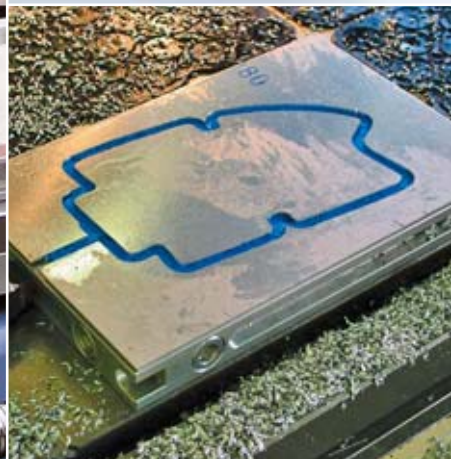


Vacuum



Vacuum Clamping Technology





Witte Gerätebau

Horst Witte Gerätebau, founded 1969, manufactures not only their own range of products but also ultra precision products for aerospace, medical technology etc.

Among a broad range our emphasis lies on development and manufacture of advanced workpiece clamping systems for universal application. Witte has taken up the lead in the branches of „flexible fixturing“ and „vacuum technology“ as a result of many patented solutions.

The high quality of all Witte products and internal processes is verified according to DIN EN ISO9001/2000 as well as QSF-A for suppliers to aerospace industry.

Qualified staff and a modern machine shop are further guarantees for quality.

A wide network of agents ensures support in all important industrial nations.




Customized precision workholding fixtures

 from page **8**

Vacuum Supply

Pumps, Units, Compressors, Accessories

 from page **12**

Witte VAC-MAT™

Pumps, Units, Compressors, Accessories

 from page **30**

Vacuum Chucks

Grid, Sintermetal, Vacudisc-ceramic, Metapor®, Slot, Rubber adapter mat, Covering foil, Perforated-grid

 from page **36**

ICEVICE™ Freeze clamp technology

 from page **64**

FLIP-POD™

Application, Sets, Accessories

 from page **70**

Circular Chucks

Grid, Sintermetal

 from page **82**

Liquid Separators

Conventional, Automatic

 from page **87**

Accessories

Safety appliances, Seal, Grease, Pressure switch, Manifold distributors, Rotary joints, Valves, Gauges, Connections, Plugs, Nozzles, Hoses

 from page **88**

METAPOR®

 from page **104**

Mould clamping method

Witte Weiguss LM 70

 from page **110**
Attention:

All information on our products, especially pictures, drawings, dimensions or characteristics as well as other technical details are to be regarded as approximate average values. We reserve the right to make changes in design, technical data, dimensions and weights. The norms stated, similar technical guidelines as well as technical information, descriptions and pictures of the product are valid at time of printing. In addition our current, valid general terms and conditions are binding and our quotations are decisive



Clamping system
540 mm x 900 mm x 5400 mm
(vacuum + hydraulic)
for contour machining
stainless steel blades

Vacuum Clamping Systems

VACUUM CLAMPING SYSTEMS GIVE YOU A TECHNOLOGICAL ADVANTAGE. USE YOUR TIME MORE PROFITABLY!

Possibilities:

- reduce clamping times
- use a universal clamping system for different workpieces
- clamp non-magnetic materials
- machine without oscillation or vibration
- only one clamping procedure for 5 side machining
- clamp extremely thin workpieces and foils
- mill through workpieces

Vacuum-clamping technology can be used in nearly all machining processes;

- Turning and milling
- Grinding and polishing
- Drilling, reaming and sinking
- Engraving
- Eroding
- Checking and measuring
- Surface treatment

of

- Aluminium
- Non ferrous metals
- Graphite
- Synthetic materials
- Glass
- Wood
- Ceramics
- Titanium
- Steel

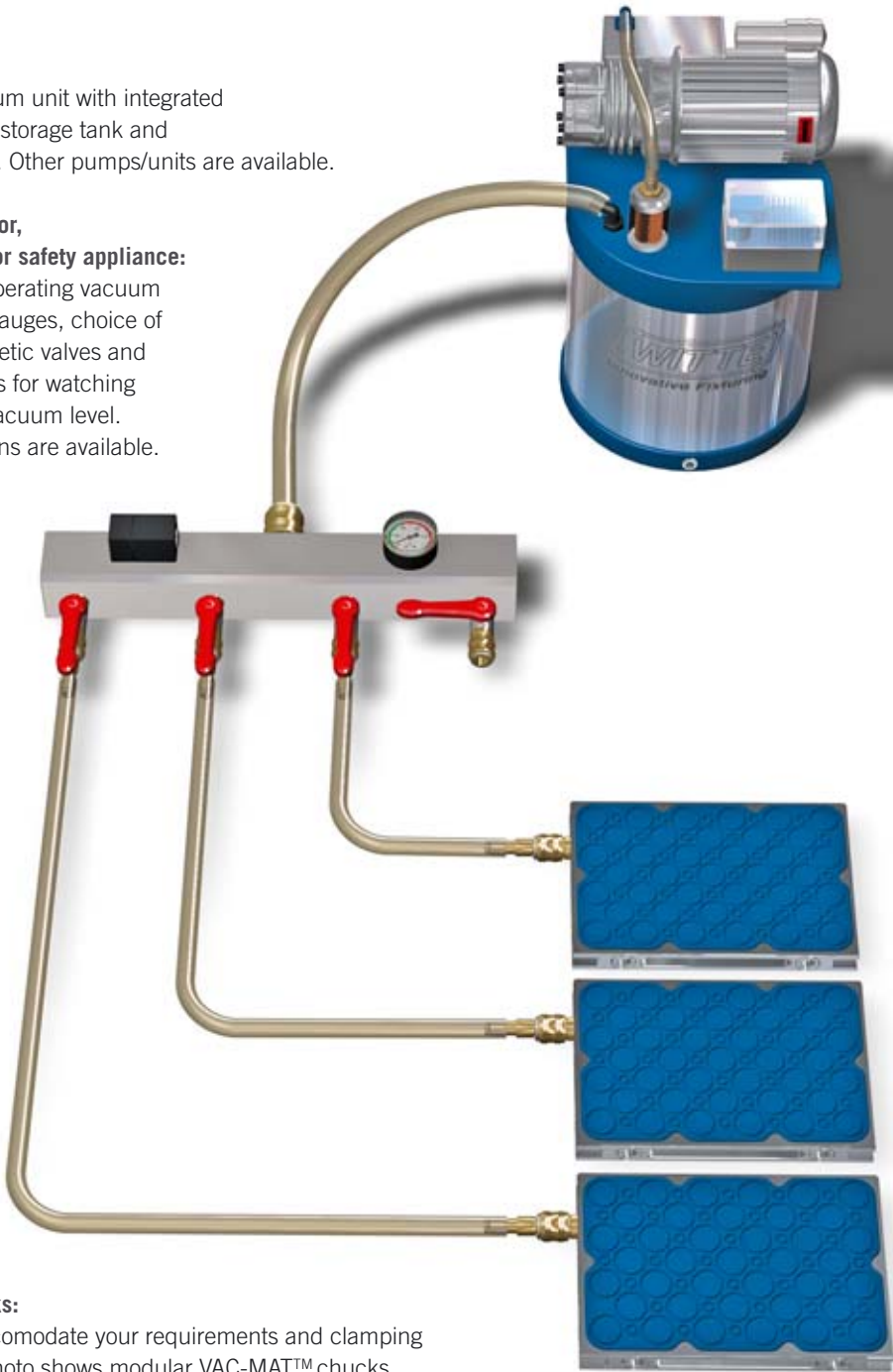
Setting up a vacuum system

Vacuum supply:

A modular vacuum unit with integrated liquid separator, storage tank and pressure control. Other pumps/units are available.

Vacuum distributor, connection unit or safety appliance:

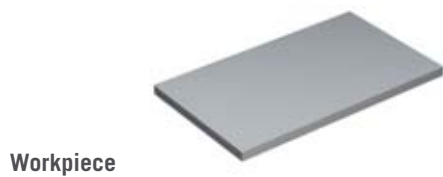
Distribution of operating vacuum to the chucks. Gauges, choice of manual or magnetic valves and pressure controls for watching over operating vacuum level. All these variations are available.



Vacuum chucks:

Chucks to accommodate your requirements and clamping operations. Photo shows modular VAC-MAT™ chucks for 5 side machining

Clamping with vacuum



Slot chuck with perforated rubber adapter mat



Slot chuck with perforated rubber adapter mat



Grid chuck with O-shaped seal



Grid chuck with O-shaped seal



Witte VAC-MAT™



Witte VAC-MAT™

Clamping with vacuum



Workpiece



Workpieces with small surfaces



Slot chuck with perforated rubber adapter mat



Slot chuck with perforated rubber adapter mat



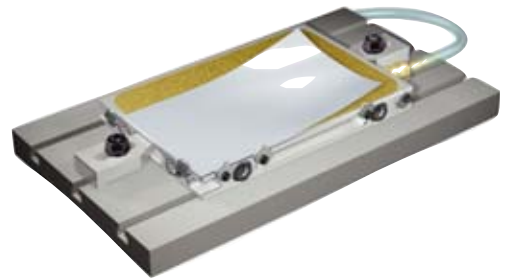
Circular grid chuck



Vitte VAC-MAT™



Chuck specially designed for workpieces



Chuck with insert made out of sintered metal or Witte Metapor© for foils and skins



Customized precision workholding fixtures

Witte is regarded as market leader for precision workholding fixtures combined with vacuum, hydraulic and pneumatic operations. Many well known machine manufacturers worldwide rely on Witte's experience. Our customers profit from our own solutions and developments used for own daily work for almost 40 years.

We will gladly meet the challenge of developing the best possible solution for your requirements.

We attend our customers from planning through approval process to after sales service. Our CAD designers who, whilst closely following our customer's special requirements also integrate ideas for improvement, with an aim to developing the best solution. Manufacturing, assembly and service is taken care of almost entirely in-house by our experienced staff and coordinated by our project managers.



Vacuum clamping fixture with automatic part stop system mounted on a tilting table. All functions of vacuum and stop system as well as vacuum supply are software controlled fully automatically through a central unit.



Vilmill vacuum clamping system incl. mobile vacuum unit 250m³/h, integrated in an HSC milling machine.



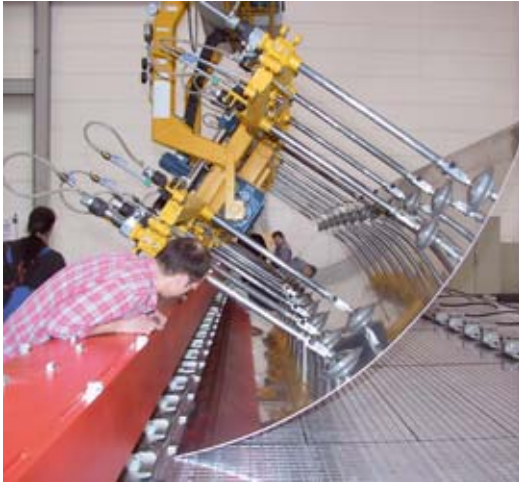
Vacuum clamping fixture incl. gantry and hydraulic press (2 tons) for selective pressing of large aluminium work pieces.



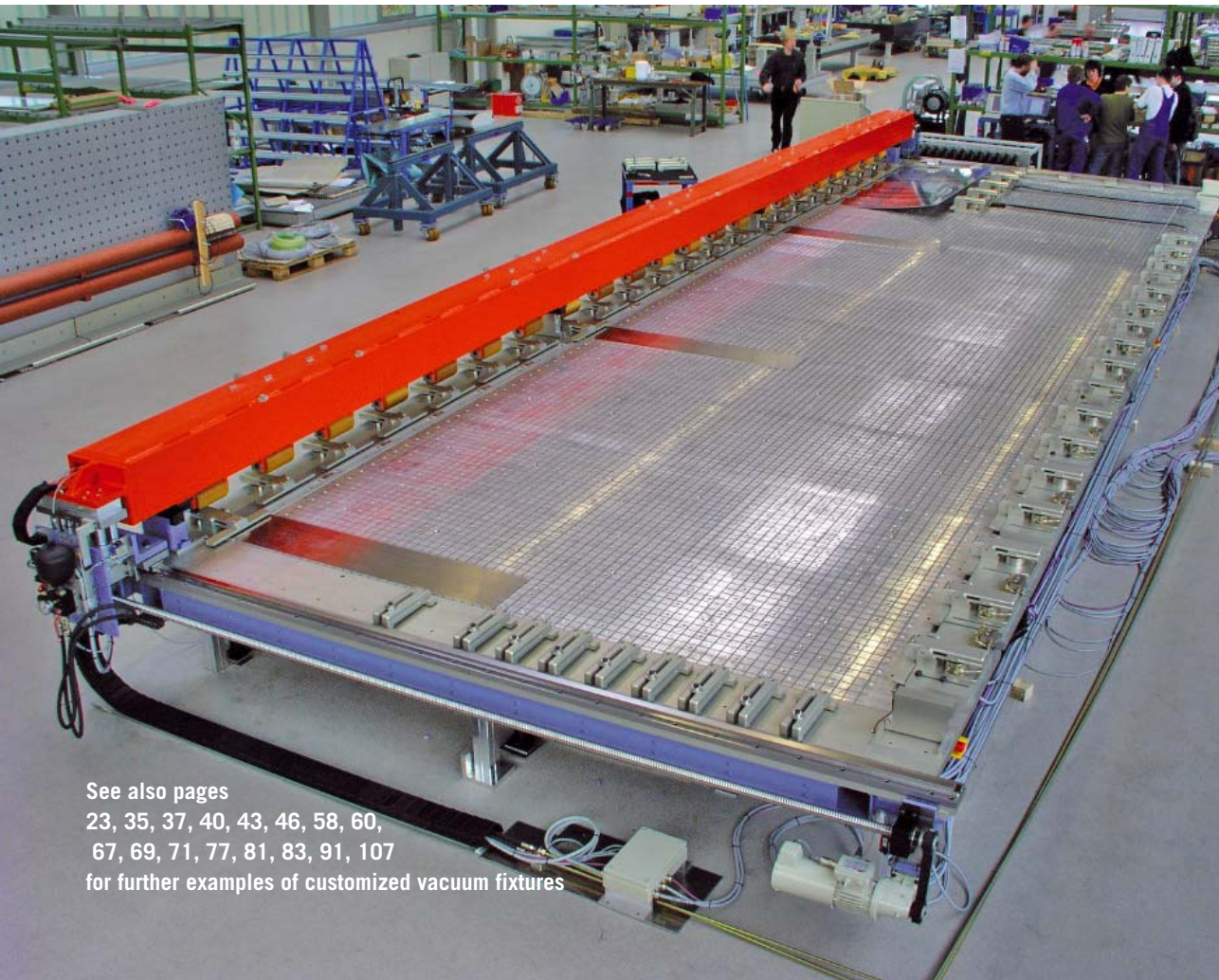
Machine table (3,3x11 meters) supplied with VAC-MAT™ Vacuum clamping. The photo shows the fixture at a well known Aircraft manufacturer, where pockets are milled into a surface area with the help of 468 Mats

CNC milling machine equipped with a vacuum system used in house for precision-machining aluminium aircraft parts





Clamping fixture for machining cylindrical pre-formed aircraft fuselage parts (13m x 4,10m)
Parts are pressed down, rolled flat and clamped using vacuum as well as pneumatic and hydraulic clamps



See also pages
23, 35, 37, 40, 43, 46, 58, 60,
67, 69, 71, 77, 81, 83, 91, 107
for further examples of customized vacuum fixtures



Vacuum Supply

Pumps

Units

Workstations

Application

We have vacuum pumps available of different types to meet each individual need.

Size and capacities vary from 3m³/h bis 510m³/h to guarantee optimal vacuum clamping fixtures whatever the circumstances

Advantages

- Reliable in continuous operation
- Easy to maintain
- Modular unit has integrated liquid separator
- Space saving assembly for easy access
- Integrated air filter, safety valve
- Witte repair service with spare parts in stock
- Pumps from 3m² to over 300m², also on request dry running pumps
- Liquid ring pumps run on regular machining coolant, pump temperature is regulated by an integrated radiator

Handling

- Small light pumps available according to individual need
- Integrated vacuum storage tank
- Different voltages available
- Castors available for mobility in workshop area
- Easy access for emptying liquid separator



Vacuum pumps



Vacuum Units



Modular vacuum unit



Liquid ring pumps



Triplex modular vacuum unit



Vacuum workstations

Choosing a vacuum unit or pump

Depending on your operation Witte offers different vacuum supply systems:

Handheld pumps / Pumps

are standard solution, almost all of which can be used together with our liquid separators if fluids are involved and sucked in during machining process

► Page 16

Vacuum units

In addition to the pumps mentioned above the vacuum units also have an additional vacuum tank as well as various safety devices.

► Page 18

Liquid ring pumps

These pumps are highly recommended when large amounts of cooling fluids are involved during the machining process and are sucked in

► Page 24

Modular vacuum unit

In addition to the pump and tank the modular vacuum units also have an integrated liquid separator and various safety devices

► Page 20

FLIP-POD™

Each m² of FLIP-POD™ surface requires 60-100m³/h vacuum suction

Area	Suction-capacity	Type	No.
<100cm ²	3 m ³ /h	Vacuum pump	98585
<1200cm ²	5 m ³ /h	Vacuum pump	99170
<1500cm ²	10m ³ /h	Vacuum pump	95969
	10m ³ /h	Vacuum unit	81010
	10m ³ /h	Vacuum unit	81011
	10m ³ /h	Modular unit	80172
	10m ³ /h	Modular unit	80173
<5000cm ²	16m ³ /h	Vacuum pump	82116
	16m ³ /h	Modular unit	82146
<1m ²	21 m ³ /h	Vacuum pump	80078
	21 m ³ /h	Vacuum unit	80000
	21 m ³ /h	Modular unit	80175
	22 m ³ /h	Liquid ring pump	93801
<2m ²	63m ³ /h	Vacuum pump	80126
	63m ³ /h	Modular unit, mobile	82150
	65m ³ /h	Liquid ring pump	93803
<3m ²	100m ³ /h	Vacuum pump	84410
	100m ³ /h	Liquid ring pump	93804
<4,5m ²	160m ³ /h	Vacuum pump	84412
	160m ³ /h	Vacuum unit, mobile	84414
	232m ³ /h	Liquid ring pump	93807
	250m ³ /h	Vacuum pump	84413
	250m ³ /h	Vacuum unit, mobile	84208

Witte VAC-MAT™

No. of Mats	Required suction capacity	
1	3 - 6m ³ /h	
≥ 8	16 - 21m ³ /h	
≥ 20	40 - 63m ³ /h	
≥ 50	100 - 160m ³ /h	

Choosing vacuum supply according to working conditions

Working conditions	Dry machining	Working with fluids
Small clamping area, Small loss of vacuum Low machining forces ▼	 Handheld pump	 Handheld pump with liquid separator
Larger clamping area, Higher loss of vacuum, Higher machining forces ▼	 Vacuum Unit	 Vacuum unit with liquid separator
Large clamping area High loss of vacuum High machining forces ▼	 Liquid ring pump	 Liquid ring pump
Very large clamping area Very high vacuum loss Very high machining forces ▼	 Modular vacuum unit	Modular vacuum units and workstations are suitable for dry and lubricated machining  Vacuum workstation
Very large clamping area Very high vacuum loss Very high machining forces	 Mobile modular vacuum unit	 Vacuum unit, mobile, with automatic liquid separator

Vacuum pumps

Oil lubricated vacuum pumps offer the following advantages:

- Air-cooled, therefore do not require coolant
- Highly reliable
- Low operating costs
- Good resistance to condensation
- Integrated oil mist separator, oil filter, check valve on suction side with sieve



98585
Vacuum pump 3 m³/h



82115
Vacuum pump 16 m³/h / 10 m³/h



80126
Vacuum pump 63 m³/h



80078
Vacuum pump 21 m³/h



Supply includes:

- 3 m wire spiral hose
- 3/2 way aerated handvalve
- and vacuummeter
- Schuko/CEE-Plug with overvoltage relay included only in supplies inside Europe

Vacuum pumps

230/400 V working voltage

No.	Suction-capacity	Motor V/kw	Lubricant	max. mbar	dB (A)	lxwxh mm	Kg
98585	3 m ³ /h	230/0,12	dry	150,0	60	239x144x143	4,5
99170	5 m ³ /h	230/0,25	dry	150,0	63	172x147x143	7,9
95969	10 m ³ /h	230/0,40	oil	20,0	60	271x258x296	18,0
82115	16 m ³ /h	230/0,55	oil	20,0	60	306x226x182	18,0
82116	16 m ³ /h	400/0,55	oil	20,0	60	306x226x182	18,0
80156	21 m ³ /h	230/0,75	oil	20,0	62	410x230x225	19,0
80078	21 m ³ /h	400/0,75	oil	20,0	62	410x230x225	19,0
80126	63 m ³ /h	400/1,5	oil	0,1	65	602x406x225	52,0
84410	100 m ³ /h	400/3,0	oil	0,1	67	692x406x290	70,0
84412	160 m ³ /h	400/5,5	oil	0,5	70	834x478x407	140,0
84413	250 m ³ /h	400/5,5	oil	0,5	72	957x523x407	190,0

Vacuum Duplex Unit with Tank and electronic control unit.
 Different configuration available on request - also for centralized use



Vacuum units

Operating vacuum required can be produced in many ways.
Witte vacuum units feature the following:

- Oil lubricated vacuum pumps with an end vacuum rate of 20mbar absolute at full suction capability of i.e. 3 m³ upto 250 m³ per hour
- Integrated pressure difference switch, which automatically switches the vacuum pump on or off thereby ensuring vacuum during machining but avoiding unnecessary idle running
- Protection switch which protects electric motor from overheating
- Air filter which protects pump from dirt (made of acrylic glass with exchangeable air filter cartridge)
- Careful assembly of compatible components guarantee trouble-free and almost maintenance-free operation using Witte vacuum units in many applications
- Drainage screw for coolants which have been sucked in
- 3m connecting cable with CEE or Schuko plug

The standard components of these tried and tested vacuum units are:

- a. Vacuum storage tank
- b. Oil lubricated vacuum pump
- c. Vacuum valve unit
- d. Air filter
- e. Vacuum hose connector
- f. Pressure difference switch
- g. On/off switch
- h. Electric cable with plug
- i. Overload protection

Supply includes:

- 1 Pce connection unit complete with
- Vacuum gauge
 - 3/2 way hand valve
 - 3m vacuum hose with quick coupling
 - Schuko/CEE-Plug with overvoltage relay included only in supplies inside Europe



80165 Vacuum unit 21m³/h

Vacuum units

230/400 V working voltage

No.	Suction-capacity	Motor V/kw	mobile	max. mbar	dB (A)	l x w x h mm	Kg
81010	10 m ³ /h	230/0,37	-	20	59	555x315x325	19
85323	16 m ³ /h	230/0,55	-	20	60	555x315x325	44
85324	16 m ³ /h	400/0,55	-	20	60	555x315x325	44
80165	21 m ³ /h	230/0,75	-	20	62	555x315x325	45
80000	21 m ³ /h	400/0,75	-	20	62	555x315x325	45
80001	63 m ³ /h	400/1,5	-	0,1	65	800x500x530	105
92302	100 m ³ /h	400/3	+	0,1	67	1200x800x1240	130
84414	160 m ³ /h	400/5,5	+	0,5	70	1200x800x1350	200
84208	250 m ³ /h	400/5,5	+	0,5	72	1200x800x1350	250



Vacuum unit with automatic liquid separator, see also p. 87



84208 Mobile vacuum unit

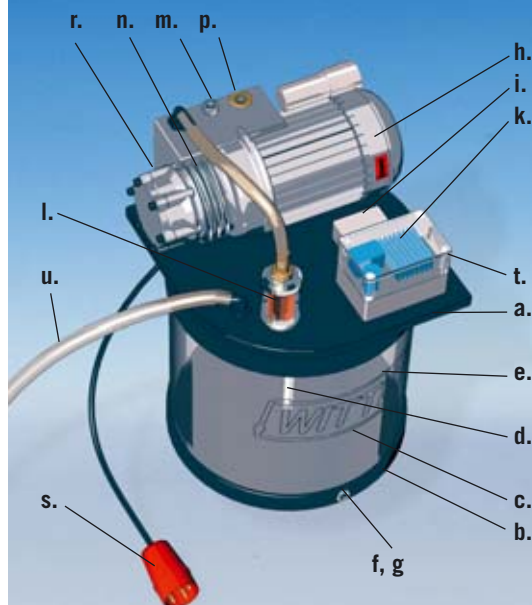
Modular vacuum units

Advantages:

- Vacuum storage unit and liquid separator are integrated - an additional liquid separator is not required
- Space saving assembly of all components
- See-through unit for liquid separator and vacuum storage unit all in one means safety "at a glance"
- Different storage volumes possible simply by changing acrylic glass cylinder
- Integrated air filter, drain separator, overvoltage relay, pressure difference switch
- Available with different pump types from 6 m³ to 63 m³, on request also available with dry running pumps

- | | |
|----|--|
| a. | Storage accumulator cover |
| b. | Storage accumulator bottom |
| c. | Acrylic glass cylinder |
| d. | Threaded stud |
| e. | Mist collector |
| f. | Profile seal |
| g. | Drainage plug |
| h. | E-motor |
| i. | Pressure difference switch |
| k. | Circuit relay |
| l. | Airfilter |
| m. | Oil filling plug |
| n. | Vacuum pump |
| p. | Exhaust air valve |
| r. | Oil level gauge |
| s. | Schuko/CEE-Plug with overvoltage relay
(In Europe only) |
| t. | On/off switch |
| u. | Wire spiral hose |

All pumps and units are also available in 110V/60Hz.





