Vacuum Cups

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Section A

www.parker.com/pneu/vaccup

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Specifications

Cup material should be considered for temperature resistance, chemical resistance, oil resistance, abrasion resistance, markless properities and electrical properties.

	NBR	NBRE	CR	SI	SIE	U
Suction cup material	Nitrile	Nitrile ESD*	Chloroprene	Silicon	Silicon ESD*	Urethane
Operating temperature (°C)	-20° to +120°	-30° to +120°	-30° to +140°	-60° to +250°	-60° to +250°	-30° to +120°
Color	Black	Black / Blue Dot	Green	White	Black / Red Dot	Blue
Hardness, shore A (°Sh)	55 ±5	70 ±5	55 ±5	55 ±5	55 ±5	55 ±5
Electrical resistance (Ωm)	–	800 to 1000	–	–	800 to 1000	–
Wear resistance	•••••	•••••	•••••	••	••	••••••
Tear strength	••••	••••	•••••	•	•	••••••
Aging resistance	••••	••••	•••••	••••••	••••••	••••••
Ozone resistance	••••	••••	•••••	••••••	••••••	••••••
Gasoline resistance	••••••	••••••	•••••	••••	••••	••••••
Oil resistance	••••••	••••••	•••••	••••••	••••••	•••••
Acid resistance	•••	•••	•••••	•••	•••	•
Alkali resistance	••••	••••	•••••	•••	•••	•
Chemical resistance	•••	•••	••••	••	••	••••••
Mechanical resistance	••••	••••	••••	••••	••••	•••••

•••••• = excellent; ••••• = very good; •••• = good; ••• = medium; •• = poor; • = not recommended

* ESD: Electric Static Dissipative Material

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Selecting the proper vacuum cup

⚠ CAUTION:

Selecting the type of vacuum cup, material, and size suitable for an application is important to the overall vacuum system. Calculating the forces involved for each application is recommended to determine the vacuum cup size. It should be noted that these calculations are basic theoretical guidelines and each application must be tested for actual results. With all vacuum applications, certain practical assumptions concerning cup materials, environmental conditions, and product characteristics to name a few, may not be consistent with the performance. Again, the user should determine the efficiency, performance, and safety factor of the cup selection.

Calculating pad diameter and forces

Mass

The term mass is a quantity of matter and its ability to resist motion when acted on by an external force. The magnitude of an object is represented as a certain number of kilograms (kg) and is symbolized as "m". The easiest way to determine the mass of an object is to measure the weight with a scale within the earth's gravitational field ($a_g = 9.81 m/sec^2$). Likewise, outside of any gravitational field, a mass could potentially be weightless.

Forces

For vacuum applications, force is a vector quantity in a defined direction either horizontal or vertical. The standard international unit of force is measured in Newtons (N) which is the equivalent of (kgm/sec^2). The force can be calculated by measuring the effect of a change in acceleration on a mass.

Newtons Law: $F(N) = mass(kg) \times a_g(m/sec^2)$

Consider an object with a mass of 10kg. The gravitational force on this object would be:

$F(N) = 10kg \times 9.81 m/sec^2 = 98.1\ N$

Acceleration

Acceleration is the change in velocity of a moving object. Acceleration is a vector, a directional quantity expressed in units of meters per second squared (m/sec^2) and symbolized as "*a*". To explain the magnitude of acceleration consider an object with a change in velocity of 2 meters per second (m/sec) over a 4 second time frame. The acceleration can be calculated with:

$$a = \frac{\triangle \text{ velocity}}{\text{time}} \qquad a = \frac{6 m/sec}{2 sec} \qquad a = 3 m/sec^2$$

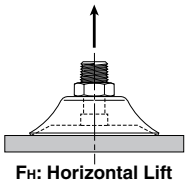
This is considered an average acceleration.

Coefficient of friction

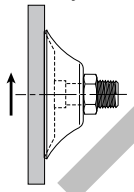
Certain values for coefficient of friction should be taken into consideration when calculating the combined forces in motion. Actual values between suction cups and surfaces are difficult to determine. Therefore, coefficient of friction values from published charts, should be used as a reference to adjust the safety factors accordingly.

Lifting forces

When calculating lifting forces, safety factors of 2 for horizontal lifts and 4 for vertical lifts are minimum values. Applications with irregular shapes, difficult surfaces, and backward motions will require increased safety factors.



FH: Horizontal Lift



FV: Vertical Lift

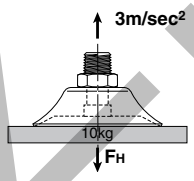
Horizontal lifting force

Apply Newtons Law to calculate the force on a 10kg mass with a change in acceleration of $3 m/sec^2$ and a safety factor of 2.

$FH(N) = mass(kg) \times (a_g + a) \times SH$

$FH(N) = 10kg \times (9.81 m/sec^2 + 3 m/sec^2) \times 2$

$FH = 256.2\ N$



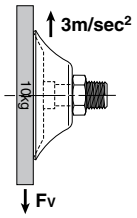
Vertical lifting force

Apply Newtons Law to calculate the force on a 10kg mass with a dry surface, a change in acceleration of $3 m/sec^2$ and a safety factor of 4.

$FV(N) = mass(kg) \times (a_g + a) \times Sv$

$FV(N) = 10kg \times (9.81 m/sec^2 + 3 m/sec^2) \times 4$

$FV = 512.4\ N$



Combined vertical lift and horizontal motion

Calculate the force on a 10kg mass with a dry surface, a change in acceleration of $3 m/sec^2$, and a change in travel acceleration of $2 m/sec^2$.

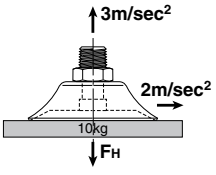
$FM(N) = \sqrt{FV^2 + FH^2}$

$FM(N) = \sqrt{[(10kg \times 2 m/sec^2) \times 4]^2 + [10kg \times (9.81 m/sec^2 + 3 m/sec^2) \times 2]^2}$

$FM(N) = \sqrt{(80 kgm/sec^2)^2 + [256 kgm/sec^2]^2}$

$FM(N) = \sqrt{6400 kgm/sec^2 + 65{,}536 kgm/sec^2}$

$FM = 268.2\ N$



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Analyze the forces

Using the previous examples, consider an application where 4 cups have been selected to transfer the product.

Take the Horizontal Lifting Force (FH) of 256.2 N and divide by the number of cups (4) to obtain the individual force for each cup.

$$\frac{256.2\ (N)}{4} = 64.05\ N\ /\ Cup$$

Referring to the chart below, at 60% vacuum, select a force greater than 64.05 N. The appropriate selection is a 40mm diameter cup which has a theoretical lifting force of 76.9 N.

The same calculation can be applied to the Vertical Lifting Force and the Forces in Motion examples to determine the cup diameter.

To convert Pounds (lbf) to Newton (N), multiply lbf x 4.4.

Calculate the diameter of the cup

Calculate the cup diameter for horizontal lift at 60% of full vacuum using the information from the previous page.

$$D = 35.7 \sqrt{\frac{m\ (a_g + a) \times S}{Pv \times n}}$$

$$D = 35.7 \sqrt{\frac{10\ (9.81 + 3) \times 2}{61 \times 4}}$$

D (mm) = Diameter of Cup
m (kg) = Mass
a_g = 9.81m/sec^2
a = Motion Acceleration
S = Safety Factor
Pv (kPa) = Operating Vacuum Pressure
n = number of Cups

D = 36.58 mm

Referring to the chart below, at 60% vacuum, select a cup diameter equal to or greater than 37mm. The appropriate selection is a 40mm diameter cup which has a theoretical lifting force of 76.9 N.

