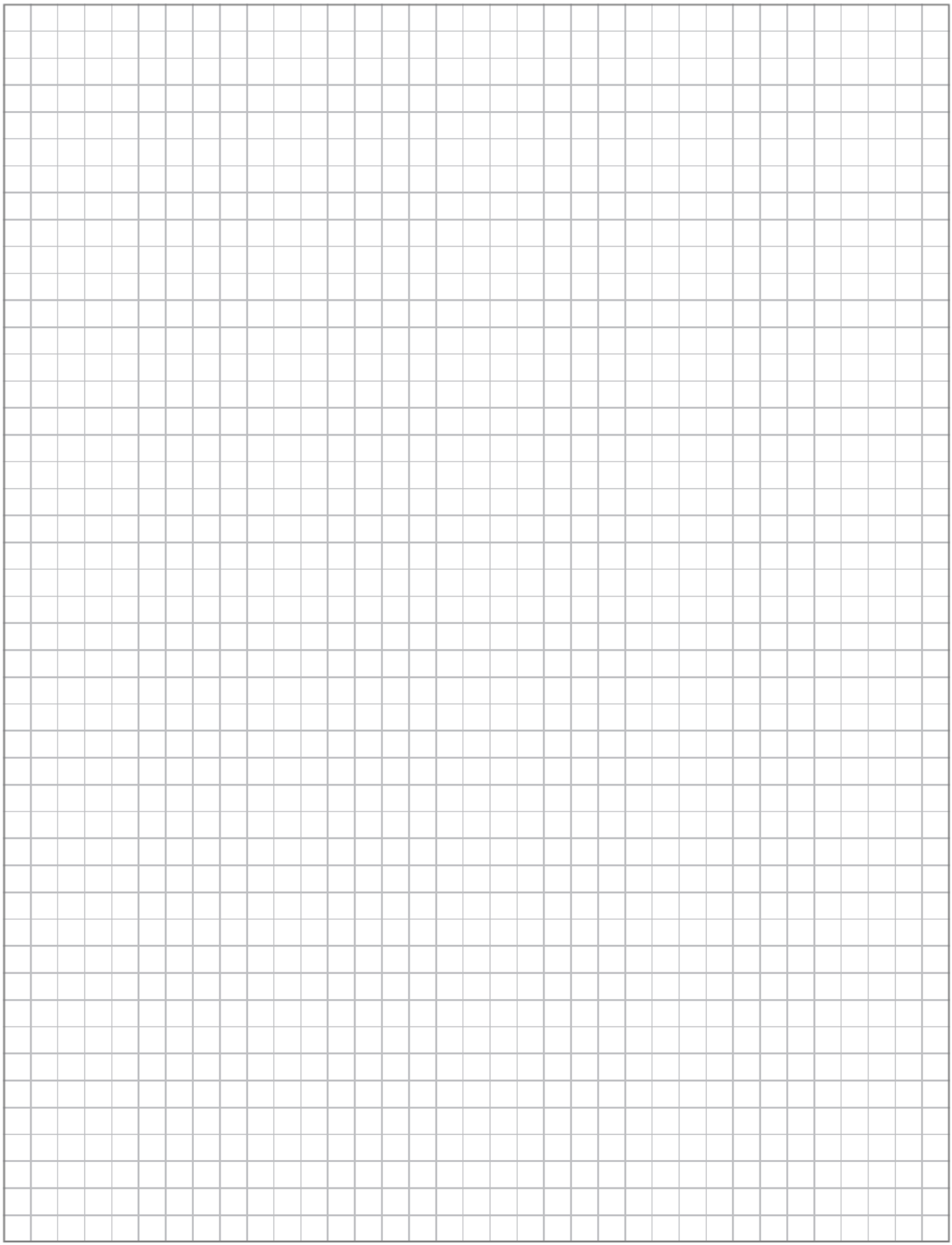
Optimally adjustable to the nominal lift capacity oft the vacuum lifters
Outstanding low-friction operation and low moving mass

