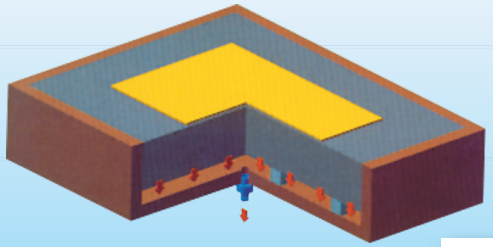
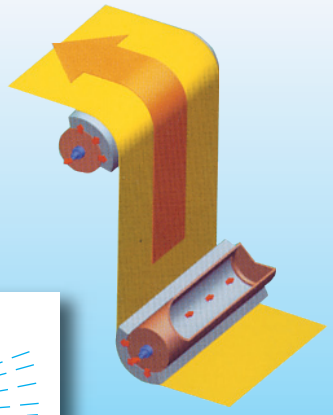
WOLF FEINMECHANIK

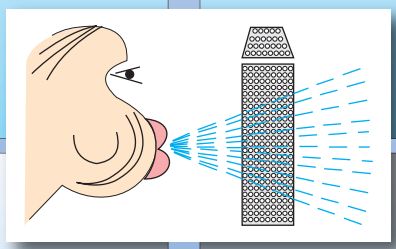
METAPOR® Microporous aluminium Microporous ceramics

Vacuum clamping technology

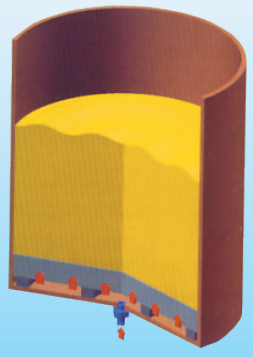


Air film sliding technology

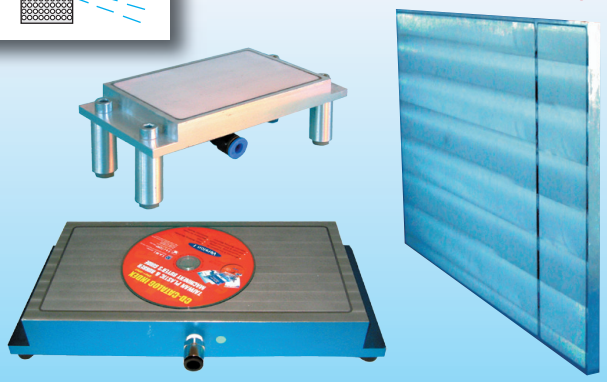




Fluidisation technology



Execution examples



Vacuum clamping technology

METAPOR® vacuum clamping systems are distinguished by full-surface suction without drilling holes. Foils may be clamped in a totally plain way. Due to the decrease in pressure, it is not required to cover free surfaces. METAPOR® is ideally suited for fixing foils and electronic parts as well as a mould gripper for soft bodies.

Air film sliding technology

The distribution of pressure within the METAPOR® structure allows for an equal load capacity, even in the case of partial coverage of the surface. Air consumption and noise emission are reduced considerably. Problem-free processing offers cost savings in respect to aerostatic construction parts and new perspectives in respect to rotary bearings, conveyor and extrusion beds.

Fluidisation technology

The microporous METAPOR® structure allows for a continuous fluidisation of granules and powders without formation of bubbles. Due to a low air consumption, friction and mechanical load are reduced. METAPOR® is ideally suited for mixing procedures, coatings, conveyor troughs and the demolition of silo bridges.

METAPOR® is a porous, air-permeable material. Many micropores form a complex system of channels in the material and allow for a balanced internal distribution of pressure. Air passing through the structure is continuously lead to and withdrawn from the entire surface.

What is METAPOR®?

METAPOR® is a compound material which is air-permeable across the entire surface due to its micro-porous structure.
METAPOR® is available in 4 different material versions which differ primarily in terms of air permeability, pore size and temperature resistance.

Available METAPOR® products.

The compound material is available as plates with a maximum size of 500 x 500 mm and in thicknesses ranging from 10 mm to a maximum of 420 mm. Larger dimensions up to a maximum of 3500 x 2000 mm and a plate weight of up to 150 kg may be bonded ex works according to requirements.