Theoretical lifting force per cup lbf (N)

Cup		Vacuum level								
		3 inHg	6 inHg	9 inHg	12 inHg	15 inHg	18 inHg	21 inHg	24 inHg	27 inHg
		-1.5 PSIG	-3 PSIG	-4.5 PSIG	-6 PSIG	-7.5 PSIG	-9 PSIG	-10.5 PSIG	-12 PSIG	-13.5 PSIG
Diameter mm	Area cm²	10.2 kPa	20.3 kPa	30.5 kPa	40.6 kPa	50.8 kPa	61 kPa	71.1 kPa	81.3 kPa	91.4 kPa
		10%	20%	30%	40%	50%	60%	70%	80%	90%
1.5	0.01	0.004 (0.02)	0.008 (0.04)	0.008 (0.04)	0.014 (0.06)	0.018 (0.08)	0.022 (0.10)	0.026 (0.12)	0.032 (0.14)	0.032 (0.14)
2	0.03	0.007 (0.03)	0.013 (0.06)	0.022 (0.10)	0.029 (0.13)	0.036 (0.16)	0.043 (0.19)	0.049 (0.22)	0.056 (0.25)	0.063 (0.28)
3.5	0.10	0.022 (0.10)	0.045 (0.20)	0.065 (0.29)	0.088 (0.39)	0.110 (0.49)	0.133 (0.59)	0.155 (0.69)	0.175 (0.78)	0.198 (0.88)
5	0.20	0.045 (0.20)	0.090 (0.40)	0.135 (0.60)	0.180 (0.80)	0.225 (1.00)	0.270 (1.20)	0.315 (1.40)	0.360 (1.60)	0.405 (1.80)
6	0.28	0.065 (0.29)	0.130 (0.58)	0.196 (0.87)	0.270 (1.20)	0.315 (1.40)	0.382 (1.70)	0.450 (2.00)	0.517 (2.30)	0.585 (2.60)
7	0.39	0.088 (0.39)	0.175 (0.78)	0.265 (1.18)	0.360 (1.60)	0.450 (2.00)	0.540 (2.40)	0.607 (2.70)	0.697 (3.10)	0.787 (3.50)
8	0.50	0.117 (0.52)	0.229 (1.02)	0.346 (1.54)	0.450 (2.00)	0.585 (2.60)	0.697 (3.10)	0.809 (3.60)	0.922 (4.10)	1.034 (4.60)
10	0.79	0.180 (0.80)	0.360 (1.60)	0.540 (2.40)	0.719 (3.20)	0.899 (4.00)	1.079 (4.80)	1.259 (5.60)	1.439 (6.40)	1.619 (7.20)
15	1.77	0.404 (1.80)	0.809 (3.60)	1.216 (5.41)	1.619 (7.20)	2.023 (9.00)	2.428 (10.8)	2.833 (12.6)	2.237 (14.4)	3.642 (16.2)
18	2.55	0.585 (2.60)	1.169 (5.20)	1.751 (7.79)	2.338 (10.4)	2.923 (13.0)	3.507 (15.6)	4.069 (18.1)	4.676 (20.8)	5.238 (23.3)
20	3.14	0.719 (3.20)	1.439 (6.40)	2.158 (9.60)	2.878 (12.8)	3.597 (16.0)	4.316 (19.2)	5.036 (22.4)	5.755 (25.6)	6.474 (28.8)
25	4.91	1.124 (5.00)	2.248 (10.0)	3.372 (15.0)	4.496 (20.0)	5.620 (25.0)	6.744 (30.0)	7.868 (35.0)	8.992 (40.0)	10.116 (45.0)
30	7.07	1.619 (7.20)	3.237 (14.4)	4.856 (21.6)	6.474 (28.8)	8.093 (36.0)	9.712 (43.2)	11.330 (50.4)	12.949 (57.6)	14.568 (64.8)
35	9.62	2.203 (9.80)	4.406 (19.6)	5.598 (29.4)	8.813 (39.2)	11.016 (49.0)	13.241 (58.9)	15.422 (68.6)	17.648 (78.5)	19.828 (88.2)
40	12.6	2.900 (12.9)	5.755 (25.6)	8.655 (38.5)	11.510 (51.2)	14.388 (64.0)	17.288 (76.9)	20.143 (89.6)	23.155 (103)	25.853 (115)
50	19.6	4.519 (20.1)	8.992 (40.0)	13.511 (60.1)	17.985 (80.0)	22.481 (100)	26.977 (120)	31.473 (140)	35.969 (160)	40.466 (180)
60	28.3	6.497 (28.9)	12.949 (57.6)	19.446 (86.5)	25.853 (115)	32.372 (144)	38.892 (173)	45.411 (202)	51.931 (231)	58.226 (259)
75	44.2	10.161 (45.2)	20.233 (90.0)	30.349 (135)	40.466 (180)	50.582 (225)	60.698 (270)	70.815 (315)	80.931 (360)	91.048 (405)
80	50.3	11.555 (51.4)	22.931 (102)	34.621 (154)	46.086 (205)	57.551 (256)	69.241 (308)	80.706 (359)	92.172 (410)	103.637 (461)
90	63.6	14.635 (65.1)	29.225 (130)	43.838 (195)	58.226 (259)	72.838 (324)	87.451 (389)	102.063 (454)	116.676 (519)	131.064 (583)
95	70.9	16.299 (72.5)	32.372 (144)	48.784 (217)	64.970 (289)	81.156 (361)	97.567 (434)	113.753 (506)	129.940 (578)	146.126 (650)
110	95.0	21.851 (97.2)	43.613 (194)	65.419 (291)	87.001 (387)	108.808 (484)	130.614 (581)	152.421 (678)	174.227 (775)	195.809 (871)
120	113.1	26.078 (116)	51.706 (230)	77.784 (346)	103.637 (461)	129.490 (576)	155.568 (692)	181.421 (807)	207.274 (922)	233.127 (1037)
150	176.7	40.690 (181)	80.931 (360)	121.622 (541)	161.862 (720)	202.328 (900)	243.019 (1081)	283.259 (1260)	323.950 (1441)	364.191 (1620)
200	314.2	72.164 (321)	143.878 (640)	216.041 (961)	287.531 (1279)	359.919 (1601)	432.083 (1922)	503.797 (2241)	575.961 (2562)	647.449 (2880

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Exceptional for any smooth flat or surface that will benifit from stability and fast response of the cup design.
This is a multi-versatile and multi-industry cup. Typical applications could be chip mounting, electrical components, semiconductor chips, glass, injection mold, sheet metal, press transfer, fixtures, woodworking.

Features

- Precision molded single lip flat cup for smooth or slightly curved surfaces.
- Universal flat design for most smooth surface applications
- Stable vertical / horizontal lift
- Strong low profile design for fast response needed for short cycles
- 5mm to 200mm diameters
- Bottom cleats on 60 to 200mm diameters

Styles

- PFTM series male thread connector
- PFTF series female thread connector
- PFTK series barbed bulkhead
- PFYK series 90° barbed adapter
- PFTYS series bulkhead level compensator

Specifications

Cup material	Nitrile	Nitrile ESD*	Silicon	Silicon ESD*	Urethane
Material code	**NBR**	**NBRE**	**SI**	**SIE**	**U**
Operating temperature (°C)	-20° to +120°	-30° to +120°	-60° to +250°	-60° to +250°	-30° to +120°
Color	Black	Black / Blue Dot	White	Black / Red Dot	Blue
Hardness, shore A (°Sh)	55 ±5	70 ±5	55 ±5	55 ±5	55 ±5
Electrical resistance (Ωm)	—	800 to 1000	—	800 to 1000	—

* ESD: Electric Static Dissipative Material

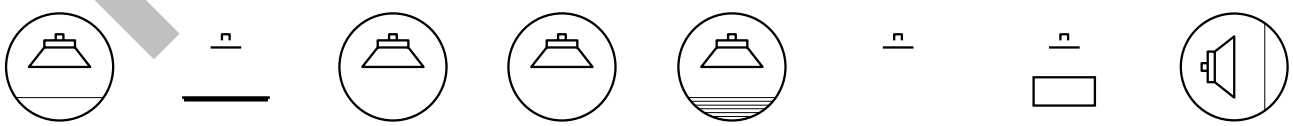
How to order

Cups Assemblies and replacement cups are specified by Cup Diameter and Material. Standard Nitrile and silicon are listed on the following pages. To specify an alternative material, replace the cup material with alternative cup material code.

Example: To specify a cup assembly with Urethane (U), replace (NBR) with (U) in the part number. PFTM-20B-NBR-G1 becomes PFTM-20B-U-G1. Inquire with factory for availability.

Application guide

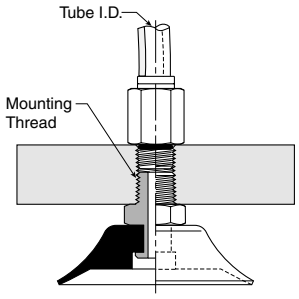
Flat - Smooth surface



Flat surface, thin section	Flat surface, any section	Slightly bowed surface, thin section	Slightly bowed surface, any section	Metal sheet handling	Corrugated sheet handling	High lifting force	Vertical lift
						Ø 120/200 only	

PFTM Series Male Thread Connector

Simple male connection for low profile positions secured to a plate or bracket. BSPP, NPT metric threads.
Fitting material: aluminum.



Installation

Note:
When installing cup assemblies, use a sealant material to secure the assembly and prevent vacuum leakage.

