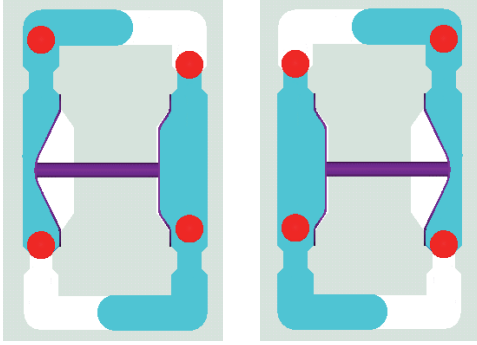


Series
CHEMICOR

Metallic Pneumatic Diaphragm Pumps



Functional principle of double diaphragm pumps

The ALMATEC CHEMICOR series is based on the functional principle of double diaphragm pumps. The basic configuration consists of two external pump housings with a center block between them. Each of the pump housings contains a product chamber which is separated from the center block by a diaphragm. Both diaphragms are interconnected by a piston rod. Controlled by an air control system, they are alternately subjected to compressed air so that they move back and forth.

In the first diagram, the compressed air has forced the left-hand diaphragm towards the product chamber and displaced the liquid from that chamber through the open valve at the top to the discharge port. Liquid is simultaneously drawn in by the right-hand diaphragm, thus refilling the second product chamber. When the end of the stroke is reached, it reverses automatically and the cycle is repeated in the opposite direction.

In the second diagram, liquid is drawn in by the left-hand diaphragm and displaced by the right-hand diaphragm.

The product is displaced - and thus conveyed - pneumatically. The diaphragms merely serve as barriers and are not pressurized. This is a fact of decisive importance for the service life of the diaphragms.

The CHEMICOR series at a glance

- three sizes: AD 20, AD 32, AD 50
- max. capacities 4.5 / 9 / 24 m³/h
- wetted housing parts made of stainless steel precision casting 1.4408 (also polished available)
- special shape of the product chambers
- pump casing with only two joint faces
- freely turnable suction and discharge ports
- ball valves for liquids containing solids
- maintenance-free air control system *PERSWING P*® without dead center
- composite diaphragms with integrated metal core and no diaphragm discs
- proof against dry running and overloading
- self-priming
- gentle displacement
- can be infinitely controlled via the air volume
- no drives, no rotating parts, no shaft seals
- unattended operation with long service life
- compact design
- easy to start up
- integrated muffler
- optional features meeting requirements
 - pulsation damper
 - back flushing system
 - barrier chamber system
 - diaphragm monitor
 - stroke counting
 - center block made of PE conductive (ATEX conformity)
 - special ports for sanitary connections

Compatible *liquids include*

sludge, acids, alkalis, solvents, slurries, emulsions, mixtures of liquids and solids, resins, powders, aqueous solutions, glues, pastes

These *liquids* may be

of high or low viscosity, abrasive, thixotropic, hazardous, toxic, non-lubricating, hot, cold, coagulating, shear sensitive, pasty, solids containing, corrosive

The fields of *application include*

chemical industry, pharmaceuticals, cosmetics, ceramics, surface treatment, emergency services, power plants, refineries, mechanical engineering, textile industry, water processing, waste disposal, paper industry, electronics

The special features

When developing the ALMATEC pneumatic diaphragm pumps made of metal, particular attention was paid to the shape of the product chambers. The result: soft changes of direction, smooth flows and no dead corners.

Two vertical joint faces in the entire construction minimize the number of seals and joints. Unlike the clamping bands which are difficult and time-consuming to adjust, the ALMATEC metal pumps are secured by only 6 or 8 tie rods.

The wetted housing parts are made of stainless steel precision casting or stainless steel precision casting polished. The center block is made of polyamide or PE conductive on request. All pumps of the CHEMICOR series are equipped with ball valves which are insensitive to liquids containing solids.

The ALMATEC metal pumps offer universal possibilities for applications all over the industries.



