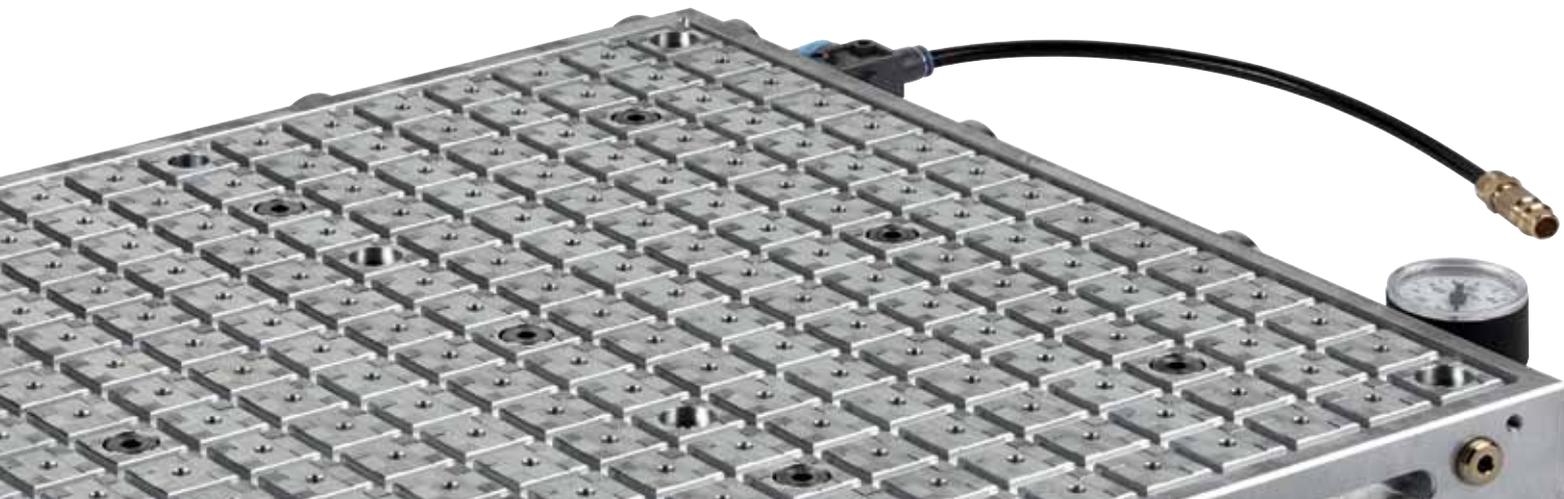


VACUUM CLAMPING TECHNOLOGY



CLAMPING. SCREWING. LOCKING.



WE GENERATE EXCITEMENT.

Since its founding by Andreas Maier in 1890, our company has lived through many exciting times. Today we are the leading manufacturer in Europe, supplying over 5,000 different products from the fields of clamping, hand tools and locks. With this extensive product range we can meet all of our customers' needs and requirements. But providing optimal quality means meeting the challenges at all levels: Expert consultation, modern team organisation, individual solutions (including special developments), flexibility in response to changing conditions, etc. And we ourselves find this so exciting that we look forward every day to shaping the market together with our employees and our customers – both now and in the future. That is something you can count on.

COMPANY HISTORY

- 1890** Company founded as a lock manufacturer by Andreas Maier.
- 1920** Product range extended to include spanners.
- 1928** Production line assembly of „Fellbach locks“.
- 1951** AMF introduces clamping elements and diversifies into workpiece and tool clamping technology.
- 1965** Toggle clamps extend the AMF product range. AMF catalogues are now printed in ten languages.
- 1975** Further specialisation into hydraulic clamping technology.
- 1982** Clamping and fixture systems round off AMF's clamping expertise.
- 1996** AMF team organisation in all sectors of the business. Quality management with certification to ISO 9001.
- 2001** AMF Service Guarantee for all products.
- 2004** Introduction of the ZPS zero-point clamping system.
- 2007** The magnetic clamping technology extends the AMF product range.
- 2009** Development and marketing of AMF Vacuum clamping technology
- 2012** Marking and cleaning tools included in the AMF product range.



MANAGING DIRECTORS

> Johannes Maier
Volker Göbel



THE AMF SERVICE GUARANTEE

> Assuredly on the way to the top

5 Individual development

And if the product you need doesn't exist? Just ask us: We will find the best solution for you – whether it is a special version or a completely new development.

4 Warranty

We stand by our high quality standards. We handle customer complaints very liberally and without red tape – whenever possible even after the end of the warranty period.

3 Guaranteed quality standard

AMF stands for manufacturing in-house with the utmost care. A tradition we have upheld since 1890 – and naturally for many years now with a modern quality management system to ISO 9001.

2 Short delivery times

AMF's finished goods inventory with over 5,000 items guarantees a delivery readiness of 98%. You can also count on each warehouse item you order being shipped to you on the same day.

1 Service from genuine experts

„Different tasks, different solutions. In AMF's professional product range, you can find the right solution quickly and reliably: either from your local dealer or with help from the specialists in our teams. A phone call is all it takes.“

E Made in Germany

It goes without saying that our range of products is developed and manufactured by our team of employees in Germany.

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THE MOST IMPORTANT ON THE SUBJECT OF VACUUM CLAMPING TECHNOLOGY

WHAT IS A VACUUM?

A vacuum is the state in a space which is free of matter. In practice, we already call it a vacuum when the air pressure in a space is less than that of the atmosphere.