Cup diameter (mm)	Vacuum port	Complete assembly Nitrile (NBR)	Replacement cup Nitrile (NBR)	Complete assembly Silicon (SI)	Replacement cup Silicon (SI)	Replacement cup fitting
5	M5	PFTM-5A-NBR-M5	PFG-5A-NBR	PFTM-5A-SI-M5	PFG-5A-SI	FTM-5A-M5
5	1/8 BSPP	PFTM-5A-NBR-G1	PFG-5A-NBR	PFTM-5A-SI-G1	PFG-5A-SI	FTM-5A-G1
6	M5	PFTM-6A-NBR-M5	PFG-6A-NBR	PFTM-6A-SI-M5	PFG-6A-SI	FTM-5A-M5
6	1/8 BSPP	PFTM-6A-NBR-G1	PFG-6A-NBR	PFTM-6A-SI-G1	PFG-6A-SI	FTM-5A-G1
8	M5	PFTM-8A-NBR-M5	PFG-8A-NBR	PFTM-8A-SI-M5	PFG-8A-SI	FTM-5A-M5
8	1/8 BSPP	PFTM-8A-NBR-G1	PFG-8A-NBR	PFTM-8A-SI-G1	PFG-8A-SI	FTM-5A-G1
10	M5	PFTM-10A-NBR-M5	PFG-10A-NBR	PFTM-10A-SI-M5	PFG-10A-SI	FTM-5A-M5
10	1/8 BSPP	PFTM-10A-NBR-G1	PFG-10A-NBR	PFTM-10A-SI-G1	PFG-10A-SI	FTM-5A-G1
15	M5	PFTM-15A-NBR-M5	PFG-15A-NBR	PFTM-15A-SI-M5	PFG-15A-SI	FTM-5A-M5
15	1/8 BSPP	PFTM-15A-NBR-G1	PFG-15A-NBR	PFTM-15A-SI-G1	PFG-15A-SI	FTM-5A-G1
20	1/8 BSPP	PFTM-20B-NBR-G1	PFG-20B-NBR	PFTM-20B-SI-G1	PFG-20B-SI	FTM-20B-G1
20	1/4 BSPP	PFTM-20B-NBR-G2	PFG-20B-NBR	PFTM-20B-SI-G2	PFG-20B-SI	FTM-20B-G2
20	M10	PFTM-20B-NBR-M10	PFG-20B-NBR	PFTM-20B-SI-M10	PFG-20B-SI	FTM-20B-M10
20	1/8 NPT	PFTM-20B-NBR-N1	PFG-20B-NBR	PFTM-20B-SI-N1	PFG-20B-SI	FTM-20B-N1
30	1/8 BSPP	PFTM-30-NBR-G1	PFG-30-NBR	PFTM-30-SI-G1	PFG-30-SI	FTM-20B-G1
30	1/4 BSPP	PFTM-30-NBR-G2	PFG-30-NBR	PFTM-30-SI-G2	PFG-30-SI	FTM-20B-G2
30	M10	PFTM-30-NBR-M10	PFG-30-NBR	PFTM-30-SI-M10	PFG-30-SI	FTM-20B-M10
30	1/8 NPT	PFTM-30-NBR-N1	PFG-30-NBR	PFTM-30-SI-N1	PFG-30-SI	FTM-20B-N1
40	1/8 BSPP	PFTM-40-NBR-G1	PFG-40-NBR	PFTM-40-SI-G1	PFG-40-SI	FTM-20B-G1
40	1/4 BSPP	PFTM-40-NBR-G2	PFG-40-NBR	PFTM-40-SI-G2	PFG-40-SI	FTM-20B-G2
40	M10	PFTM-40-NBR-M10	PFG-40-NBR	PFTM-40-SI-M10	PFG-40-SI	FTM-20B-M10
40	1/8 NPT	PFTM-40-NBR-N1	PFG-40-NBR	PFTM-40-SI-N1	PFG-40-SI	FTM-20B-N1
50	1/8 BSPP	PFTM-50-NBR-G1	PFG-50-NBR	PFTM-50-SI-G1	PFG-50-SI	FTM-50-G1
50	1/4 BSPP	PFTM-50-NBR-G2	PFG-50-NBR	PFTM-50-SI-G2	PFG-50-SI	FTM-50-G2
50	1/8 NPT	PFTM-50-NBR-N1	PFG-50-NBR	PFTM-50-SI-N1	PFG-50-SI	FTM-50-N1
60	1/4 BSPP	PFTM-60-NBR-G2	PFG-60-NBR	PFTM-60-SI-G2	PFG-60-SI	FTM-60-G2
60	M10	PFTM-60-NBR-M10	PFG-60-NBR	PFTM-60-SI-M10	PFG-60-SI	FTM-60-M10
60	1/4 NPT	PFTM-60-NBR-N2	PFG-60-NBR	PFTM-60-SI-N2	PFG-60-SI	FTM-60-N2
80	1/4 BSPP	PFTM-80-NBR-G2	PFG-80-NBR	PFTM-80-SI-G2	PFG-80-SI	FTM-60-G2
80	M10	PFTM-80-NBR-M10	PFG-80-NBR	PFTM-80-SI-M10	PFG-80-SI	FTM-60-M10
80	1/4 NPT	PFTM-80-NBR-N2	PFG-80-NBR	PFTM-80-SI-N2	PFG-80-SI	FTM-60-N2
95	1/4 BSPP	PFTM-95-NBR-G2	PFG-95-NBR	PFTM-95-SI-G2	PFG-95-SI	FTM-60-G2
95	M10	PFTM-95-NBR-M10	PFG-95-NBR	PFTM-95-SI-M10	PFG-95-SI	FTM-60-M10
95	1/4 NPT	PFTM-95-NBR-N2	PFG-95-NBR	PFTM-95-SI-N2	PFG-95-SI	FTM-60-N2

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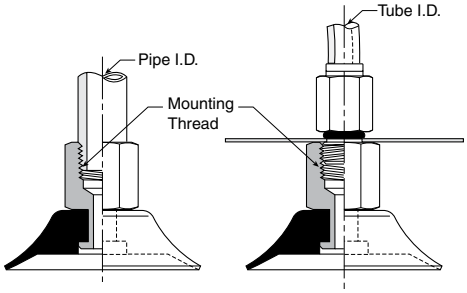
PFTF Series Female Thread Connector

Simple female connection for low profile positions secured to a plate or bracket. BSPP, NPT threads.

Fitting material: aluminum.

Installation

Note:
When installing cup assemblies, use a sealant material to secure the assembly and prevent vacuum leakage.



Cup diameter (mm)	Vacuum port	Complete assembly Nitrile (NBR)	Replacement cup Nitrile (NBR)	Complete assembly Silicon (SI)	Replacement cup Silicon (SI)	Replacement cup fitting
5	M5	PFTF-5A-NBR-M5	PFG-5A-NBR	PFTF-5A-SI-M5	PFG-5A-SI	FTF-5A-M5
5	1/8 BSPP	PFTF-5A-NBR-G1	PFG-5A-NBR	PFTF-5A-SI-G1	PFG-5A-SI	FTF-5A-G1
6	M5	PFTF-6A-NBR-M5	PFG-6A-NBR	PFTF-6A-SI-M5	PFG-6A-SI	FTF-5A-M5
6	1/8 BSPP	PFTF-6A-NBR-G1	PFG-6A-NBR	PFTF-6A-SI-G1	PFG-6A-SI	FTF-5A-G1
8	M5	PFTF-8A-NBR-M5	PFG-8A-NBR	PFTF-8A-SI-M5	PFG-8A-SI	FTF-5A-M5
8	1/8 BSPP	PFTF-8A-NBR-G1	PFG-8A-NBR	PFTF-8A-SI-G1	PFG-8A-SI	FTF-5A-G1
10	1/8 BSPP	PFTF-10A-NBR-G1	PFG-10A-NBR	PFTF-10A-SI-G1	PFG-10A-SI	FTF-5A-G1
10	M5	PFTF-10A-NBR-M5	PFG-10A-NBR	PFTF-10A-SI-M5	PFG-10A-SI	FTF-5A-M5
15	1/8 BSPP	PFTF-15A-NBR-G1	PFG-15A-NBR	PFTF-15A-SI-G1	PFG-15A-SI	FTF-5A-G1
15	M5	PFTF-15A-NBR-M5	PFG-15A-NBR	PFTF-15A-SI-M5	PFG-15A-SI	FTF-5A-M5
20	1/8 BSPP	PFTF-20B-NBR-G1	PFG-20B-NBR	PFTF-20B-SI-G1	PFG-20B-SI	FTF-20B-G1
30	1/8 BSPP	PFTF-30-NBR-G1	PFG-30-NBR	PFTF-30-SI-G1	PFG-30-SI	FTF-20B-G1
30	1/4 BSPP	PFTF-30-NBR-G2	PFG-30-NBR	PFTF-30-SI-G2	PFG-30-SI	FTF-20B-G2
40	1/8 BSPP	PFTF-40-NBR-G1	PFG-40-NBR	PFTF-40-SI-G1	PFG-40-SI	FTF-20B-G1
40	1/4 BSPP	PFTF-40-NBR-G2	PFG-40-NBR	PFTF-40-SI-G2	PFG-40-SI	FTF-20B-G2
50	1/8 BSPP	PFTF-50-NBR-G1	PFG-50-NBR	PFTF-50-SI-G1	PFG-50-SI	FTF-50-G1
50	1/4 BSPP	PFTF-50-NBR-G2	PFG-50-NBR	PFTF-50-SI-G2	PFG-50-SI	FTF-50-G2
60	1/4 BSPP	PFTF-60-NBR-G2	PFG-60-NBR	PFTF-60-SI-G2	PFG-60-SI	FTF-60-G2
60	1/4 NPT	PFTF-60-NBR-N2	PFG-60-NBR	PFTF-60-SI-N2	PFG-60-SI	FTF-60-N2
80	1/4 BSPP	PFTF-80-NBR-G2	PFG-80-NBR	PFTF-80-SI-G2	PFG-80-SI	FTF-60-G2
80	1/4 NPT	PFTF-80-NBR-N2	PFG-80-NBR	PFTF-80-SI-N2	PFG-80-SI	FTF-60-N2
95	1/4 NPT	PFTF-95-NBR-N2	PFG-95-NBR	PFTF-95-SI-N2	PFG-95-SI	FTF-60-N2
95	1/4 BSPP	PFTF-95-NBR-G2	PFG-95-NBR	PFTF-95-SI-G2	PFG-95-SI	FTF-60-G2
120	1/2 BSPP	PFTF-120-NBR-G4	PFG-120-NBR	PFTF-120-SI-G4	PFG-120-SI	FTF-120-G4
120	1/2 NPT	PFTF-120-NBR-N4	PFG-120-NBR	PFTF-120-SI-N4	PFG-120-SI	FTF-120-N4
150	1/2 NPT	PFTF-150-NBR-G4	PFG-150-NBR	PFTF-150-SI-G4	PFG-150-SI	FTF-120-G4
150	1/2 NPT	PFTF-150-NBR-N4	PFG-150-NBR	PFTF-150-SI-N4	PFG-150-SI	FTF-120-N4
200	1/2 BSPP	PFTF-200-NBR-G4	PFG-200-NBR	PFTF-200-SI-G4	PFG-200-SI	FTF-120-G4
200	1/2 NPT	PFTF-200-NBR-N4	PFG-200-NBR	PFTF-200-SI-N4	PFG-200-SI	FTF-120-N4