82150 Modular unit 63 m³/h, (mobile)

Modular vacuum units

230/400 V working voltage

No.	Suction-capacity	Motor V/kw	mobile	max. mbar	dB (A)	l x w x h mm	Kg
80172	10 m ³ /h	230/0,37	-	20	59	∅500x630	25
82147	16 m ³ /h	230/0,55	-	20	60	∅500x630	31
82146	16 m ³ /h	400/0,55	-	20	60	∅500x630	31
80174	21 m ³ /h	230/0,75	-	20	62	∅500x630	45
80175	21 m ³ /h	400/0,75	-	20	62	∅500x630	45
82150	63 m ³ /h	400/1,5	+	0,1	65	600x600x1030	95
83467	100 m ³ /h	400/3	+	0,1	67	700x700x1130	113

All pumps oil lubricated. Dry running pumps for modular units are available on request
All pumps and units are also available in 110V/60Hz.



Supply includes:

1 Pce. connection unit complete with

- Vacuum gauge
- 3/2 way hand valve
- 3m vacuum hose with quick coupling
- Schuko/CEE-Plug with overvoltage relay included only in supplies inside Europe





Roller bar vacuum system for precision machining pre-formed aluminium sheets



Vacuum clamping chuck for bottle caps as used in quality control.

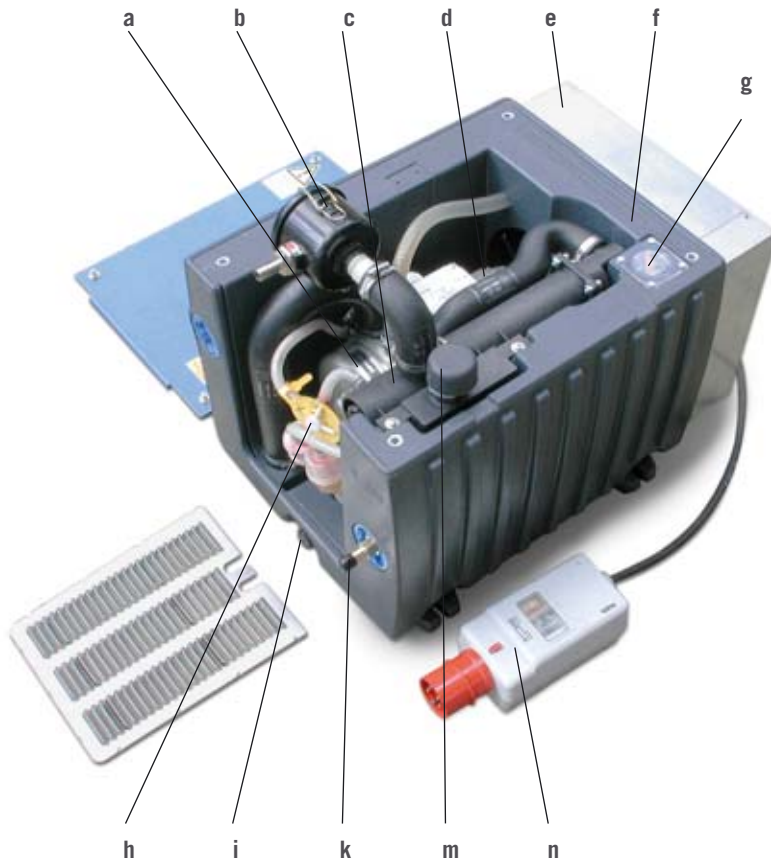
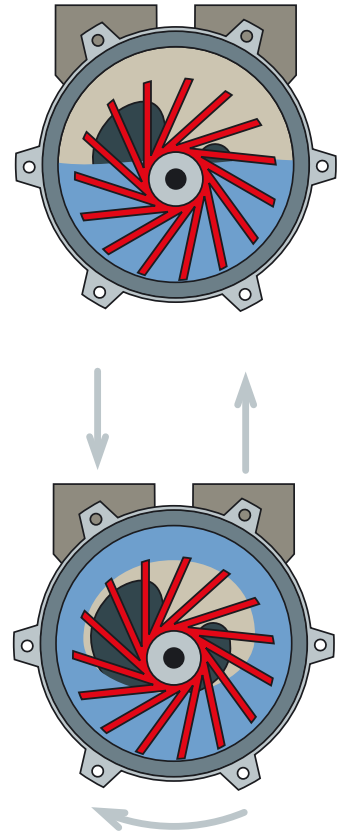


2 Rotating systems (each 3500mm) with vacuum clamping areas on all four sides for machining aluminium profiles

Liquid ring vacuum pumps

Only one unit for vacuum supply and liquid separation

These robust pumps, are low on wear-and-tear and maintenance, work at up to 50 mbar vacuum and do not need an additional liquid separator. A fast turning impeller causes water in the pump to rotate (see picture on right) simultaneously sealing itself off the impeller. A washable filter and a patented condenser clean the air being sucked in before it enters the pump. Cooling lubricant is integrated into pump's operating cycle and a valve allows removal of excess fluid which can be returned to tool machine whilst in operation. An air chiller protects the unit from overheating.



- a Liquid ring vacuum pump
- b Suction filter
- c Condenser
- d Motor
- e Chiller
- f Fluid reservoir
- g Level indicator
- h Operation selection
- i Drain plug
- k Valve
- m Air release valve
- n Shockproof plug

Liquid ring vacuum pump

230/400 V working voltage

No.	Dimensions h x w x l	Suction cap.	Motor, V/kW
93801	463 x 432 x 602	22m ³ /h	3ph. 400 Volt 50/60 HZ, 0,83/1,06kW
93802	515 x 572 x 743	45m ³ /h	3ph. 400 Volt 50/60 HZ, 1,2/1,6kW
93803	515 x 572 x 743	65m ³ /h	3ph. 400 Volt 50/60 HZ, 2,4/3,5kW
93804	525 x 620 x 920	100m ³ /h	3ph. 400 Volt 50/60 HZ, 3,5/5,2 kW
93805	710 x 845 x 1100	150m ³ /h	3ph. 400 Volt 50/60 HZ, 4,0/6,2 kW
93806	710 x 845 x 1100	198m ³ /h	3ph. 400 Volt 50/60 HZ, 5,5/8,2 kW
93807	710 x 845 x 1100	232m ³ /h	3ph. 400 Volt 50/60 HZ, 7,4/11,4 kW

Liquid ring vacuum pump

Accessories

No.	Name	For Pump	Version
13468	Air filter Element 3µm, polyester	Type 22	washable
13469	Air filter Element 3µm, polyester	Type 45-100	washable
13470	Air filter Element 3µm, polyester	Type 150-196	washable
13471	Air filter Element 3µm, polyester	Type 232	washable

Supply includes:

1 Pce. connection unit complete with

- Vacuum gauge
- 3/2 way hand valve
- 3m vacuum hose with quick coupling
- Schuko/CEE-Plug with overvoltage relay included only in supplies inside Europe



Vacuum workstations

Vacuum workstation for mobile use in the workshop, with integrated vacuum pump, liquid separator, 3-fold vacuum distributor, connectors and gauges

- Vacuum storage tank, pressure difference switch and safety appliance guarantee a triple safety factor
- Solid steel design on castors also have drawers for vacuum chucks and accessories
- Vacuum workstations have oil lubricated vacuum pumps

No.	Suction-capacity	Motor V/kw	mobile	max. mbar	dB (A)	l x w x h mm	Kg
81045	21 m ³ /h	400/0,75	+	20	62	1150x650x1050	205
81046	63 m ³ /h	400/1,5	+	20	65	1150x650x1050	215

Also available as 110V/60 Hz unit

Supply includes:

- 1 maintenance and service kit
- 5 l liquid separator
- 10m wire spiral hose
- 1 safety appliance
- 5m electro cable with CEE-plug 10A



Valve units

No.	Type	For hose ϕ
82291	T-shape	6mm
82292	T-shape	12mm
80102	straight	12mm
82519	straight	18mm
82952	straight	24mm
82902	straight	32mm
82953	straight	50mm



Supply includes:

- 1 Pce 3/2 way aerated hand valve
- 3m Vacuum suction hose with wire spiral
- 1 Pce vacuummeter
- 2 Pcs vacuum hose connectors

Additional vacuum tank

- for increasing vacuum storage volume of units
- acts as additional filter and separator for dirt or fluid
- reduces actual running time of vacuum pump

No.	lxwxh	Connection	Volume/ l	kg
80410	555x315x325	Inner thread G 3/4"	54	18
80379	800x500x530	Inner thread G 3/4"	210	30



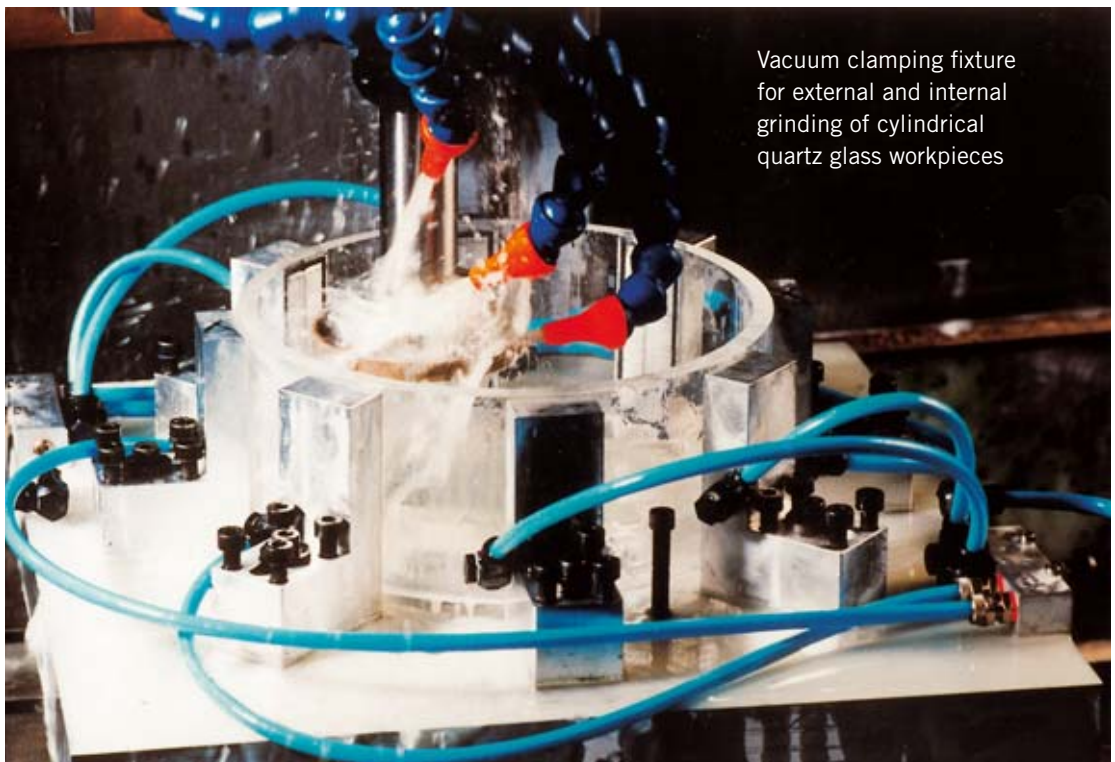
The tank is equipped with two viewing glasses. Dirt and fluid can be seen and drained immediately.

Maintenance and service kits

Maintenance and service kits for regular care of vacuum units and pumps

For pump/unit with suction capacity	Wear parts kit	Service kit	Gasket kit
10m ³ /h - 16m ³ /h	280711	82151	280721
21m ³ /h	280712	80416	280722
63m ³ /h - 100m ³ /h	280713	80417	280723
160m ³ /h	280714	280698	15202
250m ³ /h	280715	280699	15205
Comprising of:	Wear parts, Gaskets	Filter elements, gaskets, oil	Gaskets

Naturally maintenance and service can be carried out in our premises



Vacuum clamping fixture for external and internal grinding of cylindrical quartz glass workpieces



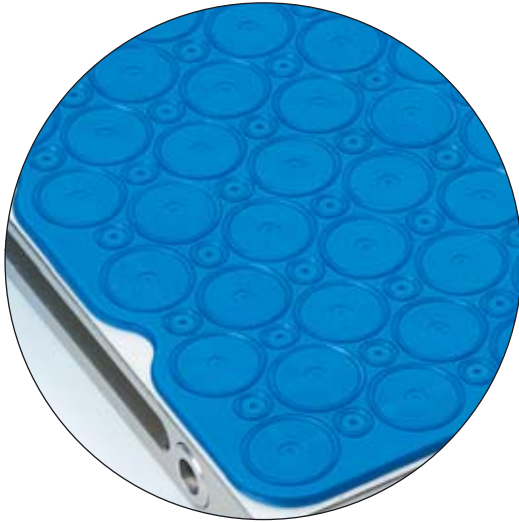
Vacuum Starter Set

No. 94078, Witte Vacuum-Starter-Set, ready to use including all materials to run

Supply includes:

No.	Pcs.	Name
95969	1	Vacuum pump, 10m ³ /h, 230V
81995	1	Vac-Mat adapterplate
89676	1	Modular vakuum grid chuck
11030	5	Vac-Mat – blue
11053	5	Vac-Mat – green
30617	2	Clamps for clamping plates onto worktable
28331	1	Setting up tool for joining modular vacuum tables
00070	1	10 meters O-shaped seal diameter 4 mm

All items needed to operate this kit i.e., spiral vacuum hose and connectors are included



Witte Vac - Mat™

The vacuum system you can cut right into!

Application

Wide spectrum of different workpiece forms can be clamped

- Grinding
- Milling
- Drilling
- Five sided treatment including milling into the Vac-Mat

Advantages

- Strong hold down force
- Clamping surface with a high friction value
- Milling through of outer and inner contours
- Precise and exact cut outs due the fact that the workpiece can be milled through into the VacMat leaving a clean cut out

Handling

- Set up time reduced to seconds as fitting of single rubberseals become obsolete
- Surface friendly material which avoids scratching of workpiece surface area
- No extra clamping fixture needed

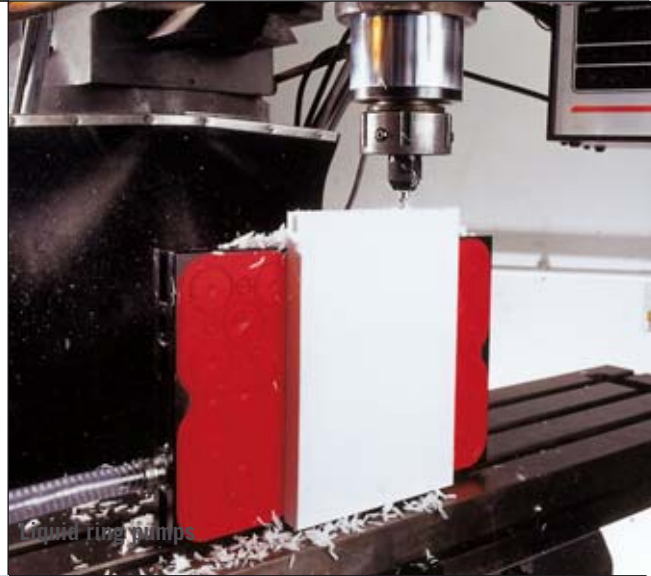
Direct milling
through a work-piece
on a modular chuck



Vac - Mat™



Accessories



High speed turning



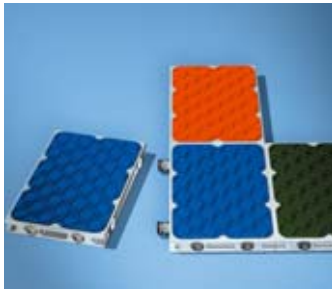
Modular
VAC - Mat™ chucks



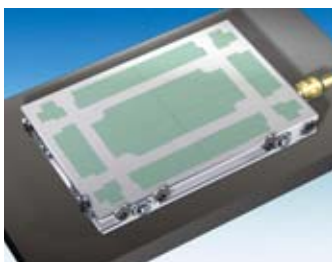
VAC - Mat™ Sets



The lugs underneath the mat guarantee fast and accurate positioning of the VAC-MAT™ on the special modular vacuum chuck



The modular concept allows connection of several vacuum chucks. The vacuum supply to each chuck continues through the connection elements.



In modular chucks additional holes can be drilled in the green areas to allow insertion of pins for positioning. Further information on page 114.

VAC-MAT™ Application

What is VAC-MAT™ ?

It is a thin soft polymer mat with many spaced out vacuum points, suckers in different sizes with a fine hole in each centre and a raised lip. On the underside there are six lugs which locate in the special VAC-MAT™ chuck. On the mat under surface there are grid shaped grooves which distribute the vacuum to each of the small holes. A lip right around the outside edge ensures no leakage.

What size is VAC-MAT™?

All VAC-MAT™s are 2,5 x 200 x 300 mm. The tolerance lies at +/- 0,04mm and concave upto 0,1mm. To increase the size of the working area, the modular VAC-MAT™ chucks are connected to one another and VAC-MAT™ s are simply placed on as described.

Is VAC-MAT™ reusable?

The working life of a VAC-MAT™ depends on the number and size of cuts made into the mat during machining.

What kinds of VAC-MAT™ are available?

There are 5 types of mat available:

- Blue mats, standard for normal machining
- Green mats, slightly harder in consistency for heavier machining
- Red mats, only to be used once
- Black mats, are used to seal the areas not required on the VAC-MAT™ chucks during machining.
- Grey mats, heat resistant, for temperatures upto 80°C

Max. temperatures during application:

Upto 40°C VAC-MAT™s can be reused without any restrictions.

Upto 50°C VAC-MAT™s can only be used once, the sucker lips will not return to their original position.

For temperatures higher than 50°C upto max. 80°C the heat resistant grey mat (No. 13156) should be used



Starter-Sets

These starter sets are designed to give the operator a complete solution to set up and start machining immediately. All plates are modular and can be extended with a simple connector at any time. These Sets are available in three different dimensions, which are defined by the size of the base plates. (see fig. right hand side) All plates are modular

Supply includes:

- 1 x Tail end
- 1 x Coupling
- 7 x Blind plug
- 10 x O-ring
- 8 x Crosspieces
- 10 x VAC-MAT™ blue
- 1m Vacuum suction hose with wire spiral 18/12



Modular VAC-MAT™ plates are made of high-tensile aluminium. Steel versions are available on request.

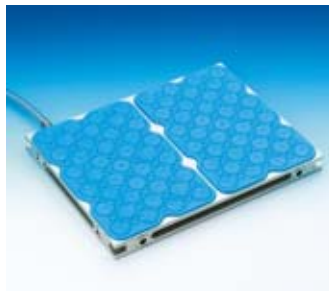
No.	Name	lxwxh	kg
81759	VAC-MAT™ Starter-Set Single	300x200x30	5
82837	VAC-MAT™ Starter-Set Double	300x400x30	10
82825	VAC-MAT™ Starter-Set Four times	600x400x30	20

Other dimensions on applications.

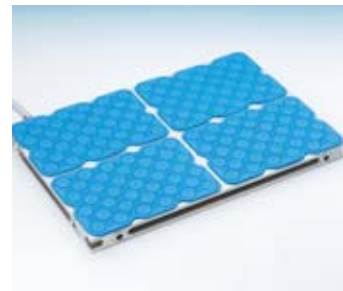
Dedicated chucks are also available but Vac-Mats™ are 200x300 mm and therefore any larger surface area must be a multiple of 200x300 mm.



VAC-MAT™ Starter-Set
Single

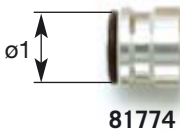


VAC-MAT™ Starter-Set
Double



VAC-MAT™ Starter-Set
Four times

Accessories



No	Name	lxwxh
11030	VAC-MAT™/blue, normal machining	300x200x2,42
11053	VAC-MAT™/green, heavier machining	300x200x2,42
11548	VAC-MAT™/red, only used once	300x200x2,42
11029	VAC-MAT™/black, for covering areas not required during machining	300x200x2,5

No.	Name	Dimension
81761	Hose connector incl. O-Ring	$\varnothing 1 = 23$ $\varnothing 2 = 14$
81762	Vacuum chuck adapter incl. O-Ring	$\varnothing 1 = 23$
81774	Plug incl. O-Ring	$\varnothing 1 = 23$
11032	O-Ring	$\varnothing 16 \times 2,5$
28331	Tool for setting up	$\varnothing 15 \times 120$
89092	VAC-MAT™ - Demo	CD-ROM



For fixing end stops, threaded holes have to be made in the plate by the customer.

Height adjustable end stops

in form of excentric washers:

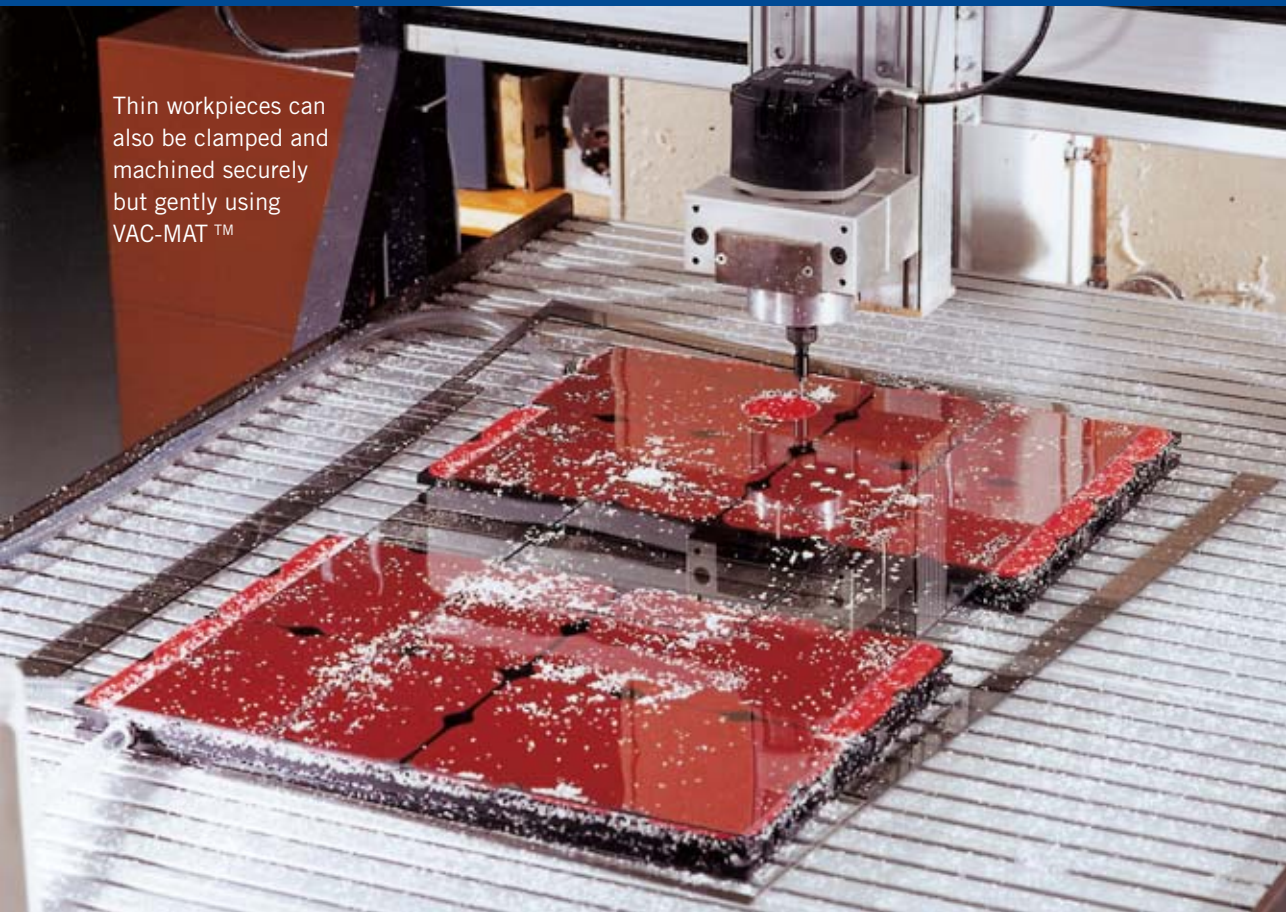
No.	pcs.	\varnothing mm	height of plate mm	knurled nut/ grub screw
85405	6	20	32,5	M5
85409	9	27	38,0	M6
85410	12	30	48,0	M6

Im Lieferumfang enthalten:

- Skizze für die Befestigungsbohrungen
- Passende Rändelmuttern und Gewindestifte

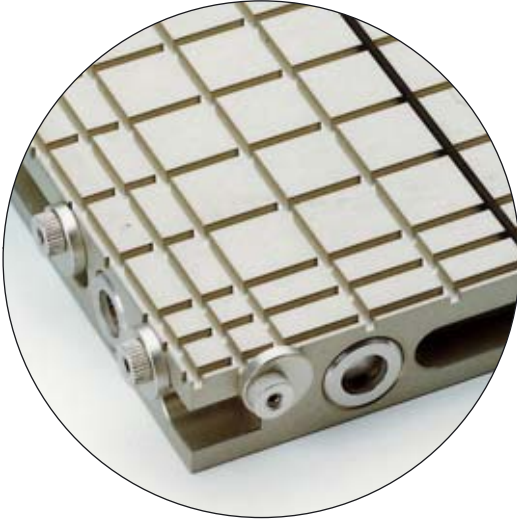
Befestigungsbohrungen sind vom Kunden selbst einzubringen.

