

Piab Automotive suction cups

Heavy duty friction cups

 **piab** Evolving automation

Piab Automotive suction cups

Heavy duty friction cups

Piab is proud to introduce a new series of automotive suction cups which address the applications within body shop and part assembly as well as low/medium speed press lines.

The new line of cups supports the industry-standard related to dimensions and interfaces, which simplifies deployment and installation. The suction cups are a good alternative for applications outside the automotive industry such as within wood, metal sheet handling, aerospace and white goods.

All suction cups are made of 60 shore (A) silicone free Nitrile-PVC which creates a durable and cost-effective cup. The automotive suction



Lennart Ryberg

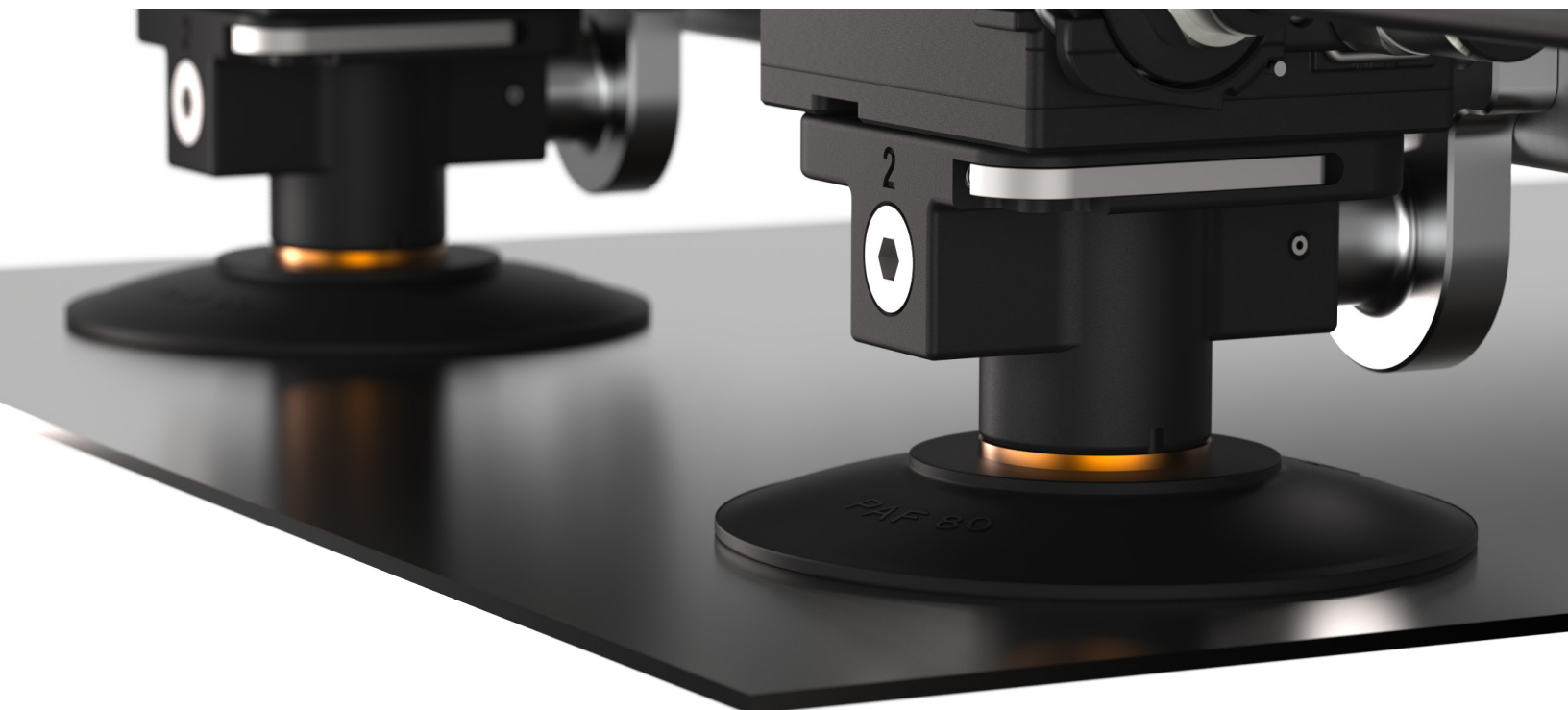
Product manager for suction cups

cups have friction cleats to better withstand shear forces during operation. All suction cups have a moulded-in aluminium insert. You can choose several fitting options provided by Piab including a quick-connect fitting system (T-slot) or apply your own fitting solution. We have designed the automotive suction cups to operate even at low vacuum levels, meaning you will have a good vacuum “reserve” for the lift itself.



