Vacuum Pad

Vacuum Pad Selection Guide

Selection Guide 1 > Select the diameter of vacuum pad from the formula ① and chart of the theoretical suction force ②

The theoretical suction force is determined from pad area and vacuum level. Calculated value is for reference only, so carry out the evaluation under an actual operating condition. The theoretical suction force is calculated under a static condition. Obtain an enough margin, considering the weight of a work-piece and acceleration of lifting, pause and rotary movement. Enough room is needed in deciding a number of pads and arrangement position.

1) Calculation by formula

w =

- W : Suction force(N)
- C : Pad area(cm²)
- P : Vacuum level -kPa
- f : Safety factor Horizontal lifting (refer to the right fig.) ▶ 1/4 Vertical lifting (refer to the right fig.) ▶ 1/8
- *1.Refer to the following chart for Sponge Series.(Internal diameter is used for calculation)
- *2.Refer to the following chart for Flat Series.(Pad grooves are used for calculation)
- *3.As for Bellows, Multi-Bellows, Soft, Soft Bellows and Ultrathin Series, their theoretical suction force may exceed the strength of pad itself, depending on the vacuum level. Carry out the evaluation under an actual operating condition.
- O Chart of the theoretical suction force <Add safety factor to values from the chart> –

Standard / Bellows / Multi-bellows / Soft / Soft bellows / Skidproof / Ultrathin / Mark-free (*)







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Selection Guide 2 > Select a vacuum pad type according to a work-piece.

Please select suitable pads for your application from the following.



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Selection Guide 2
Select a vacuum pad material from an application...

Iter	n	Pad material	Nitrile rubber N,	NBR Suited for the food sanitation act. (Japan)	HNBR	Silicone rubber	Conductive Silicone rubber	Urethane rubber	Fluoro rubber	Fluorosilicone rubber	EPDM	Conductive Butadiene rubber (Low resistance type)	Conductive NBR (low resistance)	Chloroprene rubber (For Sponge type)	Silicone rubber (For Sponge Type)
Material code			NH (*1)	G	HN	S	SE	U	F	FS	EP	E	NE	-	S
			Card	board	Cardboard	Semico	nductors	Cardboard	Chemical	Taking out	Application	General	Semi-	Uneven	Uneven
			Plyv	vood	Plywood	Takir	ig out	Plywood	environment	molded	that	pars of	conductors	work-piece	work-piece
			Metal	plate	Metal plate	molde	d parts	Metal plate	High temp.	parts	light.	semicon-			Food-
			Food-	related	Food-related	Thin wo	rk-piece		work-		resistant or	ductors			related
An	plication		Other g	general	Other general	Food-	related		pieces		ozoneproof				
Λp	plication		w	ork	work						In use				
					In use under						under the				
					a low ozone						containing				
											atmosphere				
					environment										
Pa	d color		Black	Gray	Black	Translucent	Black	Blue	Gray	Salmon	Black	Black	Black	Black	Salmon
		Standard	50°~80°	60°~70°	50°~70°	50°	60°	55°~70°	60°~70°	-	50°~70°	70°	60°~70°	-	-
		Bellows	50°	-	50°	50°	60°	55°	60°	-	50°	-	60°	-	-
		Multi-bellows	50°	50°	50°	50°	-	55°	50°	-	50°	-	60°	-	-
	Surface	Oval	40°~50°	-	50°	40°~50°	50°~60°	55° (*2)	50° (*2)	-	50°	70°	70°	-	-
	hardness	Soft	40°	-	-	40°	60°	-	-	40°	-	-	50°	-	-
	(Shore A)	Soft bellows	40°	-	50°	40°	-	55°	-	-	50°	-	60°	-	-
P		Skidproof	50°	-	-	50°	-	55°	60°	-	-	-	60°	-	-
/sic		Ultrathin	40°	-	-	40°	-	55°	50°	40°	-	-	60°	-	-
alF		Flat	60°	-	-	40°	40°	50°	50°	-	-	-	60°	-	-
rop	Highest ope	rating temp.	11(D°C	140°C	18	D°C	60°C	230°C	180°C	150°C	100°C	110°C	80°C	180°C
erti	Lowest oper	rating temp.	-30	0°C	-30°C	-40	D°C	-20°C	-10°C	-50°C	-40°C	-50°C	-30°C	-45°C	-40°C
es	Weathera	bility	2	2	0	(0	0	0	0	0	0	\triangle	0	0
	Ozone-pro	oof	>	<	0	(0	0	0	0	0	×	×	0	0
	Acid-resis	tance	2	2	\triangle	(2	×	0	0	0	\triangle	\triangle	\triangle	0
	Alkaline-re	esistance	()	0	(0	×	×	O	O	0	0	O	0
	Oil	(Gasoline oil)	(0	O	Z	2	O	O	\triangle	×	×	O	×	\triangle
	resistance	(Benzene/toluene)		2	×		<u> </u>	\triangle	0	\triangle	×	×	\triangle	\triangle	\triangle
	Volume re	sistance		-	-	-	Max. 10 ⁵ Ω·cm	- 1	- 1	-	-	Max. 200Ω-cm	Max. 2000-cm	-	-

Please select the suitable material from the table.