How is METAPOR® processed?

METAPOR® is processed dry and can be compared to very easily machinable aluminium. The surface may be polished. In contrast to very expensive sintering materials, the pores are not closed in respect to chip removing processing which means that air permeability is fully maintained. This is an innovation in porous materials.

What are the advantages of METAPOR®?

- Drilling of air holes in the construction part is no longer necessary and a continuous generation of vacuum and compressed air is present at each point of the METAPOR® structure (same wall thickness).
- A continuous decrease in pressure allows for high retention forces for the first time, even in the case of partial coverage of the surface.
- With clamping elements made of METAPOR®, workpieces may be fixed evenly and without deformation. Due to lack of grooves and drilling holes, deformation of the workpieces is excluded.
- Static adhesion is eliminated by gentle, continuous blowing.

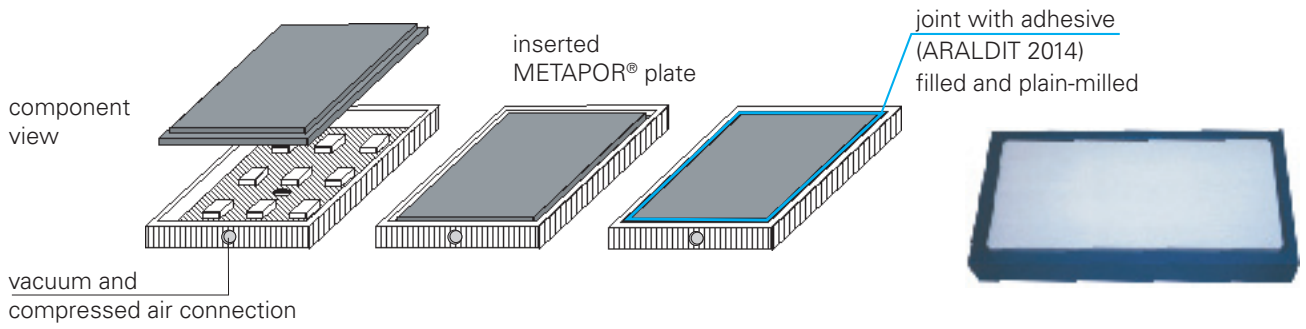
What is METAPOR® used for?

For flat clamping purposes:
Processing tables (e.g. fixing of electronic parts, bank cards, foils etc.), printing tables (e.g. pad printing), measuring tables
For mould clamping purposes:
Vacuum supported mould grippers for complex workpieces
Combinations:
Combined conveyors and fixtures for the printing industry

Product selection – application – characteristics

Product	Material	Surface colour	Vacuum clamping technology	Air film sliding technology	Temperature resistance	Air permeability	Coverage of suction surface
BF 100 AL	Aluminium	grey	X	X	108 °C	100	partial
HD 210 AL	Aluminium	grey	X	X	210 °C	50	partial
MC 100 AL	Aluminium	grey	X	–	100 °C	800	complete
CE 100 WHITE	Ceramics	white	X	X	100 °C	100	partial

Construction example of a METAPOR® clamping plate



Comparative test of the retention forces

Vacuum (bar)	Retention force (N/cm²)			
	BF 100 AL	HD 210 AL	MC 100 AL	CE 100 WHITE
– 0,30	2,3	1,6	1,6	2,3
– 0,50	3,9	2,9	2,9	3,9
– 0,85	8,2	8,4	8,4	8,2

The values measured at -0.85 bar refer to a full-surface coverage while the other values refer to a partial coverage of the clamping surface. The specified vacuum level was measured under the clamping plate in the vacuum chamber. The retention forces were determined by removing a suction cup in a rectangular way.

The tests were performed on clamping plates (size: A4, thickness: 10 mm) which were evacuated by an ejector.

METAPOR® BF 100 AL

Fine pored material made of **aluminium** for applications in the field of vacuum clamping and air film sliding technology. Holds sensitive materials such as extremely **thin foils** (0.01 mm) or workpieces supported for engraving purposes gently and safely in place. Can be used up to 108 °C.

