

# DURAFLEX® FRICTION CUPS

New improved models DCF for domed surfaces and BFFT for very thin metal sheets



# **Our Mission**

The Piab mission is to increase productivity for industrial customers and provide energy saving solutions by promoting our superior technology universally.



# **Selection of DCF**



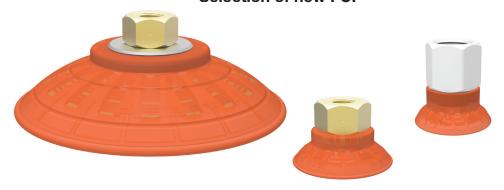
# **Selection of BFFT**



# **Selection of new BFF**



# **Selection of new FCF**





# Features and benefits

- Handling parts with an oily or slippery metal surface. The DURAFLEX® Friction Cups are tailor-made for handling parts with an oily or slippery metal surface.
- Higher machine speed without risk for sliding cups, resulting in downtime and scrap. The new friction cups the DCF and BFFT have a special pattern that resembles the ones found on winter/snow tires that will give even additional shear force grip.
- Easy to retrofit. The new cups match industry standard of cup build heights.
- **Minimize micro leakage.** Thanks to the lip's sealing area being larger/wider compared to other similar cups, it will minimize the risk or micro leakage due to particles on the metal sheet.
- No dents on thin sheets. The BFFT is especially designed for thin metal sheets and the cups have been tested to avoid giving dents.
- Great grip performance on flat and quite concave or convex surfaces. To achieve a best-inclass grip, the design of DCF cups are thin and pliable, that in combination with a special inner friction pattern will maximize grip performance. On DCF cups, we are not using an inner friction hub, the entire inner section of the cup works as a friction area.
- Higher machine speed without risk for sliding cups, resulting in downtime and scrap. The DURAFLEX® Friction Cups are tailor-made for handling parts with an oily or slippery metal surface.
- Higher productivity. These cups have exceptional elastic memory which will result in longer between service intervals and less mispicks resulting in down time and scrap due to misshaped cups.
- Lower cost of ownership. The products have a much better oil and abrasion resistance than Nitrile cups that will provide an outstanding life time of the cups.



# Bellows flat friction family (BFF)



- Special designed friction cups for oily surfaces, such as sheets in metal forming processes.
- Normal wear on friction cup will not affect the long term shear force performance.
- Best choice if > 0.1g/m² press oil is used on the sheet.
- Thanks to the strong grip on oily surfaces, the suction cups can withstand high shear forces, typically 2–4 times
  more than corresponding conventional suction cups.
- The "BFF" design is suitable for uneven/curved surfaces or if level compensation is needed, for example in destacking applications.
- The flat inner support gives stability during movement in any orientation.
- DURAFLEX® suction cups manufactured in a specially developed material that features the elasticity of rubber and wear resistance of polyurethane. The material does not leave any marks on the objects handled.

## **Lifting forces**

Name			Lifting force parallell to the surface, N, at vacuum level	
	60 -kPa	90 -kPa	60 -kPa	90 -kPa
BFF30P	24/23*	27/30*	11/5.5*	13.5/7.8*
BFF40P	43/45*	56/60*	60/35*	81/45*
BFF60P	77/82*	112/106*	90/76*	122/93*
BFF80P	176/174*	236/207*	201/110*	240/160*
BFF110P	279/284*	377/345*	298/235*	346/253*

<sup>\*</sup> Dry metal sheet/Oily metal sheet.

# **General specifications**

Name	Outer diameter, mm	Height, mm	Min. curve radius, mm	Max. vertical movement, mm	Volume, cm³
BFF30P	30	30	15	5	5
BFF40P	45	32–51.5*	23	7	10
BFF60P	61	36–55.3*	35	10	20
BFF80P	85	46–55.8*	50	14	50
BFF110P	115	53-72.5*	95	21	110

<sup>\*</sup> Height range includes fittings.



# **Available materials**

Name	PU55°/PU60°
BFF30P	•
BFF40P	•
BFF60P	•
BFF80P	•
BFF110P	•

# **Applications**

Table shows typical applications for the suction cup. For more detailed information, please visit piab.com.