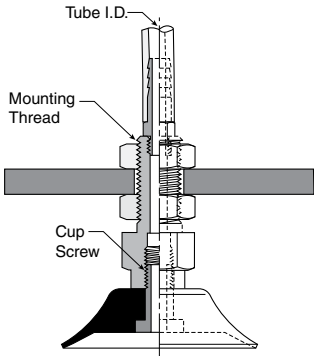
A

PFTK Series Barbed Bulkhead

Top stem connectors secured with jam nuts and allow tubing connections at the top side. Fitting material: nickel plated brass.

Installation

Note:
When installing cup assemblies, use a sealant material to secure the assembly and prevent vacuum leakage.

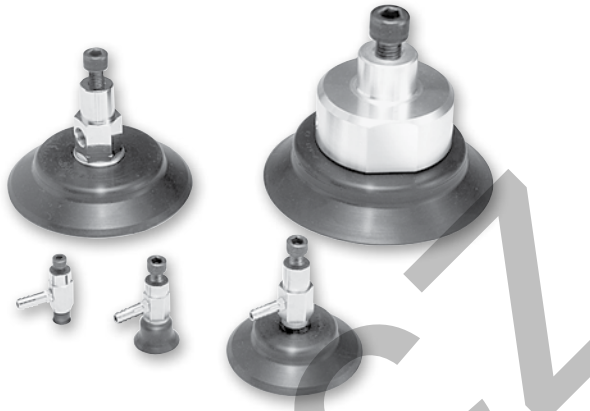


Cup diameter (mm)	Vacuum port	Complete assembly Nitrile (NBR)	Replacement cup Nitrile (NBR)	Complete assembly Silicon (SI)	Replacement cup Silicon (SI)	Replacement cup fitting
5	Barb	PFTK-5A-NBR	PFG-5A-NBR	PFTK-5A-SI	PFG-5A-SI	FTK-5A
6	Barb	PFTK-6A-NBR	PFG-6A-NBR	PFTK-6A-SI	PFG-6A-SI	FTK-5A
8	Barb	PFTK-8A-NBR	PFG-8A-NBR	PFTK-8A-SI	PFG-8A-SI	FTK-5A
10	Barb	PFTK-10A-NBR	PFG-10A-NBR	PFTK-10A-SI	PFG-10A-SI	FTK-5A
15	Barb	PFTK-15-NBR	PFG-15-NBR	PFTK-15-SI	PFG-15-SI	FTK-15
20	Barb	PFTK-20-NBR	PFG-20-NBR	PFTK-20-SI	PFG-20-SI	FTK-20
30	Barb	PFTK-30-NBR	PFG-30-NBR	PFTK-30-SI	PFG-30-SI	FTK-25
40	Barb	PFTK-40-NBR	PFG-40-NBR	PFTK-40-SI	PFG-40-SI	FTK-25
50	Barb	PFTK-50-NBR	PFG-50-NBR	PFTK-50-SI	PFG-50-SI	FTK-50
60	1/8 BSPP	PFTK-60-NBR-G1	PFG-60-NBR	PFTK-60-SI-G1	PFG-60-SI	FTK-60-G1
60	1/8 NPT	PFTK-60-NBR-N1	PFG-60-NBR	PFTK-60-SI-N1	PFG-60-SI	FTK-60-N1
80	1/8 BSPP	PFTK-80-NBR-G1	PFG-80-NBR	PFTK-80-SI-G1	PFG-80-SI	FTK-60-G1
80	1/8 NPT	PFTK-80-NBR-N1	PFG-80-NBR	PFTK-80-SI-N1	PFG-80-SI	FTK-60-N1
95	1/8 BSPP	PFTK-95-NBR-G1	PFG-95-NBR	PFTK-95-SI-G1	PFG-95-SI	FTK-60-G1
95	1/8 NPT	PFTK-95-NBR-N1	PFG-95-NBR	PFTK-95-SI-N1	PFG-95-SI	FTK-60-N1

A

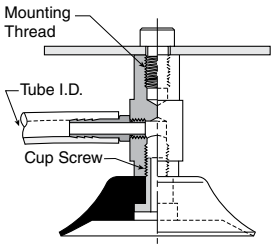
PFYK Series 90° Barbed Adapter

Side stem connectors allow you to secure the stem with a bolt thru a plate or “L” bracket to allow the tube connection from the side port. Fitting material: nickel plated brass.



Installation

Note:
When installing cup assemblies, use a sealant material to secure the assembly and prevent vacuum leakage.



Cup diameter (mm)	Vacuum port	Complete assembly Nitrile (NBR)	Replacement cup Nitrile (NBR)	Complete assembly Silicon (SI)	Replacement cup Silicon (SI)	Replacement cup fitting
5	Barb	PFYK-5A-NBR	PFG-5A-NBR	PFYK-5A-SI	PFG-5A-SI	FYK-5A
6	Barb	PFYK-6A-NBR	PFG-6A-NBR	PFYK-6A-SI	PFG-6A-SI	FYK-5A
8	Barb	PFYK-8A-NBR	PFG-8A-NBR	PFYK-8A-SI	PFG-8A-SI	FYK-5A
10	Barb	PFYK-10A-NBR	PFG-10A-NBR	PFYK-10A-SI	PFG-10A-SI	FYK-5A
15	Barb	PFYK-15-NBR	PFG-15-NBR	PFYK-15-SI	PFG-15-SI	FYK-15
20	Barb	PFYK-20-NBR	PFG-20-NBR	PFYK-20-SI	PFG-20-SI	FYK-20
30	Barb	PFYK-30-NBR	PFG-30-NBR	PFYK-30-SI	PFG-30-SI	FYK-25
40	Barb	PFYK-40-NBR	PFG-40-NBR	PFYK-40-SI	PFG-40-SI	FYK-25
50	Barb	PFYK-50-NBR	PFG-50-NBR	PFYK-50-SI	PFG-50-SI	FYK-50
60	1/8 BSPP	PFYK-60-NBR-G1	PFG-60-NBR	PFYK-60-SI-G1	PFG-60-SI	FYK-60-G1
60	1/8 NPT	PFYK-60-NBR-N1	PFG-60-NBR	PFYK-60-SI-N1	PFG-60-SI	FYK-60-N1
80	1/8 BSPP	PFYK-80-NBR-G1	PFG-80-NBR	PFYK-80-SI-G1	PFG-80-SI	FYK-60-G1
80	1/8 NPT	PFYK-80-NBR-N1	PFG-80-NBR	PFYK-80-SI-N1	PFG-80-SI	FYK-60-N1
95	1/8 BSPP	PFYK-95-NBR-G1	PFG-95-NBR	PFYK-95-SI-G1	PFG-95-SI	FYK-60-G1
95	1/8 NPT	PFYK-95-NBR-N1	PFG-95-NBR	PFYK-95-SI-N1	PFG-95-SI	FYK-60-N1
120	1/8 BSPP	PFYK-120-NBR-G1	PFG-120-NBR	PFYK-120-SI-G1	PFG-120-SI	FYK-120-G1
120	1/8 NPT	PFYK-120-NBR-N1	PFG-120-NBR	PFYK-120-SI-N1	PFG-120-SI	FYK-120-N1
150	1/8 BSPP	PFYK-150-NBR-G1	PFG-150-NBR	PFYK-150-SI-G1	PFG-150-SI	FYK-120-G1
150	1/8 NPT	PFYK-150-NBR-N1	PFG-150-NBR	PFYK-150-SI-N1	PFG-150-SI	FYK-120-N1
200	1/8 BSPP	PFYK-200-NBR-G1	PFG-200-NBR	PFYK-200-SI-G1	PFG-200-SI	FYK-120-G1
200	1/8 NPT	PFYK-200-NBR-N1	PFG-200-NBR	PFYK-200-SI-N1	PFG-200-SI	FYK-120-N1