UNITS OF MEASUREMENT USED

The most common units are the pascal and the bar.

- > 100 Pa = 1 hPa
- > 1 hPa = 1 mbar
- > 1 mbar = 0,001 bar

VACUUM CLAMPING SYSTEMS

Vacuum clamping systems are used above all in the wood, plastics and non-ferrous metals industries for quick, simple machining; they are compatible with CNC machine tools. Here vacuum technology is used in connection with special handling systems, for example in order to fix an aluminium plate and machine it from all sides. This increases productivity and cost-effectiveness: the fixing does not cause any damage to the workpiece, and no laborious, time-consuming aligning of the workpiece is required. The latest clamping systems allow attachments of various sizes and shapes to be exchanged in a very short time, thus facilitating flexible handling of a wide range of workpiece shapes.

WHAT DOES VACUUM CLAMPING MEAN?

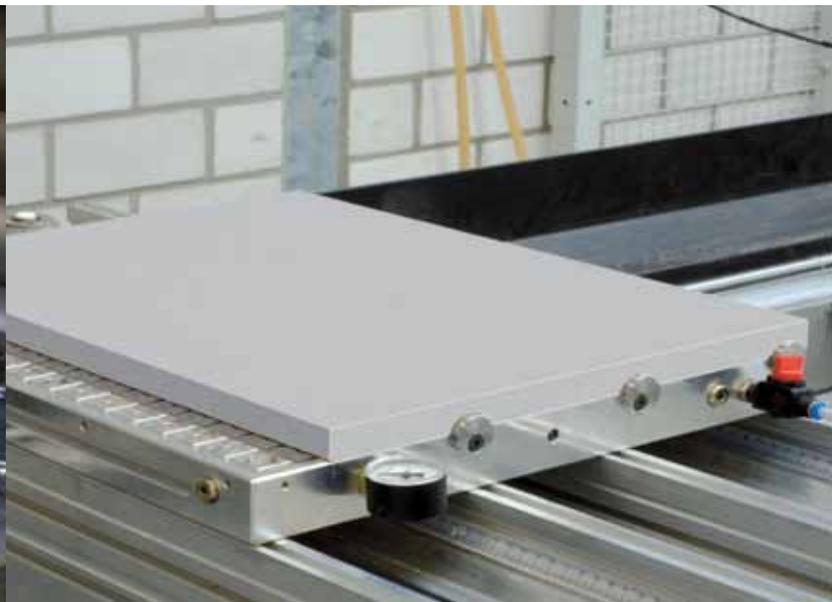
In vacuum clamping, an underpressure is generated under the workpiece being clamped, i.e. a pressure differential is created which presses the workpiece against the clamping plate. Thus the workpiece is not, as one might think, actually „sucked,“ but is rather pressed against the vacuum table. The sliding force of the workpiece depends on its surface structure, the pressure differential and the area on which the vacuum acts. The larger this area is, the better the holding forces.

WHY DOES A VACUUM GENERATE A HOLDING FORCE?

All surfaces of an object are subjected to an even pressure of approx. 1 bar by the surrounding atmosphere. The integrated Venturi nozzle or an external vacuum pump then removes some of the air from under the workpiece being held, thus removing part of the pressure load on that surface. What remains is a one-sided pressure on the top surface of the workpiece, whose size depends on the degree of the vacuum. Generally it is 0.7 - 0.8 bar. This means, for example, that a vacuum of 200mbar (absolute pressure) is generated. The pressure differential acting on the workpiece is therefore 800mbar (approx. 0.8 kp/cm²). The size of the clamping force is then only dependent on the clamping area.

CALCULATION FORMULA:

- > Force = Pressure x Area
- > $F \text{ (N)} = \text{bar} \times A \text{ (m}^2\text{)} \times 10^5$
- > 1 bar = 10 N / cm²



THE BENEFITS OF AMF VACUUM CLAMPING TECHNOLOGY



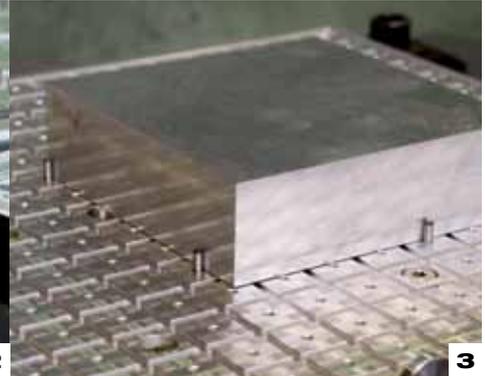
1

> The AMF vacuum clamping plate can be operated using compressed air and the integrated Venturi nozzle, or with an external vacuum pump.



2

> The height-adjustable eccentric stops absorb the sliding forces, and can be adjusted individually to the workpiece height.



3

> Easy positioning of workpieces by fastening with stop pins. These also absorb the sliding forces.



4

> Irregularities in the workpiece surface are compensated for by the sealing cord. The workpiece contour can be represented optimally using the grid pattern on the plate.



5

> Lateral grooves allow the vacuum clamping plate to be fastened to a baseplate or onto the machine table using AMF clamps No. 6325.