Name	Oily sheet metal		
BFF30P			
BFF40P	•		
BFF60P	•		
BFF80P	•		
BFF110P	•		

Name	Art. no.	
Suction cup BFF30P Polyurethane 55/60, 3/8" NPT female	0206915	New!
Suction cup BFF30P Polyurethane 55/60, G1/4" female	0206918	New!
Suction cup BFF30P Polyurethane 55/60, G3/8" female	0206908	New!
Suction cup BFF30P Polyurethane 55/60, G3/8" female plastic	0206599	New!
Suction cup BFF30P Polyurethane 55/60, G3/8" male, 1/8" NPSF female	0201821	
Suction cup BFF30P Polyurethane 55/60, T-slot	0206924	New!
Suction cup BFF40P Polyurethane 55/60, 3/8" NPT female	0122278	
Suction cup BFF40P Polyurethane 55/60, G1/4" female	0206940	New!
Suction cup BFF40P Polyurethane 55/60, G3/8" female	0118992	
Suction cup BFF40P Polyurethane 55/60, G3/8" female, 17 mm thread	0200697	
Suction cup BFF40P Polyurethane 55/60, G3/8" male, with mesh filter	0118991	
Suction cup BFF40P Polyurethane 55/60, M10x1.5 male	0121427	
Suction cup BFF40P Polyurethane 55/60, T-slot, with mesh filter	0206925	New!
Suction cup BFF60P Polyurethane 55/60, 3/8" NPT female	0122279	
Suction cup BFF60P Polyurethane 55/60, G1/4" female	0206941	New!
Suction cup BFF60P Polyurethane 55/60, G3/8" female	0118995	
Suction cup BFF60P Polyurethane 55/60, G3/8" female, 17 mm thread	0200699	
Suction cup BFF60P Polyurethane 55/60, G3/8" female, plastic thread	0124742	
Suction cup BFF60P Polyurethane 55/60, G3/8" male, with mesh filter	0118994	
Suction cup BFF60P Polyurethane 55/60, M10x1.5 male	0121428	
Suction cup BFF60P Polyurethane 55/60, T-slot, with mesh filter	0206933	New!
Suction cup BFF80P Polyurethane 55/60, 3/8" NPT female	0122280	
Suction cup BFF80P Polyurethane 55/60, G1/4" female	0206942	New!
Suction cup BFF80P Polyurethane 55/60, G3/8" female	0118670	
Suction cup BFF80P Polyurethane 55/60, G3/8" female, 17 mm thread	0200695	



Name	Art. no.	
Suction cup BFF80P Polyurethane 55/60, G3/8" female, plastic thread	0124717	
Suction cup BFF80P Polyurethane 55/60, G3/8" male, with mesh filter	0118997	
Suction cup BFF80P Polyurethane 55/60, M10x1.5 male	0121384	
Suction cup BFF80P Polyurethane 55/60, T-slot, with mesh filter	0206934	New!
Suction cup BFF110P Polyurethane 55/60, 3/8" NPT female	0122281	
Suction cup BFF110P Polyurethane 55/60, G1/4" female	0206943	New!
Suction cup BFF110P Polyurethane 55/60, G3/8" female	0118673	
Suction cup BFF110P Polyurethane 55/60, G3/8" female, 17 mm thread	0200696	
Suction cup BFF110P Polyurethane 55/60, G3/8" female, plastic thread	0124734	
Suction cup BFF110P Polyurethane 55/60, G3/8" male, with mesh filter	0118671	
Suction cup BFF110P Polyurethane 55/60, M10x1.5 male	0121430	
Suction cup BFF110P Polyurethane 55/60, T-slot, with mesh filter	0206935	New!



# Bellows flat friction, Thin sheets family (BFFT)



- Special designed friction cups for thin (0.6–0.8 mm) oily metal sheets, such as outer body car parts in a press-to press forming process.
- Long lasting material, normal wear on friction cup will not affect the long term grip performance.
- Refined internal friction pattern provides additional grip performance, the suction cups can withstand high shear forces, typically 3–5 times more than corresponding conventional suction cups.
- Best choice if > 0.1g/m² press oil is used on the sheet but also a great choice for dry metal sheets.
- The "BFFT" design is suitable for thin flat or uneven/curved surfaces and if level compensation is needed, for example in de-stacking applications.
- The flat inner support, made of dual hardness, gives stability and good grip during movement in any orientation.
- DURAFLEX® suction cups manufactured in a specially developed material that features the elasticity of rubber and wear resistance of polyurethane. The material does not leave any marks on the objects handled and has a fantastic elastic memory, even after hundreds of thousands of cycles.

## **Lifting forces**

Name			Lifting force parallell to the surface, N, at vacuum level	
	60 -kPa	90 -kPa	60 -kPa	90 -kPa
BFFT50P	105/104*	146/145*	122/61*	155/85*
BFFT70P	172/165*	220/211*	176/110*	245/148*
BFFT90P	184/184*	228/230*	273/171*	364/232*

<sup>\*</sup> Dry metal sheet/Oily metal sheet.