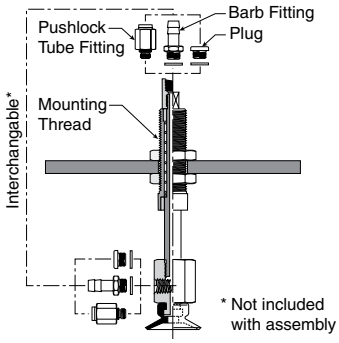
A

PFTYS Series Bulkhead Level Compensator

303 stainless steel construction secured with jam nuts. Spring biased compensators can absorb impacts of down-strokes and adjust for different levels of pick up points. 303 stainless corrosion resistant materials with drymet bushings increases the strength and life.

Installation

Note:
When installing cup assemblies, use a sealant material to secure the assembly and prevent vacuum leakage.

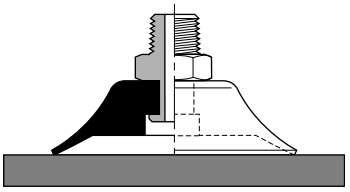


Cup dia. (mm)	Vacuum port	Stroke (mm)	Spring compression Force lbf (N) 0%	100%	Cup material Nitrile assembly (NBR)	Replacement cup Nitrile (NBR)	Cup material Silicon assembly (SI)	Replacement cup Silicon (SI)	Level Compensator P/N
5	M5	10	.14 (.61)	.26 (1.17)	PFTYS5A10NBRM5	PFG-5A-NBR	PFTYS5A10SIM5	PFG-5A-SI	FTYS-5A-10-M5
5	M5	15	.15 (.64)	.26 (1.17)	PFTYS5A15NBRM5	PFG-5A-NBR	PFTYS5A15SIM5	PFG-5A-SI	FTYS-5A-15-M5
6	M5	10	.14 (.61)	.26 (1.17)	PFTYS6A10NBRM5	PFG-6A-NBR	PFTYS6A10SIM5	PFG-6A-SI	FTYS-5A-10-M5
6	M5	15	.15 (.64)	.26 (1.17)	PFTYS6A15NBRM5	PFG-6A-NBR	PFTYS6A15SIM5	PFG-6A-SI	FTYS-5A-15-M5
8	M5	10	.14 (.61)	.26 (1.17)	PFTYS8A10NBRM5	PFG-8A-NBR	PFTYS8A10SIM5	PFG-8A-SI	FTYS-5A-10-M5
8	M5	15	.15 (.64)	.26 (1.17)	PFTYS8A15NBRM5	PFG-8A-NBR	PFTYS8A15SIM5	PFG-8A-SI	FTYS-5A-15-M5
10	M5	10	.11 (.49)	.13 (.59)	PFTYS10A10NBRM5	PFG-10A-NBR	PFTYS10A10SIM5	PFG-10A-SI	FTYS-5A-10-M5
10	M5	15	.11 (.49)	.13 (.59)	PFTYS10A15NBRM5	PFG-10A-NBR	PFTYS10A15SIM5	PFG-10A-SI	FTYS-5A-15-M5
15	M5	10	.11 (.49)	.13 (.59)	PFTYS15A10NBRM5	PFG-15A-NBR	PFTYS15A10SIM5	PFG-15A-SI	FTYS-5A-10-M5
15	M5	15	.11 (.49)	.13 (.59)	PFTYS15A15NBRM5	PFG-15A-NBR	PFTYS15A15SIM5	PFG-15A-SI	FTYS-5A-15-M5
20	M5	15	.56 (2.5)	.79 (3.4)	PFTYS20B15NBRM5	PFG-20B-NBR	PFTYS20B15SIM5	PFG-20B-SI	FTYS-20B-15-M5
20	M5	30	.56 (2.5)	1.2 (4.9)	PFTYS20B30NBRM5	PFG-20B-NBR	PFTYS20B30SIM5	PFG-20B-SI	FTYS-20B-30-M5
30	M5	15	.56 (2.5)	.79 (3.4)	PFTYS3015NBRM5	PFG-30-NBR	PFTYS3015SIM5	PFG-30-SI	FTYS-20B-15-M5
30	M5	30	.56 (2.5)	1.2 (4.9)	PFTYS3030NBRM5	PFG-30-NBR	PFTYS3030SIM5	PFG-30-SI	FTYS-20B-30-M5
40	M5	15	.56 (2.5)	.79 (3.4)	PFTYS4015NBRM5	PFG-40-NBR	PFTYS4015SIM5	PFG-40-SI	FTYS-20B-15-M5
40	M5	30	.56 (2.5)	1.2 (4.9)	PFTYS4030NBRM5	PFG-40-NBR	PFTYS4030SIM5	PFG-40-SI	FTYS-20B-30-M5
50	M5	15	.56 (2.5)	1.2 (4.9)	PFTYS5015NBRM5	PFG-50-NBR	PFTYS5015SIM5	PFG-50-SI	FTYS-50-15-M5
50	M5	30	.67 (2.9)	1.4 (5.9)	PFTYS5030NBRM5	PFG-50-NBR	PFTYS5030SIM5	PFG-50-SI	FTYS-50-30-M5
60	1/8 BSPP	30	1.6 (6.8)	3.6 (15.6)	PFTYS6030NBRG1	PFG-60-NBR	PFTYS6030SIG1	PFG-60-SI	FTYS-60-30-G1
60	1/8 BSPP	50	1.9 (8.3)	4.5 (19.6)	PFTYS6050NBRG1	PFG-60-NBR	PFTYS6050SIG1	PFG-60-SI	FTYS-60-50-G1
80	1/8 BSPP	30	1.6 (6.8)	3.6 (15.6)	PFTYS8030NBRG1	PFG-80-NBR	PFTYS8030SIG1	PFG-80-SI	FTYS-60-30-G1
80	1/8 BSPP	50	1.9 (8.3)	4.5 (19.6)	PFTYS8050NBRG1	PFG-80-NBR	PFTYS8050SIG1	PFG-80-SI	FTYS-60-50-G1
95	1/8 BSPP	30	1.6 (6.8)	3.6 (15.6)	PFTYS9530NBRG1	PFG-95-NBR	PFTYS9530SIG1	PFG-95-SI	FTYS-60-30-G1
95	1/8 BSPP	50	1.9 (8.3)	4.5 (19.6)	PFTYS9550NBRG1	PFG-95-NBR	PFTYS9550SIG1	PFG-95-SI	FTYS-60-50-G1
120	1/4 BSPP	20	3.6 (15.6)	6.8 (29)	PFTYS12020NBRG2	PFG-120-NBR	PFTYS12020SIG2	PFG-120-SI	FTYS-120-20-G2
120	1/4 BSPP	50	3.4 (14.7)	6.8 (29)	PFTYS12050NBRG2	PFG-120-NBR	PFTYS12050SIG2	PFG-120-SI	FTYS-120-50-G2
150	1/4 BSPP	20	3.6 (15.6)	6.8 (29)	PFTYS15020NBRG2	PFG-150-NBR	PFTYS15020SIG2	PFG-150-SI	FTYS-120-20-G2
150	1/4 BSPP	50	3.4 (14.7)	6.8 (29)	PFTYS15050NBRG2	PFG-150-NBR	PFTYS15050SIG2	PFG-150-SI	FTYS-120-50-G2
200	1/4 BSPP	20	3.6 (15.6)	6.8 (29)	PFTYS20020NBRG2	PFG-200-NBR	PFTYS20020SIG2	PFG-200-SI	FTYS-120-20-G2
200	1/4 BSPP	50	3.4 (14.7)	6.8 (29)	PFTYS20050NBRG2	PFG-200-NBR	PFTYS20050SIG2	PFG-200-SI	FTYS-120-50-G2