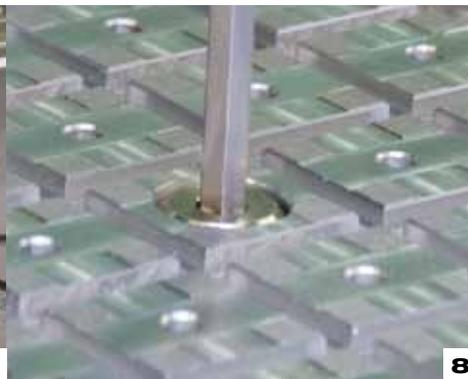
6

> Fixtures can be positioned on the vacuum clamping plate with a precision of ± 0.01 mm using one locating pin and one diamond pin each.



7

> The sound absorber is integrated into the vacuum clamping plate. We offer two different versions of the sound absorber (No. 7800VSDI and 7800VSD), depending on the specific application.



8

> Depending on the size of the clamping plate, workpieces can be clamped using more than one suction point. This can also be used to clamp multiple workpieces – even different ones.



9

> For efficient changing of the vacuum clamping plate, it can be used in combination with the AMF „Zero-Point“ clamping system. This minimises setup times and increases machine runtime.

No. 7800

Vacuum clamping plate

Included in scope of supply:

- Baseplate made of aluminium
- Integrated Venturi nozzle
- Sound absorber, supplied
- Vacuum meter
- Shut-off valve
- 6 eccentric stops
- 2 m pneumatic hose
- Plug-in nipple for compressed air connection
- 10 m sealing cord Ø 4 mm



Order no.	Operating pressure [bar]	max. vacuum [%]	Number of suction points	L	B	H ±0,1	R	Weight [Kg]
375105	3-8	93	1	150	150	40	25	1,0
374470	3-8	93	3	200	300	40	25	6,0
374488	3-8	93	9	300	400	40	25	12,0
374496	3-8	93	9	400	400	40	25	16,0
374504	3-8	93	9	400	600	40	25	24,0
375717	3-8	93	1	150	150	40	12,5	1,0
375733	3-8	93	3	200	300	40	12,5	6,0
375758	3-8	93	9	300	400	40	12,5	12,0
375774	3-8	93	9	400	400	40	12,5	16,0
375790	3-8	93	9	400	600	40	12,5	24,0

Design:

The vacuum plate has grooves and suction points on its upper side. By inserting the sealing cord, one or more fields can be defined for the desired workpiece size. All suction points are interconnected. Easy positioning via holes for stop pins or lateral, height-adjustable eccentric stops. Lateral grooves or fastening holes allow the vacuum clamping plate to be fastened to a baseplate (e.g. machine table).

Fixture plates can additionally be fixed using a sword or locating pin. It is also no problem to integrate the vacuum clamping plate into the AMF „Zero-Point“ clamping system (see the AMF catalogue „Zero-Point Systems“).

Application:

The workpieces being machined are clamped through generation of a vacuum by means of the integrated Venturi nozzle technology (included in scope of supply) or with an external vacuum pump. By means of individual grid allocation it is also possible to clamp and machine multiple, different workpieces at the same time.

Typical applications are milling and grinding operations.

The vacuum clamping plate is ready to use right away – all of the necessary components are included in the scope of supply.

Advantage:

- The AMF vacuum clamping plate can be operated using compressed air and the integrated Venturi nozzle, or with an external vacuum pump.
- Cost savings through use of the Venturi nozzle
- Low compressed air consumption, thus low operating costs
Example: 1 m³ of compressed air costs 0.0078 €. At an average consumption of 40 l/min, this corresponds to 0.0187 €/h.
- Multiple suction points, thus flexible grid allocation and clamping of multiple parts possible
- Vacuum plates can be combined with each other
- High holding forces
- Universal use
- High coefficient of friction allows secure clamping of unmachined workpiece surfaces
- Sealing cords compensate for small irregularities in the workpiece surface
- Distortion-free, vibration-free five-sided machining

Note:

Operate only with dried, filtered, non-lubricated compressed air!

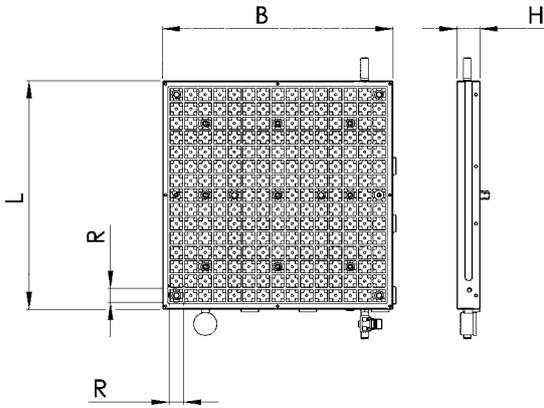
Max. suction volume against atmosphere: 21.8 l/min.

Operating pressure for max. suction volume flow: 3.5 bar.

Please observe installation manual 7800.

On request:

Special dimensions





No. 7800AMG

Adapter mat, rubber

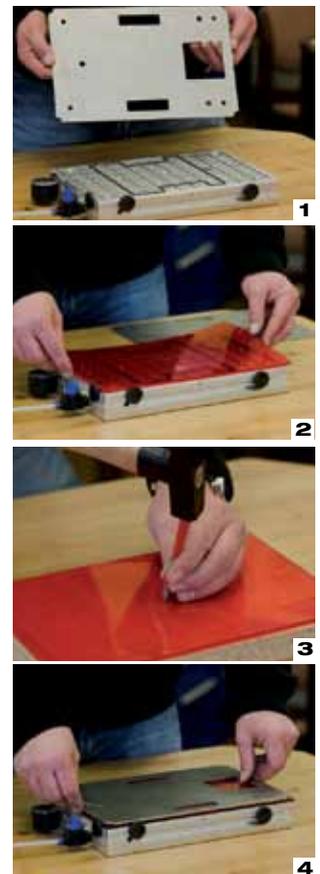
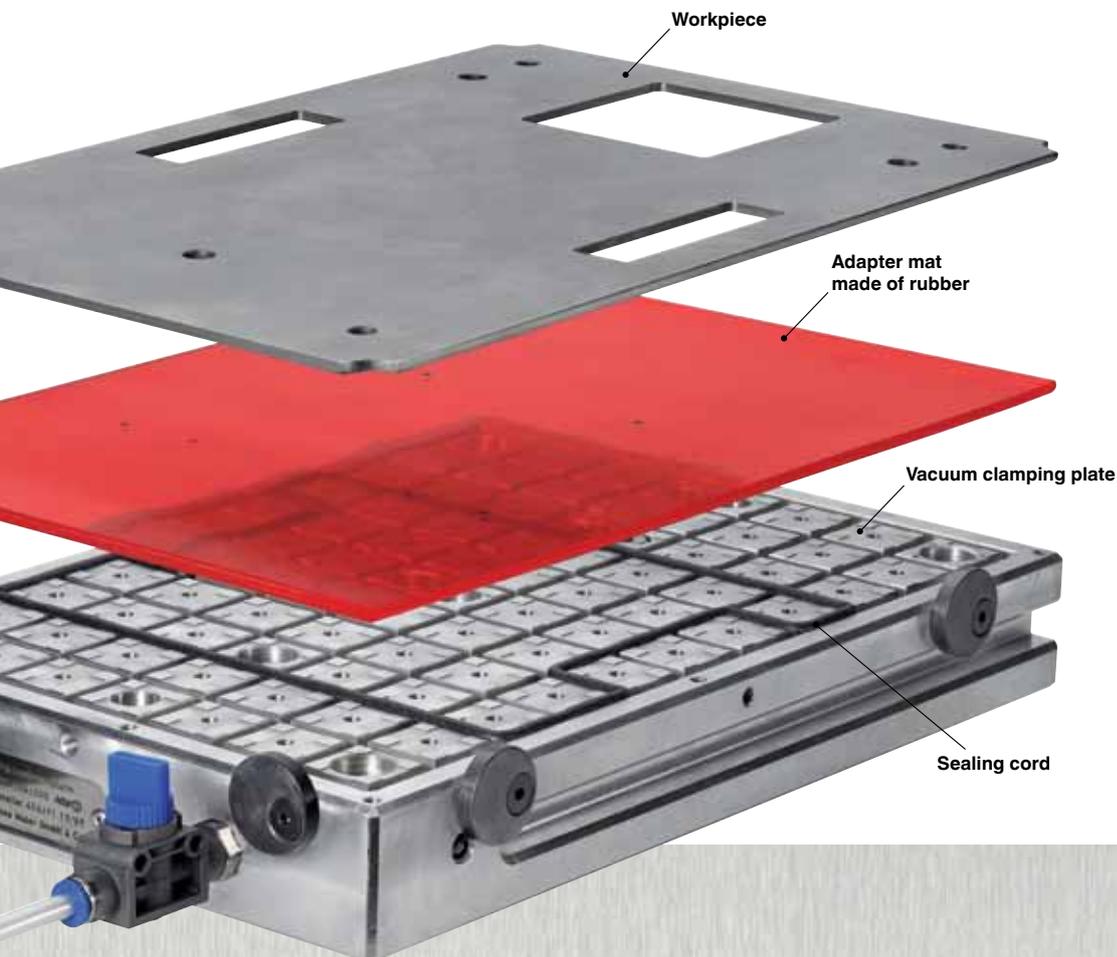
Order no.	Dimension	Material thickness ± 0.2	Weight
	[mm]	[mm]	[g]
375485	150x150	4	110
375014	300x200	4	275
375022	300x400	4	550
375030	400x400	4	780
375048	400x600	4	1100

Application:

1. The sealing cord is placed in the grid of the vacuum clamping plate. It goes up to the end of the area to be worked on in the workpiece.
2. The adapter mat is placed onto the vacuum clamping plate.
3. Holes are made in the adapter mat within the marked clamping surface over a wood plate with a 3-5 mm diameter hole punch. The location of the holes must be in the area of the grid cuts of the vacuum clamping plate.
4. The workpiece to be worked on is placed on it and fixed using the adjustable eccentric stops.

Advantage:

- The good coefficient of friction offers especially good resistance against the displacement forces that arise during processing.
- The adapter mat can be cut into up to 2 mm deep without problem.
- If the same contours are used, the adapter mat can be reused almost any number of times, since it does not undergo wear.



Subject to technical alterations.