# **General specifications**

Name	Outer diameter, mm	Height, mm	Min. curve radius, mm	Max. vertical movement, mm	Volume, cm <sup>3</sup>
BFFT50P	53	36.6	85	11	14.8
BFFT70P	73	41.1	95	14	36.4
BFFT90P	93	50.4	130	21	83.6

## **Available materials**



Name	PU60°/PU60°/PU30°		
BFFT50P			
BFFT70P	•		
BFFT90P	•		

# **Applications**

Table shows typical applications for the suction cup. For more detailed information, please visit piab.com.

Name	Oily sheet metal	
BFFT50P	•	
BFFT70P	•	
BFFT90P	•	

Name	Art. no.
Suction cup BFFT50P Polyurethane 60/60/30, 3/8" NPT female, with mesh filter	0206519
Suction cup BFFT50P Polyurethane 60/60/30, G3/8" male, 1/8" NPSF female, with mesh filter	0206521
Suction cup BFFT50P Polyurethane 60/60/30, G3/8" female, with mesh filter	0206522
Suction cup BFFT50P Polyurethane 60/60/30, G3/8" female plastic	0206523
Suction cup BFFT50P Polyurethane 60/60/30, T-slot, with mesh filter	0206524
Suction cup BFFT50P Polyurethane 60/60/30, G1/4" female, with mesh filter	0206791
Suction cup BFFT70P Polyurethane 60/60/30, 3/8" NPT female, with mesh filter	0206525
Suction cup BFFT70P Polyurethane 60/60/30, G3/8" male, 1/8" NPSF female, with mesh filter	0206526
Suction cup BFFT70P Polyurethane 60/60/30, G3/8" female, with mesh filter	0206527
Suction cup BFFT70P Polyurethane 60/60/30, G3/8" female plastic	0206528
Suction cup BFFT70P Polyurethane 60/60/30, T-slot, with mesh filter	0206529
Suction cup BFFT70P Polyurethane 60/60/30, G1/4" female, with mesh filter	0206792
Suction cup BFFT90P Polyurethane 60/60/30, 3/8" NPT female, with mesh filter	0206530
Suction cup BFFT90P Polyurethane 60/60/30, G3/8" male, 1/8" NPSF female, with mesh filter	0206531
Suction cup BFFT90P Polyurethane 60/60/30, G3/8" female, with mesh filter	0206532
Suction cup BFFT90P Polyurethane 60/60/30, G3/8" female plastic	0206533
Suction cup BFFT90P Polyurethane 60/60/30, T-slot, with mesh filter	0206534
Suction cup BFFT90P Polyurethane 60/60/30, G1/4" female, with mesh filter	0206793



# Deep concave friction family (DCF)



- Special designed friction cups for domed or flat oily surfaces, such as sheets in metal forming processes.
- Long lasting material, normal wear on friction cup will not affect the long term shear force performance.
- Best choice if > 0.1g/m² press oil is used on the sheet but also a great choice for dry metal sheets.
- Refined internal friction pattern provides additional grip performance, the suction cups can withstand high shear forces, typically 3–5 times more than corresponding conventional suction cups.
- Thin design that easily will follow convex or concave surfaces. The thin and pliable design in combination with a special inner friction pattern will maximize grip performance.
- DURAFLEX® suction cups manufactured in a specially developed material that features the elasticity of rubber and wear resistance of polyurethane. The material does not leave any marks on the objects handled and has a fantastic elastic memory, even after hundreds of thousands of cycles.

# **Lifting forces**

Name			Lifting force parallell to the surface, N, at vacuum level	
	60 -kPa	90 -kPa	60 -kPa	90 -kPa
DCF65P	143/141*	193/191*	146/100*	196/134*
DCF90P	255/222*	311/310*	256/183*	358/248*
DCF110P	315/313*	436/433*	377/287*	573/358*

<sup>\*</sup> Dry metal sheet/Oily metal sheet.

# **General specifications**

Name	Outer diameter, mm	Height, mm	Min. curve radius, mm	Max. vertical movement, mm	Volume, cm³
DCF65P	67.5	37.6	95	9.35	23.9
DCF90P	92.5	41.6	130	12.8	57.5
DCF110P	112.5	50	153	16.05	110.2



# **Available materials**

Name	PU60°/PU60°/PU30°
DCF65P	•
DCF90P	•
DCF110P	•

# **Applications**

Table shows typical applications for the suction cup. For more detailed information, please visit piab.com.