Thin workpieces can also be clamped and machined securely but gently using VAC-MAT™



Combined special clamping system made out of Witte VAC-MAT™ and FLIP-POD™ (see p.70)





Grid type vacuum chucks

Modular Grid Chucks with standard sizes or made to order

Applications

For simple shaped workpieces
with a rough surface and heavy duty milling

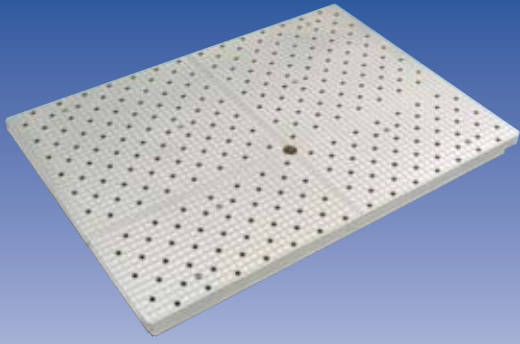
- Grinding
- Milling
- Turning

Advantages

- Strong hold down force
- Universally applicable
- Secure clamping of rough workpieces
due to the high friction properties
- The O-shaped seal evens out any irregularities
between workpiece and chuck surface

Handling

- Any shape or size of chuck made to measure
- Recommended grid size depends on
workpiece contour and dimensions
- Clamping area defined by Polymer O-shaped seal
- Fine vacuum grid plates for
extremely small workpieces in any form
- Acts as a base for many special solutions
in connection with special vacuum adapter mats



Vacuum grid type plate with additional threaded bores



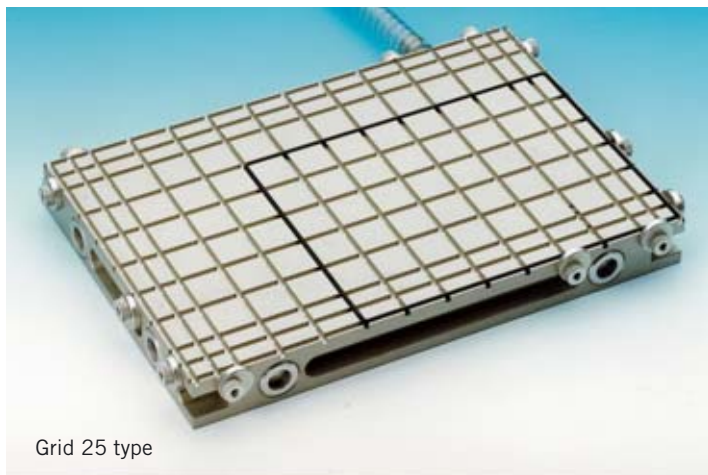
Custom build vacuum cube with integrated storage tank, magnetic Valve and 6 pc grid type chucks.

Modular grid chucks

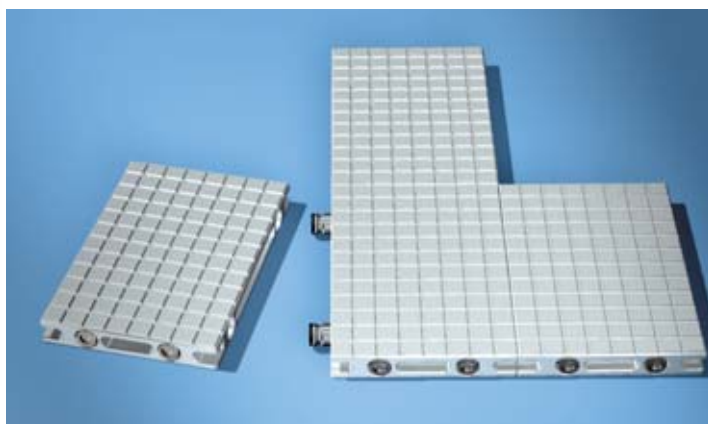
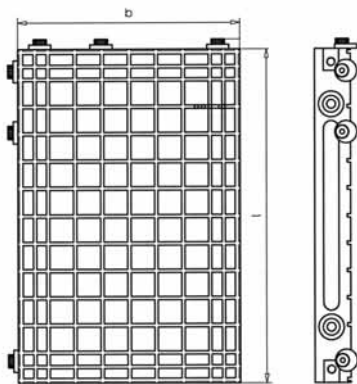
Witte grid chucks are manufactured in high-tensile aluminium. Steel versions are available on request.



Grid 12,5 type



Grid 25 type



Special dimensions available on request!

The modular concept allows connection of several vacuum chucks. The vacuum supply to each chuck continues through the connection elements.

No.	Description/Grid	l x w x h	kg
82978	Grid type vacuum chuck, modular/25	300x200x32,5	5
84161	Grid type vacuum chuck, modular/25	300x400x32,5	10
84162	Grid type vacuum chuck, modular/25	600x400x32,5	20
89676	Grid type vacuum chuck, modular/12,5	300x200x32,5	5
90249	Grid type vacuum chuck, modular/12,5	400x300x32,5	10
92289	Grid type vacuum chuck, modular/12,5	600x400x32,5	20

Supply includes:

- 1 x Tail end
- 7 x Blind plug
- 10 x O-ring
- 1 x Plug, inside dia 12
- 10m O-shaped seal, $\varnothing 3,5\text{mm}$, #00170
- 2 Step heel clamps no.30617, alu
- 1m Vacuum suction hose with wire spiral 18/12
- Height adjustable, excentric end stops with discs

Standard grid chucks

These tried and tested standard grid type vacuum chucks made by Witte are as described in the table made of high tensile aluminium or steel.

The grid sizes are either 12,5 mm or 25 mm. The height adjustable rim assists the vacuum hold down force as well as a positioning aid

Special dimensions available on request!



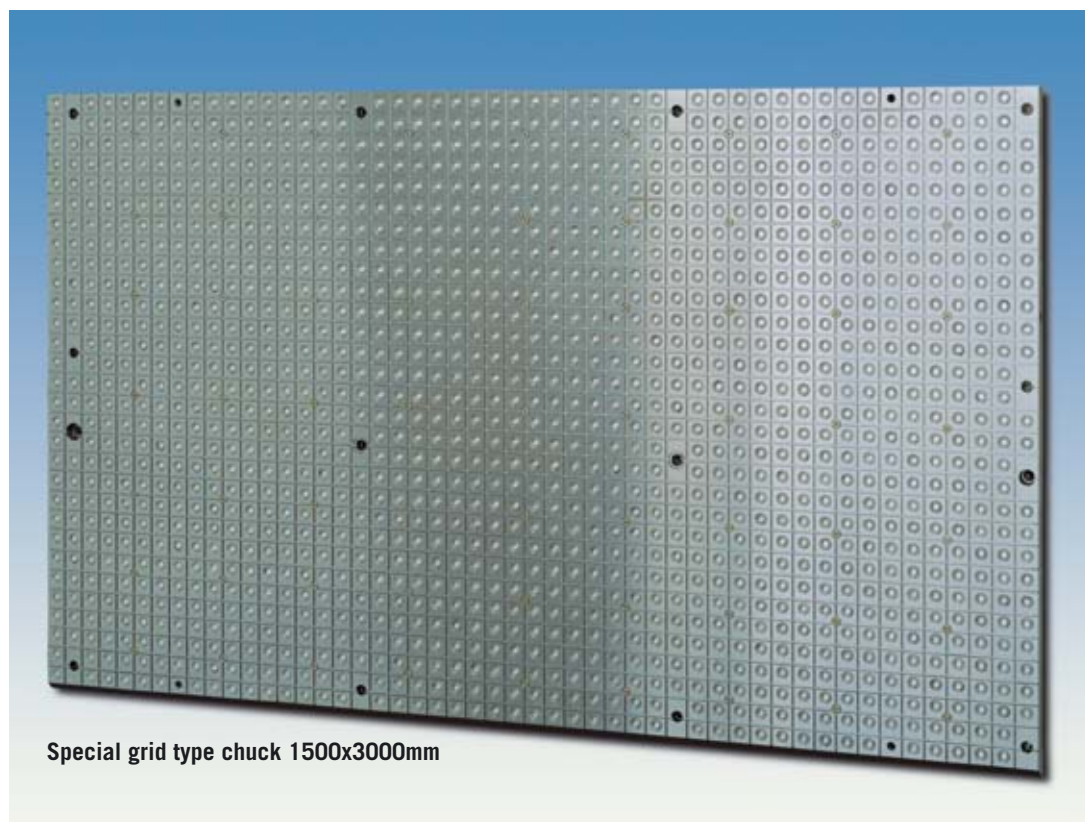
lxwxh (mm)	Aluminium		Grid 25	
	Grid 12.5 No	kg	No	kg
150x100x38	80802	1	80214	1
200x100x38	80803	2	80215	2
250x150x38	80804	3	80216	3
300x150x38	80805	4	80217	4
350x150x38	80806	5	80218	5
400x200x38	80807	8	80219	8
500x200x48	80808	13	80220	13
600x200x48	80809	15	80221	15
400x250x48	80810	13	80222	13
500x250x48	80811	16	80223	16
400x300x48	80812	15	80224	15
500x300x48	80813	20	80225	20
400x400x48	80814	21	80374	21
600x300x48	80815	23	80226	23
600x400x48	80816	31	80376	31
800x400x48	80817	41	80227	41
1000x500x48	80818	65	80427	65

Steel		Grid 25	
Grid 12.5 No	kg	No	kg
80819	4	80228	4
80820	6	80229	6
80821	11	80230	11
80822	13	80231	13
80823	15	80232	15
80824	24	80233	24
80825	37	80234	37
80826	45	80235	45
80827	37	80236	37
80828	47	80237	47
80829	45	80238	45
80830	56	80239	56
80831	60	80375	60
80832	67	80240	67
80833	90	80377	90
80834	121	80241	121
80835	192	80426	192

Supply includes:

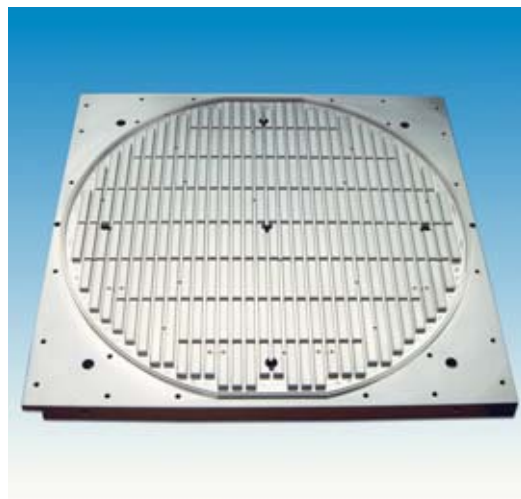
- 1 x Tail end
- 1 x Plug, inside dia 12
- 1m Vacuum suction hose with wire spiral 18/12
- Height adjustable end stops
- 10m O-shaped seal, ø3,5mm. #00170

Custom built grid chucks



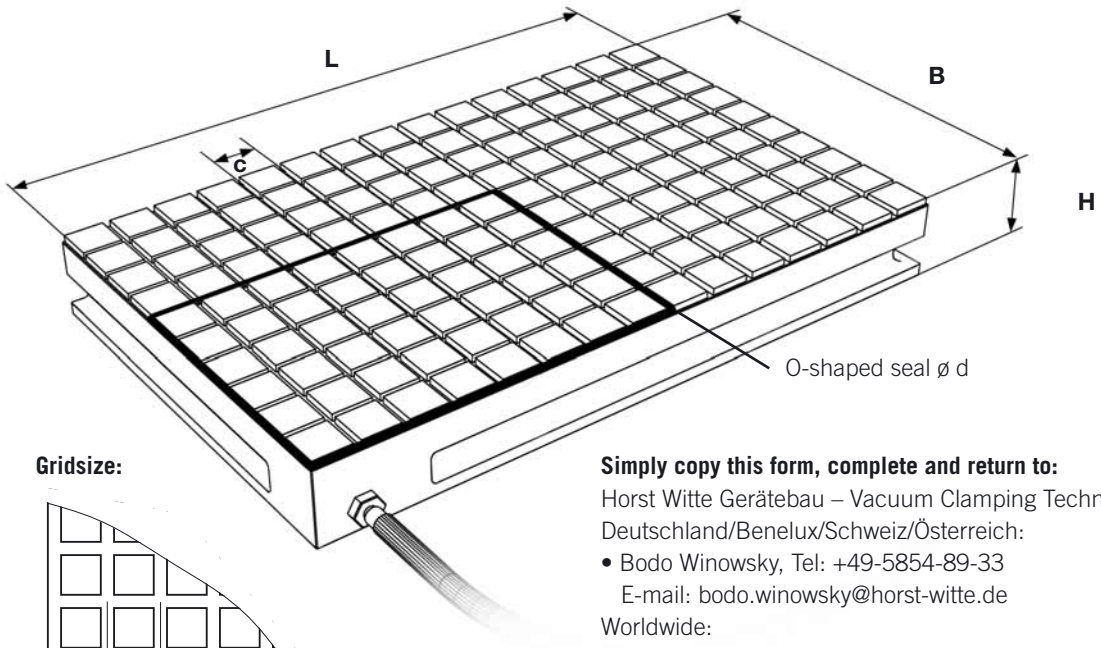
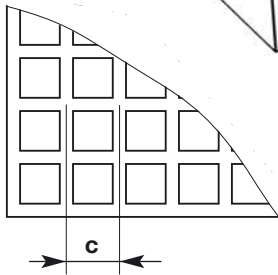
In addition to standard sizes shown here Witte grid type chucks are also custom built to suit your requirements up to dimensions of more than 40m². Dimensions of chuck and clamping area, grid size, slot width, downforce and best type of clamping surface are all details taken into account to supply a chuck which gives optimal results for the application in question. Use our inquiry form on page 43 or get in touch with our agent in your area or with us directly.

Chucks can be made according to a customers workpiece design drawing, we can help in finding the best way to clamp your workpiece



Customized vacuum chuck for the aircraft industry, similar chucks have also been supplied for the spacecraft industry

Inquiry form for Grid type vacuum chucks:


Gridsize:

Simply copy this form, complete and return to:

Horst Witte Gerätebau – Vacuum Clamping Technology
 Deutschland/Benelux/Schweiz/Österreich:

• Bodo Winowsky, Tel: +49-5854-89-33

E-mail: bodo.winowsky@horst-witte.de

Worldwide:

• Martin Schröder, Tel: +49-5854-89-978

E-mail: martin.schroeder@horst-witte.de

• Rudolf Behn, Tel: +49-5854-89-28

E-mail: rudolf.behn@horst-witte.de

Outer dimensions:

l= _____

w= _____

h= _____

Gridsize:

c= _____

O-shaped seal-ø:

d= _____

End stops:

Height adjustable end stops _____

In form of excentric washers _____

Without or: _____

Material: Aluminium

Surface: Anodized, colour: Natural

More details on request

Complete and return for a quotation

 Name

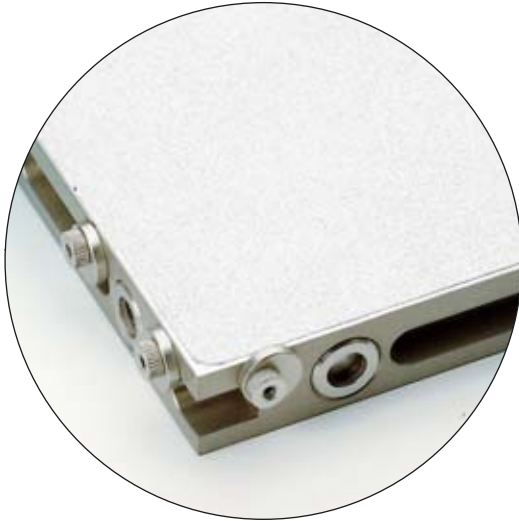
 Postal code/Town

 Company

 Street

 Type of work

 Tel / Fax



μ -porous Vacuum chucks

Modular chucks Custom built chucks

These chucks have a porous surface area made out of sinterbronze, ceramic or porous aluminium depending on the application and workpiece.

METAPOR® opens a whole new perspective for different clamping solutions

Application

Preferred workpieces:

- Thin walled (i.e. paper, foils, plate bars, metal strips)
- Fine (i.e. optical)
- Soft materials (i.e. rubbers)

for work such as:

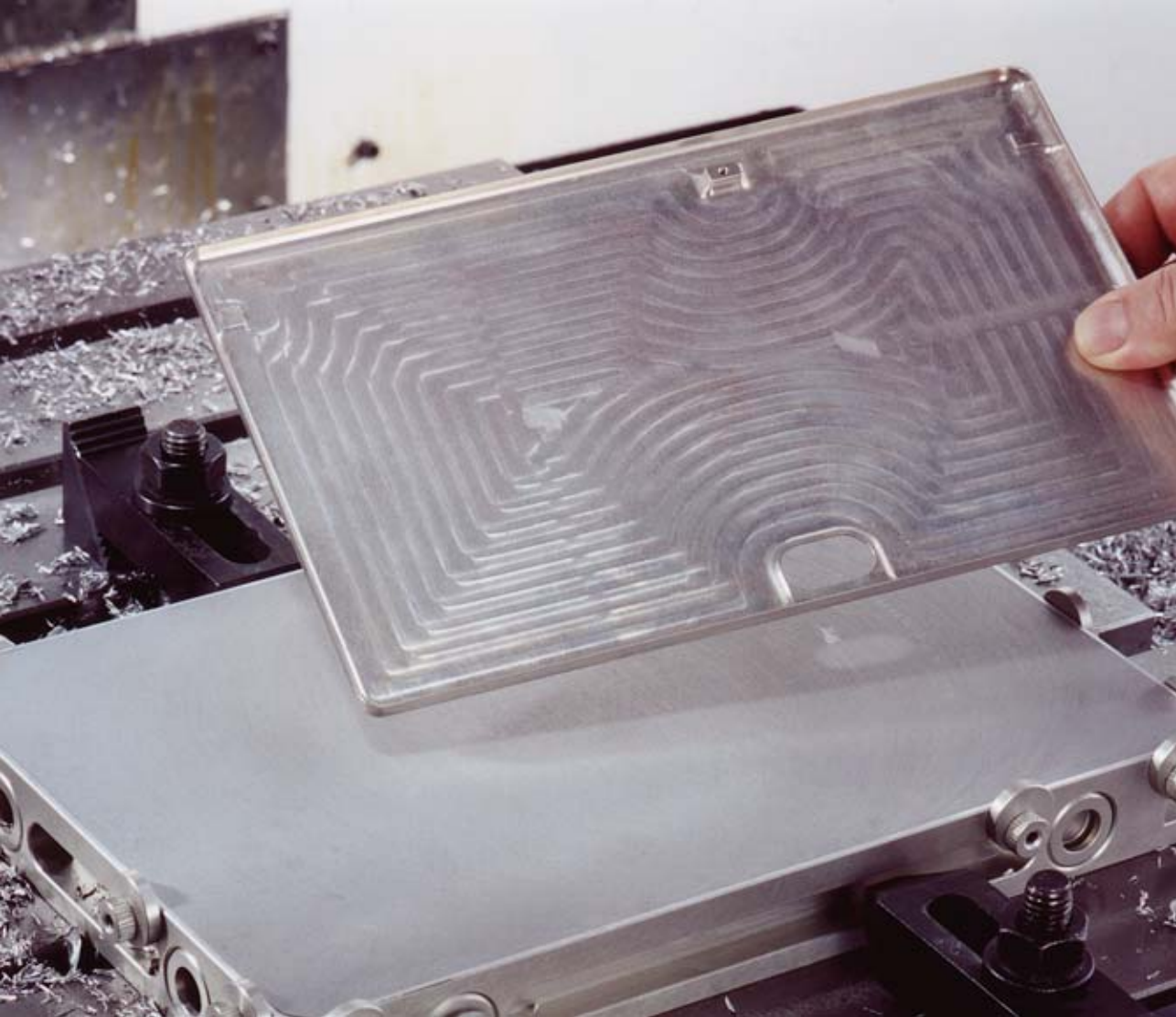
- High precision measuring
- Precision milling
- Silicon wafer production
- Clean room surroundings (KI.10)
- only Metapor CE-100

Advantages

- Due to the absence of grooves and holes workpieces are not deformed for instance on inserts in the clamping area
- Milling through the workpiece is possible with the use of our Friction booster
- METAPOR® has different quality grades and can also qualify for Clean room surroundings (KI. 10)

Handling

- Modular chucks can be interconnected to enlarge the surface area.



Witte modular grid chucks are manufactured in high-tensile aluminium. Steel versions are available on request.

Custom built vacuum chuck with Metapor insert

Special dimensions available on request !



μ-porous Vacuum chucks

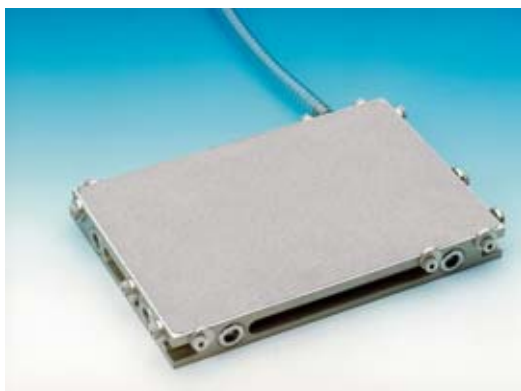
Modular chucks can be interconnected to enlarge the surface area. The inserts can be out of Sintermetal or METAPOR®



Sintermetal Vacuum chucks

Inlay out of well tested Sinterbronze

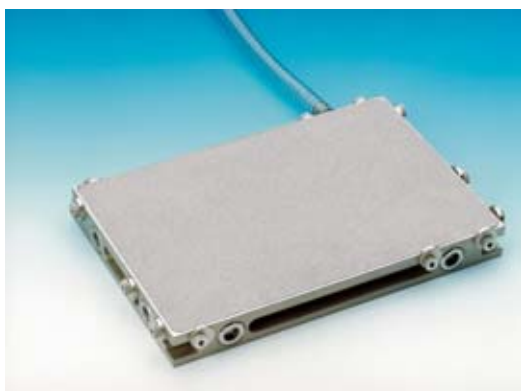
No.	lxwxh	kg
84686	300x200x38	7,1
84687	300x400x38	14,2
84688	600x400x38	28,4



METAPOR® Vacuum chucks with BF 100 AL:

Inlay out of an air permeable material called METAPOR® BF 100 AL, a description can be found on page 106

No.	lxwxh	kg
83401	300x200x38	6,1
84380	300x400x38	12,2
84381	600x400x38	24,4



METAPOR® Vacuum chucks with MC 100 AL:

Inlay out of an air permeable material called METAPOR® MC 100 AL, with a higher degree of porosity compared to BF 100 AL

No.	lxwxh	kg
91021	300x200x38	6,1
92290	300x400x38	12,2
92291	600x400x38	24,4

Special dimensions available on request !

