

# Suction Components - Overview

## Material Properties of Suction Cups

Select an appropriate cup material according to the usage environment, conditions, atmosphere, conductivity, and material and properties of the workpiece.

<Material property list>

Pad Material	Rubber Type					Sponge Type
	Nitrile Rubber	Silicon Rubber	Conductive Silicon Rubber	Fluoro Rubber	Phlorosilicon Rubber	Chloroprene Rubber
Applications	Cardboard Plywood Metal Plates Other common materials	Semiconductors Removal of molded parts Thin materials Food-related		Chemical atmosphere High Temperature	Removal of molded parts	Uneven surface
Color	Black	White*	Black	Gray	Light Brown	Black
Max. Operating Temp.	110°C	180°C		230°C	180°C	80°C
Min. Operating Temp.	-30°C	-40°C		-10°C	-50°C	-45°C
Weather Resistance	△	○	○	○	○	○
Ozone Resistance	×	○	○	○	○	○
Oil Resistance / Solvent Resistance	Gasoline, Light Oil	○	△	○	△	×
	Benzene, Toluene	×	△	○	△	△
	Alcohol	○	○	△~○	-	△
	Ether	×	×	×	-	×
	Ketone	×	○	×	-	×
Acid Resistance / Alkali Resistance	Water	○	○	○	-	○
	Organic Acid	×	○	△~○	-	×
	Alkaline	○	○	×	○	○

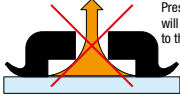
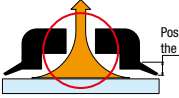



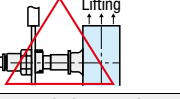
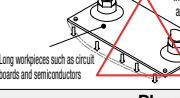
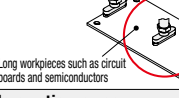
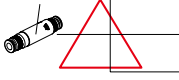
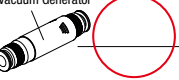

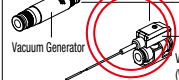
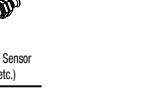

○: Most suitable    Hardly affected    ○: Suitable    Slightly affected but can withstand use depending on the condition

△: Allowed.    If possible, do not use    ×: Not suitable    Seriously affected and not suitable for use

\* Some products have black, semitransparent, and sky blue variations.

(Note) The above table just shows general properties of materials, which may vary depending on usage conditions and other factors and are not guaranteed.

## Recommended methods of attaching and piping suction cups

Shock to a cup and positioning		Balance of installed cups	
If a strong shock is given to a cup, it will be deformed, cracked, and worn more quickly. Position the cup within the deformation range of the skirt of the cup or place it in a position where it slightly touches the workpiece. Precisely position small cups in particular.		Place suction cups on a workpiece so that it is well balanced. Take measures such as balancing the workpiece, preventing the cups from sticking out of the workpiece, and equalizing the loads on the respective cups.	
	Pressing too much will lead damage to the cup		Position within the range
<b>When the suction face is air-permeable or has holes</b>		-	
If the face is air-permeable, the amount of air leakage becomes larger and the suction force is reduced. It is necessary to take measures such as enlarging the effective sectional area of the pipeline or using smaller cups and increasing the number of cups.		When there is a danger of falling of the workpiece, install fall prevention guards and take safety measures.	
	Air-permeable workpiece		Fall prevention guards, etc
<b>When the workpiece is wrinkled</b>		<b>In vertical lifting</b>	
Soft workpieces such as paper, thin materials, plastic sheets, can be deformed or wrinkled by the suction force. Use smaller cups or reduce the vacuum pressure.		Cups are basically designed to be used for horizontal lifting. For vertical lifting, consider not only the safety factor for the suction force but also the strength of the holder and the cup. It is recommended to suction the workpiece from both sides.	
	Plastic / paper bags, etc.		Lifting
<b>When the workpiece is flat and long</b>		<b>When the workpiece undergoes rotary conveyance or acceleration</b>	
Workpieces such as circuit boards and glass boards may form ripples due to the load of the workpiece itself during suction and transport. Select cups taking the shape, size, arrangement, and transport speed into account and affording a sufficient margin.		When a workpiece undergoes rotary conveyance, make sure the screws are not loosened and pay special attention if the cup is out of the center of the gravity of the workpiece. For rotary conveyance with a lateral movement, set a safety factor larger than that for vertical lifting (8 times larger).	
	In lifting, a large force is applied due to acceleration		Long workpieces such as circuit boards and semiconductors
<b>Placement of multiple suction cups</b>		<b>Checking the suction force (vacuum pressure)</b>	
It is ideal to install a vacuum generator piping for each suction cup. If multiple suction cups are attached to one vacuum generator and one of the cups falls off, the degrees of vacuum of the other cups are reduced. Take fall prevention measures.		It is recommended to install a sensor or a gauge so that the vacuum pressure can be checked. It is effective as a safety measure for detecting abnormalities and suction condition.	
	Vacuum Generator		Vacuum Generator
	Vacuum Generator		Vacuum Generator
	Vacuum Generator		Vacuum Pressure Sensor (Vacuum Gauge, etc.)