Name	Oily sheet metal	
DCF65P		
DCF90P		
DCF110P		

Name	Art. no.
Suction cup DCF65P Polyurethane 60/60/30, 3/8" NPT female, with mesh filter	0206535
Suction cup DCF65P Polyurethane 60/60/30, G3/8" male, 1/8" NPSF female, with mesh filter	0206536
Suction cup DCF65P Polyurethane 60/60/30, G3/8" female, with mesh filter	0206537
Suction cup DCF65P Polyurethane 60/60/30, G3/8" female plastic	0206538
Suction cup DCF65P Polyurethane 60/60/30, T-slot, with mesh filter	0206539
Suction cup DCF65P Polyurethane 60/60/30, G1/4" female, with mesh filter	0206794
Suction cup DCF90P Polyurethane 60/60/30, 3/8" NPT female, with mesh filter	0206540
Suction cup DCF90P Polyurethane 60/60/30, G3/8" male, 1/8" NPSF female, with mesh filter	0206541
Suction cup DCF90P Polyurethane 60/60/30, G3/8" female, with mesh filter	0206542
Suction cup DCF90P Polyurethane 60/60/30, G3/8" female plastic	0206543
Suction cup DCF90P Polyurethane 60/60/30, T-slot, with mesh filter	0206544
Suction cup DCF90P Polyurethane 60/60/30, G1/4" female, with mesh filter	0206795
Suction cup DCF110P Polyurethane 60/60/30, 3/8" NPT female, with mesh filter	0206545
Suction cup DCF110P Polyurethane 60/60/30, G3/8" male, 1/8" NPSF female, with mesh filter	0206546
Suction cup DCF110P Polyurethane 60/60/30, G3/8" female, with mesh filter	0206547
Suction cup DCF110P Polyurethane 60/60/30, G3/8" female plastic	0206548
Suction cup DCF110P Polyurethane 60/60/30, T-slot, with mesh filter	0206549
Suction cup DCF110P Polyurethane 60/60/30, G1/4" female, with mesh filter	0206796



# Flat concave friction family (FCF)



- Special designed friction cups for oily surfaces, such as sheets in metal forming processes.
- Normal wear on friction cup will not affect the long term shear force performance.
- Best choice if > 0.1g/m² press oil is used on the sheet.
- Thanks to the strong grip on oily surfaces, the suction cups can withstand high shear forces, typically 2–4 times more than corresponding conventional suction cups.
- The "FCF" design is suitable for slightly domed and flat surfaces, e.g., such as those encountered when handling
  metal sheets in press lines.
- The suction cups have support cleats that prevent thin objects from being disfigured.
- DURAFLEX® suction cups manufactured in a specially developed material that features the elasticity of rubber and wear resistance of polyurethane. The material does not leave any marks on the objects handled.

# **Lifting forces**

Name	Lifting force vertical to the surface, N, at vacuum level		Lifting force parallell to the at vacuum level	surface, N,
	60 -kPa	90 -kPa	60 -kPa	90 -kPa
FCF25P	19/19*	28/29*	7/5*	10/7.2*
FCF35P	42/34*	58/50*	30/26*	42/32*
FCF50P	78/72*	106/101*	77/52*	105/70*
FCF75P	171/163*	236/228*	166/104*	211/139*
FCF100P	347/236*	490/298*	337/139*	484/205*
FCF125P	475/405*	650/442*	445/194*	602/236*

<sup>\*</sup> Dry metal sheet/Oily metal sheet.

# **General specifications**

Name	Outer diameter, mm	Height, mm	Min. curve radius, mm	Max. vertical movement, mm	Volume, cm³
FCF25P	25	28	27	_	5.5
FCF35P	35	29–47.8*	40	2	5
FCF50P	50	31–49.9*	50	3	10
FCF75P	75	31–41*	100	4	30



Name	Outer diameter, mm	Height, mm	Min. curve radius, mm	Max. vertical movement, mm	Volume, cm³
FCF100P	100	36–45*	150	6	70
FCF125P	126	42–51.2*	150	8	100

<sup>\*</sup> Height range includes fittings.

# **Available materials**

Name	PU55°/PU60°
FCF25P	
FCF35P	
FCF50P	
FCF75P	
FCF100P	
FCF125P	

# **Applications**

Table shows typical applications for the suction cup. For more detailed information, please visit piab.com.