Legend C 🗇 Eest

 \bigcirc : Suitable

riangle : Good

×∶NG

*1.Material code "NH" is only available for Skidproof Series.

*2.It does not apply to pad size: 4×30mm.

Note 1). The above "Physical Properties" shows the data of general synthetic rubbers.

Note 2). The highest / lowest operating temp. is for momentary usage. Carry out durability evaluation in case of continuous usage under the highest / lowest operating temp.

Vacuum Pad Series

Please select the suitable vacuum pad resin material from the table.

			Pad material	PEEK	POM	Conductive PEEK	
to	-	Material	Mark free series	К	М	KE	
le		code	Resin attachment for Bellows	-OK	-OM	-OKE	
		0000	series	QIT	Gin	GILE	
				Manufacturing machine for	General production line	Manufacturing machine for	
٩p	plication			liquid crystal / semiconductor	Food-related machine	liquid crystal / semiconductor	
					Packaging machine	Electronic components	
Pa	d color			Natural (ivory)	White	Black	
	Highest op	eratin	g temp.	250°C	95°C	250°C	
ç	Lowest ope	erating	temp.	-50°C	-60°C	-50°C	
lisvi	Weatherab	ility		0	×	0	
	Acid-resista	ance		0	×	0	
ē	Alkaline-re:	sistan	ce	0	\triangle	0	
ert	Self-lubricit	y		0	O	0	
ës	Abrasion-re	esistar	nce	0	0	0	
	Volume res	istanc	e	-	-	10⁵~10⁵Ω·cm	

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Legend C 💿 : Best

○ : Suitable

 $\bigtriangleup:\mathsf{Good}$

×∶NG

Note 1). The above "Physical Properties" shows the data of pad resin material only. The holder of Mark-free Series is not included.

Note 2). The above "Physical Properties" shows the data of resin attachment only. The pad rubber is not included.

Note 3). The above "Physical Properties" shows a general properties of resin materials and not a guaranteed value. Carry out the necessary evaluation under an actual operating condition.

Note 4). The highest / lowest operating temp. is for momentary usage. Carry out durability evaluation in case of continuous usage under the highest / lowest operating temp.

Note 5).Volume resistance is a representative value from the material manufacture, and not a guaranteed value.



To prevent dust from getting into the pad holder.



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Reference Guide for Vacuum Pad

Impact on pad

Avoid an impact or a large force on a vacuum pad, when it is pressed against a work-piece. It may cause deformation, crack or abrasion at an early stage of use. Adjust the pad position so that the lip of pad touches lightly on a workpiece. Especially a small type of vacuum pad should be positioned precisely.



Large and wide flat plate work-piece

When lifting large size of glass board or circuit board, work-piece may bend by the lifting acceleration or the self-weight. Select a proper size of pad and positioning, considering an enough margin of suction force.



Soft work-piece

When soft work-pieces such as plastic bags, papers or thin boards are sucked, work-pieces can be deformed or shrunk by vacuum suction (Figure-1). Select smaller vacuum pads and reduce the vacuum pressure. Smaller vacuum pads are suitable for plastic bags and papers. When plastic / paper bags are opened by using vacuum pads, shift the center of two vacuum pads slightly in order to open them easily as Figure-2 shows.



Inclined work-piece

Select Free Holder for an inclined work-piece.

Porous or perforated work-piece

Since the suction of a porous work-piece causes a drop of suction force, select the proper specifications of vacuum system and secure a larger effective crosssection area of the piping. Selecting a small type of vacuum pad is one of solutions to reduce the air leakage.



Lifting work-piece, sucking the both side of it

Since all vacuum pad holders are designed for horizontal lifting, consider the strength of holders and pads.



Work-piece with different heights

Select Long Stroke holders for work-pieces having different heights, or piled-up work-pieces. Its stroke can absorb the difference in height.



Conveyance with rotary movement

When vacuum pad is fixed with a screw and has a rotary movement, the pad may drop due to the loosened screw. Pay special attention when the vacuum location of work-piece is off the center of work-piece gravity.