Item no.	Dimensions mm	Weight kg
215.248x248x010	248 x 248 x 10	1,2
215.248x248x015	248 x 248 x 15	1,7
215.248x248x020	248 x 248 x 20	2,2
215.500x500x010	500 x 500 x 10	4,5
215.500x500x015	500 x 500 x 15	6,8
215.500x500x020	500 x 500 x 20	9,0
215.500x500x025	500 x 500 x 25	11,3
215.500x500x030	500 x 500 x 30	13,5
215.500x500x035	500 x 500 x 35	15,8
215.500x500x040	500 x 500 x 40	18,0
215.500x500x050	500 x 500 x 50	22,5
215.500x500x060	500 x 500 x 60	27,0
215.500x500x070	500 x 500 x 70	31,5
215.500x500x080	500 x 500 x 80	36,0
215.500x500x100	500 x 500 x 100	45,0
215.500x500x400	500 x 500 x 400	180,0

METAPOR® HD 210 AL

Very fine pored material made of **aluminium** specifically designed for applications in the field of vacuum clamping and air film sliding technology. Highly recommended for moulds with a **complex 3D geometry** in order to fix the entire surface of foils without deformation and for thin-walled vacuum clamping elements (up to a plate thickness of approximately 8 mm).
Can be used at high temperatures up to 210 °C.

Item no.	Dimensions mm	Weight kg
217.248x248x010	248 x 248 x 10	1,2
217.248x248x015	248 x 248 x 15	1,7
217.248x248x020	248 x 248 x 20	2,2
217.500x500x010	500 x 500 x 10	4,5
217.500x500x015	500 x 500 x 15	6,8
217.500x500x020	500 x 500 x 20	9,0
217.500x500x025	500 x 500 x 25	11,3
217.500x500x030	500 x 500 x 30	13,5
217.500x500x035	500 x 500 x 35	15,8
217.500x500x040	500 x 500 x 40	18,0
217.500x500x050	500 x 500 x 50	22,5
217.500x500x060	500 x 500 x 60	27,0
217.500x500x070	500 x 500 x 70	31,5
217.500x500x080	500 x 500 x 80	36,0
217.500x500x100	500 x 500 x 100	45,0
217.500x500x390	500 x 500 x 390	180,0

METAPOR® MC 100 AL

Fine pored material made of **aluminium** with high air flow specifically designed for applications in the field of vacuum clamping and air film sliding technology. Highly recommended for moulds with a **complex 3D geometry** in order to fix the entire surface of foils without deformation. Can be used up to 100 °C.

Item no.	Dimensions mm	Weight kg
214.248x248x010	248 x 248 x 10	1,2
214.248x248x015	248 x 248 x 15	1,7
214.248x248x020	248 x 248 x 20	2,2
214.500x500x010	500 x 500 x 10	4,5
214.500x500x015	500 x 500 x 15	6,8
214.500x500x020	500 x 500 x 20	9,0
214.500x500x025	500 x 500 x 25	11,3
214.500x500x030	500 x 500 x 30	13,5
214.500x500x035	500 x 500 x 35	15,8
214.500x500x040	500 x 500 x 40	18,0
214.500x500x050	500 x 500 x 50	22,5
214.500x500x060	500 x 500 x 60	27,0
214.500x500x070	500 x 500 x 70	31,5
214.500x500x080	500 x 500 x 80	36,0
214.500x500x100	500 x 500 x 100	45,0
214.500x500x420	500 x 500 x 420	180,0

METAPOR® CE 100 WHITE

Very fine pored material made of **ceramics** with a white, non-reflecting surface. Well-proven for **dust-free rooms**. May also be used for applications in the field of air film sliding technology where a continuous vibration-free air flow plays an important role. Can be used up to 100 °C.