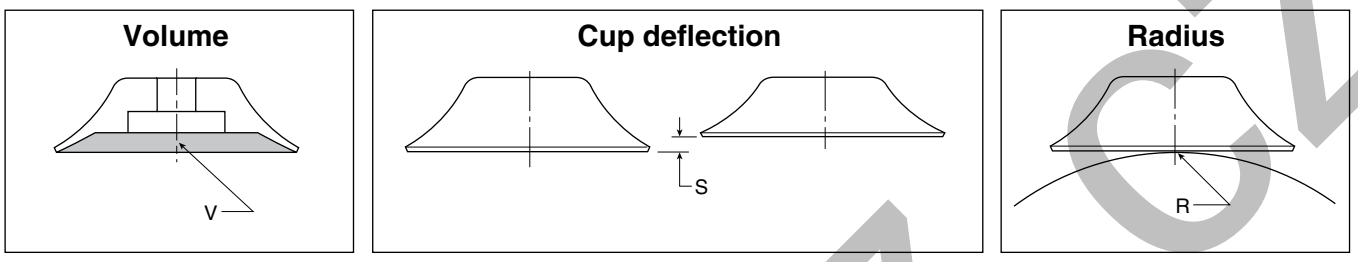
A

Applications

- Products with smooth surfaces
- Products with minimum flex
- Products that will not permanently deform



Main data for fat PFG cups



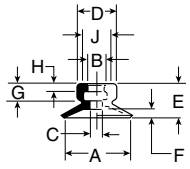
Model number	Cup diameter mm	Area cm²	Volume (V) liters	Lifting force @60% (N)		Cup deflection (S) mm	Radius (R) mm
PFG-5A-*	5	0.20	0.000005	1.20	0.6	0.5	3.5
PFG-6A-*	6	0.28	0.000008	1.70	0.85	1.0	4.0
PFG-8A-*	8	0.50	0.00003	3.10	1.5	1.4	5.0
PFG-10A-*	10	0.79	0.00007	4.80	2.4	1.5	6.0
PFG-15-*	15	1.77	0.0004	10.8	5.4	1.9	6.0
PFG-15A-*	15	1.77	0.0004	10.8	5.4	1.9	6.0
PFG-20-*	20	3.14	0.0008	19.2	9.6	2.3	9.0
PFG-20B-*	20	3.14	0.0008	19.2	9.6	2.3	13.0
PFG-30-*	30	7.07	0.0018	43.2	21.6	2.0	26
PFG-40-*	40	12.60	0.004	76.9	38.5	3.5	37
PFG-50-*	50	19.60	0.007	120	60	4.0	41
PFG-60-*	60	28.30	0.0090	173	87	5.0	70
PFG-80-*	80	50.30	0.025	308	154	6.0	100
PFG-95-*	95	70.90	0.035	434	267	6.0	150
PFG-120-*	120	113.00	0.078	692	346	6.0	365
PFG-150-*	150	176.70	0.177	1081	541	9.0	380
PFG-200-*	200	314.20	0.425	1922	961	13.0	430

* Cup material

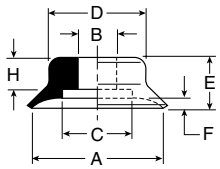
A

PFG Series Replacement Cup Dimensions

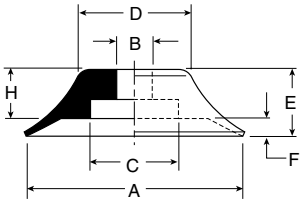
PFG-5A
PFG-15A



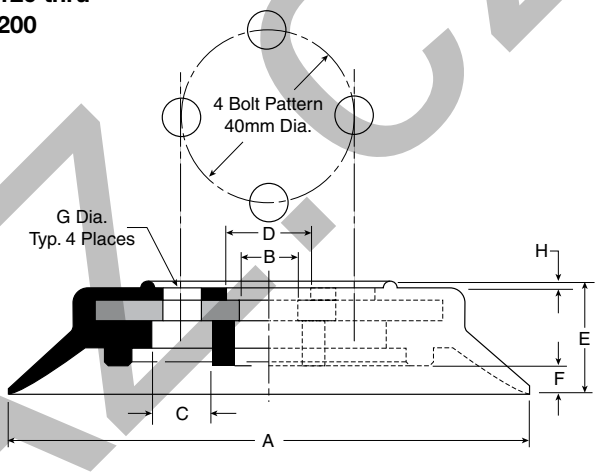
PFG-15 thru
PFG-40



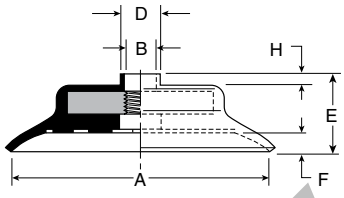
PFG-50



PFG-120 thru
PFG-200



PFG-60 thru
PFG-95



Dimensions (mm)

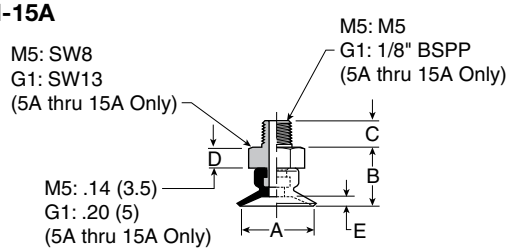
Model number	ØA	ØB	ØC	ØD	E	F	G	H	ØJ
PFG-5A-*	5	4	1.4	7.5	6.5	.8	4	2	6
PFG-6A-*	6	4	2	7.5	6.5	.8	4	2	6
PFG-8A-*	8	4	2	8	7	1.2	4	2	6
PFG-10A-*	10	4	2	8.5	7.5	1.5	4	2	6
PFG-15-*	15	—	7.8	12	8	1.9	—	—	—
PFG-15A-*	15	4	2	9	8	2	4	2	6
PFG-20-*	20	4.6	11	15	10	2.3	—	4.5	—
PFG-20B-*	20	6	11	15	12.5	2.3	—	7	—
PFG-30-*	30	6	11	14	12	2	—	7	—
PFG-40-*	40	6	11	24	14	4	—	7	—
PFG-50-*	50	8	20	27	15	3.5	—	7	—
PFG-60-*	60	M10x1.25	—	12.5	18.5	5	—	2.5	—
PFG-80-*	80	M10x1.25	—	12.5	20.5	6	—	2.5	—
PFG-95-*	95	M10x1.25	—	12.5	21	6	—	2.5	—
PFG-120-*	120	14	14	20	25.5	6	4xØ8.7xØ40	1.5	—
PFG-150-*	150	13	14	20	32.5	9	4xØ8.7xØ40	1.5	—
PFG-200-*	200	13	12	20	37.5	13	4xØ8.7xØ40	1.5	—

* Cup material

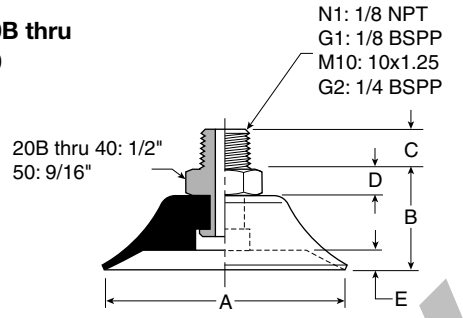
A

Dimensions

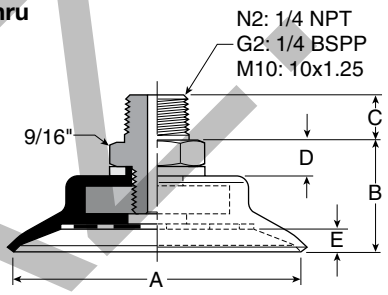
PFTM-5A thru PFTM-15A



PFTM-20B thru PFTM-50



PFTM-60 thru PFTM-95



Dimensions (mm)

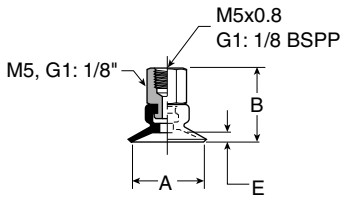
Model number	ØA	B	C (M3)	C (M5)	C (N1 / G1)	C (M10 / G2)	C (N2)	D	E
PFTM-5A-*-†	5	10	—	4.5	8	—	—	See Dwg.	8
PFTM-6A-*-†	6	10	—	4.5	8	—	—	See Dwg.	8
PFTM-8A-*-†	8	10.5	—	4.5	8	—	—	See Dwg.	1.2
PFTM-10A-*-†	10	11	—	4.5	8	—	—	See Dwg.	1.5
PFTM-15A-*-†	15	11.5	—	4.5	8	—	—	See Dwg.	2
PFTM-20B-*-†	20	17.5	—	—	8	10	—	5	2.5
PFTM-30-*-†	30	17	—	—	8	10	—	5	2
PFTM-40-*-†	40	19	—	—	8	10	—	5	3.5
PFTM-50-*-†	50	20	—	—	8	10	—	5	4
PFTM-60-*-†	60	23	—	—	—	10	15	7	5
PFTM-80-*-†	80	25	—	—	—	10	15	7	6
PFTM-95-*-†	95	25.5	—	—	—	10	15	7	6