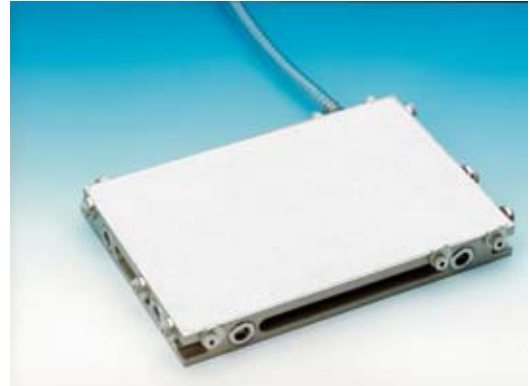
μ-porous Vacuum chucks

Modular chucks can be interconnected to enlarge the surface area. The inserts can be out of Sintermetal or METAPOR®

METAPOR® Vacuum chucks with CE 100:

Inlay out of METAPOR® CE100 WHITE, is a fine porous material with a medium pore diameter which is lower than that of of BF100 or MC100. This Material has a very homogenous total porosity. Especially interesting for the silicon wafer production

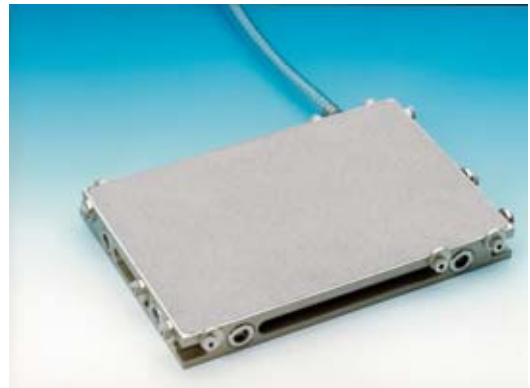
No.	lxwxh	kg
91488	300x200x38	6,1
92294	300x400x38	12,2
92296	600x400x38	24,4



METAPOR® Vacuum chucks with HD 210:

Inlay out of an air permeable material called METAPOR® HD 210, this material can be used up to 210°C

No.	lxwxh	kg
94315	300x200x38	6,1
94316	300x400x38	12,2
94317	600x400x38	24,4



Supply includes:

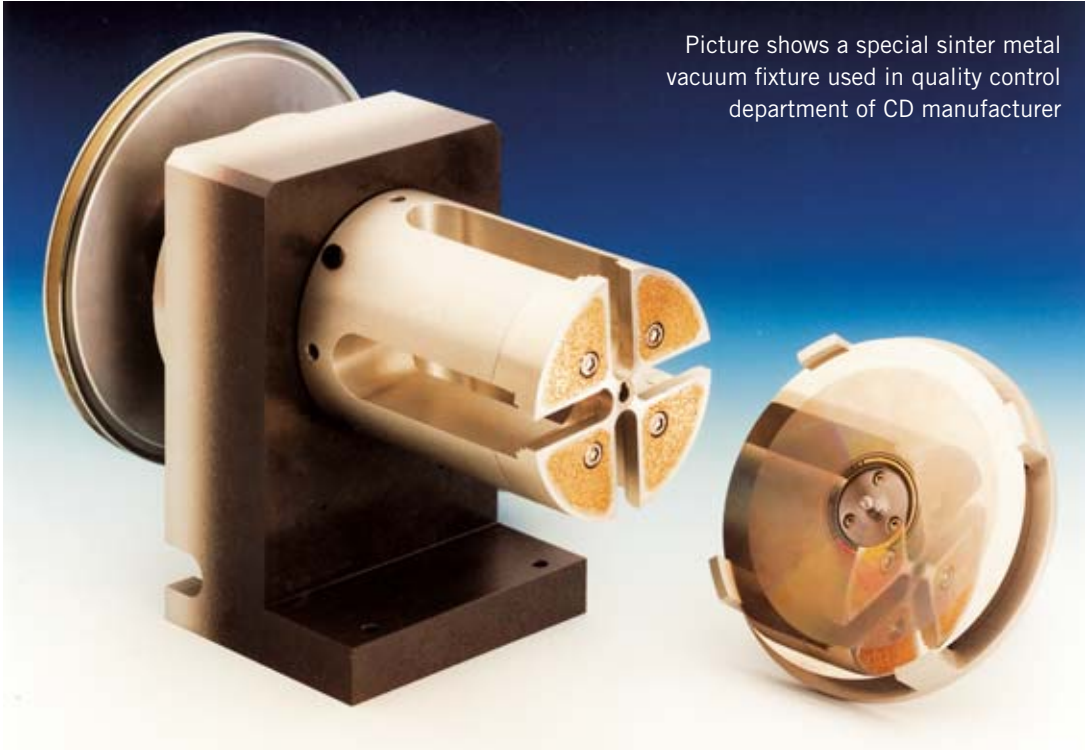
- 1 x Tail end
- 7 x Blind plug
- 10 x O-ring
- 1 x Plug, inside dia 12
- 2 Step heel clamps no.30617, alu
- 1m Vacuum suction hose with wire spiral 18/12
- Height adjustable excentric end stops



Witte METAPOR® chucks are also available in a modular version if required

Sintermetal & METAPOR[®] vacuum fixtures

Examples of custom made chucks



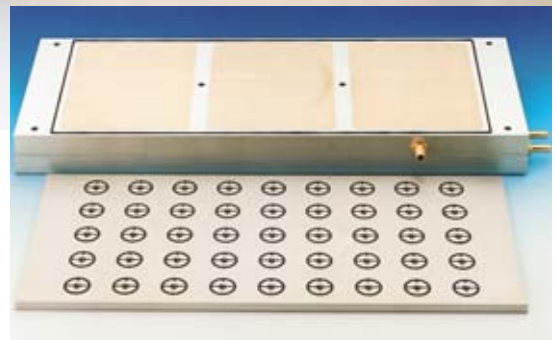
Picture shows a special sinter metal vacuum fixture used in quality control department of CD manufacturer



3D Vacuum chuck



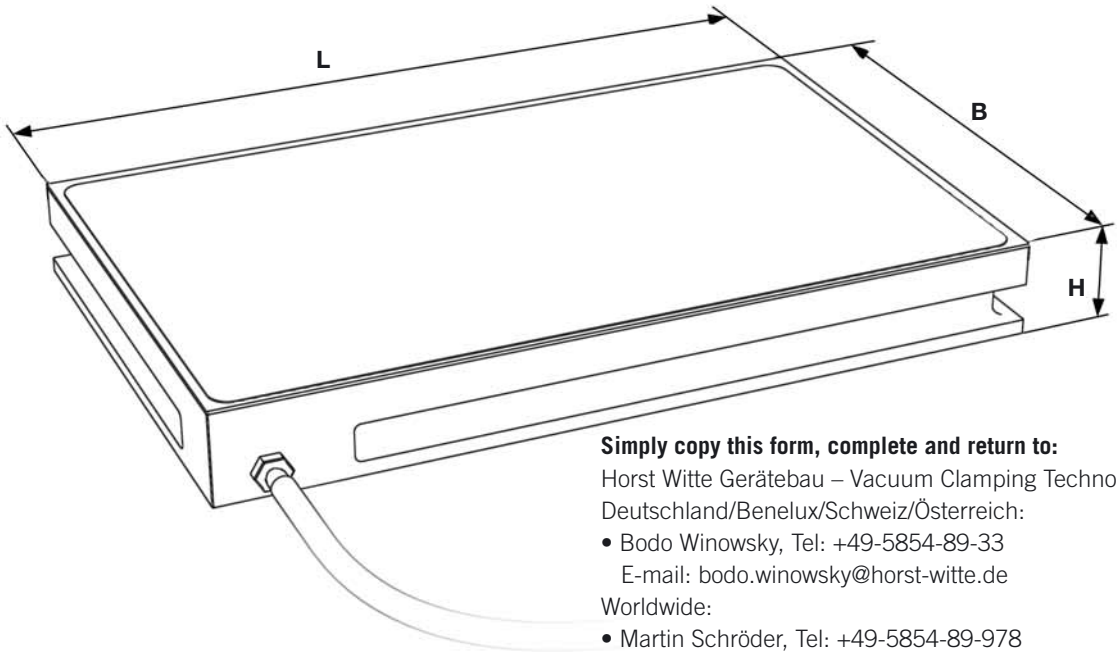
Vacuum chuck for credit cards



Right: Sinter metal vacuum chuck with special adapter plate for clamping hard metal blanks during laser machining process.

It has an integrated cooling labyrinth which prevents inaccuracies, due to development of warmth which occurs during the laser machining process

Inquiry form for μ -porous Vacuum chucks


Simply copy this form, complete and return to:

Horst Witte Gerätebau – Vacuum Clamping Technology
 Deutschland/Benelux/Schweiz/Österreich:

• Bodo Winowsky, Tel: +49-5854-89-33

E-mail: bodo.winowsky@horst-witte.de

Worldwide:

• Martin Schröder, Tel: +49-5854-89-978

E-mail: martin.schroeder@horst-witte.de

• Rudolf Behn, Tel: +49-5854-89-28

E-mail: rudolf.behn@horst-witte.de

Outer dimensions:

l= _____

w= _____

h= _____

Inlay Material

Sintermetal _____

METAPOR _____

End stops:

Height adjustable end stops _____

In form of excentric washers _____

Without or: _____

Material: Aluminium

Surface: Anodized, Colour: Natural

More details on request

Complete and return for quotation

 Name

 Postal code/Town

 Company

 Street

 Type of work

 Tel / Fax



Slot vacuum chucks

Standard sizes
Adapter mats
Custom made chucks

All vacuum slot chucks have integrated slots in their surface area according to customer requirements. To clamp parts that do not cover the full surface area rubber adapter mats or foils can be used to cover the area not needed under vacuum.

Application

- Light milling work
- Drilling (e.g. semiconductors, electronic parts)
- Engraving
- Also for complicated workpieces

Advantages

- Very flat (28 mm)

- Large range of uses (rubber adapter mat can be reused or exchanged)
- Can be used in high speed cutting for precision work with the aid of the plane parallel black mat that can be machined down to achieve optimum accuracy
- Clamping very small workpieces

Handling

- Makes workpiece positioning easier with the aid of height adjustable end stops
- Limiting of vacuum area can be achieved by the moveable hose connection, masking foil or rubber adapter mat. (See page 56 for examples)



Slot chuck with rubber adapter mat and workpiece



Customized slot type vacuum chuck

Slot vacuum chuck starter set

Slot vacuum chuck with integrated vacuum supply



Comprising: Slot - vacuum chuck 32 x 100 x 200 mm in aluminium alloy This chuck already has vacuum supply integrated (see below) and is immediately ready to use. For workpiece adjustment there are excentric stops on two sides of the vacuum chuck. The rubber adapter mat can be configured as required by punching holes through it, thereby enabling clamping of small parts. A vacuum stopper allows limitation of area affected by vacuum thereby extending the clamping possibilities of this vacuum clamping system substantially. It has an oil pressure hose and a plug for commercial pneumatic connection.

Vacuum supply using compressed air. Operating pressure of 4-6 bar. Depending upon operating conditions a final vacuum of 940 mbar can be achieved. During vacuum applications 60 litres of air are used. The noise level of approx. 57 dbA. is relatively low but can be reduced further at any time by a suitable muffler from our extensive range of accessories.

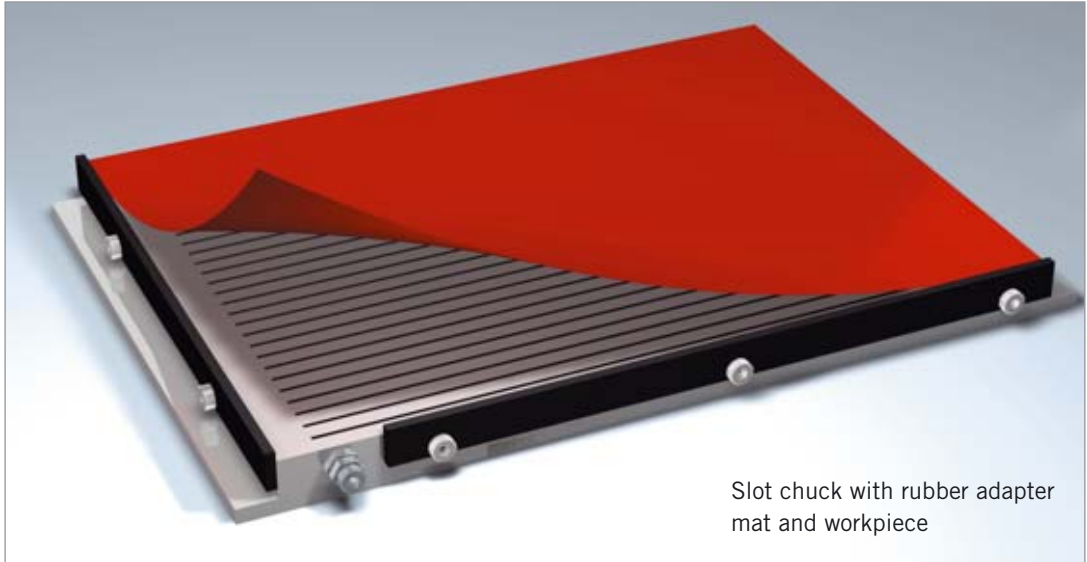
No.	Clamp. area l ₁ x _b	Total dim. l ₁ x _w x _h	kg
94587	100x200	100x200x32	2,0
95166	150x200	150x200x32	3,5
95167	200x300	200x300x32	5,2

Supply includes:

- Chuck 32x100x200mm
- 1 Vacuum supply (Venturi – injector)
- 2 Clamps (#30617) for clamping chuck to machine table
- 1 Vacuum stopper
- 1 Rubber adapter mat
- 1 Friction booster
- 1 Pressure oil hose with connector for Compressed air connection

Slot vacuum chucks

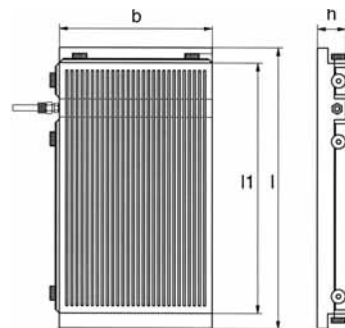
Vacuum plate 28mm high



Slot chuck with rubber adapter mat and workpiece

All vacuum slot chucks have a 10mm clamping edge. The slot width is 1mm with a middle distance of 5mm. For the larger plates this may vary to 2mm at 10mm.

No.	Clamp. area l ₁ x b	Total dim. l ₁ xw ₁ xh	kg
84422	150x100	170x100x28	1,5
84423	200x100	220x100x28	1,9
84424	250x150	270x150x28	3,4
84425	200x200	220x200x28	3,6
84426	300x150	320x150x28	3,9
84427	350x150	370x150x28	4,4
84428	400x200	420x200x28	6,6
84429	350x250	370x250x28	7,5
84430	300x300	320x300x28	7,8
84431	400x250	420x250x28	8,5
84432	400x300	420x300x28	10,2
84433	400x400	420x400x28	13,6
84434	500x300	520x300x28	12,1
84435	600x300	620x300x28	14,4



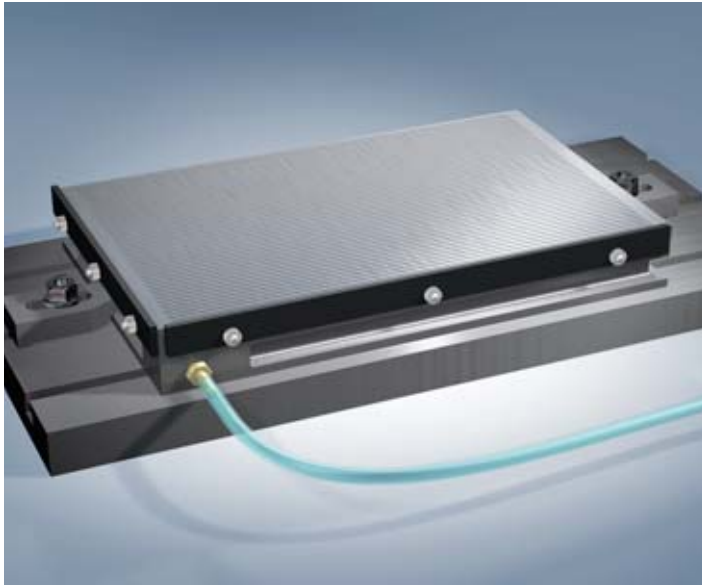
Supply includes:

- 1 Vacuum chuck
- 1 Vacuum stopper
- 1 Rubber adapter mat
- 3 Height adjustable end stops
- 1m Hose with connector for quick coupling

Special dimensions available on request!

Slot vacuum chucks

Vacuum plate 38/48mm high



Supply includes:

- 1 Vacuum chuck
- 1 Vacuum stopper
- 1 Rubber adapter mat
- 3 Height adjustable end stops
- 1m Hose with connector for quick coupling

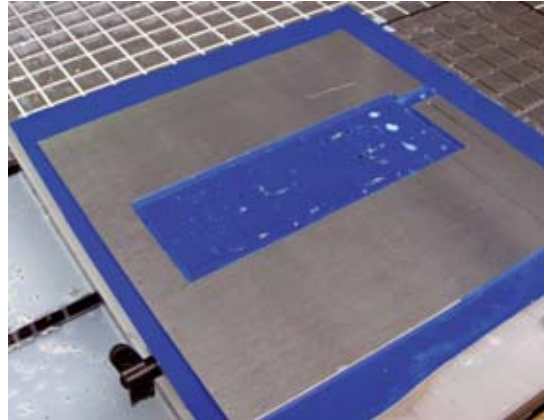
lxwxh (mm)	No.	Aluminium		
		s	a	kg
150x100x38	80016	1	5	1
200x100x38	80017	1	5	2
250x150x38	80018	1	5	3
300x150x38	80019	1	5	4
350x150x38	80020	1	5	5
400x200x48	80021	1	5	8
500x200x48	80022	2	10	13
600x200x48	80023	2	10	15
400x250x48	80024	2	10	13
500x250x48	80025	2	10	16
400x300x48	80026	2	10	15
500x300x48	80027	2	10	19
400x400x48	80130	2	10	21
600x300x48	80028	2	10	23
600x400x48	80136	2	10	31
800x400x48	80029	2	10	41
1000x500x48	80429	2	10	65

No.	s	Steel	
		a	kg
80002	1	5	4
80003	1	5	6
80004	1	5	11
80005	1	5	13
80006	1	5	15
80007	1	5	24
80008	2	10	37
80009	2	10	45
80010	2	10	37
80011	2	10	47
80012	2	10	45
80013	2	10	56
80372	2	10	60
80014	2	10	67
80373	2	10	90
80015	2	10	120
80428	2	10	188

Rubber adapter mat

The blue rubber adapter mat is placed between part and chuck. It covers areas of the chuck not in use and secures part against slipping due to high friction value.

Rubber adapter mat - blue
Only available as a complete roll

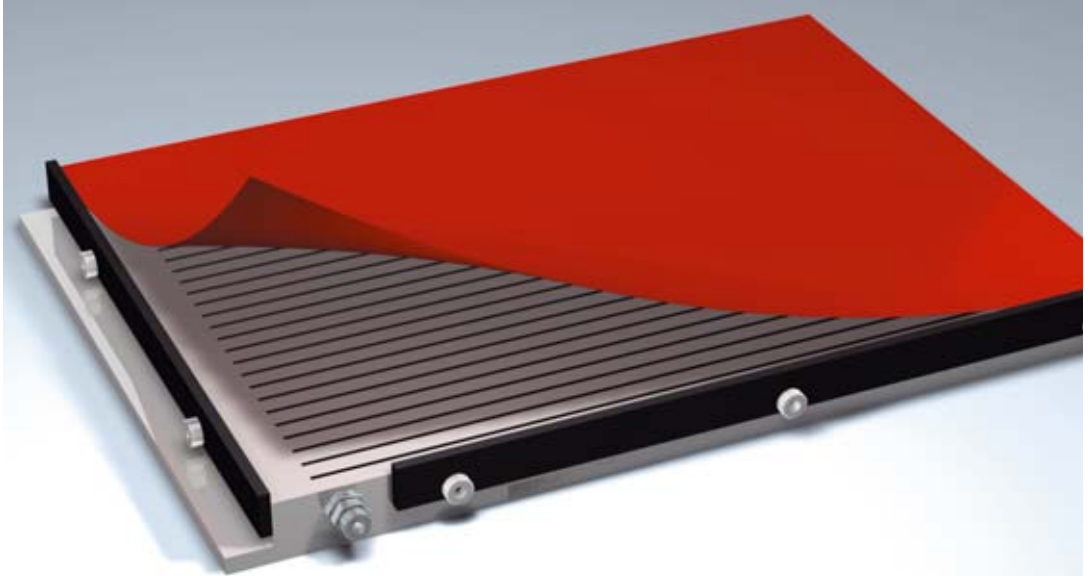


No.	LxB	thickness	kg
14972	2000 x 400	1	-



Vacuum Fixture for drilling operation, approx. 4600mm long, with additional manually clamps.

Slot vacuum chucks and rubber adapter mat


1

Lay the rubber adapter mat onto the chuck covering all the slots.

2

Position workpiece with the help of adjustable end stops. Then draw round the contour using an ordinary pen

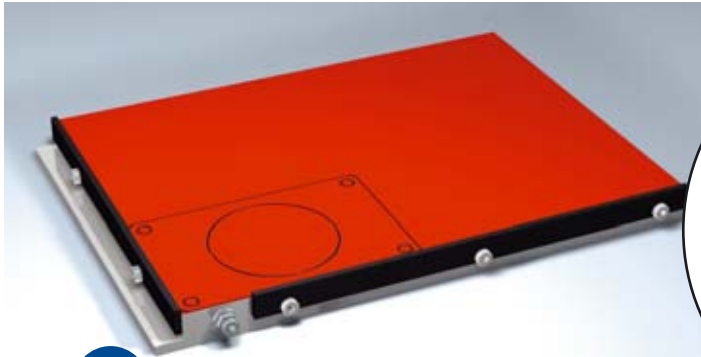


Application

Simply follow steps 1-5 and a custom built fixture is ready in seconds. When vacuum is switched on mat and workpiece are sucked down together. The excellent friction values offer especially good resistance to displacement forces during machining.

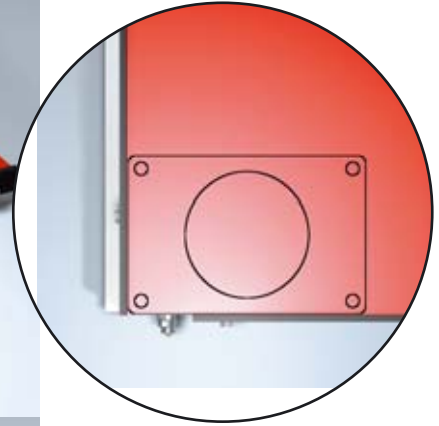
Using the slot chuck with the rubber adapter mat allows drilling of holes and milling or cutting of pockets and cutouts into the mat to a depth of 1,5mm without losing vacuum. As the mat suffers hardly any wear and tear it can be used often for workpieces with the same contour. Certain applications allow the tool to work to depths of 1,5mm into the mat.