A Vacuum Pad Series

Vacuum Pad

Pad dia. list by pad type and material

Pad material					N	: Nitrile rubb	er			
Pad type		Standard			Bellows	Multi-	Soft	Soft	Ultrathin	Flat
	au type	General type	Deep type	Small type	Dellows	Bellows	3011	bellows	Ultratini	Fial
	ø0.7									
	ø1			•						
	ø1.5									
	ø2									
	ø3			•						
	ø4			•			•			
[ø6	•			•			•		
_	ø8				•		•	•	•	
ad	ø10				•	•	•	•	•	۲
di-	ø15	•	•		•			•		•
_	ø20		•		•	•	•	•	•	•
m	ø25		•		•					•
\sim	ø30	•	•		•	•				•
[ø40		•		•	•	•			
	ø50	•	•		•	•				
	ø60	•	•		•					
[ø80		•		•					
	ø100	•	•		•					
	ø150									
	ø200									

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Pad material		U : Urethane rubber													
	Pad type		Standard		Bellowe	Multi-	Soft bollows	Skidproof	Ultrathin	Flat					
	au type	General type	Deep type	Small type	Dellows	Bellows	Soll bellows	экіцріооі	Uluauliil	Fidt					
	ø0.7														
	ø1	•		•											
	ø1.5			•											
	ø2	•		•											
	ø3	•		•											
	ø4	•		•											
	ø6	•			•		•								
-	ø8	•			•				•						
ad	ø10	•			•	•		•	•	•					
dia	ø15														
_	ø20	•	•		•	•		•	•	•					
m	ø25	•	•		•										
\sim	ø30	•	•		•	•		•		•					
	ø40	•				•		•							
	ø50	•	•		•	•		•							
	ø60														
	ø80	•	•		•										
	ø100	•	•		•										
	ø150	•													
	ø200	•													

•: Available

Pad material					G: NBR Suited for the food sanitation act. (Japan)								
Pad type		Standard			Bellowe	Multi-	Skidproof	Ultrothin	Flot		Standard		Multi-
		General type	Deep type	Small type	Dellows	Bellows	Oluauiiii	Fial	General type	Deep type	Small type	Bellows	
	ø0.7			•									
	ø1											•	
	ø1.5											•	
	ø2			•								•	
	ø3			•								•	
	ø4											•	
	ø6												
-	ø8												
ad	ø10				•				•				
die	ø15								•				
÷	ø20						•		•				•
B	ø25								•	•			
	ø30												
	ø40												
	ø50												
	ø60												
	ø80												
	ø100												
	ø150	•											
	ø200												

•: Available

A Vacuum Pad Series

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: Available



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Pad material		HN : HNBR							EP : EPDM						FS : Fluorosilicone rubber	
	ad turne	Standard			Bollows	Multi-	Soft		Standard	i	Bellows	Multi-	Soft	Soft	Illtrathin	
-	au type	General type	Deep type	Small type	Dellows	Bellows	bellows	General type	General type Deep type Small type		type	Bellows	bellows	3011	Uluaulin	
	ø0.7															
	ø1															
	ø1.5															
	ø2	•		•				•								
[ø3			•												
	ø4			•										•		
	ø6						•				۲		۲	•		
_	ø8										•		•	•		
ac	ø10					۲					٠		۲	٠	•	
d	ø15										•		•	•	•	
	ø20					۲					۲		۲	۲	•	
Ш	ø25										٠					
	ø30		•		•	•		•	•		•	•		•		
	ø40					•					•			٠		
ĺ	ø50					۲					٠					
	ø60								•		•					
	ø80		•		•			•	•		•					
ĺ	ø100										٠					
Ì	ø150	•						•								
	ø200							•								
	: Availab	le														

Pad material		N Nitrile rubber	S Silicone rubber	U Urethane rubber	F Fluoro rubber	SE Conductive Silicone rubber	Conductive Butadiene rubber (Low resistance type)	NE Conductive NBR (Low resistance type)	HN HNBR	EP EPDM					
F	Pad type	Oval													
	2×4	•	•	•	•	•		•	•	•					
	3.5×7	•	•	•	•	•		•	•	•					
	4×10	•	•	•	•	•	•	•	•	•					
	4×20	•	•	•	•	•	•	•	•	•					
2	4×30	•	•			•	•	•	•	•					
ă	5×10	•	•	•		•		•	•	•					
la	5×20	•	•	•	•	•	•	•	•	•					
Ξĺ	5×30	•	•	•	•	•	•	•	•	•					
3[6×10	•	•	•		•		•	•	•					
Ì	6×20	•	•	•		•		•	•	•					
	6×30	•	•	•	•	•	•	•	•	•					
	8×20								•						
	8×30	•	•	•	•	•		•	•	•					

•: Available

Pad material		K : PEEK	M : POM	KE : Conductive PEEK	Q2K : PEEK	Q2M : POM	Q2KE : Conductive PEEK			
Pad type			Mark free		Resin attachment for Bellows series					
Pad dia. (mm)	ø10	•	•	•	•	•	•			
	ø15				•	•	•			
	ø20	•	•	•	•	•	•			
	ø25				•	•	•			
	ø30	•	•	•	•	•	•			

•: Available