Get in touch!

Send us an email and get to know more about product: info-piab@piab.com



PAF - Piab Automotive Flat

PAF - Piab Automotive Flat, five suction cups designed for slightly domed and flat surfaces, such as those encountered when handling metal sheets in automotive applications. The suction cups have support cleats and a hub that prevent thin objects from being disfigured and can withstand high shear forces. These suction cups are designed to handle dry as well as oily workpieces.

→
Friction pattern prevents sheets from slipping
←→
Sizes
Ø30-80mm

dynamic handling of flat and uneven/curved metal sheet parts. The friction pattern on the hub and lip of the suction cup prevents sheets from slipping. The PAF offers a wide sealing surface for better sealing over dust and debris. The cups are available with all major automotive industry-standard fittings as well as a quick-connect system, T-slot, that allows for quick changes.

The PAF is a round, flat suction cup created for the



PAB - Piab Automotive Bellow

PAB - Piab Automotive Bellows, five suction cups designed for the dynamic handling of flat and uneven/curved metal sheet in an automotive application. The PAB suction cups are recommended when level compensation is needed, for example in de-stacking applications. These suction cups are designed to handle both dry and oily workpieces and to withstand high shear forces.

→
Friction pattern prevents sheets from slipping
←→
Sizes
Ø30-80mm

grip during movement in any orientation. The friction pattern on the hub and lip of the suction cup prevents sheets from slipping. The suction cups have a wide sealing surface for better sealing over dust and debris. The cups are available with all major automotive industry-standard fittings as well as a quick-connect system, T-slot, that allows for quick changes.

The PAB inner support gives stability and good



Do you want to know more?

Take a look at the online product page: www.piab.com

PAXB - Piab Automotive X-tra Bellow

PAXB - Piab Automotive X-tra Bellows, five suction cups designed for flat as well as uneven/curved metal surfaces when great level compensation is needed. The PAXB is a multi bellow friction cup designed for dry and oily metal sheets in automotive body shop applications.

The PAXB is a round, multi- bellow suction cup created to have a high vertical movement for the dynamic handling of very uneven or curved metal sheets/objects such as pipes, this offers a good adaptation to concave and convex surfaces. The suction cups offer a high suction force and smooth placement of workpieces during placement on workpieces. They have very good stability and resistance

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Friction pattern prevents sheets from slipping

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Sizes Ø32-88mm

to horizontal forces and the friction pattern prevents oily sheets from slipping. The suction cups offer a wide sealing surface for better sealing over dust and debris. A low vacuum level is required for actuating the cup and ridges and enforcement on bellow are added to avoid stickiness, self-vacuum, and implosion. The cups are available with all major automotive industry-standard fittings as well as a quick-connect system, T-slot, that allows for quick changes.



PAOF - Piab Automotive Oval Flat

PAOF - Piab Automotive Oval flat, four suction cups designed for long, narrow parts with slightly curved or flat surfaces such as metal sheets in automotive body shop applications e.g., reinforcing ribs and plates. The PAOF suction cups are designed to handle both dry and oily workpieces and can withstand high shear forces. The cleats prevent thin, sensitive objects from being deformed and give extra friction when the lifting force is parallel to the surface of the object.

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Friction pattern prevents sheets from slipping

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Sizes 16x50-50x100mm

The PAOF is an oval, flat suction cup created for the dynamic handling of oblong metal sheet parts. The PAOF has good stability and little inherent movement. The friction pattern on the lip of the suction cup prevents oily sheets from slipping. The PAOF offers a wide sealing surface for better sealing over dust and debris. The cups are available with all major automotive industry standard fittings as well as a quick-connect system, T-slot, that allows for quick changes and keeps the oval cups in the correct position.



PAOB - Piab Automotive Oval Bellow

PAOB - Piab Automotive Oval Bellows, three suction cups designed for a wide range of parts of different sizes. Especially for oblong objects with domed and flat surfaces for use e.g., in feeder systems for press lines in the automotive industry. PAOB suction cups are specially designed for both dry and oily surfaces and can handle objects with height differences.

The PAOB is an oval bellow suction cup created for the dynamic handling of oblong metal sheet parts. The suction cups have good stability, little inherent movement and are perfect when level compensation is needed. The PAOB is

→
Friction pattern prevents sheets from slipping

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Sizes 30x60-55x110mm

great when handling thin sheets without deforming or denting the objects. A friction pattern on the lip of the suction cups prevents oily sheets from slipping. The suction cups have a wide sealing surface for better sealing over dust and debris and ridges to avoid stickiness and self-vacuum, the cups also offer an enforcement of the bellow to avoid implosion. The cups are available with all major automotive industry standard fittings as well as a quick-connect system, T-slot, that allows for quick changes and keeps the oval cups in the correct position.