Height tolerance of the mats according to DIN 7715, part 5



3

Here you can see the workpiece contour



4

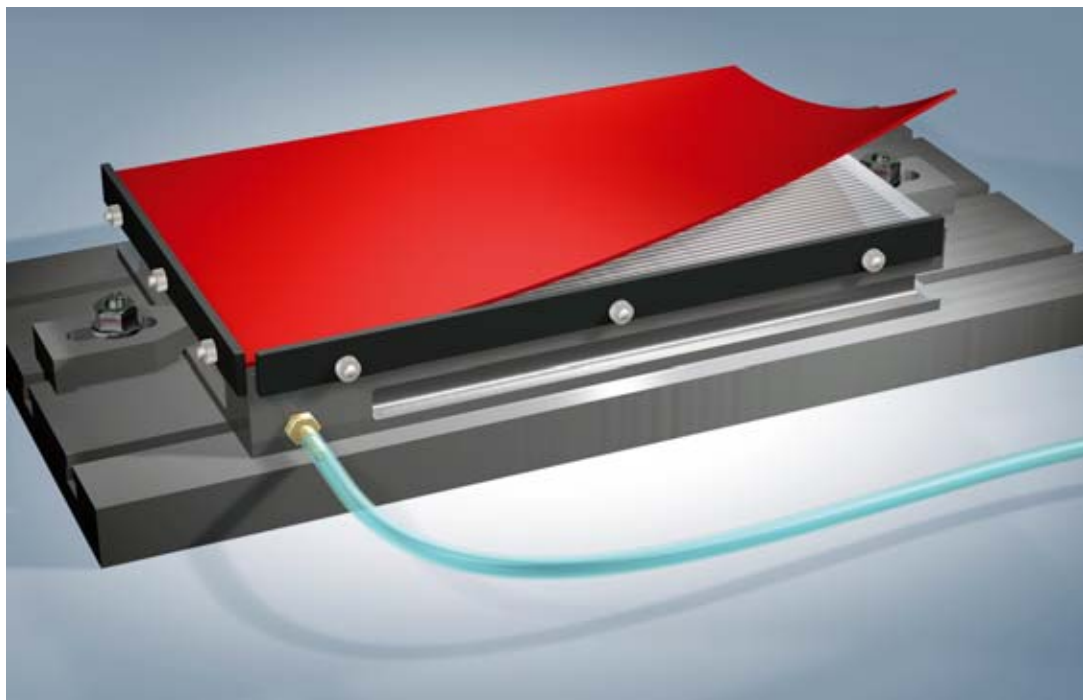
Remove the mat and punch holes into the area corresponding to the actual clamping surface of the workpiece. The holes should be approx. 3-8 mm Dia. in a 10mm grid and lie on slots of the chuck

5

Replace workpiece onto the mat. The excellent friction of the rubber material counteracts high-displacement forces better than any other vacuum system.



Rubber adapter mats for slot vacuum chucks



Rubber adapter mats, brown, for use on slot type vacuum chucks (see also page 54) Brown mats have very high friction properties, low accuracy and cannot be machined (as opposed to black mats).

Dimension tolerance according to DIN 7715 Part 5.

Rubber adapter mats with less tolerance (0,05mm) are available on request

No.	lxwxh
00005	150x100x3
00006	200x100x3
00007	250x150x3
00008	200x200x3
00416	200x300x3
00609	200x500x3
00564	200x600x3
00009	300x150x3
00010	350x150x3
00011	400x200x3
00013	350x250x3
00014	300x300x3
00015	400x250x3
00016	400x300x3
00017	400x400x3
00415	500x300x3
00164	500x500x3

No.	lxwxh
00418	500x1000x3
00437	600x300x3
00414	600x400x3
00409	1000x1000x3
00682	1000x2000x3
00732	1000x2000x1
00733	1000x2000x1,5

Rubber adapter mats for slot vacuum chucks



Rubber adapter mats, black, made of synthetic polymer for use on slot type vacuum chucks. Black mats have low friction properties and achieve high accuracy (tolerance approx. 0,05mm) after they have been milled over by customer directly on their machine.

No.	lxwxh
00845	100x150x3
00846	100x200x3
00847	150x250x3
00848	200x200x3
00280	200x300x3
00849	200x500x3
00850	200x600x3
00851	150x300x3
00825	200x400x3
00852	250x350x3
00853	300x300x3
00796	250x400x3
00854	300x400x3
00855	400x400x3
00856	400x500x3
00857	500x500x3
00858	300x600x3

No.	lxwxh
00791	400x600x3
00859	500x1000x3
00860	1000x1000x3
00861	1000x2000x3

Slot vacuum chucks - special versions

Slot vacuum chucks for workpieces with complicated geometrical forms, also with cut-outs i.e. screens; ideal for light machining operations like engraving or grinding etc.

The vacuum supply is connected to a moveable hose within the plate. In order to reduce the area affected by vacuum the hose is pulled towards the user and the end sealed with a plastic chip put into the plate between the lines marked.

All slots can be covered also using covering foil (accessories). On the same principle as the rubber adapter mat, the workpiece contour is traced onto the foil. The foil within the contour is then slit using a knife resulting in a custom built fixture in seconds.

By using adapter plates it is also possible to create multiple fixtures.

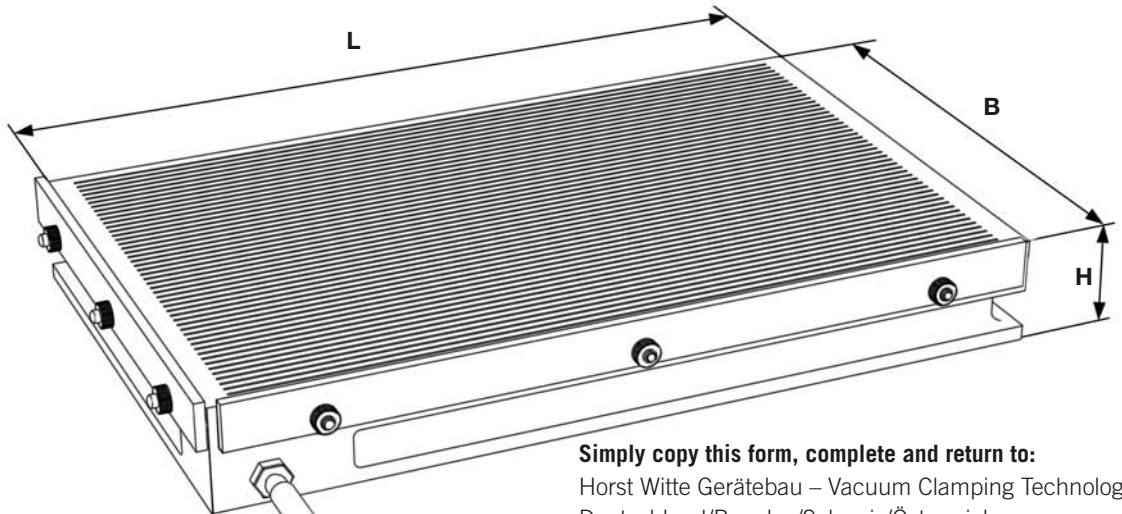


Slot vacuum chuck with special adapter plate

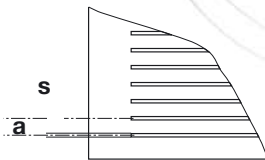


Slot vacuum chuck with 3 vacuum areas, which work combined or independently

Inquiry form for Slot vacuum chucks



Slots:



Simply copy this form, complete and return to:

Horst Witte Gerätebau – Vacuum Clamping Technology
 Deutschland/Benelux/Schweiz/Österreich:

- Bodo Winowsky, Tel: +49-5854-89-33
 E-mail: bodo.winowsky@horst-witte.de

Worldwide:

- Martin Schröder, Tel: +49-5854-89-978
 E-mail: martin.schroeder@horst-witte.de
- Rudolf Behn, Tel: +49-5854-89-28
 E-mail: rudolf.behn@horst-witte.de

Outer dimensions:

l= _____

w= _____

h= _____

Slot dimensions:

s (Slot width) = _____

a (Slot distance) = _____

End stops:

Height adjustable end stops _____

In form of excentric washers _____

Without or: _____

Material: Aluminium

Surface: Anodized, Colour: Natural

More details on request

Please complete and return for a quotation

 Name

 Postal code/Town

 Company

 Street

 Type of work

 Tel / Fax



Perforated-grid chucks

Tailer made for the customer

Surface area has many small bores.

The large area enables the secure clamping of sensitive work pieces such as foils used in the printing or photographic industry. These are only made to order according to customer data.

Applications

Highly accurate

- Clamping of films and foils on machines used to make printing plates during laser and UV exposure of films.
Foils and conductors.

Advantages

- Sizes from 1.400 x2.000 mm with an accuracy of 50 µm
- Vacuum clamping area need not be covered to 100%

Handling

- Easy positioning of workpiece with excentric end stops
- Only limited hold down force for machining purposes.

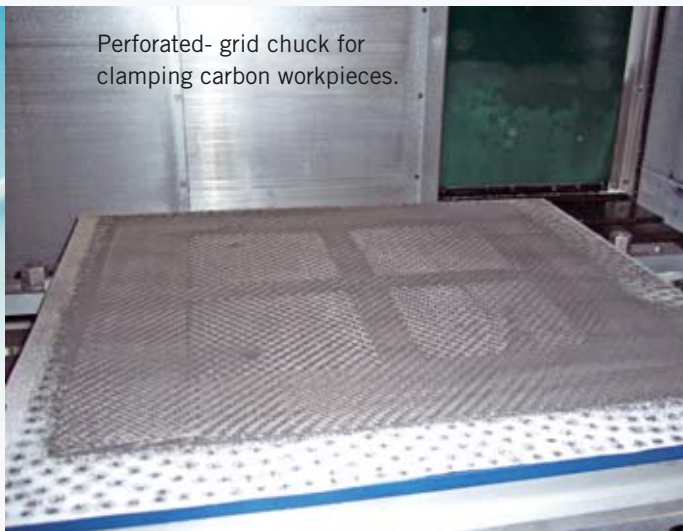
Custom built perforated grid chucks



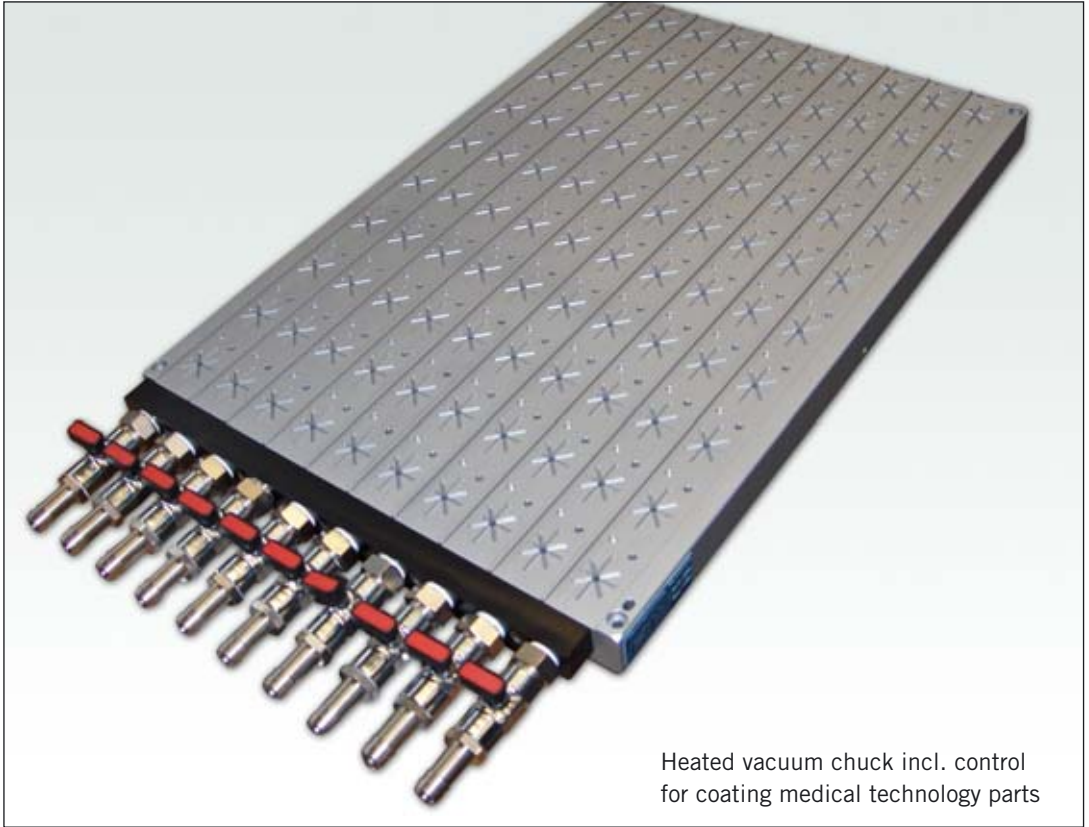
Perforated-grid chuck for exposure machine



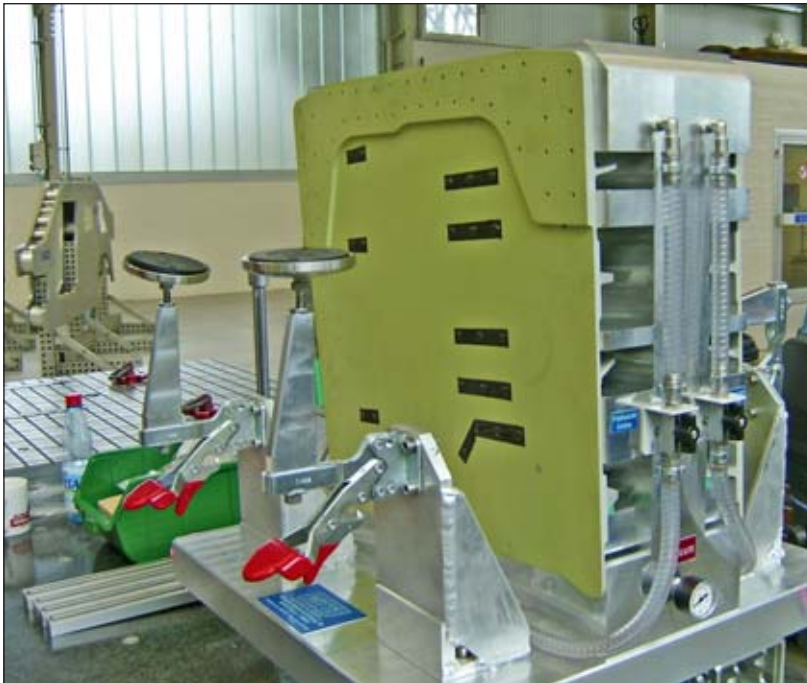
Perforated-grid chuck with eccentric end stops



Perforated- grid chuck for clamping carbon workpieces.

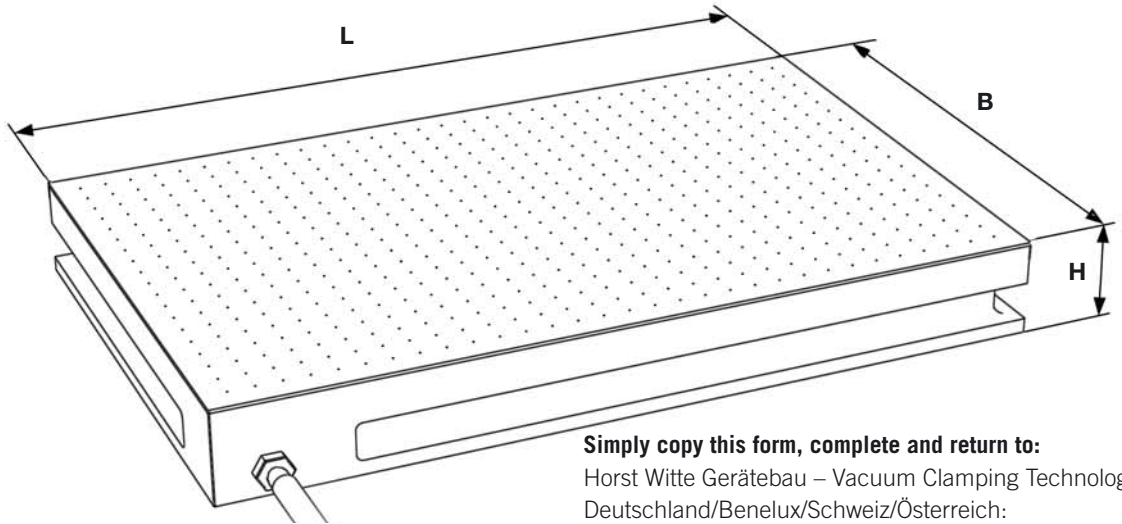


Heated vacuum chuck incl. control
for coating medical technology parts

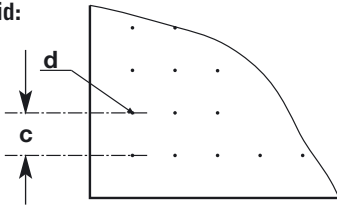


Double sided
clamping cube
for contour and
surface machining
of left/right
aluminium fittings

Inquiry form for Perforated-grid chucks



Grid:



Simply copy this form, complete and return to:

Horst Witte Gerätebau – Vacuum Clamping Technology
Deutschland/Benelux/Schweiz/Österreich:

• Bodo Winowsky, Tel: +49-5854-89-33

E-mail: bodo.winowsky@horst-witte.de

Worldwide:

• Martin Schröder, Tel: +49-5854-89-978

E-mail: martin.schroeder@horst-witte.de

• Rudolf Behn, Tel: +49-5854-89-28

E-mail: rudolf.behn@horst-witte.de

Outer dimensions:

l= _____

w= _____

h= _____

Grid:

d (Borediameter) = _____

c (Grid) = _____

End stops:

Height adjustable end stops _____

In form of excentric washers _____

Without or: _____

Material: Aluminium

Surface: Anodized, Colour: Natural

More details on request

Please complete and return for a quotation

Name

Postal code/Town

Company

Street

Type of work

Tel / Fax



ICEVICE®

Freeze clamp technology

ICEVICE®

When to use this technology

This is ideal technology for clamping small or intricate workpieces without any tension yet accurately.

For machining mechanically or to separate small parts from a large unit of raw material.

Favoured by the following industries;

- Electronics / Semi-conductors
- Ceramics
- Optics, Glass / Quarz treatment
- Metals, clocks and watches
- Medical tools and laboratory equipment
- For universities and research.

Advantages

- Very precise up to $\pm 3\mu\text{m}$
- No tension builds up within the workpiece
- Short clamping time +/- 90 seconds.

Handling

- Easy and quick
- With the use of workpiece specific adapter plates a high degree of repeatability in positioning and clamping is achieved

Clamping by freezing on a thin water film



Machining at
MOTOROLA



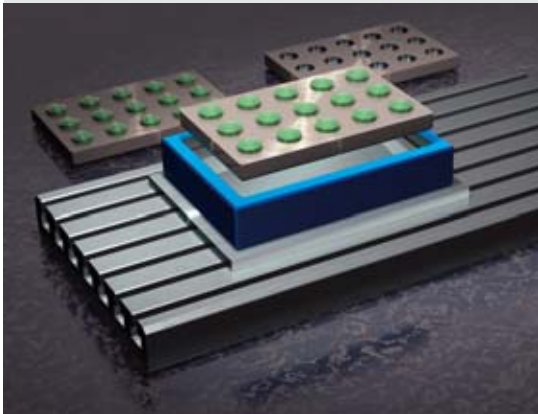
Machining small
graphite workpieces



Metalcutting



Milling of honeycomb
structure

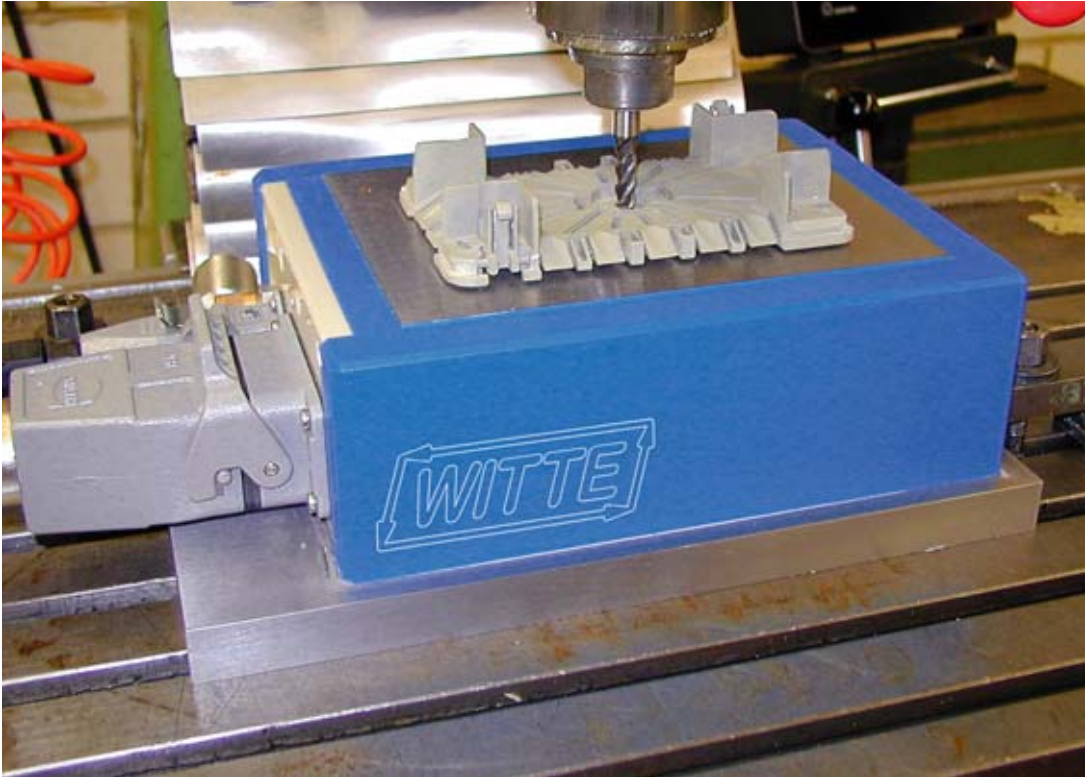


To improve production time ICEVICE® can also be palletized where a quick exchange of Freeze plates is possible. These plates have a vacuum connection to ensure secure fixation to the Icevice base.



ICEVICE® Freeze plate with a cavity for freezing unevenly shaped or unstable workpieces.

ICEVICE® freeze chucks

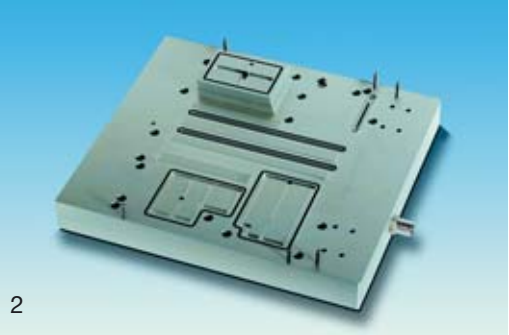


Clamping by freezing on a thin water film

During clamping with ICEVICE systems workpieces are frozen tight onto a chuck for machining by a capillary film of water. Also for relatively uneven workpieces the gaps fill completely with water and freeze. The adhesion, detaching and shearing forces are strong enough to be able to mill, grind, drill or polish parts.

ICEVICE freeze plate with ca. 400 workpieces frozen on the surface





2

3

5

1. Workpieces frozen on ICEVICE™
2. Vacuum plate for clamping the housing of a Lap-top
3. Clamping fixture for micro-chip cards
4. Circular chuck \varnothing 1500 mm
5. Vacuum cube with integrated storage tank and distribution manifold, approx. 800 x 800 x 900 mm, used on machining centre with automatic 24 hour pallet exchange system. Parts held with vacuum during machining, transport and standing times.