* Cup material
† Thread size

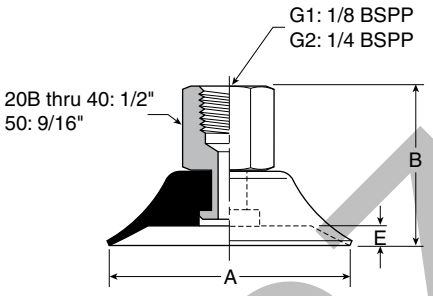
A

Dimensions

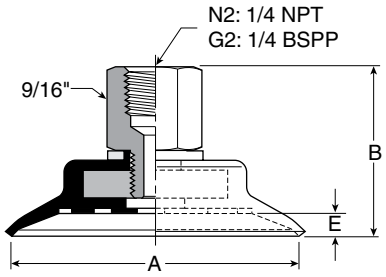
PFTF-5A thru PFTF-15A



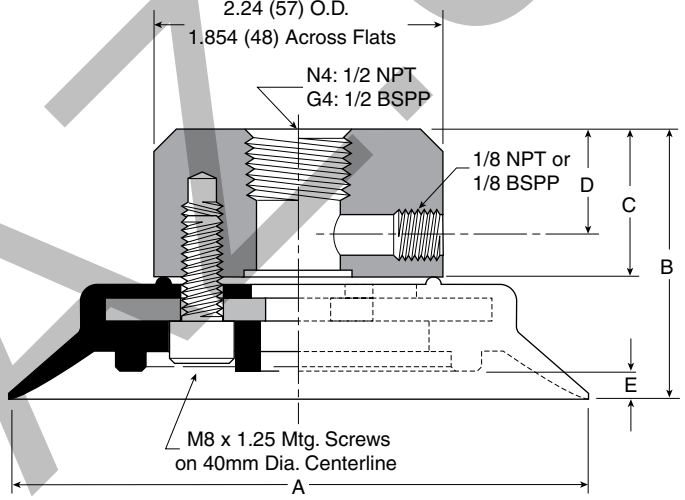
PFTF-20B thru PFTF-50



PFTF-60 thru PFTF-95



PFTF-120 thru PFTF-200



Dimensions (mm)

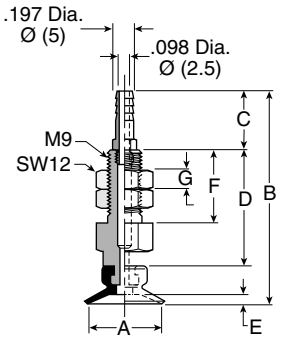
Model number	ØA	B	B (M5)	C	D	E
PFTF-5A-*-†	5	14.5	20.5	—	—	.8
PFTF-6A-*-†	6	14.5	20.5	—	—	.8
PFTF-8A-*-†	8	15	21	—	—	1.2
PFTF-10A-*-†	10	14.5	20.5	—	—	1.5
PFTF-15A-*-†	15	16	22	—	—	2
PFTF-20B-*-†	20	26.5	—	—	—	2.5
PFTF-30-*-†	30	26	—	—	—	2
PFTF-40-*-†	40	28	—	—	—	4
PFTF-50-*-†	50	29	—	—	—	4
PFTF-60-*-†	60	35.5	—	—	—	5
PFTF-80-*-†	80	37.5	—	—	—	6
PFTF-95-*-†	95	38	—	—	—	6
PFTF-120-*-†	120	46.5	—	24	13	6
PFTF-150-*-†	150	53.5	—	24	13	9
PFTF-200-*-†	200	58.5	—	24	13	13

* Cup material
† Thread size

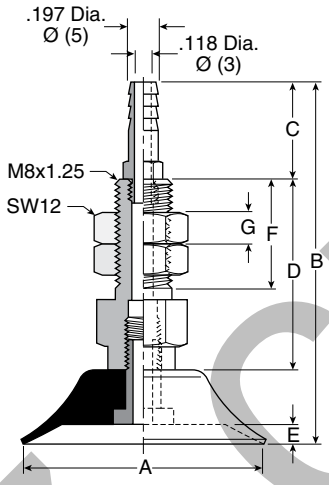
A

Dimensions

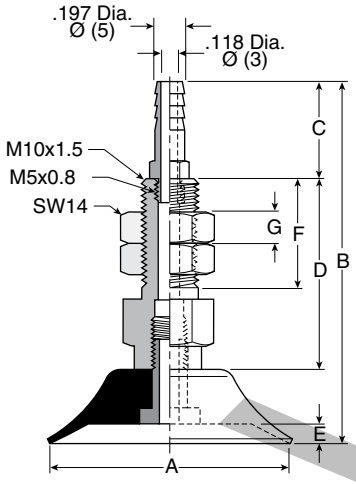
PFTK-5A thru PFTK-10A



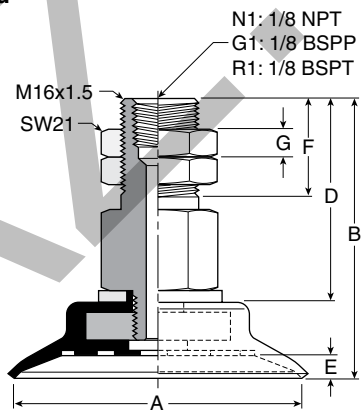
PFTK-15 thru PFTK-20



PFTK-30 thru PFTK-50



PFTK-60 thru PFTK-95



Dimensions (mm)

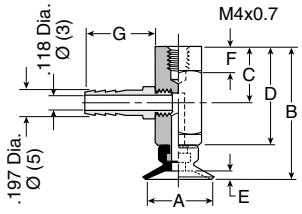
Model number	ØA	B	C	D	E	F	G	Wt g
PFTK-5A-*	5	30.5	10	14	.8	15.5	3	11
PFTK-6A-*	6	30.5	10	14	.8	15.5	3	11
PFTK-8A-*	8	31	10	14	1.2	15.5	3	11
PFTK-10A-*	10	46	16	22.5	1.5	15.5	3	15
PFTK-15-*	15	46	16	22	1.9	15	3	20
PFTK-20-*	20	48	16	22	2.3	15	5	20
PFTK-30-*	30	60	16	32	2	20	5	40
PFTK-40-*	40	62	16	32	3.5	20	5	40
PFTK-50-*	50	63	16	32	4	20	5	50
PFTK-60-*-†	60	58.5	—	42.5	5	20	6	130
PFTK-80-*-†	80	60.5	—	42.5	6	20	6	170
PFTK-95-*-†	95	61	—	42.5	6	20	6	220

* Cup material
† Vacuum port

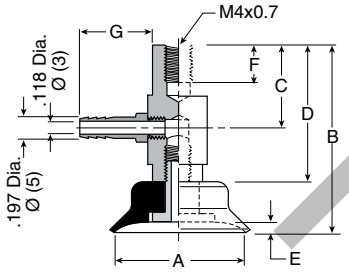
A

Dimensions

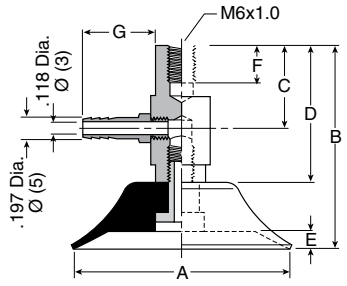
PFYK-5A thru PFYK-10A



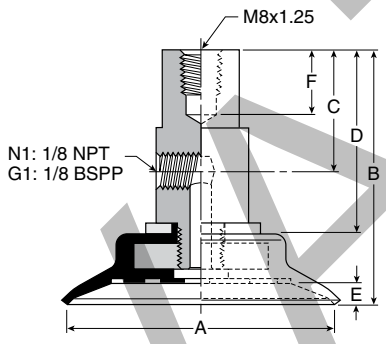
PFYK-15 thru PFYK-20



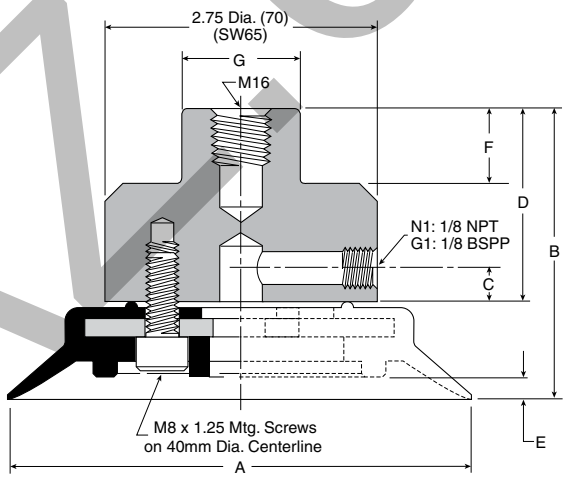
PFYK-30 thru PFYK-50



PFYK-60 thru PFYK-95



PFYK-120 thru PFYK-200



Dimensions (mm)