Fitting options

All round suction cups are moulded with a unique Piab design thread interface which allows the cups to be configured and permanently fixed with a large variety of fittings. G1/8" female or G3/8" female depending on cup size. The fitting selection accommodates the majority of

fitting standards found not only in the automotive industry but also in many other production related applications where suction cups are used. The cups can even be selected using the interface thread itself as an attachment to a gripper or if you want to make your own fitting.



Piab Automotive Suction Cups

Model of suction cup
 Size of the suction cup
 Material: Nitrile PVC 60 Shore A
 Fitting type, size & style
 Filter options
 00 – None
 01 – Filter mesh

S.PAF.60NP60.G38M.01



S.PAF 60NP60.G38M.01
 Cup model PAF in size 60mm with G3/8" male fitting with a mesh filter.

		Fitting options & Building heights (inch)										
Cup models	Model Code	Size code (mm)										
			Fitting code	G14F	G14M	G14MS	G18M	G38F	G38FL	G38M	G38MS	G38MNS18F
	PAF	30	0,97	0,70	-	0,66	1,05	1,41	0,67	-	-	0,70
		40	1,04	0,77	-	0,73	1,12	1,48	0,74	-	-	0,77
		50	1,14	0,87	-	0,83	1,22	1,57	0,84	-	-	0,87
		60	1,26	0,98	-	0,94	1,34	1,69	0,96	-	-	0,98
		80	1,38	1,06	-	1,14	1,38	1,75	-	-	0,98	1,14
	PAB	30	1,29	1,01	-	0,97	1,37	1,72	0,99	-	-	1,01
		40	1,30	1,02	-	0,98	1,38	1,73	1,00	-	-	1,02
		50	1,50	1,22	-	1,19	1,58	1,93	1,20	-	-	1,22
		60	1,67	1,40	-	1,36	1,75	2,11	1,37	-	-	1,40
		80	1,96	1,65	-	1,72	1,96	2,33	-	-	1,57	1,72
	PAXB	32	2,01	1,73	-	1,69	2,09	2,44	1,71	-	-	1,73
		42	2,34	2,07	-	2,03	2,42	2,78	2,04	-	-	2,07
		52	2,44	2,13	-	2,20	2,44	2,81	-	-	2,05	2,20
		62	2,64	2,32	-	2,40	2,64	3,01	-	-	2,24	2,40
		88	3,90	3,58	-	3,66	3,90	4,27	-	-	3,50	3,66
	PAOB	30x60	1,32	-	0,94	0,97	1,32	1,58	-	0,81	-	0,97
		40x80	1,42	-	1,03	1,06	1,42	1,67	-	0,91	-	1,06
		55x110	1,64	-	1,25	1,28	1,64	1,89	-	1,13	-	1,28
	PAOF	16x50	1,36	1,08	0,00	1,04	1,44	1,79	1,06	-	-	1,08
		30x90	1,11	-	0,60	0,76	1,11	1,37	-	0,48	-	0,76
		40x80	1,19	-	0,68	0,84	1,19	1,45	-	0,56	-	0,84
		50x100	1,13	-	0,74	0,77	1,13	1,38	-	0,61	-	0,77

- Automotive suction cup – addressing body shop segments and supporting industry standard in those application.
- Made of black Nitrile-PVC, 60 shore (A), silicone-free.
- Round, bellow suction cup for dynamic handling of flat and uneven/curved metal sheet parts.
- Good stability and resistance to horizontal forces.
- Good for level compensation.
- Handling of thin sheets without deformation or denting objects.
- For dry as well as oily sheets.
- Friction pattern on hub and lip prevents sheets from slipping.
- Wide sealing surface for better sealing over dust and debris.
- Low required vacuum level for actuation, gives good vacuum reserve for the lift itself.
- Fitting options: cup has a moulded-in aluminium insert, to be used with one of the nine (9) fitting options from Piab or your own fitting solution.













Do you want to know more?