ICEVICE®-AFP Freeze plates



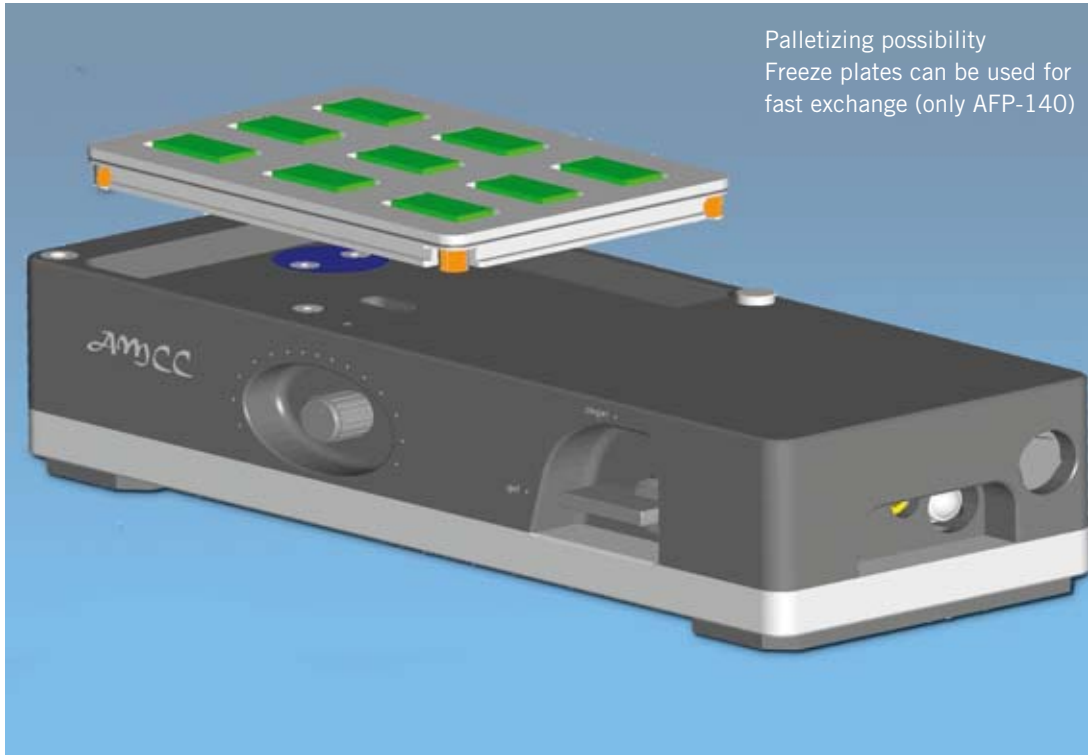
Cooling down with compressed air

Fragile, unstable parts are clamped gently and securely.

No deformation or breaks arise during clamping procedure.

Almost all materials can be clamped. Composites, graphites, ceramic, rubber and also difficult honeycomb structures, which usually have complete hollows, can be clamped easily with a clamping force of upto approx. 140N/cm².

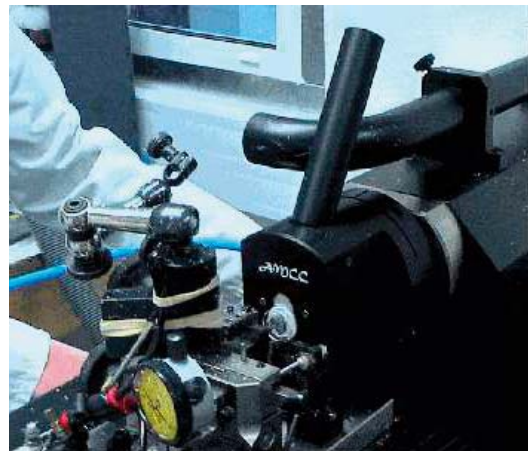
ICEVICE®-AFP Freeze plates



Palletizing possibility
Freeze plates can be used for fast exchange (only AFP-140)

No	Name	dim
91641	Freeze plate AFP-140	100 x 140
91642	Freeze plate AFP-250	150 x 250
92367	Adapter plate f AFP-140	7x100x140
13052	Silencer	
92540	Replacement freeze chuck	ø20mm
92541	Freeze chuck AFC-55	ø55mm
92542	Replacement freeze chuck	ø55mm
92543	Freeze chuck AFC-80	ø80mm

Also available in special sizes!



Fixture for holding workpieces on lathe. Can be used for varying diameters



FLIP-POD™ Vacuum-System

ALU FLIP-POD FLIP-POD

This technology is ideal for

- Mechanical milling or grinding
- Drilling
- Making threaded bores
- Mainly for large workpieces made out of wood
- Plastic, glass or cast metals.
- Suitable for sawn or raw surfaces.

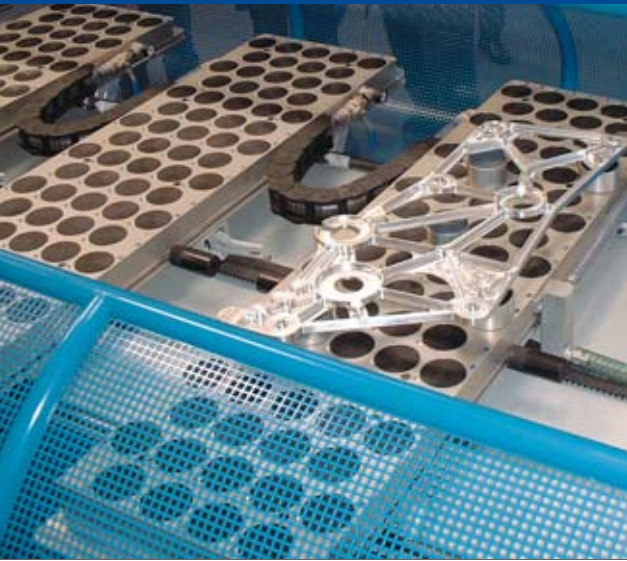
Advantages

- Strong hold down forces enable the use of large machines.
- Bevels, contours and radii can be performed on the upper and lower Workpiece surfaces.

- Clamping dimensions can be changed within seconds to conform to new workpiece Sizes
- Can be used on most machinetables.

Handling

- Pods are the contact surfaces for the workpiece
- Simply activate or deactivate the pods by turning them around.
- To clamp a workpiece effectively 6-8 pods are advised.
- This modular system can be extended for larger clamping surfaces.



◀ Modular FLIP-POD clamping system mounted on guide rails for a CNC deburring machine, used on aeroplane parts



▶ Flip-Pod vacuum chuck with two different grid patterns. All pods not in use lie flat in the chuck



◀ FLIP-POD™ clamping system in working position prepared for a large aluminium workpiece with cutouts



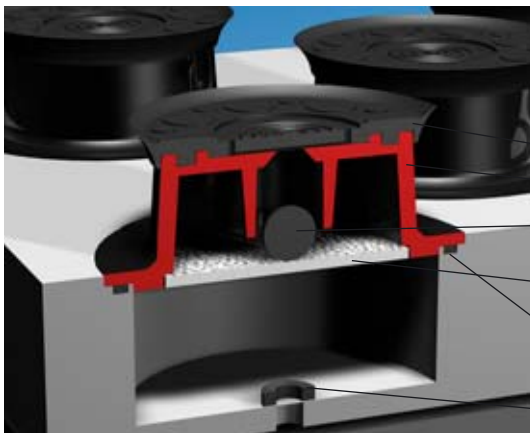
FLIP-POD™ Vacuum-System



Function

The round polymer pods (1) protrude out of the pod plate when in use. The pods not required lie in a recess cavity (2) of the pod plate. Simply flipping them over activates or deactivates the pods. The valve ball which stops the vacuum supply when the pod is resting, opens the valve and the vacuum system is activated. All active pods stand 27mm

above the pod plate surface, allowing contour milling and recess cutting on the outer contours.



The crosssection shows

- FP Sucker
- FP Unit
- FP Polymer ball
- and
- FP Filter

In the pod plate you will find

- FP Large gasket
- FP Center hole gasket

FLIP-POD™ Vacuum-System



Application demonstrating active and inactive FLIP-POD™s



Retractable and fixed locator pods

Fixed and retractable locator pods

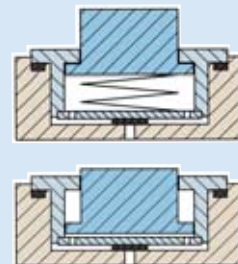
ensure high accuracy. Locator pods are available in both fixed and retractable versions, either of which fit in any pod cavity.

After positioning the workpiece the retractable pods are drawn back into the pod plate as soon as vacuum is switched on, allowing a free path for the cutting tool.

Alu FLIP-POD™

has an accurate, defined workpiece surface. Height tolerance is only 50µ. They are suitable for face machining on both surfaces, especially of metallic workpieces.

Cross section of retractable Pod

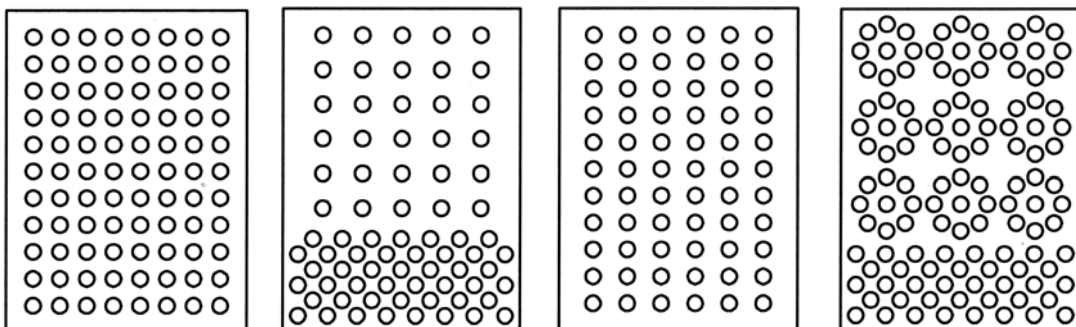


ALU FLIP-POD™ Vacuum system



Pod -Plate, ready for use, with ALU FLIP-POD™'s

The sketches show a range of possible pod panel designs.

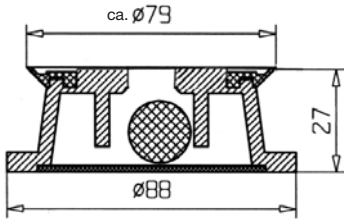


The user can choose a panel design that best suits the parts being machined. The pod panel can be laid out in almost any design and combination.

ALU FLIP-POD™ Accessories and spare parts

No.	Name
-----	------

84408 FP Complete with seal, filter element and ball (11394 and 11395 order separately)



No.	Name
-----	------

30584 FP Seal for Alu-Pod



No.	Name
-----	------

12124 FP Polymer Ball $\varnothing 15,8\text{mm}$



No.	Name
-----	------

12125 FP Filter $\varnothing 61 \times 3 \text{ mm}$



No.	Name
-----	------

11395 FP Large Seal for Pod Plate $\varnothing 88 \times 4,5\text{mm}$



No.	Name
-----	------

11394 FP Center hole gasket for pod cavity $\varnothing 38 \times 6\text{mm}$

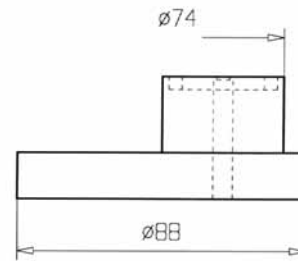


ALU FLIP-POD™ Vacuum system



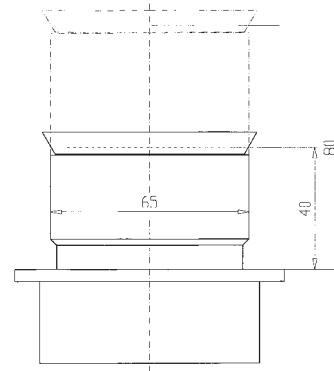
No.	Name
-----	------

85328 FP Alu Half-Pod
incl. 1m seal \varnothing 5 mm



No.	Name
-----	------

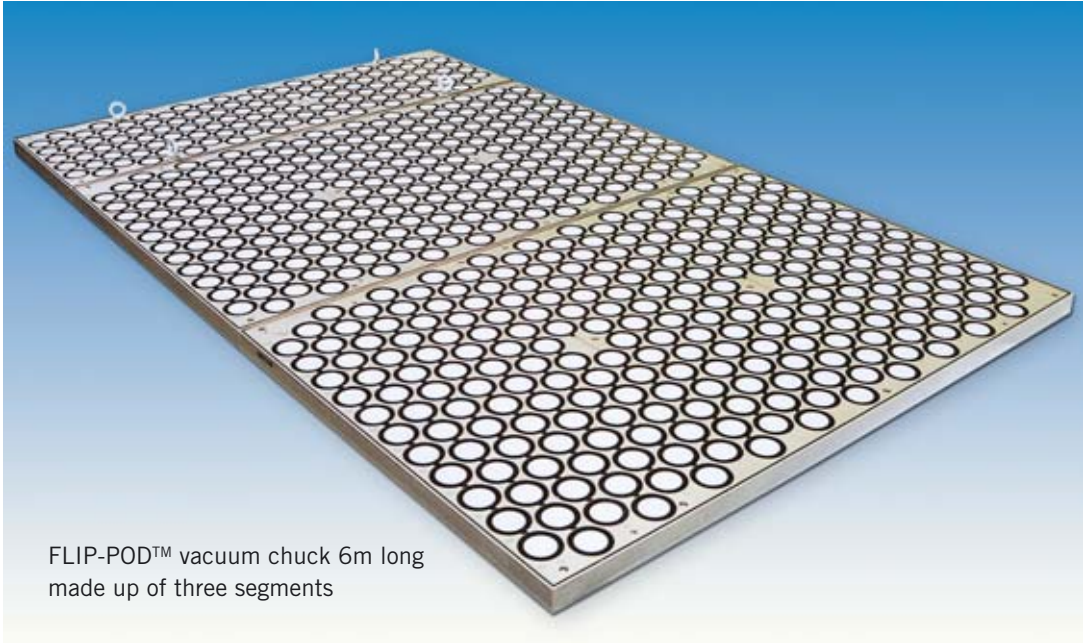
90860 Height adjustable ALU Flip-Pod



No.	Name
-----	------

90628 Height adjustable ALU Flip-Pod
(special shape)

FLIP-POD™ Vacuum system



FLIP-POD™ vacuum chuck 6m long
made up of three segments

FLIP-POD™ Sets, polymer version

No.	Description	Area/Grid	PODS
83100	FLIP-POD™ Set 100	1m ² /100mm	100
83200	FLIP-POD™ Set 200	2m ² /100mm	200
83300	FLIP-POD™ Set 300	3m ² /100mm	300
83400	FLIP-POD™ Set 400	4m ² /100mm	400

Supply FLIP-POD™ Set 100 includes

No.	Name	Pcs
11392	FP Unit	100
11393	FP Sucker	100
11394	FP Center gasket	100
11395	FP Large gasket	100
82136	Retract. loc. pods	3
82137	Fixed loc. pods	3

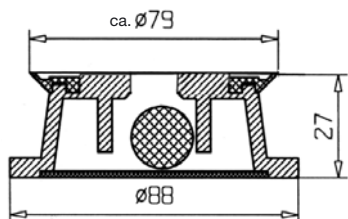


FLIP-POD™ with sucker

FLIP-POD™ Accessories and spare parts



No.	Name
14384	FP Complete with seal, filter element and ball (11394 and 11395 order separately)




No.	Name
30584	FP Seal for Flip-Pod



No.	Name
12124	FP Polymer Ball Ø15,8mm



No.	Name
12125	FP Filter Ø61 x 3 mm



No.	Name
11395	FP Large Seal for Pod Plate Ø88 x 4,5mm



No.	Name
11394	FP Center hole gasket for pod cavity Ø38 x 6mm



No.	Description
11393	FP Sucker (old version), which is mounted onto the unit
11392	FP Unit (old version) complete with filter element and ball

FLIP-POD™ Accessories and spare parts

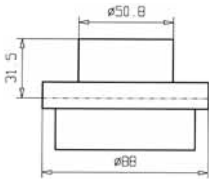
No.	Name
11396	FP Lift ring 1/2"



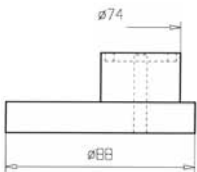
No.	Name
85662	FP Transfer Pod For easy positioning of large workpieces over the Flip-Pods



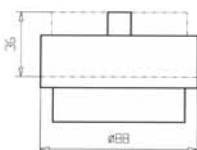
No.	Name
82136	FP Retractable locator pod, automatically retract when vacuum is applied



No.	Name
82138	FP Polymer-Half-Pod (1/2)



No.	Name
82137	FP Fixed locator pods incl. unit, pins and spacer disks



FLIP-POD™ Accessories and spare parts



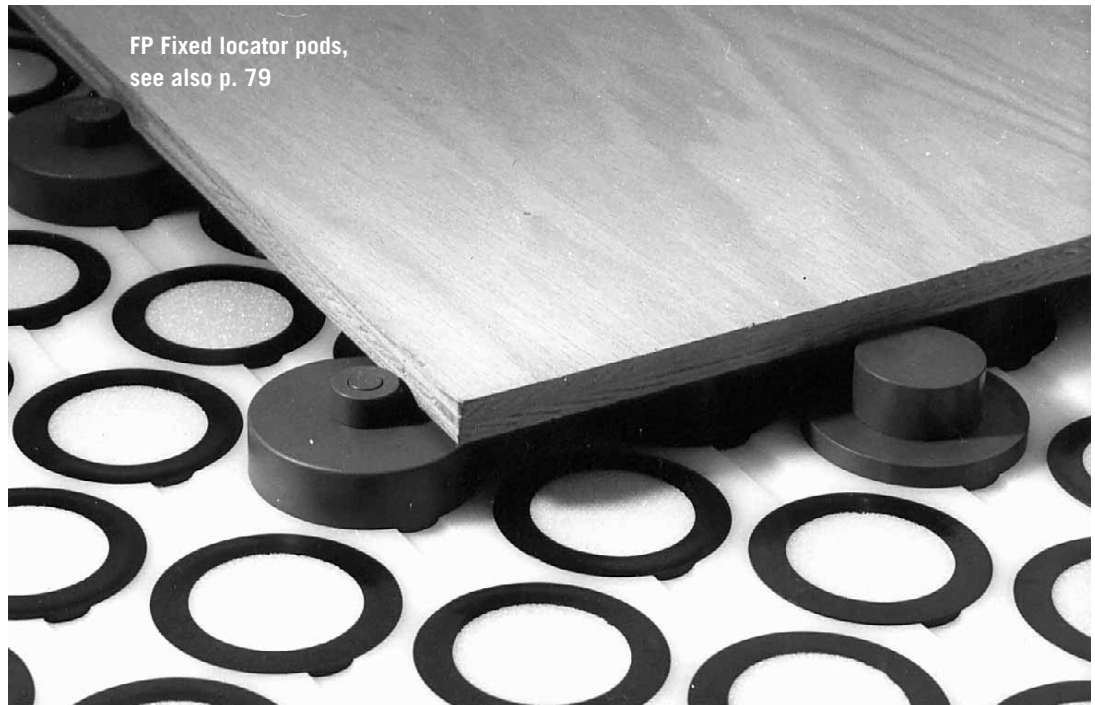
No.	Name
13422	Center-Line-FLIP-POD™ - short



No.	Name
13423	Center-Line-FLIP-POD™ - long

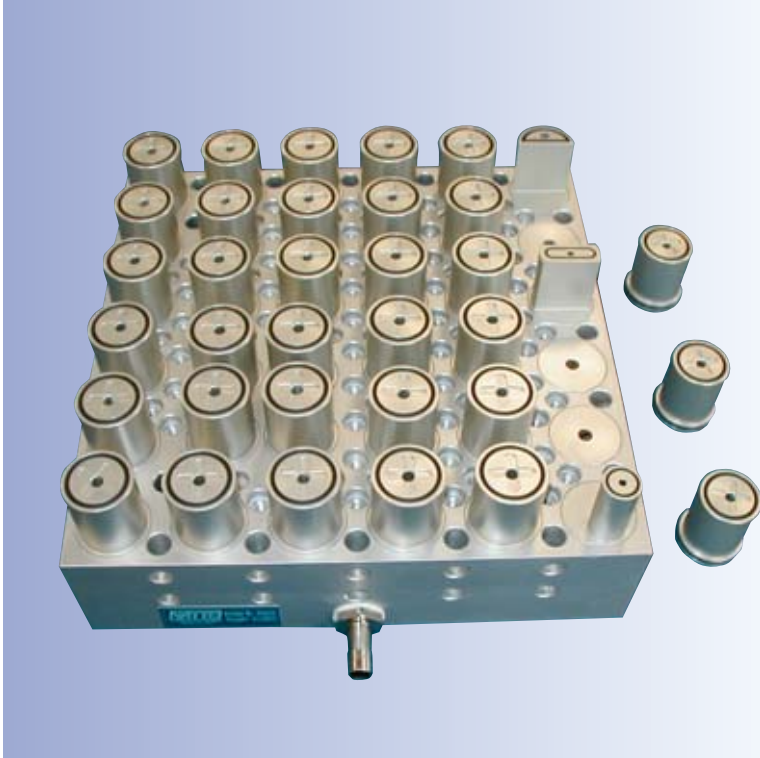


No.	Name
89093	FLIP-POD™-Video on CD-ROM

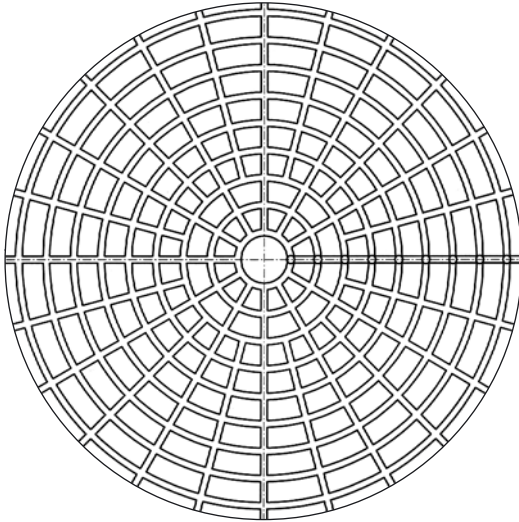




FLIP-POD™-clamping system for a CNC deburring machine, used on aeroplane parts



Custom built Flip Pod Chuck with alu base plate



Circular chucks

Suitable for circular type workpieces

Applications

For simple shaped workpieces with a rough surface and heavy duty milling

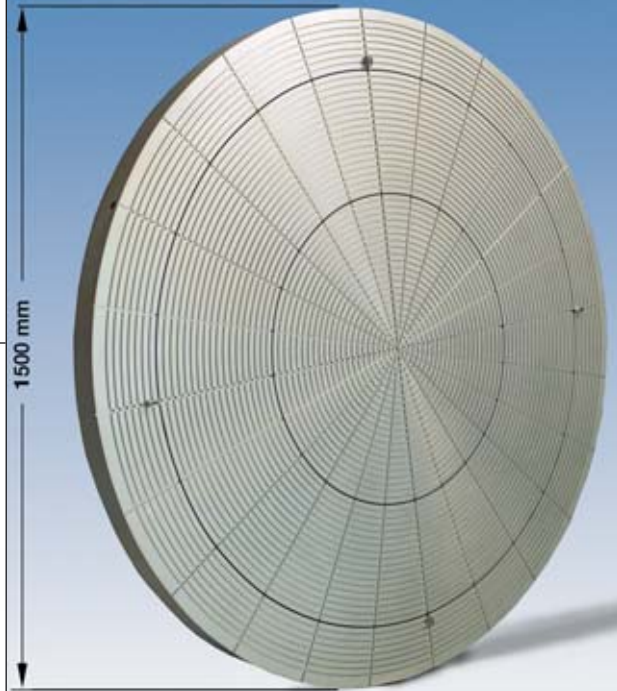
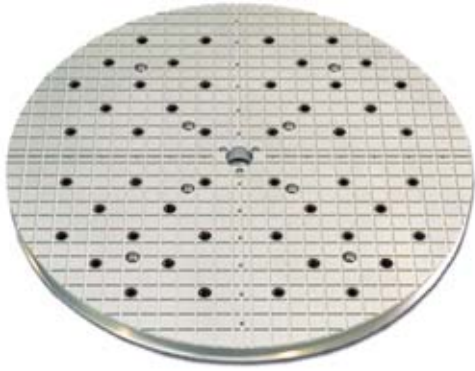
- Grinding
- Milling
- Turning

Advantages

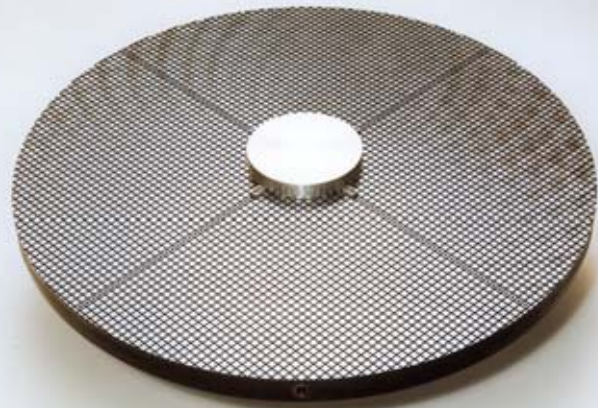
- Strong hold down force
- Universally applicable
- Secure clamping of rough workpieces due to the high friction properties
- The O-shaped seal evens out any irregularities between workpiece and chuck surface

Handling

- Any shape or size of chuck made to measure
- Recommended grid size depends on workpiece contour and dimensions
- Clamping area defined by Polymer O-shaped seal
- Fine vacuum grid plates for extremely small workpieces in any form
- Acts as a base for many special solutions in connection with special vacuum adapter mats



Circular chucks available in different diameters, thicknesses and grids.