Name	Oily sheet metal
FCF25P	•
FCF35P	•
FCF50P	•
FCF75P	•
FCF100P	•
FCF125P	•

Name	Art. no.	
Suction cup FCF25P Polyurethane 55/60, 3/8" NPT female	0206916	New!
Suction cup FCF25P Polyurethane 55/60, G1/4" female	0206919	New!
Suction cup FCF25P Polyurethane 55/60, G3/8" female	0206909	New!
Suction cup FCF25P Polyurethane 55/60, G3/8" female plastic	0206895	New!
Suction cup FCF25P Polyurethane 55/60, G3/8" male, 1/8" NPSF female	0201827	]
Suction cup FCF25P Polyurethane 55/60, T-slot	0206926	New!
Suction cup FCF35P Polyurethane 55/60, 3/8" NPT female	0122282	
Suction cup FCF35P Polyurethane 55/60, G1/4" female	0206921	New!
Suction cup FCF35P Polyurethane 55/60, G3/8" female	0118981	
Suction cup FCF35P Polyurethane 55/60, G3/8" female plastic	0206893	New!
Suction cup FCF35P Polyurethane 55/60, G3/8" female, 17 mm thread	0200652	]
Suction cup FCF35P Polyurethane 55/60, G3/8" male, with mesh filter	0119913	1
Suction cup FCF35P Polyurethane 55/60, M10x1.5 male	0121431	]
Suction cup FCF35P Polyurethane 55/60, T-slot, with mesh filter	0206927	New!
Suction cup FCF50P Polyurethane 55/60, 3/8" NPT female	0122283	
Suction cup FCF50P Polyurethane 55/60, G1/4" female	0206936	New!
Suction cup FCF50P Polyurethane 55/60, G3/8" female	0118986	



Name	Art. no.	
Suction cup FCF50P Polyurethane 55/60, G3/8" female plastic	0206606	New!
Suction cup FCF50P Polyurethane 55/60, G3/8" female, 17 mm thread	0200685	
Suction cup FCF50P Polyurethane 55/60, G3/8" male, with mesh filter	0118985	
Suction cup FCF50P Polyurethane 55/60, M10x1.5 male	0121432	
Suction cup FCF50P Polyurethane 55/60, T-slot, with mesh filter	0206929	New!
Suction cup FCF75P Polyurethane 55/60, 3/8" NPT female	0122284	
Suction cup FCF75P Polyurethane 55/60, G1/4" female	0206937	New!
Suction cup FCF75P Polyurethane 55/60, G3/8" female	0118429	
Suction cup FCF75P Polyurethane 55/60, G3/8" female, 17 mm thread	0200687	
Suction cup FCF75P Polyurethane 55/60, G3/8" female, plastic thread	0124718	
Suction cup FCF75P Polyurethane 55/60, G3/8" male, with mesh filter	0118423	
Suction cup FCF75P Polyurethane 55/60, M10x1.5 male	0121433	
Suction cup FCF75P Polyurethane 55/60, T-slot, with mesh filter	0206930	New!
Suction cup FCF100P Polyurethane 55/60 G3/8" male, with mesh filter	0118430	
Suction cup FCF100P Polyurethane 55/60, 3/8" NPT female	0122285	
Suction cup FCF100P Polyurethane 55/60, G1/4" female	0206938	New!
Suction cup FCF100P Polyurethane 55/60, G3/8" female	0118432	
Suction cup FCF100P Polyurethane 55/60, G3/8" female, 17 mm thread	0200690	
Suction cup FCF100P Polyurethane 55/60, G3/8" female, plastic thread	0124669	
Suction cup FCF100P Polyurethane 55/60, M10x1.5 male	0121385	
Suction cup FCF100P Polyurethane 55/60, T-slot, with mesh filter	0206931	New!
Suction cup FCF125P Polyurethane 55/60, 3/8" NPT female	0122286	
Suction cup FCF125P Polyurethane 55/60, G1/4" female	0206939	New!
Suction cup FCF125P Polyurethane 55/60, G3/8" female	0118437	
Suction cup FCF125P Polyurethane 55/60, G3/8" female, 17 mm thread	0200693	
Suction cup FCF125P Polyurethane 55/60, G3/8" female, plastic thread	0124787	
Suction cup FCF125P Polyurethane 55/60, G3/8" male, with mesh filter	0118435	
Suction cup FCF125P Polyurethane 55/60, M10x1.5 male	0121435	
Suction cup FCF125P Polyurethane 55/60, T-slot, with mesh filter	0206932	New!





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# No need to compromise



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