No. 7800APA

Adapter plate, aluminium

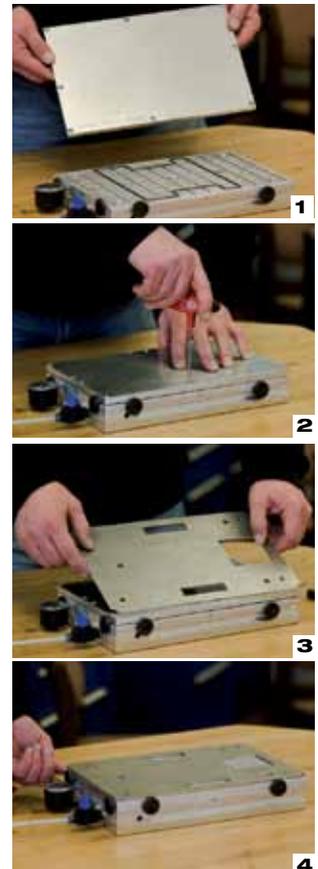
Order no.	Dimension	Material thickness ± 0.1	Weight [Kg]
	[mm]	[mm]	
375097	150x150	10	0,6
374876	300x200	10	1,6
374892	300x400	10	3,3
374900	400x400	10	4,4
374918	400x600	10	6,6

Application:

1. The sealing cord is placed in the grid of the vacuum clamping plate. It goes up to the end of the area to be worked on in the workpiece.
2. The adapter plate is screwed to the vacuum clamping plate.
3. The workpiece to be worked on is placed on it.
4. The workpiece is fixed using the adjustable eccentric stops.

Advantage:

- The adapter plate can be overcut by up to 2 mm (elimination of cuts).
- Preferred uses are for processing thin sheet metal, foils, boards and even paper.



Subject to technical alterations.

No. 7810AB

Surface-mounted block

- The following are supplied as standard:
- Surface-mounted block from aluminium, grid 12.5 x 12.5 mm
 - 3 eccentric stops with fixing screws
 - 1 m sealing cord Ø 2.0 mm



Order no.	max. vacuum [%]	Number of suction points	L	B	H	Weight [g]
375626	93	1	78	78	40	600

Design:

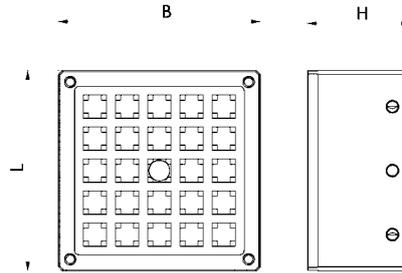
The surface-mounted block has grooves and a suction point on its upper side. The grid spacing is 12.5 mm. The field size is individually defined by inserting the sealing cord. The surface-mounted block is placed directly over a suction point on the vacuum clamping plate no. 7800. The underside is equipped with a sealing cord Ø 2.0 mm.

Application:

The use of surface-mounted blocks allows openings for finishing. Workpieces can be through-bored without the vacuum clamping plate or the component itself being damaged.

Note:

Please order sealing cord Ø 4.0 mm separately (OrderNo. 374512).



No. 7810APA

Adapter plate, aluminium

Suitable for surface-mounted block no. 7810ABX.



Order no.	Dimension [mm]	Material thickness ±0.1 [mm]	Weight [g]
375634	78 x 78	10	200

Advantage:

- The good coefficient of friction offers particularly favourable resistance to the resulting displacement forces during finishing.
- Milling down to 2 mm deep in the adaptermat is no problem.
- If the same contours are always applied, the adapter mat can be reused any number of times, since they do not suffer any wear.

No. 7810AMG

Adapter mat, rubber

Suitable for surface-mounted block no. 7810ABX.



Order no.	Dimension [mm]	Material thickness ±0.2 [mm]	Weight [g]
375642	78 x 78	4	60

Advantage:

- The adapter plate can be milled down to 2 mm (millings on both sides).
- Preferred applications are the finishing of thin sheets, foils, PCBs and even paper.

No. 7800VP

Rotary vane vacuum pump

Included in scope of supply:

- suction-side fine-mesh filter
- oil mist separator
- reversing valve for coarse or fine vacuum operation
- anti-vibration buffer
- initial oil fill
- without gas ballast



Order no.	Vacuum [%]	Suction performance [m³/h]	Lubrication	Motor rating [V/Hz]	Noise level [dB (A)]	Code class	Continuous operation [%]	Weight [Kg]
374991	99	15	15	230/50	59	54	100	19

Application:

If compressed air is present where the vacuum clamping plate is used, we recommend using the AMF rotary vane vacuum pump. It ensures reliable continuous operation of the clamping plates used. Due to its small design, the pump can be attached directly to your machine.

On request:

Other sizes and suction performances are available on request.

No. 7800VPF

Liquid separator

included in scope of supply:

- Water separator
- Vacuum filter
- Fastening unit
- Ball valve
- Coupling plug 1/2" external thread - 15 mm
- Plastic tube Ø 15 x 12 mm, length 2 m
- Coupler socket
- Double nipple



Order no.	Size	Connection	Flow [m³/h]	Weight [g]
374975	D100x250	3/4"	15	1610

Application:

The liquid separator effectively removes condensate (water) from the vacuum clamping system and so protects it from contamination.

Advantage:

- Removal of 99% of the contained liquid
- maintenance-free
- system's operation and maintenance costs are minimised
- easy to install (before the vacuum pump)

Note:

The set is supplied in the assembled state.

Example of assembly:



Subject to technical alterations.

No. 7800VPE

Vacuum pump, external



Order no.	max. vacuum [%]	Max. suction volume flow [l/min.]	min. operating pressure [bar]	Vacuum connection Outside dia. [mm]	Pneum. connection Outside dia. [mm]	Weight [g]
376434	93	21,8	3,5	6	6	47

Design:

- Silencer open
- Ball valve
- Plug connection for hose

Application:

A small plastic ejector that is used to clamp suction-tight workpieces. For use in systems with external (decentralised) vacuum generation.

Advantage:

Very small design, universal use and economical.

No. 7800D

Sealing cord

Shore hardness: 8-13°.



