Adsorption Plate

**SP Series**

Specialized for adsorption and fixing in place of thin sheets, glass substrates, and soft workpieces.
Ideal for adsorption and fixing in place of thin sheets, glass

**Adsorption Plate**

**1**

Adsorbs workpieces and holds them in place without leaving wrinkles, air bubbles or marks.

- **Plate with holes: current**
  - Adsorption Plate
  - Air vent
  - Suction

- **Adsorption of thin sheets**
  - Plate with holes: current
  - Adsorption Plate
  - Air vent
  - Suction

No wrinkles or air bubbles are left on workpiece surfaces.

- **Adsorption of soft workpieces**
  - Plate with holes: current
  - Adsorption Plate
  - Air vent
  - Suction

No wrinkles or air bubbles are left on workpiece back side.

**2**

High processing precision

- **FL Rz JIS 3.2**
  - G Rz 3.2

- **Parallelism 15 µm**

Extremely flat adsorption surface preserves the flatness of the workpiece surface and adsorbs without deforming.

- **Parallelism 30 µm**

Superior surface parallelism of the adsorption surface and body part surface allow for highly precise mounting.

- **Adsonption surface area**
  - Closeup picture

- **Adsorption surface cross-section**

- **Adsorption surface size**
  - 50 to 150 mm

- **GRz JIS 3.2**
  - 0.030 [A]
  - 0.015 [B]
The entire surface area of the adsorption surface contains minute holes of ø0.12\* at a density of approximately 1,300 holes per square centimeter.

As the aperture ratio is large, high adsorption force can be obtained. The positional deviation of the workpiece does not occur.

Note) Aperture ratio: The percentage of surface area of the adsorption surface taken up by air vents.

\* This value represents the average diameter when air vents are converted to a circle.
Suitable for adsorption and fixing in place of film and soft sheets
High processing precision (adsorption surface)
Large, evenly distributed adsorption force

Circuit example
## SP Series

### Rectangular/SP1□30

<table>
<thead>
<tr>
<th>Part no.</th>
<th>Adsorption surface size</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP1130</td>
<td>□50 x 50</td>
<td>80</td>
<td>110</td>
<td>20</td>
<td>50</td>
<td>65</td>
<td>95</td>
<td>70</td>
<td>5</td>
</tr>
<tr>
<td>SP1230</td>
<td>□100 x 100</td>
<td>130</td>
<td>160</td>
<td>20</td>
<td>100</td>
<td>115</td>
<td>145</td>
<td>95</td>
<td>9</td>
</tr>
</tbody>
</table>

### Rectangular/SP1□□□□□

<table>
<thead>
<tr>
<th>Part no.</th>
<th>Adsorption surface size</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP1330</td>
<td>□150 x 150</td>
<td>180</td>
<td>210</td>
<td>20</td>
<td>150</td>
<td>82.5</td>
<td>97.5</td>
<td>120</td>
<td>16</td>
</tr>
<tr>
<td>SP1430</td>
<td>□200 x 200</td>
<td>230</td>
<td>260</td>
<td>20</td>
<td>200</td>
<td>107.5</td>
<td>122.5</td>
<td>145</td>
<td>25</td>
</tr>
<tr>
<td>SP1530</td>
<td>□250 x 250</td>
<td>280</td>
<td>310</td>
<td>25</td>
<td>250</td>
<td>132.5</td>
<td>147.5</td>
<td>170</td>
<td>36</td>
</tr>
<tr>
<td>SP1630</td>
<td>□300 x 300</td>
<td>330</td>
<td>360</td>
<td>25</td>
<td>300</td>
<td>157.5</td>
<td>172.5</td>
<td>195</td>
<td>49</td>
</tr>
</tbody>
</table>

4 x 5.5 drill

9.5 depth of counter bore 7 (mounting hole)

Rc 1/8 (Suction port)

Element fixing nut  N pcs.
## Adsorption Plate SP Series

### Square/SP2 □30

<table>
<thead>
<tr>
<th>Part no.</th>
<th>Adsorption surface size</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP2130</td>
<td>□50 x 50</td>
<td>80</td>
<td>80</td>
<td>20</td>
<td>50</td>
<td>65</td>
<td>65</td>
<td>55</td>
<td>5</td>
</tr>
<tr>
<td>SP2230</td>
<td>□100 x 100</td>
<td>130</td>
<td>130</td>
<td>20</td>
<td>100</td>
<td>115</td>
<td>115</td>
<td>80</td>
<td>9</td>
</tr>
</tbody>
</table>