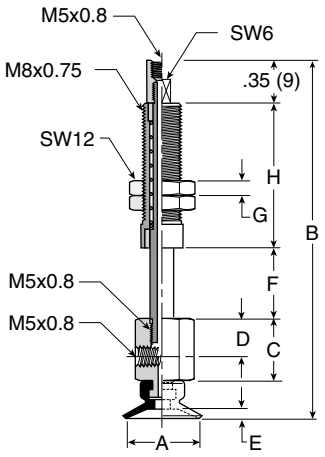
Model number	ØA	B	C	D	E	F	G	Wt g
PFYK-5A-*	5	29	13	22.5	.8	6	16	16
PFYK-6A-*	6	29	13	22.5	.8	6	16	16
PFYK-8A-*	8	29.5	13	22.5	1.2	6	16	16
PFYK-10A-*	10	30	13	22.5	1.5	6	16	16
PFYK-15-*	15	30	14	22	1.9	6	16	20
PFYK-20-*	20	32	14	22	2.3	6	16	20
PFYK-30-*	30	44	20	32	2	8	16	40
PFYK-40-*	40	46	20	32	3.5	8	16	50
PFYK-50-*	50	47	20	32	4	8	16	55
PFYK-60-*-†	60	58.5	28	40	5	11	—	120
PFYK-80-*-†	80	60.5	28	40	6	11	—	160
PFYK-95-*-†	95	61	28	40	6	11	—	210
PFYK-120-*-†	120	75.5	12	50	6	20	Dia. 30	640
PFYK-150-*-†	150	82.5	12	50	9	20	Dia. 30	910
PFYK-200-*-†	200	87.5	12	50	13	20	Dia. 30	1200

* Cup material
† Vacuum port

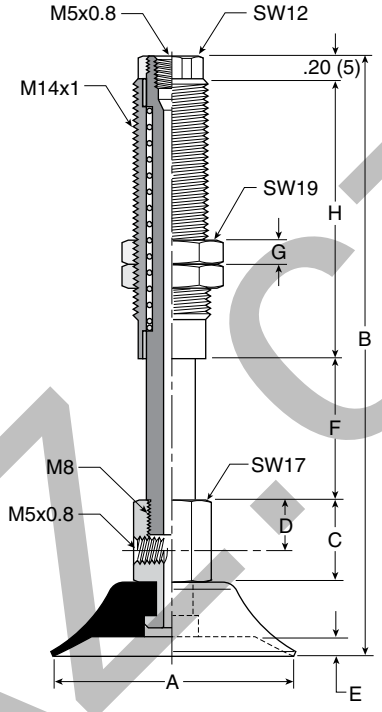
A

Dimensions

PFTYS5A thru PFTYS15A



PFTYS20B thru PFTYS50



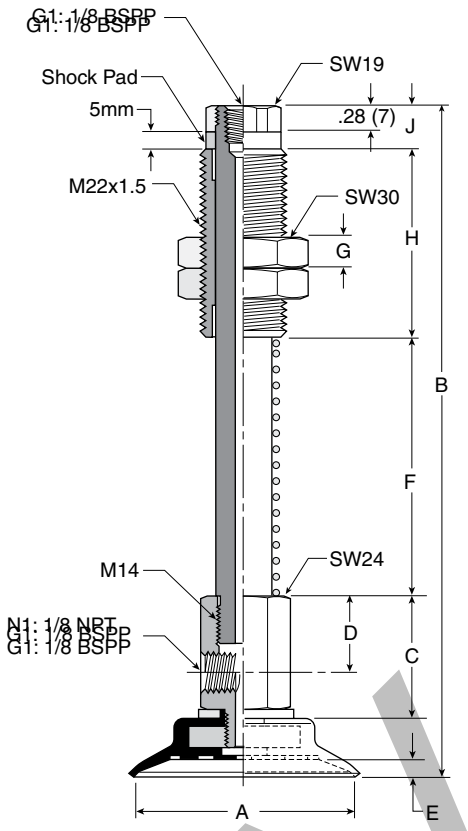
Dimensions (mm)

Model number	ØA	B	C	D	E	F	G	H	Wt g
PFTYS5A10*†	5	61.5	13	8	.8	10	3	23	18.5
PFTYS5A15*†	5	74	13	8	.8	15	3	30.5	21
PFTYS6A10*†	6	61.5	13	8	.8	10	3	23	18.5
PFTYS6A15*†	6	74	13	8	.8	15	3	30.5	21
PFTYS8A10*†	8	62	13	8	1.2	10	3	23	18.5
PFTYS8A15*†	8	74.5	13	8	1.2	15	3	30.5	21
PFTYS10A10*†	10	63	13	8	1.5	10	3	23	18.5
PFTYS10A15*†	10	75	13	8	1.5	15	3	30.5	21
PFTYS15A10*†	15	63.5	13	8	2	10	3	23	18.5
PFTYS15A15*†	15	75.5	13	8	2	15	3	30.5	21
PFTYS20B15*†	20	85.5	17	10	2.3	15	5	36	71
PFTYS20B30*†	20	122.5	17	10	2.3	30	5	58	96
PFTYS3015*†	30	85	17	10	2	15	5	36	72
PFTYS3030*†	30	122	17	10	2	30	5	58	97
PFTYS4015*†	40	87	17	10	3.5	15	5	36	76
PFTYS4030*†	40	124	17	10	3.5	30	5	58	101
PFTYS5015*†	50	88	17	10	4	15	5	36	85
PFTYS5030*†	50	125	17	10	4	30	5	58	110

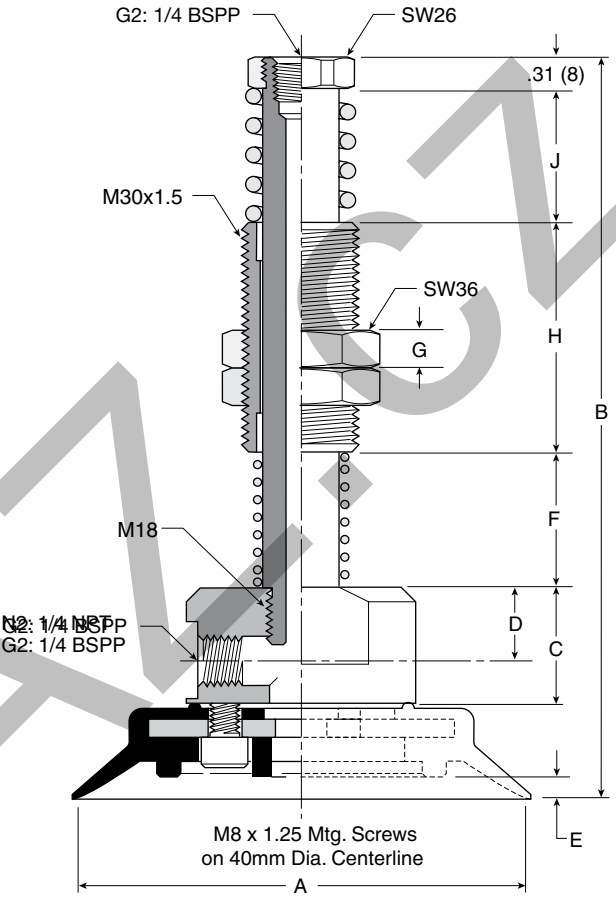
* Cup material
† Vacuum port

Dimensions

PFTYS60 thru PFTYS95



PFTYS120 thru PFTYS200



Dimensions (mm)

Model number	ØA	B	C	D	E	F	G	H	J	Wt g
PFTYS6030*†	60	153	32.5	20	5	45	10	50	12	282
PFTYS6050*†	60	178	32.5	20	5	70	10	50	12	316
PFTYS8030*†	80	155	32.5	20	6	45	10	50	12	310
PFTYS8050*†	80	180	32.5	20	6	70	10	50	12	344
PFTYS9530*†	95	156	32.5	20	6	45	10	50	12	350
PFTYS9550*†	95	181	32.5	20	6	70	10	50	12	384
PFTYS12020*†	120	192	32.5	18	6	35	10	60	35	1165
PFTYS12070*†	120	257	32.5	18	6	100	10	60	35	1246
PFTYS15020*†	150	199	32.5	18	9	35	10	60	35	1389
PFTYS15070*†	150	209	32.5	18	9	75	10	60	35	1471
PFTYS20020*†	200	204	32.5	18	13	35	10	60	35	1755
PFTYS20070*†	200	264	32.5	18	13	100	10	60	35	1836

* Cup material
† Vacuum port