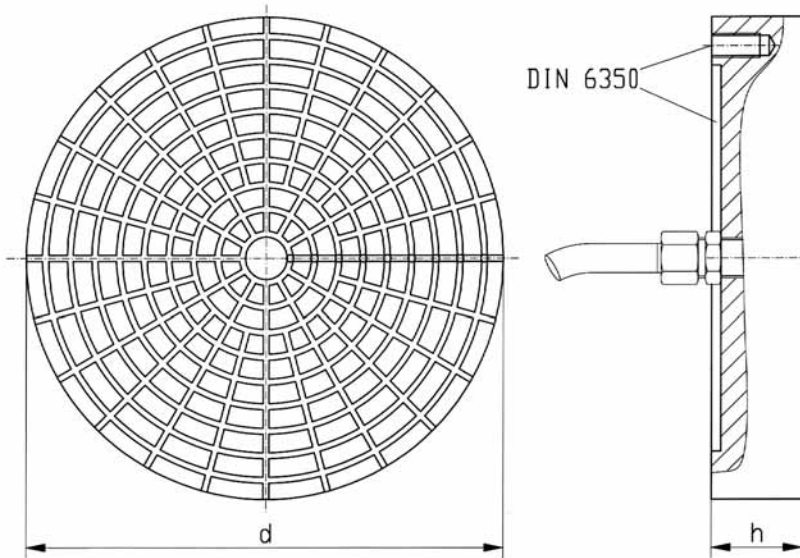


Circular grid type chucks

These circular chucks are ideal for disk or circular type workpieces for machining i.e. on a lathe. They are used in glass and polymer processing industries, but metal machining is of course also possible.

Supply includes:

- Seal 10m (h=38mm), or 20m (for h=48mm)
ø3,5mm, # 00170
- 4 stops



Aluminium

No.	Grid dim.	Øxh	kg
80836	10,0	ø100x38	1
80837	10,0	ø125x38	1
80838	10,0	ø160x38	2
80839	10,0	ø200x38	3
80840	10,0	ø250x38	5
80841	12,5	ø315x48	5
80842	12,5	ø400x48	16
80843	12,5	ø500x58	31
80844	12,5	ø630x58	49

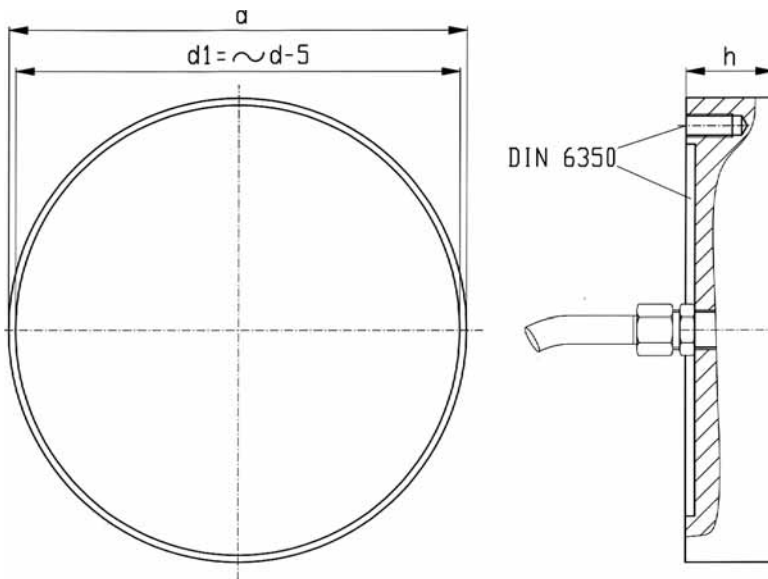
Steel

No.	Grid dim.	Øxh	kg
80845	10,0	ø100x38	2
80846	10,0	ø125x38	3
80847	10,0	ø160x38	6
80848	10,0	ø200x38	9
80849	10,0	ø250x38	14
80850	12,5	ø315x48	14
80851	12,5	ø400x48	47
80852	12,5	ø500x58	89
80853	12,5	ø630x58	142

Special dimensions available on request!

μ-porous circular vacuum chucks

The insert made of sinter bronze guarantees even and accurate clamping of different workpieces i.e. optical glass, wafer etc. Also available in METAPOR© see page 104



Aluminium

No.	Øxh	kg
80854	Ø100x38	0,8
80855	Ø125x38	1,3
80856	Ø160x38	2,0
80857	Ø200x38	3,0
80858	Ø250x38	5,0
80859	Ø315x48	10,0
80860	Ø400x48	16,0
80861	Ø500x58	31,0
80862	Ø630x58	49,0

Steel

No.	Øxh	kg
80863	Ø100x38	2,3
80864	Ø125x38	3,5
80865	Ø160x38	6,0
80866	Ø200x38	9,0
80867	Ø250x38	14,5
80868	Ø315x48	29,0
80869	Ø400x48	47,0
80870	Ø500x58	89,0
80871	Ø630x58	142,0

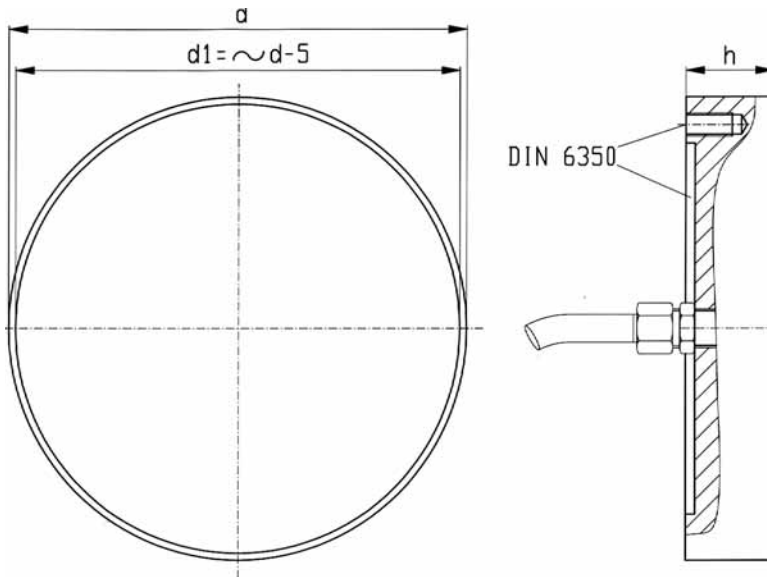
Special dimensions available on request!

WITTE - METAPOR[®]-circular vacuum chucks

Vacuum-circular chuck with an air through-flow, fine porous and homogenous insert.

Especially for tension free clamping of very thin foils or similar materials. The insert can be produced in any of the different

WITTE - METAPOR[®] materials, technical data can be found on page 104. These materials can also be used for air film glide handling equipment using the standard quality BF 100.



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Example:

Aluminium with BF-100

No.	Øxh	kg
90962	Ø100x38	0,8
90964	Ø125x38	1,3
90965	Ø160x38	2,0
90966	Ø200x38	3,0
90967	Ø250x38	5,0
90968	Ø315x48	10,0
90969	Ø400x48	16,0
90970	Ø500x58	31,0
90971	Ø630x58	49,0

Example:

Steel with BF-100

No.	Øxh	kg
90972	Ø100x38	2,3
90973	Ø125x38	3,5
90974	Ø160x38	6,0
90975	Ø200x38	9,0
90976	Ø250x38	14,5
90977	Ø315x48	29,0
90978	Ø400x48	47,0
90979	Ø500x58	89,0
90980	Ø630x58	142,0

Special dimensions available on request!

Liquid separator

Liquid separators are indispensable whenever coolants or lubricants are being used. Also acts as a retainer for dust, chips etc.

Advantages:

- fluid level can be seen at all times
- aluminium and acrylic materials result in light weight
- easy handling due to its ergonomic design

No.	Vol.	Dim	connection	kg
80200	5l	ø200x400	ø 12	4
82392	21l	ø300x500	ø 32	10
94953	90l	ø630x700	LW32	40



Automatic liquid separator

Fully automatic operation is guaranteed with an integrated magnetic valve and 2-chamber system. The separator is set up between vacuum chuck and pump, thereby protecting vacuum pump from the large amounts of fluid, which are absorbed and dispersed.

The fluids, which are sucked in, are transported back to the machine by means of a hose system.

Clamping of the workpiece is not interrupted at any time. Electricity supply of 230V is necessary for operation. Also available in 110V/60 Hz version.

We advise you to use the reducer connections (page 99) and hose nozzles (page 100) fitting to your vacuum hose diameter. You will need two of each part, one in and one out of your automatic liquid separator. These parts are not included and need to be ordered separately!



No.	l Fluid-capacity	Separation capacity l/h	for suction capacity m ³ /h	l x b x h	Hose entrance inner Dim.	Hose exit inner Dim.	kg
80155	3,5	100	up to 100	400x400x685	G 1 1/2"	G 1 1/2"	8,5
82782	9,5	100	160-250	410x410x950	G 2 "	G 2 "	15



Nr	Dim. (mm)	U	kg
84886	40x31, 5 x 37	24V	0,05

Supply includes:

- Operation manual
- 2 mounting brackets w. 2 screws M3
- Display unit label
- Blind plug

Vacuum Switch with LED Display

Vacuum switch with adjustable limit values. Used as safety switch. Cable 4,5x1,8, 2m long is connected to machine controls. Should minimum vacuum drop below preset value switch sends a signal to machine to stop

- Electronically controlled LCD Vacuum display showing 7 different units, letter size 11mm, display in red or green
- Top and bottom vacuum limits freely adjustable.
- Adjustable response time 2,5 to 500 ms in 4 steps.
- Can be used in N.O. (normal open) or N.C. (normal closed) state.
- 2 vacuum suction bores R1/8" can be used optionally in 90° position.



Nr	Dim. (mm)	U	kg
93937	h=92, ø33	24V	0,25

Supply includes:

- Operation manual
- Display unit label

Vacuum Switch with LED Display

Vacuum switch, electronic with a wide range of adjustable and programmable functions. For use in wet / damp or dangerous areas with a risk of explosion

- Vacuum indicator electronic.
- Can be adjusted to the highest and lowest vacuum limit (Hysterese)
- Adjustable reaction time
- Opening switches can be programmed
 Hno = Hysterese / Closing
 Hnc = Hysterese / Opening
 Fno = Gap / Closing
 Fnc = Gap / Opening
 (Closing contact and rest position)
- Max pressure 10 bar

Safety appliance



The German Employer's Liability Insurance Association demands that machines having power-operated workpiece clamping devices must be designed and installed in such a way that the driving spindle or feed mechanism can only be activated after completing the fixing or clamping procedure.

The safety appliance is a must for all jobs on heavy-duty machines and can be integrated into the machine controls.

When the vacuum drops below the pre-set value (infinitely adjustable) a visual signal is given. The built-in dead changer is integrated into the machine controls and sets off an emergency stop of spindle or feedstop.

The range between maximum and minimum vacuum is 70 mbar.

This version with magnetic valve allows the clamping procedure to be activated from the machine control panel.

No.	Name	for hose inner Dia.	Voltage
85466	Safety appliance with electronic vacuum switch	ø12 mm	24 Volt
85475	Safety appliance with electronic vacuum switch	ø18 mm	24 Volt
92264	Safety appliance with electronic vacuum switch	ø18 mm	24 Volt
85476	Safety appliance with electronic vacuum switch	ø25 mm	24 Volt
85484	Safety appliance with electronic vacuum switch	ø32 mm	24 Volt
85485	Safety appliance with electronic vacuum switch	ø50 mm	24 Volt

Pressure regulator Switch



Used to set underpressure on vacuum units, is infinitely adjustable. Switches off automatically when set vacuum is reached and switches on again when vacuum drops below permitted range

- Setting range from 0 - 99,8% vacuum
- Vacuum range approx 70 mbar
- Made of black polymer

The switch has two fixing bores for fillister head cap screws M4 DIN 912

No.	lxwxh	U	kg
80411	70x30x30	≤ 250V	0,07

O-shaped seal

- The seal diameter is dependant on the cross section of the slot. If a plate is remachined then a seal with a smaller diameter will be required. Minimum order quantity 50m/per diameter

Used for sealing grid chucks or workpiece specific contours. This high quality neoprene seal is placed into the suction slot of a vacuum grid type chuck to restrict the clamping area. (i.e. see page 36)



No.	Dia.	No.	Dia.
00188	ø 2,0mm	00171	ø 5,5mm
00069	ø 3,0mm	00072	ø 6,0mm
00170	ø 3,5mm	00172	ø 6,5mm
00070	ø 4,0mm	00073	ø 7,0mm
00157	ø 4,5mm	00251	ø 8,0mm
00071	ø 5,0mm	00316	ø 10,0mm

Y distributor with female thread



No.	Thread	Hose nozzle
90716	G3/8"	3 x ø12
90717	G1/2"	3 x ø18
90718	G1/2"	1 x ø18, 2 x ø12



Vacuum grease

Used from time to time for the following:

- Greasing suction hose
- Sealing off workpieces with rough or scored surface



No.	Name	Cont.	kg
80140	Grease	250g	0,29

Vacuum gauges

No.	Connection thread	Diameter	Range
80103	G1/8" axial	ø40	0 to -1 bar
80100	G1/8" radial	ø40	0 to -1 bar



80103
Axial connection



80100
Radial connection

Manifold distributors

All manifolds are supplied with corresponding hose-nozzles and on each exit there is a 3/2 way aerated vacuum valve with a vacuummeter

The manifold can be upgraded to a safety appliance when assembled together with a safety pressure switch (80411, see page 88). Connection threads R 1/8" with blind plugs are already in place.



No.	Name	Entrance Connection	Exit Connection	LxBxH
84389	Manifold distributor	1xLW18	4xLW12	43x43x300
85680	Manifold distributor	1xLW24	3xLW18	
84390	Manifold distributor	1xLW25	6xLW12	84x84x480
85197	Manifold distributor	1xLW32	4xLW12	
84391	Manifold distributor	1xLW32	6xLW12	84x84x480
84591	Manifold distributor	1xLW32	4xLW18	
84392	Manifold distributor	1xLW32	6xLW18	84x84x765
89052	Manifold distributor	1xLW32	2xLW25	
90134	Manifold distributor	1xLW50	6xLW12	
90177	Manifold distributor	1xLW50	3xLW18	
84393	Manifold distributor	1xLW50	4xLW25	84x84x510
90562	Manifold distributor	1xLW50	5xLW25	
90527	Manifold distributor	1xLW50	2xLW32	
84394	Manifold distributor	1xLW50	4xLW32	84x84x510


Supply includes:

- Hose nozzle for vacuum pump exit
- Hose nozzle and aerated 3/2 way hand valve for each connection exit
- Vacuum gauge

Various types available on request!



Witte Vilmill application

Vakuum & Vilmill

Partners for high-speed cutting of aluminium and plastics

If your job is to cut lots of small parts out of one large part the combination of vacuum and Vilmill is what you need.

Vilmill is a vacuum system comprising of a fleece-like, coated foil, a specially equipped vacuum chuck and a powerful pump system for vacuum supply.

The Vilmill foil is mounted between chuck and part. The warmth created during cutting causes the surface coating to melt and sticks the part to the chuck.

The vacuum is effective through the Vilmill foil at the same time foil acting as a puffer. The accurately balanced permeability of Vilmill foil increases the efficiency of vacuum chucks and reduces the vacuum consumption.

Especially when cutting out small parts Vilmill offers additional security through the adherence effect. It also simplifies removal of the small finished parts from the machine.

For maximum cutting speeds a thin layer of material should remain in order to use the complete part surface under vacuum until the last cut is made.

Vilmill is suitable for aluminium or plastic sheets up to 15mm thick. Only dry machining is possible and the working range in Z axis must be high enough to integrate a vacuum chuck.



Machining of thin metal sheets

The heat generated at the milling burr activates the adhesive coating on the mat and keeps even small parts inplace.



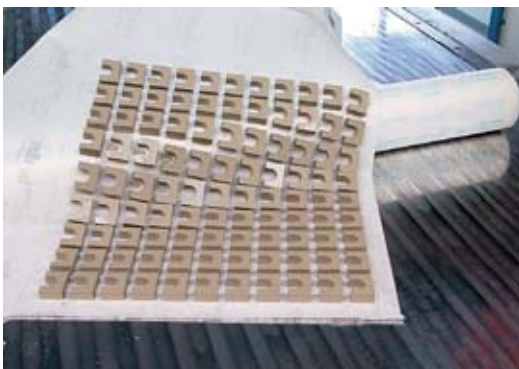
Machining of aluminum sheets of greater thickness

Only the final feeding depth (0.1- 0.3 mm) cuts in the adhesive mat and separates the parts completely.



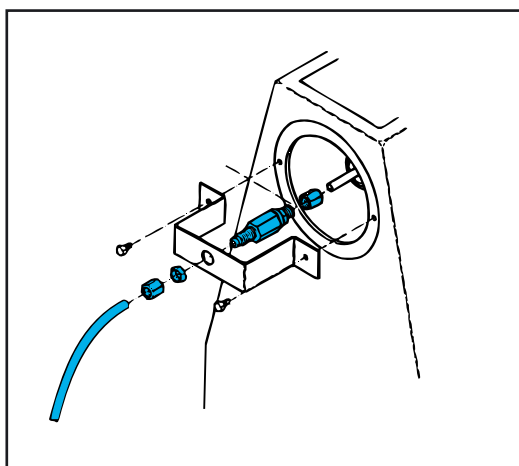
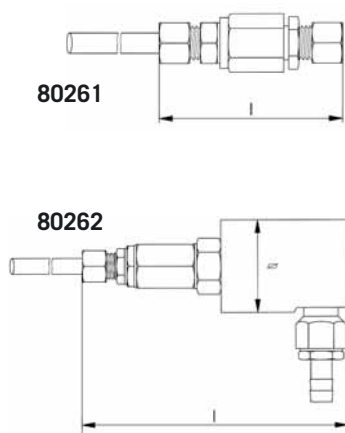
Machining of plastics

The adhesive coating is also activated during the machining of plastics and fiber compounds.



Vilmill adhesive foil

- Increase efficiency of vacuum chucks
- Fix parts during cutting
- Provide necessary space when material is cut through
- Are ideal for removing small parts after machining



Rotation joints

Ideal for using with

- Circular vacuum chucks on lathes with a hollow spindle
- Vacuum chucks on a rotating machine table with hollow spindle

The Witte rotation joint allows rotary movement of circular or normal chuck but with a stationary vacuum supply without any vacuum loss. Standard rotation joints are available for three RPM ranges: upto 1500, 3000 and 6000. They come complete with polymer tubing, which connects the chuck through the hollow spindle with the rotation joint. It is the tubing which takes up the torque force

No.	max.RPM	ø	l(ca.)	kg	Thread
80261	1500	35	85	0,3	G $\frac{3}{8}$ "-G $\frac{3}{8}$ "
80262	3000	57,1	113	0,7	G $\frac{1}{2}$ "-NPT $\frac{1}{2}$ "
80910	6000	50	110	1,0	G $\frac{1}{2}$ "-G $\frac{3}{8}$ "

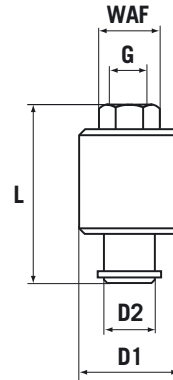
Supply includes:

- 1,5m hose
- Connection parts

Other sizes available on request!

Slide valve

No.	Conn. thread G	WAF	D1	D2	L
81322	1/8" female	14	25	13	48
11252	1/4" female	17	30	16	58
81324	3/8" female	22	35	25	70
82961	1/2" female	26	40	40	80



Vacuum hand valve

Nr	Connection thread	Typ
85625	1/4" female/female	
80139	3/8" female/female	
13444	3/8" female/female	mini
80988	1/2" female/female	
83116	3/4" female/female	
82927	1" female/female	
80563	1 1/4" female/female	
83144	1 1/2" female/female	



Foot switch

No.	Connection thread
80322	G1/4"

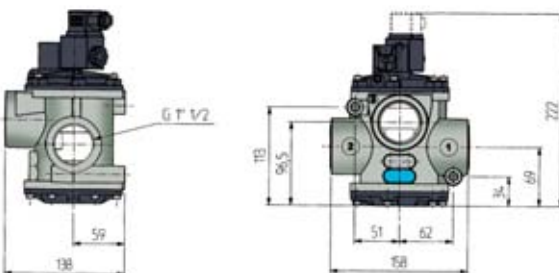
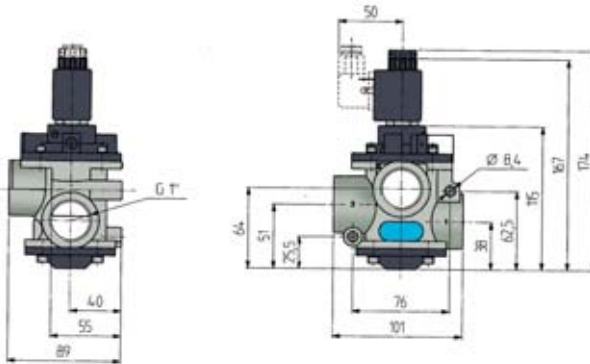
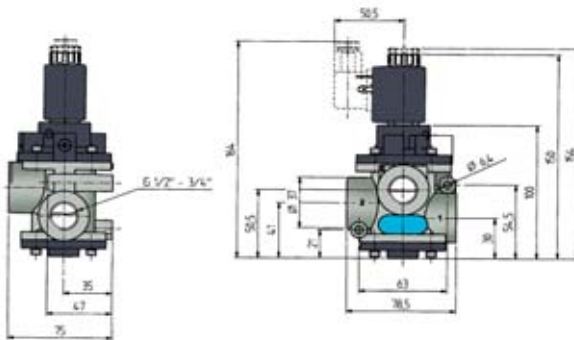
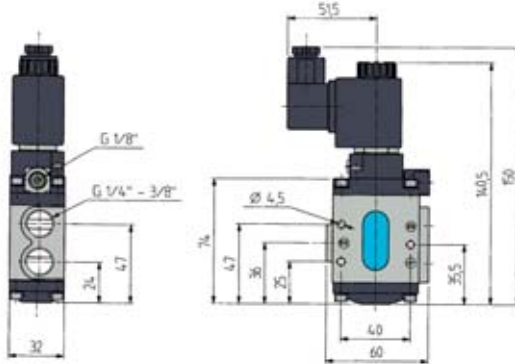
Supply includes:

- 2 hose nozzles
- 2x3m vacuum suction hose with wire spiral 18/12

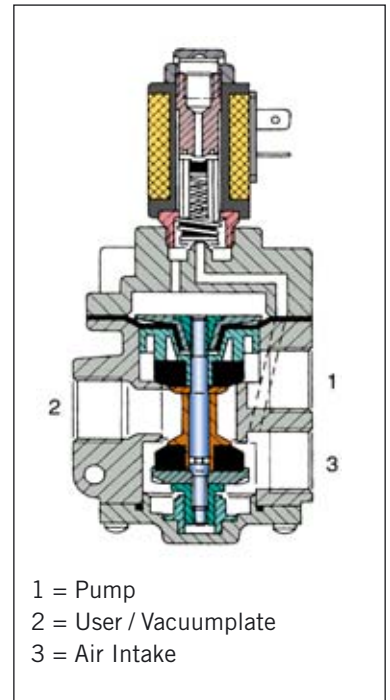


All valves shown on this page are 3/2-way valves

Vacuum electro-magnetic valves



All vacuum valves are 3/2 way with ventilation. For safety reasons the electro-magnetically operated vacuum valves are always open. That means that even if the electricity is cut off, the vacuum supply bore in the valve remains open, and supply of vacuum is guaranteed. This is valid for 230 volt AC or 24 volt DC



Supply includes:

- 24 volt solenoid
- Plug

Supply does not include nozzles or connection elements. See next pages.