Order no.	Groove width [mm]	dia. [mm]	Length [m]	Weight [g]
374512	4	4,0 ±0,45	10	320

Application:

The sealing cord is inserted in the groove to delimit the clamping surface.

Advantage:

Multiple workpieces can be clamped, even with different sizes.

No. 7800V

Vacuum meter



Order no.	Indicators area [bar]	dia. [mm]	Connection below	Weight [g]
374694	-1 ... 0	40	G1/8	73

No. 7800VD

Sealing ring

for vacuum meter



Order no.	Connection	Weight [g]
374561	G1/8	0,5

Application:

Sealing ring is used in installation of the vacuum meter.

No. 7800VDS

Vacuum pressure sensor with accessories

Electrical connection:

Cable with connector according to EN 60947-5-2, round design

M 8x1, 4-pin, Cable length 0.3 m.

Scope of supply consists of:

- Pressure sensor
- Vacuum hose, outer Ø 4 mm, length 30 cm
- Plug connection G1/8-4



Order no.	Indicators area [bar]	Ambient temp. [°C]	Weight [g]
374520	-1 ... 0	0-50	80

Application:

The threshold values (variable: 2 x relative pressure) are set on the pressure sensor using teaching. If the vacuum pressure drops, the machine is switched off.

Advantage:

The vacuum pressure sensor serves to monitor the applied air pressure. If the pressure drops, the machine is switched off. This contributes decisively to process reliability.

No. 7800E

Eccentric stop, dia. 30 mm

Steel, blued.

Complete with flat-head screw.



Order no.	dia. [mm]	Weight [g]
374538	30	26

Advantage:

Individual adjustment to the workpiece height. The sliding forces are absorbed by the stop.

No. 7800VSD

Sound absorber

Housing and absorber insert of PE.



Order no.	Connection	Ambient temp. [°C]	Weight [g]
374579	G1/8	-10 - 60	5

Application:

Can be screwed directly into the in vacuum clamping plate.

Note:

Check sound absorber regularly for fouling.

No. 908-G1/8

Screw plug

with rubber seal



Order no.	Connection	Weight [g]
374553	G1/8	7

No. 7800VAF

Suction filter

Housing of brass, filter insert of tin bronze.



Order no.	Connection	Weight [g]
374884	G1/8	2

Application:

The suction filter is screwed into the vacuum clamping plate.

Note:

Check suction filter regularly for fouling.

No. 7800AV

Ball-Valve

manually operated.



Order no.	Connection	Hose dia. [mm]	Weight [g]
374587	G1/8	6	40

Application:

The hand valve is screwed into the plate directly. With O-ring seal.

No. 7800VNS
Plug-in nipple for quick coupling

with cap nut DN7.2. Brass.

Order no.	Hose dia., outer	Weight
	[mm]	[g]
374595	6	17

Advantage:

Easy connection with the pneumatic hose of the vacuum clamping plate.


No. 7800ZS
ISO 8734-4x12-A cylinder pin

Steel.

Order no.	Packaging unit	Weight
	[St]	[g]
374603	10	15

Application:

Easy positioning of workpieces by fastening in the holes provided in the vacuum clamping plate.

Advantage:

The sliding forces are absorbed by the stop.


No. 2800W-06
Pneumatic hose

Order no.	Hose dia.	Length	Weight
	[mm]	[m]	[g]
374611	6	10	300



No. 7800VAB

Locating pin

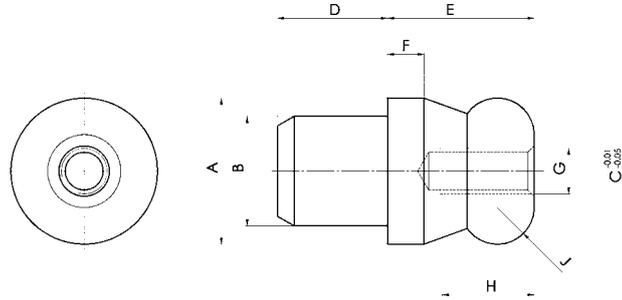
Steel.



Order no.	A	B	C	D	E	F	G	H	J	Weight [g]
374629	16	12	16	12	16	4	M5	10	R4	30

Advantage:

Quick, precise alignment of the fixtures being clamped.



No. 7800VSB

Sword pin

Steel.



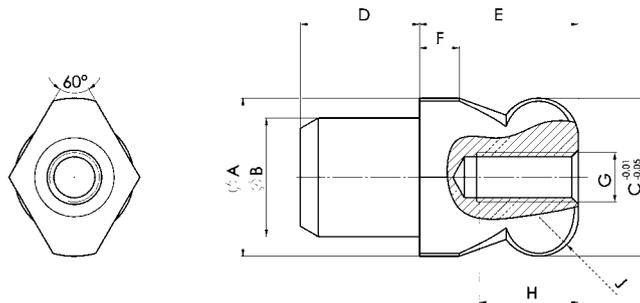
Order no.	A	B	C	D	E	F	G	H	J	K	Weight [g]
374637	16	12	16	12	16	4	M5	10	R4	4,3	23

Application:

The sword pin is used for tolerance compensation (± 0.01).

Advantage:

Quick, precise alignment of the fixtures being clamped.



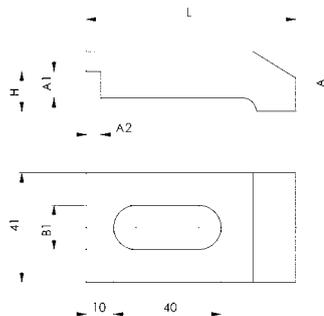
No. 6325

Clamps for machine vices

Tempering steel, blued, packaged in pairs.