### Adsorption Plate Size

<table>
<thead>
<tr>
<th>Part no.</th>
<th>Adsorption surface size</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP2330</td>
<td>□150 x 150</td>
<td>180</td>
<td>180</td>
<td>20</td>
<td>150</td>
<td>82.5</td>
<td>82.5</td>
<td>105</td>
<td>16</td>
</tr>
<tr>
<td>SP2430</td>
<td>□200 x 200</td>
<td>230</td>
<td>230</td>
<td>20</td>
<td>200</td>
<td>107.5</td>
<td>107.5</td>
<td>130</td>
<td>25</td>
</tr>
<tr>
<td>SP2530</td>
<td>□250 x 250</td>
<td>280</td>
<td>280</td>
<td>25</td>
<td>250</td>
<td>132.5</td>
<td>132.5</td>
<td>155</td>
<td>36</td>
</tr>
<tr>
<td>SP2630</td>
<td>□300 x 300</td>
<td>330</td>
<td>330</td>
<td>25</td>
<td>300</td>
<td>157.5</td>
<td>157.5</td>
<td>180</td>
<td>49</td>
</tr>
</tbody>
</table>

**Specifications**
- 4 x 5.5 drill
- 9.5 depth of counter bore 7 (mounting hole)
SP Series
Made to Order

Please contact SMC for detailed specifications, delivery and pricing.

1 Changeable Suction Port Position and Element Type (Particle Diameter)

How to Order

SP 11 30 -

Adsortion Plate

<table>
<thead>
<tr>
<th>Shape</th>
<th>Adsorption surface size</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Rectangular</td>
<td>1 50 x 50 mm</td>
</tr>
<tr>
<td>2 Square</td>
<td>2 100 x 100 mm</td>
</tr>
<tr>
<td>3 150 x 150 mm</td>
<td></td>
</tr>
<tr>
<td>4 200 x 200 mm</td>
<td></td>
</tr>
<tr>
<td>5 250 x 250 mm</td>
<td></td>
</tr>
<tr>
<td>6 300 x 300 mm</td>
<td></td>
</tr>
</tbody>
</table>

Port position

| A Standard (back side) |
| B Rectangular A position |
| C Rectangular B position |
| D Square A position |

Particle diameter

| A Standard (Ø0.3) |
| B Ø0.2 |
| C Ø0.4 |

Sintered metallic element particle diameter

30 Ø0.3 standard

Caution

1 This item has made to order specifications including a particle diameter differing from standard items, and a suction port on the side.
2 Refer to the table for the port position dimensions on the side. The back side port is plugged with a Tapered Screw Plug.
3 There are no differences in aperture ratio or adsorption force due to changes in particle diameter of elements.

Particle diameter Ø0.2
Particle diameter Ø0.3
Particle diameter Ø0.4
Made to Order **SP Series**

---

### Side Port Position

**Rectangular (Select either A or B.)**

![Rectangular Diagram]

**Square**

![Square Diagram]

---

### Special Order Products

Products with a stainless steel body or in other shapes can be manufactured. Consult SMC separately.

---

### Manufacturable Range

**Configuration**
- Square board (Dimension classification)
- Circular board

**Body size**
- Perpendicular A (mm) or Horizontal B (mm)
- Diameter D (mm)

<table>
<thead>
<tr>
<th>Base part no.</th>
<th>Adsorption surface size</th>
<th>P1</th>
<th>P2</th>
<th>P3</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP1130</td>
<td>□50 x 50</td>
<td>55</td>
<td>40</td>
<td>10</td>
</tr>
<tr>
<td>SP1230</td>
<td>□100 x 100</td>
<td>95</td>
<td>50</td>
<td>10</td>
</tr>
<tr>
<td>SP1330</td>
<td>□150 x 150</td>
<td>120</td>
<td>75</td>
<td>10</td>
</tr>
<tr>
<td>SP1430</td>
<td>□200 x 200</td>
<td>145</td>
<td>100</td>
<td>10</td>
</tr>
<tr>
<td>SP1530</td>
<td>□250 x 250</td>
<td>170</td>
<td>125</td>
<td>10</td>
</tr>
<tr>
<td>SP1630</td>
<td>□300 x 300</td>
<td>195</td>
<td>150</td>
<td>10</td>
</tr>
</tbody>
</table>