### Workshop Equipment

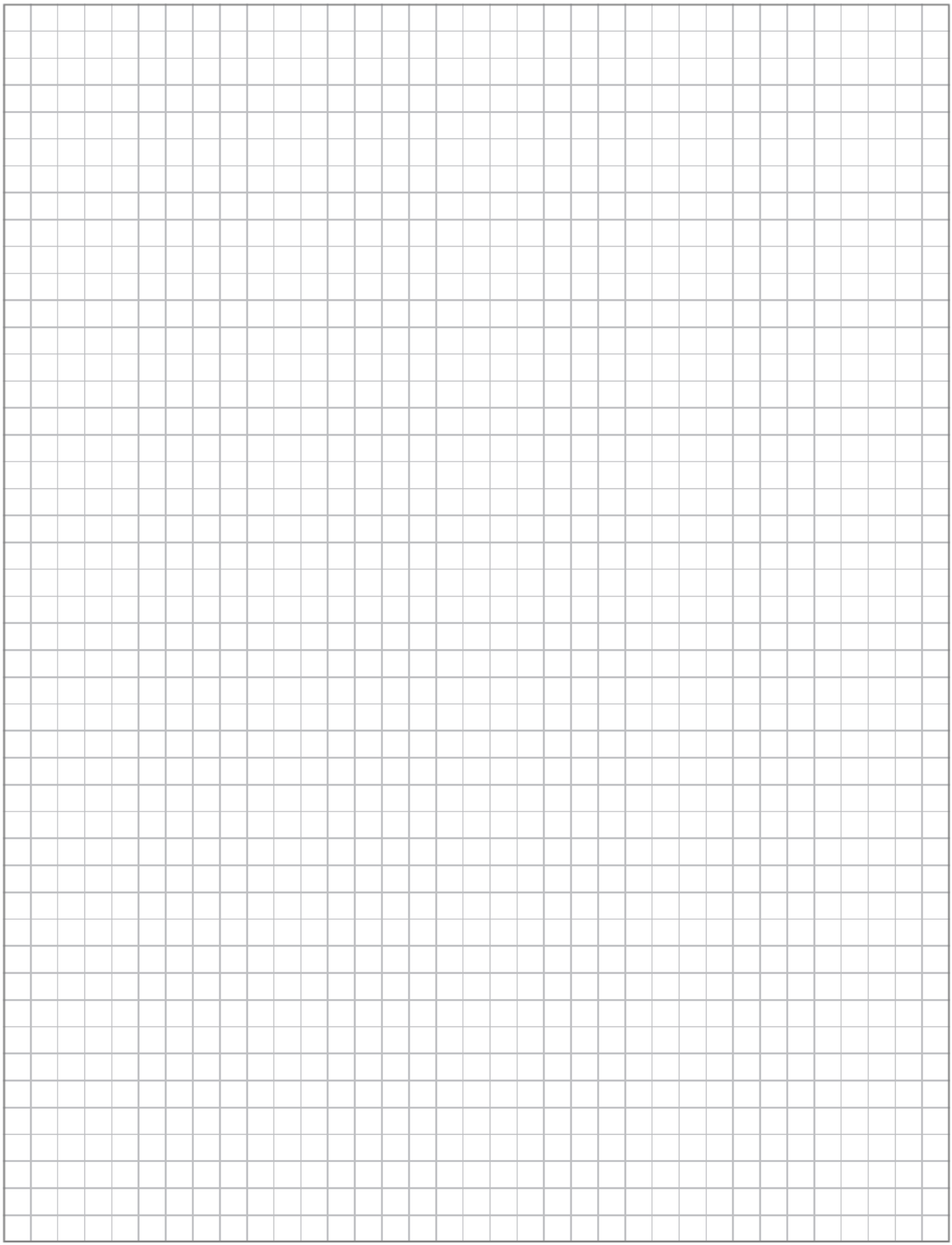
Damage-Free Storage, Transport and Clamping of Workpieces

Transport trolleys for space-saving storage
Vacuum workbenches and vacuum work stands for clamping workpieces

# Notes



# Notes



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