Order no.	B1	L	for clamping screw metric	for clamping screw inch	for jaw width	A	A1x A2	H	Weight [g]
74682	16,5	78	M12, 14, 16	1/2, 5/8	100	22,5	10x5,5	15	685



No. 6370ZN-20

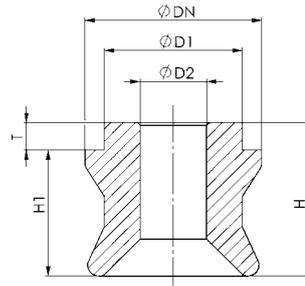
Clamping nipple for clamping modules K20

Hardened, for hydraulic and pneumatic clamping modules size K20.

Order no.	Size	dia. DN	dia. D1	dia. D2	H	H1	M	T	Weight [g]
303149	K20	32,0	25	12	28	23	-	5	110
303156	K20	32,0	25	12	28	23	-	5	110
303164	K20	31,8	25	12	28	23	-	5	110

Design:

Order no. 303149: Zero point nipple
 Order no. 303156: Slit nipple
 Order no. 303164: Undersized nipple
 Order no. 303172: Protection nipple



No. 6370ZNS-001

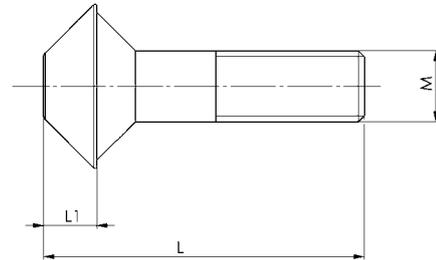
Engagement nipple screw

Strength class 10.9.
 Suitable for clamping nipple, article no. 6370ZN.

Order no.	Size	M	L	L1	Weight [g]
303222	K20	M12	54	9,0	70

On request:

Engagement nipple screws in various lengths and materials (e.g. high-grade stainless steel).

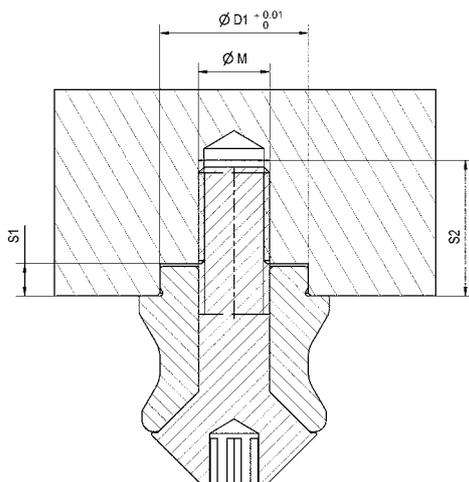


Dimensions for machining nipple mountings.

Size	ØD1	ØM	S1	S2
K20	25	M12	5,5	23

Figure:

Shown with clamping nipple and engagement nipple screw.



These conditions of sale apply to business conducted with companies, legal entities in the public sector, and legal entities with special budget in the public sector. Our deliveries and services are carried out exclusively on the basis of the conditions stated below. Deviating purchasing conditions of the buyer will not become part of the contract, not even through acceptance of the order, unless we have expressly accepted them.

1. Offer and entering into a contract

The basis of our delivery contracts is the latest edition of our catalogue. Orders are not considered as accepted until they have been confirmed by us in writing. When goods are supplied from stock and, for organisational reasons, you receive no separate confirmation, the invoice has the additional function of confirming the order. Details of dimensions and weights, and illustrations, drawings and data are not binding and may be changed by us at any time. Deviations cannot be excluded.

2. Prices

Prices are quoted in EUR ex-works excluding turnover tax, packing, freight, carriage, and insurance. Unless otherwise agreed, our list prices on the day of delivery apply. In order to cover our costs, orders under EUR 50.– net value are subject to a small order surcharge of EUR 10.–.

3. Delivery

Delivery delays are quoted to the best of our knowledge but without guarantee. Agreed delivery delays begin on the day we accept the order and refer to the completion of the goods in our works.

4. Transfer of risk

Risks are transferred to you when the goods are passed to a specific person, company, or organisation that is charged with the execution of carriage of the goods. This applies also to partial deliveries and when we have accepted the costs of carriage, delivery or erection. The risks are also transferred to you when you have defaulted on acceptance.

5. Dispatch

Goods are supplied ex-works. Dispatch is at your cost and risk. Scheduled, FOB, and CIF deliveries are also at your risk. In the absence of specific instructions concerning dispatch, we will arrange same as we think fit, but without accepting any responsibility for choosing the cheapest or most suitable method of dispatch. We make a handling charge of EUR 5.– if goods are sent at your request to a third party. You accept that your order can be supplied in partial deliveries insofar as this is reasonable.

6. Reservation of proprietary rights

Goods delivered remain our property until payment of all claims has been received in full or until redemption of cheques given in payment. The cancellation of individual positions in an open invoice and the drawing of a balance and its acceptance do not affect proprietary rights. You have the right to dispose of the goods as a normal commercial transaction, but you are forbidden to pawn, mortgage, or transfer ownership of them in settlement of a debt or debts. You surrender to us herewith your right to payment for goods for which we reserve our proprietary rights. You have the right to collect these payments as long as you meet your obligations to us. If we request it, you are obliged to name the third party and we have the right to publish this information and the transfer of rights.