---

### Recommended Body Thickness

**Body area (cm²)**

<table>
<thead>
<tr>
<th>Thickness (mm)</th>
<th>Equivalent size</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 or less</td>
<td>□100 x 100</td>
</tr>
<tr>
<td>361 or less</td>
<td>□190 x 190</td>
</tr>
<tr>
<td>625 or less</td>
<td>□250 x 250</td>
</tr>
<tr>
<td>900 or less</td>
<td>□300 x 300</td>
</tr>
<tr>
<td>Over 900</td>
<td></td>
</tr>
</tbody>
</table>

*Order a thickness equal to or greater than that shown on the table. If the thickness is less than that shown, the product may not be able to be manufactured, due to warping.*

---

### Degree of Flatness (reference value)

**Body area (cm²)**

<table>
<thead>
<tr>
<th>Flatness (mm)</th>
<th>Parallism (mm)</th>
<th>Equivalent size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stainless steel</td>
<td>0.010</td>
<td>0.025</td>
</tr>
<tr>
<td>Aluminum</td>
<td>0.015</td>
<td>0.025</td>
</tr>
</tbody>
</table>

*This table shows the relationship between body area and degree of flatness when square or circular adsorption plates are manufactured at the recommended thickness.*
SP Series
Specific Product Precautions
Be sure to read this before handling the products.

⚠️ Caution on Design

1. **Workpieces not able to be fixed in place by suction**
   - Workpieces of a smaller size than the adsorption surface
   - Warped workpieces
   - Workpieces with holes or porous workpieces
   - Workpieces with rough adsorption surfaces, or with vacuum leakage.

2. **Adsorption force (Theoretical fixing force)**
   \[ W = P \times S \times K \times 0.1 \]
   - **W**: Adsorption force (N)
   - **P**: Vacuum pressure (kPa)
   - **S**: Adsorption surface area (cm²)
   - **K**: Aperture ratio 0.15 (15%)

   The adsorption force given is calculated on the assumption that 15% of the surface area of the adsorption surface is taken up by air vents. This value should be used as a guideline.

3. **Vacuum release pressure (Positive pressure)**
   After applying suction to the workpiece, when using a vacuum release to add pressure from the suction port, use a pressure of 0.1 MPa or less. Failure to do so may result in a reduction in flatness.

4. **Definitions of flatness/parallelism**
   - **Flatness**: The differential between the maximum and minimum values after plane correction, determined by measuring the adsorption surface side with a 3-D measuring machine.
   - **Parallelism**: When measuring the adsorption surface side in the same manner as with the degree of flatness, on the basis of the surface plate of the 3-D measuring machine, this is the differential between the maximum and minimum values of the datum flatness (theoretical flatness) at the point of measurement.

5. **Do not adsorb and fix the workpiece, and then try to lift it.**
   This exerts negative pressure between the workpiece and the workpiece platform, and may make adsorption impossible. Use in such a way that the workpiece is held in place on top of the adsorption plate.

### Operating Precautions

⚠️ Caution

4. **Do not carry out additional processing on the adsorption plate.**
   Deformation resulting from processing may cause a reduction in flatness.

5. **Dust may be produced from the adsorption part.**
   Cutting particles and fluids may remain and they cannot be removed completely. Such foreign objects may stick to the workpiece.

6. **Do not apply a pressure or load of 0.1 MPa or more to the adsorption surface.**
   Doing so may cause a reduction in flatness, damage, or impact marks.

7. **The body is made of aluminum (casted) and the adsorption face and seating surface are untreated, meaning that discoloration or corrosion may result if it is used in an environment with water or oil splatters, or very high humidity.**
   Even when it is used indoors, discoloration may occur if used over long periods of time.

8. **A clearance of up to 0.2 mm may be opened in the outer periphery of the element.**

### Warning

1. **Use the adsorption plate to fix the workpiece in place.**
   Do not use it to adsorb and transport workpieces. If such use is unavoidable, be sure to mount appropriate hardware to prevent the workpieces from falling.

### Cleaning

1. **If foreign particles attach to the adsorption surface, remove them by blowing with clean air.**

2. **Do not conduct immersion cleansing with solvents, etc.**
   Doing so may cause swelling and degradation of the adhesives used, and may result in a vacuum leakage or reduction in flatness.

3. **Restrict use of solvents to just wiping down with alcohol.**
   When doing so, do not use a fibrous cloth. The fabric may become stuck in the air vents and become debris.

### Storage

1. **Store in a normal indoor environment.**
   Storing in an environment where there is splashing of water or oil, etc., may result in discoloration or corrosion.

2. **Do not place objects on top of the adsorption plate.**
   Doing so may result in a reduction in flatness.