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Material resistance

- Alcohol Good
- Concentrated Acids Fair
- Ethanol N/A
- Hydrolysis Good
- Methanol N/A
- Oil Excellent
- Oxidation Good
- Petrol Excellent
- Wear Resistance Excellent
- Weather & Ozone Good

			Technical data					BAF* at 60 -kPa		
										
NT38F	TLXX	TXX	Diameter at rest (inch)	Actuated Diameter, max (inch)	Max. vertical movement (inch)	Min. curve radius 60 -kPa (inch)	Internal volume (inch ³)	Vertical Dry (lbf)	Parallel Dry (lbf)	Parallel oily (lbf)
1,05	-	0,91	1,26	1,34	0,12	1,38	0,18	10,12	11,24	4,50
1,12	-	0,98	1,65	1,77	0,16	1,77	0,35	15,74	16,86	7,87
1,22	-	1,08	2,05	2,17	0,20	1,97	0,65	23,60	26,75	12,36
1,34	-	1,20	2,46	2,64	0,24	2,56	1,15	33,05	30,80	15,96
1,50	-	1,36	3,23	3,46	0,30	3,35	2,56	52,38	50,13	20,68
1,37	-	1,23	1,28	1,34	0,35	0,59	0,37	8,99	10,57	4,05
1,38	-	1,24	1,65	1,71	0,39	0,98	0,59	15,29	17,98	6,29
1,58	-	1,44	2,05	2,13	0,45	1,18	1,10	22,71	25,63	9,22
1,75	-	1,61	2,46	2,58	0,57	1,57	1,88	32,15	34,85	16,64
2,08	-	1,94	3,27	3,41	0,87	1,77	4,13	50,36	59,12	29,90
2,09	2,32	1,95	1,28	1,30	0,57	0,79	0,43	8,54	7,64	4,50
2,42	2,66	2,28	1,67	1,75	0,77	0,98	1,16	14,39	11,47	6,74
2,56	2,76	2,42	2,05	2,11	0,94	1,77	2,32	21,81	17,09	8,09
2,76	2,95	2,62	2,46	2,56	1,14	1,18	3,54	27,88	27,20	12,36
4,02	4,21	3,88	3,52	3,76	1,54	1,97	9,64	62,50	46,99	31,47
1,32	-	1,18	-	1,25x2,44	2,44x1,31	0,71	0,71	17,31	22,26	7,87
1,42	-	1,28	-	1,61x3,22	3,22x1,67	1,57	1,24	27,88	37,77	15,06
1,64	-	1,50	-	2,2x4,4	4,4x2,36	1,97	3,48	49,91	70,81	24,73
1,44	-	1,20	-	4,4x1,94	1,94x0,68	0,31	0,10	7,42	11,24	2,70
1,11	-	0,85	-	1,27x3,64	3,64x1,37	1,57	0,52	31,92	42,26	16,41
1,19	-	0,93	-	1,57x3,22	3,22x1,67	1,97	0,65	32,15	34,40	15,74
1,13	-	0,98	-	1,94x4,03	4,03x2,1	2,36	1,34	49,68	58,23	24,95

* BAF (Break Away Force), measured at 60 -kPa on a flat metal surface. Values could vary depending on application (not including safety factor).
 ** Height with mounted T-slot

Application

Press shop

Slippery panels due to oil, narrow areas to grip, reliability and speed in the press are all factors to consider in designing your vacuum system of suction cups. Using our products created especially for the automotive industry, press shop sheet metals are moved across the press quickly and efficiently.

When **de-stacking** metal sheets, Piab's suction cups are made for the often-oily surfaces of sheet metal and ensure high friction security and dent free sheets. **Press transfer** is a high-speed application where Piab's friction cups for oily surfaces are needed for maximum performance and minimized risks. Decentralized

ejectors with integrated release mechanisms such as piSTAMP and piINLINE® are placed directly at the suction cup. For the **end of line racking** of metal panels robots are equipped with a vision system and are often used in this process since panels are not always in a fixed position. Combining level compensators, unique multi-bellow friction cups (PAXB series), and reliable vacuum ejectors will help the robots move the metal panels as well as compensate for panels in unknown positions and resist the high shear forces.



Body assembly

In the automotive industry, body assembly speed and safety are first priorities. The metal sheets are heavy and oily, requiring the need for specially designed automotive cups to help lift, grip, and move products along the assembly line. Selecting the right suction cups for a safe, reliable and dent free grip on oily surfaces is crucial. Flexible tooling components for easy positioning will facilitate shorter installation time and deliver reliable positioning. Piab's automotive suction cups are specially designed for body assembly.