7. Cancellation rights due to late payment or insolvency

If you do not pay for the goods by the time payment is due, and if you have not paid after expiry of a reasonable time limit set by us, we have the right to withdraw from the contract and demand the return of goods already supplied. Rights under § 323 BGB (BGB = German civil law code) remain otherwise unaffected. Application for the opening of insolvency proceedings gives us the right to withdraw from the contract and demand the immediate return of goods supplied before the bankruptcy court orders protective measures.

8. Packaging

Packages comply with the German packaging regulations (WO). Disposable packaging is charged at cost. The packaging is not returnable.

9. Tooling costs

In the absence of any agreement to the contrary, tooling made for the execution of an order remains our property in all cases. This applies even if we have made a charge for a proportion of the tooling costs.

10. Payment

Our invoices are payable net within 30 days of the date of the invoice, or with 2% discount if paid within 10 days. Invoices below EUR 50.– are payable immediately without discount. Our credit notes and your charges on us reduce the amount subject to discount. Late payment entitles us to

interest at the rate the bank charges us for a current account overdraft but at least 8 percent above the current base rate of the European Central Bank. If payment is overdue, we are entitled, after giving you notice in writing, to cease fulfilling our obligations under the contract until payment is received.

11. Offsetting exclusion

You can only offset payments with legally-established or unopposed counter claims.

12. Guarantee

If you come to an agreement with us on properties of the goods, we include this agreement in our technical specifications. If we have to supply to your drawings, specifications, samples, etc., you accept the risk associated with suitability for the intended purpose. The point in time at which risk is transferred is decisive for the contractual condition of the goods. The deterioration of parts subject to wear in the course of normal use does not constitute a defect. If the goods supplied are defective, we will – at our choice and within a reasonable time limit set by you – supply a replacement or repair the goods. If such repair or replacement is not satisfactory, you have the right to reduce the price or withdraw from the contract. Any further guarantee claims are excluded. Recognisable defects must be notified at the latest within 10 days of receipt and defects that are not recognisable must be notified as soon as they are discovered. The guarantee period is 24 months and starts with dispatch of the goods from our works.

13. Hindered or impossible performance

If we are prevented from meeting our obligation by some unforeseeable event (e.g. disruption of our plant, or delay in the delivery of important raw materials), which, in spite of taking all reasonable care appropriate to the circumstances of the case, we have been unable to avert, and it has become impossible to execute the delivery or service punctually, the delivery delay will be extended to an appropriate extent.

14. Liability

Except in the case of injury to life or limb, or damage to health caused by our breach of duty, we are only liable in the event of intent or culpable negligence on our part.

15. Customer specials

Orders for customer specials must be in writing and include binding details of execution, quantities etc. For technical reasons we reserve the right to supply 10% more or less than the quantity specified. If technical changes or cancellation are required, the costs incurred will be charged to the customer.

16. Deliveries of samples and return of goods

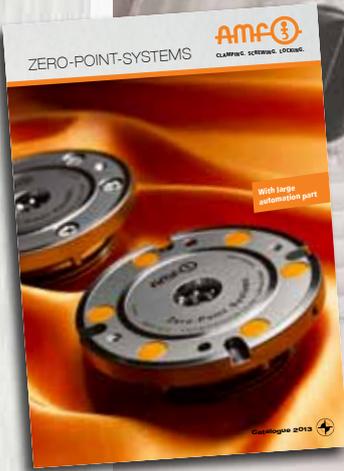
Samples will be charged. When goods have been sent for testing or as samples, we will credit you with the additional price against subsequent orders, as long as the net contract value is at least EUR 125.–. The return of goods is only possible with prior agreement. Customer specials may not be returned. For goods returned for reasons outside our responsibility (e.g. wrongly ordered), we charge 10% of the value of the goods but at least EUR 7.50, to cover administration costs.

17. Place of fulfilment, court of jurisdiction

The place of fulfilment for all obligations arising from this contract is D-70707 Fellbach. The court of jurisdiction for any legal dispute arising from this contract is D-71332 Waiblingen. (All disputes that arise from this contract or about its validity will be decided by a court of arbitration according to the Arbitration Rules of the German Committee for Arbitration Courts/Settlement and Arbitration Procedure of the International Chamber of Commerce. Such decisions will be final and normal legal procedures are excluded.) German law applies (BGB and HGB = civil and commercial codes). The application of UN purchasing law (CISG) is excluded.

18. Validity clause

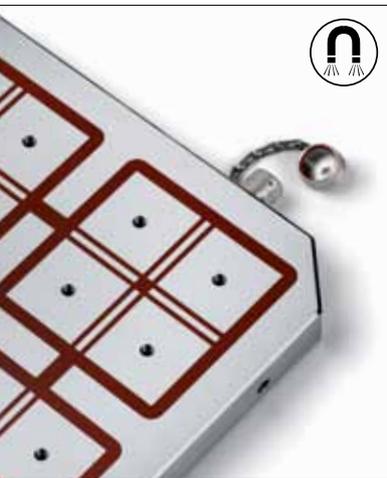
If individual conditions should be found to be not legally valid, the remaining conditions continue to apply. The invalid conditions will be replaced by conditions which fulfil as closely as possible the commercial intent of the contract with reasonable consideration of the interests of both parties. With the publication of these Conditions for Sales, Deliveries and Payment, all previous versions become invalid. This does not apply to contracts agreed before publication.



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