Vacuum electro-magnetic valves

No.	Connection thread	Pumpe max. m ³ /h	Vacuum min.	Vacuum max.	Weight kg
90960	1/4" female/female	4			0,52
80908	3/8" female/female	10	150mm/HG	759,50mm/HG	0,56
90961	1/2" female/female	20			1,19
84204	3/4" female/female	60			1,13
82997	1" female/female	90	610 Torr	0,5 Torr	1,62
84275	1 1/2" female/female	180			2,00

Seals

for electromagnetic valve

No.	For Valve
11108	80908
11178	90961
11178	84204
12210	82997
12365	84275



80908

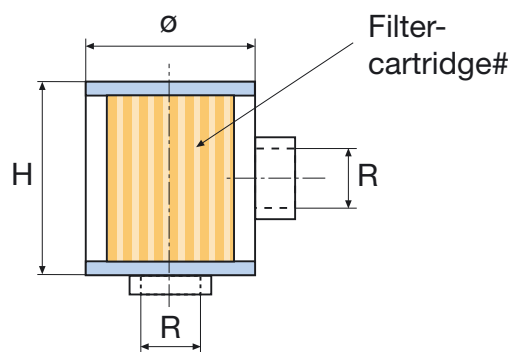
Other sizes available on request!



82997



84275



Airfilter

Universally used dust filter, dirt immediately visible through transparent housing. Designed to allow easy exchange of cartridge.

A fitting filter cartridge is included in package.

No.	H	Ø	G	Filter#
83324	110	105	3/4	80142
83322	120	140	1 1/4	80143



Airfilter

Additional air filter for protection of stop valve

A fitting filter cartridge is included in package.

No.	Dim	For hose inner dia.	Filter-cartridge
93814	G3/8"	12mm	13480
93813	G3/8"	18mm	13479

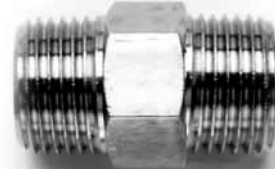
Screw hose connection



No.	Thread	for hose inner dia.
10632	3/8"	Ø9
10580	1/2"	Ø12

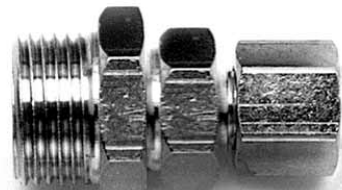
Double nipple, detachable

No.	Thread
10301	1/8" female/female
12110	3/8" male/male
12072	3/4" male/male
11479	1" male/male



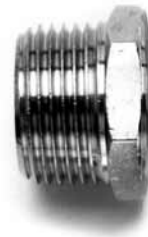
Screw hose connection for slot-type vacuum chucks

No.	Thread	for hose inner Dia.
10239	1/8"	ø 4,5
10414	1/4"	ø 6



Reducers male/female

No.	Thread male	Thread female
10542	1/4"	1/8"
10681	3/8"	1/8"
12113	3/8"	1/4"
10302	1/2"	1/8"
10743	1/2"	1/4"
10299	1/2"	3/8"
11455	3/4"	1/8"
10896	3/4"	3/8"
10316	3/4"	1/2"
12107	1"	3/8"
12108	1"	1/2"
10636	1"	3/4"
12109	1 1/4"	1/2"
10637	2"	1 1/2"
12359	1 1/2"	1"



Quick coupling with male thread



No.	Thread	for plug
80104	3/8"	10271
		10275
		10519
80989	1/2"	10271
		10275
		10519
80665	3/4"	12079

Hose nozzles



No.	Thread	for hose inner dia.	WAF
11561	1/8"	ø 9	14
10638	1/4"	ø 9	17
11768	1/4"	ø 13	17
10354	3/8"	ø 9	19
10269	3/8"	ø 13	19
10270	1/2"	ø 13	24
11508	1/2"	ø 19	22
11509	3/4"	ø 19	32
11746	3/4"	ø 25	32
11726	1"	ø 25	37
10471	1"	ø 32	37
10598	1 1/4"	ø 32	50
11620	1 1/2"	ø 50	53
11468	2"	ø 50	57

Plug for quick coupling



No.	for hose inner dia.
10271	ø 6
10275	ø 8
10519	ø 13
12079	ø 19

Vacuum polymer tubing

Used with rotation joints

No.	Description	Outer/inner ϕ
00058	Polymer tubing, black	ϕ 8/6
00059	Polymer tubing, black	ϕ 12/8
00132	Polymer tubing, black	ϕ 15/12



Polymer hose

Used for slot-type chucks

No.	Description	Outer/inner ϕ
00306	Polymer hose, white	ϕ 8/6



Wire spiral hose

Durable vacuum supply hose suitable for most chucks

No.	Bendable radius (min)	Outer/inner ϕ
00717	20 mm	ϕ 13/8
00060	25 mm	ϕ 18/12
00061	40 mm	ϕ 25/18
00253	60 mm	ϕ 34/25
00184	75 mm	ϕ 40/32
00185	125 mm	ϕ 60/50



Suction capacity of vacuum pumps may drop and reduce suction volume if hoses are too narrow or too long. For hose lengths from 2-3m upward we recommend using hoses a size larger or using several hoses in connection with a manifold distributor in order to ensure the required supply cross section.

Please state length in metres when ordering

WITTE-METAPOR® - Porous aluminium

Instead of bores for vacuum and air pressure - METAPOR® for vacuum and air pressure!

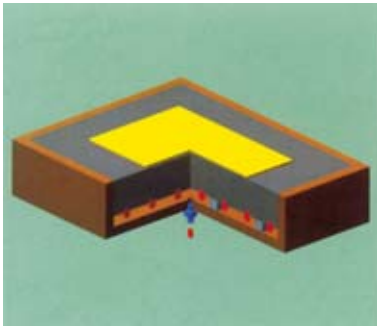
This unique porous aluminium compound material is suitable for die and mould, conveyance and clamping systems

- **Evacuation**
vacuum mould-forms made of METAPOR®
vacuum chucks made of METAPOR® i.e.
for clamping electronic workpieces and foils
- **Lifting**
air film glide handling equipment
made of METAPOR®
- **Through flow**
for agitating bases and
conveyor channels made of METAPOR®
- **Molding/Demoulding**
deep drawn and die moulds
made of METAPOR®
- **Ceramic and machined forms**
made of METAPOR®



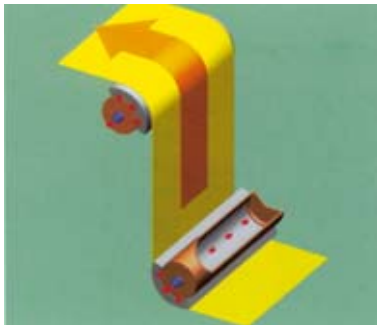
Deep drawn form,
made of WITTE - METAPOR®

WITTE - METAPOR® - Applications



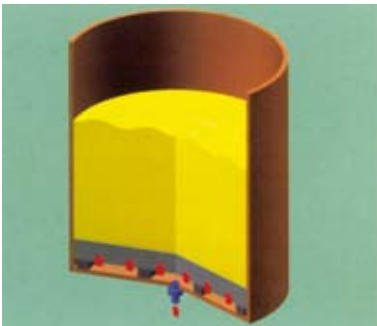
Vacuum clamping technology

The main feature of METAPOR® vacuum clamping systems is suction over the complete surface area without suction bores. Foils are held absolutely flat. The pressure drop, which takes place within the structure means that it is not necessary to cover areas not in use. METAPOR® is ideally suited for holding foils and electronic parts as well as for mould-forms and soft workpieces.



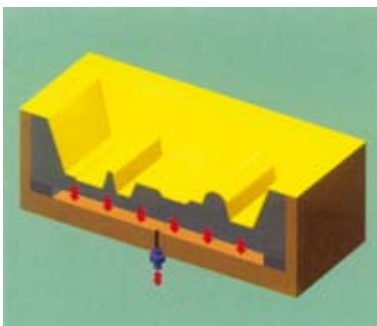
Air film glide technology

The pressure distribution in the METAPOR® structure allows even surface airflow capacity, even if only part of the surface is covered. Air consumption and noise emission are considerably reduced. Trouble-free machining offers cost reduction on air flow components, a new perspective for rotation bearings, conveyance and extrusion beds.



Through-flow technology

The microporous METAPOR® structure allows an even agitation of granulates and powders without bubbles occurring. Low air consumption reduces friction and mechanical load. METAPOR® ideal for mixing processes, coating, conveyance troughs and dismantling of silo bridges



Molding technology

Deep drawn moulds made of METAPOR® do not require any bores. Bore imprints on the workpiece are avoided. Suction over the complete area allows structures to be complex without air pockets and distortions. The complete flow-through of air prevents high-temperature areas developing. Rational machining procedure and immediate usability promise a valuable technological advantage

Witte METAPOR® - material properties

METAPOR® is made mainly out of two components: Granulate (e.g., Aluminium, Ceramic) and a binder e.g., epoxy, polyester, polyurethane).

These different components influence the qualities and behaviour of the material.

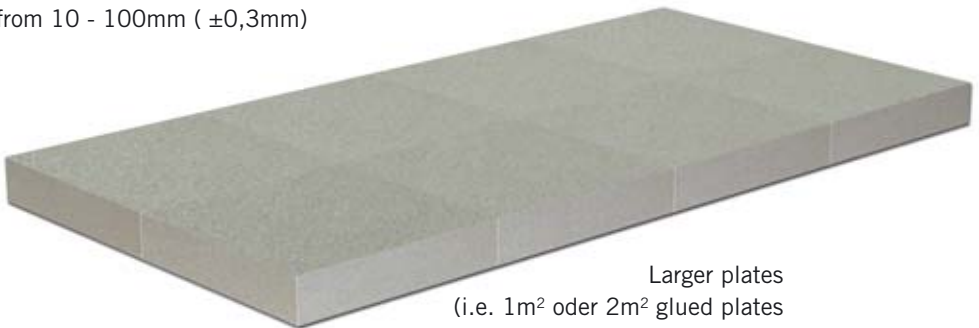
For example porosity, hardness, temperature consistency, and surface finish.



The machineability of METAPOR® is excellent and can be compared to easily machineable aluminium. METAPOR® is machined without coolant in order to keep the pores clean

Better surfaces are achieved with high cutting values. No noticeable warmth developing in the workpiece can be felt during machining.

METAPOR® is available in the standard sizes 500x500mm, thickness from 10 - 100mm (±0,3mm)



Larger plates
(i.e. 1m² oder 2m² glued plates
supplied on request)

METAPOR®-Materials in comparison:

	BF 100 AL	MC 100 AL	CE 100 White	HD 210 AL
Porosity	100%	800%	100%	50%
Max. Temp.	100°C	100°C	100°C	210°C
Strength	★★	★	★★★★★	★★
Thermo-forming	★★		★	★★★★
Vacuum-clamping	★★★★★	★★★★	★★★★	★★★★
Average pore dia.	ca. 15µm	ca. 40µm	ca. 10-12µm	ca. 12µm

★★★★★ = Very suitable

- = Not suitable

Witte METAPOR® materials

No.	lxbxh	kg
00704	500x500x10	4,0
00705	500x500x15	6,0
00706	500x500x20	8,0
00707	500x500x25	10,0
00708	500x500x30	12,0
00709	500x500x35	14,0
00710	500x500x40	16,0
00711	500x500x50	20,0
00712	500x500x60	24,0
00713	500x500x70	28,0
00714	500x500x80	32,0
00715	500x500x100	40,0

All dimensions are rough cut segments • Other dimensions on request

No.	lxbxh	kg
00513	500x500x10	4,5
00552	500x500x15	6,8
00553	500x500x20	9,0
00554	500x500x25	11,3
00555	500x500x30	13,5
00556	500x500x35	15,8
00557	500x500x40	18,0
00558	500x500x50	22,5
00559	500x500x60	27,0
00560	500x500x70	31,5
00561	500x500x80	36,0
00562	500x500x100	45,0



MC 100 AL

METAPOR® material
with maximum porosity

- Density: 1,7 g/cm³
- Flexural strength: 25,0 N/mm²
- Max. Temp: 100,0 °C
- Thickness tol.: -0/+0,3 mm



BF 100 AL

Standard quality
with good alround properties

- Density: 1,78 g/cm³
- Flexural strength: 56,0 N/mm²
- Max. Temp: 100,0 °C
- Thickness tol.: -0/+0,3 mm

Witte METAPOR® materials



HD 210 AL

METAPOR® material
with high temperature resistance

- Density: 1,9 g/cm³
- Flexural strength: 43,0 N/mm²
- Max. Temp: 210,0 °C
- Thickness tol.: -0/+0,3 mm



CE 100 White

METAPOR® material with very hard surface
properties and low porosity

- Density: 1,7 g/cm³
- Flexural strength: 24,0 N/mm²
- Max. Temp: 100,0 °C
- Thickness tol.: -0/+0,3 mm

No.	lxbxh	kg
00766	500x500x10	4,0
00767	500x500x15	6,0
00768	500x500x20	8,0
00769	500x500x25	10,0
00770	500x500x30	12,0
00771	500x500x35	14,0
00772	500x500x40	16,0
00773	500x500x50	20,0
00774	500x500x60	24,0
00775	500x500x70	28,0
00776	500x500x80	32,0
00777	500x500x100	40,0

All dimensions are rough cut segments • Other dimensions on request

No.	lxbxh	kg
00244	500x500x10	4,0
00245	500x500x15	6,0
00246	500x500x20	8,0
00247	500x500x25	10,0
00248	500x500x30	12,0
00288	500x500x35	14,0
00249	500x500x40	16,0
00289	500x500x50	20,0
00250	500x500x60	24,0
00292	500x500x70	28,0
00293	500x500x80	32,0
00252	500x500x100	40,0

Witte METAPOR® materials

No.	lxbxh	kg
600001	500x500x10	4,0
600235	500x500x15	6,0
600414	500x500x20	8,0
600415	500x500x25	10,0
600416	500x500x30	12,0
600417	500x500x35	14,0
600418	500x500x40	16,0
600419	500x500x50	20,0
600420	500x500x60	24,0
600421	500x500x70	28,0
600422	500x500x80	32,0
600423	500x500x100	40,0



MC 240

METAPOR® material
with highest temperature resistance

- Density: 1,7 g/cm³
- Flexural strength: 25,0 N/mm²
- Max. Temp: 240,0 °C
- Thickness tol.: -0/+0,3 mm

All dimensions are rough cut segments • Other dimensions on request

Special chuck, fixture for holding workpieces on a measuring machine



Witte Weiguss mould clamping method



Witte Weiguss mould clamping technology is suitable for manufacturing workpieces, which cannot be clamped conventionally because support surfaces are lacking.

Application: Clamp the unmachined workpiece onto i.e. a Vac-Mat™ vacuum chuck. The top surface is milled conventionally.

The milled hollows are filled with melted Weiguss alloy, which hardens into a plane parallel surface. The workpiece is then turned around 180° and clamped securely on to the vacuum chuck. Stop pins make sure the workpiece is positioned accurately.

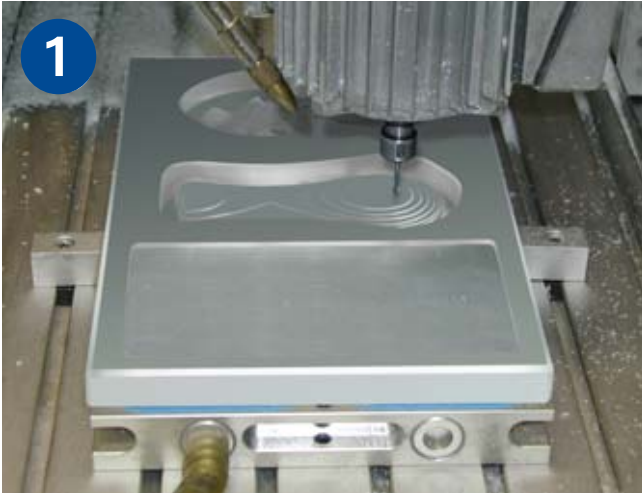
The finished workpiece is placed into warm water at 80°C in order to melt the alloy attached to it. The alloy does not mix with water and can be collected, remelted and used again.

Witte Weiguss melting set

No.	Description
94212	Witte Weiguss melting set consisting of : <ul style="list-style-type: none"> ■ Hotplate 1,5 kW, No. 11805 ■ Stainless steel jug, No. 11806 ■ Hot water bath, No. 11807

Witte Weiguss LM70

No.	Description
94161	Set of 1 piece approx. 1kg incl. CD-Rom with video and technical information in PDF format
92912	Set of 5 piece approx. 1kg incl. CD-Rom with video and technical information in PDF format



Left: First step is milling workpiece conventionally



Top: Finally workpiece is placed in water at 80°C to melt and remove alloy, which can be reused

Right: Filling hollow with melted Witte Weiguss alloy



Right: After hardening, workpiece is turned over and machined on reverse side



Witte Weiguss is especially suitable for complicated workpieces with curved or concave surfaces

Instant clamping of your measuring arm !

The Witte vacuum foot can be universally used to position and clamp your measuring arm.

Rechargeable power pack batteries power the small Vacuum pump which Creates a secure vacuum to hold the measuring arm in position. This is also possible on varying Surfaces.

Warning lights as LED's and a pressure switch guarantee a firm stance on many different surfaces.

A quick and easy connection for all measuring arms will be available.

Dimensions approx. Ø 260 x 80mm, Weight 3,7Kg
 Hold down force max. 4200Newton (at sea level)
 Battery charger, Voltages from 100 to 240Volt AC
 Rechargeable power pack operating with 12 Volt.
 LED's indicate length of battery time available,
 Green for safe use.

RED Battery empty, needs recharging

YELLOW Battery half full, only short operating time

GREEN Battery full, optimal operating conditions

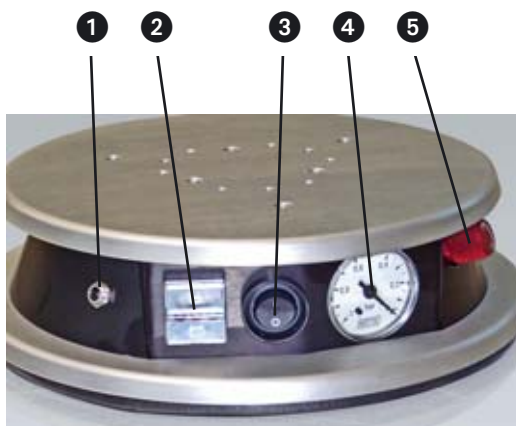
An alarm signal will warn the operator when the adjusted vacuum reaches the lowest safe operating limit. This gives the operator enough time to secure the measuring arm and avoid any damage. When adjusted to give a vacuum 100mbar absolute this will result in a relative end vacuum of about 90%.

How to operate in easy steps.

1. Place foot on a suitable impermeable surface.
2. Close ventilation screw.
3. Switch on using the ON / OFF switch and wait for approx. five seconds to reach the maximum vacuum.
4. Check state of battery condition using the LED indicators red/ yellow or green
5. The vacuum gage must show a value between 0,8 and 0,9 for safe operation.
6. Now a measuring arm can be attached safely and the measuring operation can begin.



- 1 Charging socket
- 2 LED showing battery status
red / yellow / green
- 3 Operating control light
- 4 On / Off switch
- 5 Vacuum gauge dial
- 6 Ventilation screw to release vacuum



Inquiry for vacuum equipment:

Simply copy this form, complete and return to:

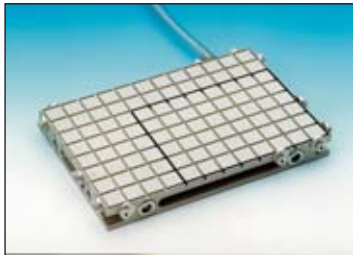
Horst Witte Gerätebau –
 Vacuum Clamping Technology
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 • Bodo Winowsky, Tel: +49-5854-89-33
 E-mail: bodo.winowsky@horst-witte.de

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 E-mail: martin.schroeder@horst-witte.de
 • Rudolf Behn, Tel: +49-5854-89-28
 E-mail: rudolf.behn@horst-witte.de

Request for:

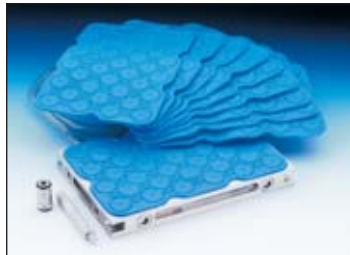
Info

Grid chuck



Video

WITTE VAC-MAT™

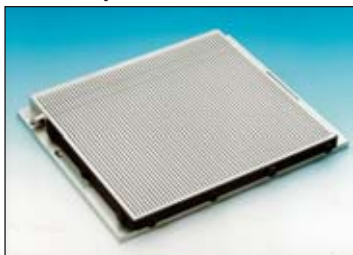


Quotation on

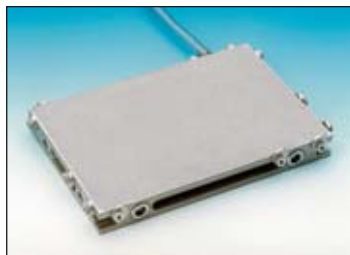
FLIP-POD™



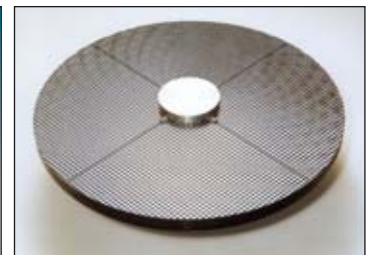
Slot plate



WITTE METAPOR®



Circular Chucks



**In order to make a suitable quotation for your application,
 we need following information:**

What kind of material(s) are you machining:

What size(s) of workpiece are you machining:

Type of machining process (i.e. milling incl. speed and feed):

How much material is removed:

Is vacuum supply available:

Do you use coolants:

Name _____

Postal code/Town _____

Company _____

Street _____

Type of work _____

Tel / Fax _____

Vacuum conversion table

%Vacuum	kPa	mbar	Torr	-kPa	-mmHg	-inHg
100	0	0	0	101,3	760	30
90	10	100	75	90	675	27
80	20	200	150	80	600	24
70	30	300	225	70	525	21
60	40	400	300	60	450	18
50	50	500	375	50	375	15
40	60	600	450	40	300	12
30	70	700	525	30	225	9
20	80	800	600	20	150	6
10	90	900	675	10	75	3
0	101,3	1013	760	0	0	0

Atmospheric pressure

At sea level 0 m 1013 mbar

On the Zugspitze 2963 m 695 mbar

On Mount Everest 8848 m 330 mbar

1 bar = 10N/cm²

Formula for determining holding forces

The pressure P is the result of the ratio to force F and area A

$$F = P \times A = N/cm^2$$

Example: Vacuumchuck 40 x 60 cm;

Vacuum unit with under pressure of 85% Vacuum

Whereby

$$P = 0,85 \text{ bar} = 0,85 \text{ N/cm}^2$$

$$A = 40\text{cm} \times 60\text{cm} = 2400 \text{ cm}^2$$

$$F = 0,85 \text{ N/cm}^2 \times 2400 \text{ cm}^2 = 2040 \text{ N}$$

$$F = P \times A = 0,85 \text{ bar} \times 2400 \text{ cm}^2 = 0,85 \text{ N/cm}^2 \times 2400 \text{ cm}^2 = 2040 \text{ N}$$

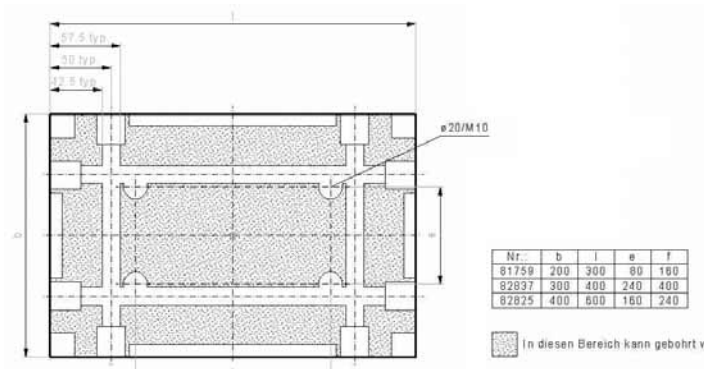
Units:

P = N/cm²

F = N

A = cm²

Additional holes in modular chucks





DESIGN BY

Horst Witte

(HORST WITTE)

Further Witte products:

Aluminium clamping systems

Alufix clamping system

Alufix XL clamping system

Alufix XS clamping system

Aluquick clamping system

FIXinspect measuring accessories

Alufix Expert design-software

Witte registered trademarks:

ALUFIX · EUROFIX

FIXMES · POSIFIX

MEGALU · Gigalu

VAC-MAT · VACUCOMB

ALUGRIP

ALUQUICK

ICE-VICE



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Witte Gerätebau Barskamp KG
is certified according to

- DIN EN ISO 9001
- DIN EN ISO 9100
- QS-F (Aerospace supplier)