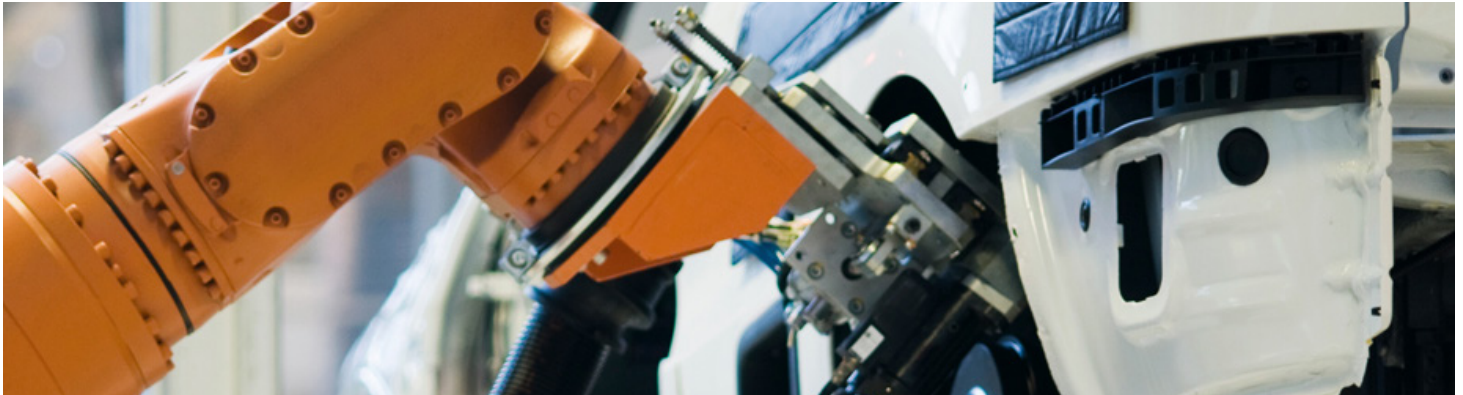
Combining each suction cup with sensing vacuum switches is recommended for more control as well as additional safety and reliability. In applications where level compensation is needed Piabs unique multi-bellow friction cups (PAXB series) and reliable vacuum ejectors will help the robots move the metal panels as well as compensate for panels in unknown positions and resist the high shear forces.



Final assembly

In the final assembly (after paint-shop), the vehicle is equipped with heavy exterior and interior parts such as bumpers, dashboards, tires, windscreens, and even brakes and AC systems. Thanks to our large selection of automotive suction cups you will find the right grip without leaving any dents. Piab has

components designed to retain the part if air pressure or power is lost. Our automotive suction cups are made with a sturdy and reliable inner support structure and with a strong over-seam sealing capability. Piab's vacuum products together with robots help to lift these parts safely and efficiently.



Aerospace

The aerospace industry, known for its complex and state-of-the-art systems, still relies heavily on manual labour. Aerospace manufacturers are currently dealing with huge backlogs and need a solution which speeds up production, and many companies are looking to automation to solve this problem.

products designed to retain the part if air pressure or power is lost. Our PA-family suction cups are made with a sturdy and reliable inner support structure with a strong over-seam sealing capability. In applications where level compensation is needed Piab's unique multi bellow friction cups (PAXB series) and reliable vacuum ejectors will support the automatisisation of this industry.

Traditionally you lift a lot of metal and composite sheets where Piab has



Wood industry

There is a high potential for robotics and automation within the forestry and wood industry. Because of the worldwide competition, the industry has to achieve important gains in productivity to decrease costs and protect profit margins from declining. The industry also needs to improve its efficiency in terms of safety. Automation offers great improvement potential in a machine's

productivity as well as safety. Solutions such as combining level compensators and PA-family suction cups with unique friction pattern and reliable vacuum ejectors will support this automation. The friction pattern and the design of the cups make them suitable for high shear forces and the ability to handle surfaces with dust.



Metal sheet handling

Automate your entire metal sheet manufacturing process by using tailored solutions. In dedicated manufacturing with cells containing tending robots, plates can be cut, folded and processed with workpieces travelling between welding and grinding stations on a conveyor. Once completed the workpiece then moves onto another belt for transportation to a paint spraying cell etc.

Piab automotive suction cups can support this process. In applications where level compensation is needed Piab's unique multi bellow friction cups (PAXB series) and reliable vacuum ejectors will help the robots move the metal sheets and resist the high shear forces.



White Goods

Everyone has home appliances (white goods) all over their house, and many of these appliances were constructed with the use of robotic automation. Appliance automation combines many different processes during the production process to the manufacturer with faster, cleaner and smarter products than ever before. In this industry, you handle a lot of metal sheets in

different parts of the process. Piab has specially designed suction cups in many different shapes and sizes for thin metal sheet handling. As well as height adjusters, flexible suction cup mounts, highly competitive ejectors and vacuum pumps that can support the automation of this industry.



**Do you
want to know
more?**

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