Item no.	Dimensions mm		Weight kg
218.248x248x010	248 x 248 x 10	All surfaces non-reflecting	1,1
218.248x248x015	248 x 248 x 15		1,6
218.248x248x020	248 x 248 x 20		2,2
218.500x500x010	500 x 500 x 10		4,4
218.500x500x015	500 x 500 x 15		6,6
218.500x500x020	500 x 500 x 20		8,8
218.500x500x025	500 x 500 x 25		11,0
218.500x500x030	500 x 500 x 30		13,2
218.500x500x035	500 x 500 x 35		15,4
218.500x500x040	500 x 500 x 40		17,6
218.500x500x050	500 x 500 x 50		22,0
218.500x500x060	500 x 500 x 60		26,4
218.500x500x070	500 x 500 x 70		30,8
218.500x500x080	500 x 500 x 80		35,2
218.500x500x100	500 x 500 x 100		44,0
218.500x500x400	500 x 500 x 400		176,0

Thickness tolerance for METAPOR plates: -0/+0.3 mm

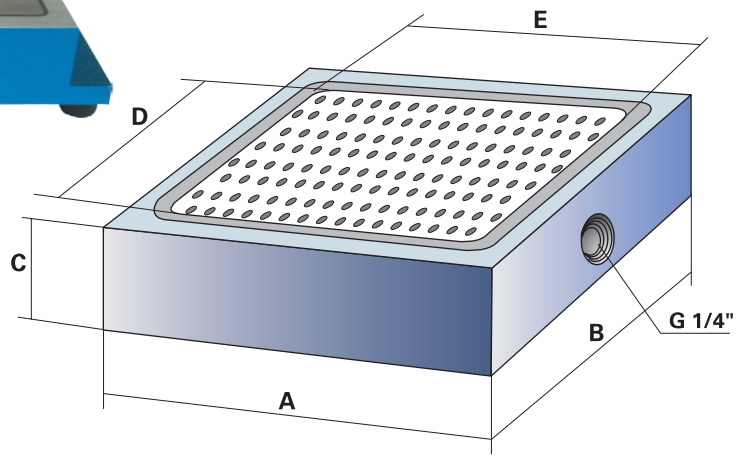
We also deliver larger sizes. The plates are combined by means of bonding. Araldit 2014 is recommended for use as adhesive. They may also be screwed together.

Please request processing information if required.

Physical characteristics of METAPOR® at 20 °C

Technical data	Standard	Unit	BF 100 AL	HD 210 AL	MC 100 AL	CE 100 WHITE
Density		g/cm	1,8	1,9	1,7	1,7
Shore D hardness	DIN 53505	N/mm	81	82	82	89
Flexural strength	DIN 53452	N/mm	56	43	25	28,5
Modulus of elasticity	DIN 53457-B3	kJ/m²	9000	10800	8600	14498
Impact strength	DIN 53453	$°C^{-1} \times 10^{-6}$	14	11	3,5	1,0
Coefficient of thermal expansion 25 – 125 °C	DIN 53752	°C	30,4	32	34	25 – 30
Dimensional stability according to Martens	DIN 53462	µm	108	210	100	100
Average pore diameter		%	15	12	400	100
Total porosity		g/cm	15	16	26	20

METAPOR®
Standard vacuum clamping system



Note:
Other dimensions upon request.
Please write the desired dimensions in the opposite drawing and fax us a copy of this page.

Available from stock. Subject to prior sale.

Item no.	METAPOR® type	Housing dimensions mm			Active suction surface mm	
		A=E +28 mm	B=D +28 mm	C ≧40 mm	D	E
APM-A1001-148x148x40	BF 100 AL	148	148	40	120	120
APM-A2001-148x148x40	HD 210 AL	148	148	40	120	120
APM-A1008-148x148x40	MC 100 AL	148	148	40	120	120
APM-K1001-148x148x40	CE 100 WHITE	148	148	40	120	120
APM-A1001-148x296x40	BF 100 AL	148	296	40	268	120
APM-A2001-148x296x40	HD 210 AL	148	296	40	268	120
APM-A1008-148x296x40	MC 100 AL	148	296	40	268	120
APM-K1001-148x296x40	CE 100 WHITE	148	296	40	268	120

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