The materials

Stainless steel 1.4408 (G-X 6 CrNiMo 18 10) is a cast steel which is resistant to corrosion and acids and which is frequently used for fittings and pump casings because of its good general chemical stability. This material in a precision lost-wax casting is used for the wetted housing parts of the CHEMICOR series. The lost-wax process is a complex casting process yielding a smooth and dense surface with increased resistance to corrosion. The housing parts are additionally glass-bead blasted and pickled. The polished version is subjected to three additional machining stages, namely grinding, mechanical polishing and electrolytic polishing.

Cast polyamide PA 6 G is used for the center blocks. It displays very good mechanical strength and can withstand temperatures up to 130°C.

PTFE is a thermoplastic polymer of tetrafluorethylene. It has a smooth surface, a very low friction coefficient, is physiologically safe, can be used over a wide range of temperatures and displays virtually universal resistance to chemicals. However, pure PTFE has very little resistance to abrasion and tends to cold-flow.

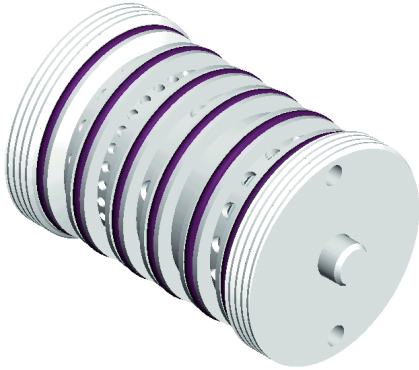
EPDM is an ethylene-propylene-diene rubber. Elastomers made from EPDM have good resistance to ozone and aging, can withstand hot water and steam, oxidizing media, acids, alkalis and ketones. EPDM is not resistant to hydrocarbons. It has good mechanical strength and can be used over a wide range of temperatures up to 130°C.

The materials PTFE and EPDM are used for ball valves and diaphragms of the ALMATEC metal pumps.

Summary of chemical resistance	water	mineral oils	veget., anim. fats	hydrocarbons				alcohols	ketones	esters	acids, diluted	acids, concentrated	alkalis, diluted	alkalis, concentrated	salts
				aliphatic	aromatic	halogenated	chlorinated								
1.4408	+	+	+	+	+	+	+	+	+	+	0	0	0	0	0
PTFE	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
EPDM	+	-	-	-	-	-	-	0	+	+	+	+	+	+	+

+ = resistant, 0 = fairly resistant, - = not resistant; all entries are merely intended for guidance!

The *PERSWING P*® air control system

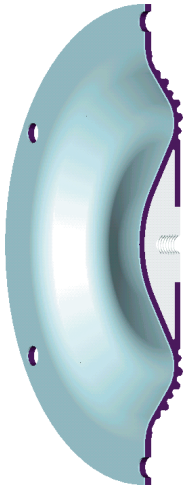


All ALMATEC pneumatic diaphragm pumps of the CHEMICOR series are equipped with the *PERSWING P*® air control system.

This metal-free, pneumatically pilot-operated control system ensures accurate reversal of the main piston and is characterized by low noise levels. Only two moving parts ensure that there is absolutely no dead center in the *PERSWING P*® control system. It does not require maintenance, operates without any lubrication whatsoever and is made up of no more than four different parts. The complete cartridge can be replaced easily.

PERSWING P® is a precision control system and therefore requires clean, oil-free compressed air to ensure its optimal function.

The diaphragms



The surface of the ALMATEC diaphragms is smooth and not interrupted by any seals. Due to the integrated metal core, they do not require diaphragm discs which frequently give rise to leaks.

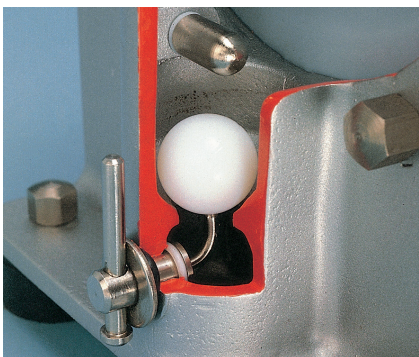
Since the medium is displaced and delivered by the compressed air, the diaphragms merely serve as barriers and are not pressurized. This is a fact of decisive importance for the service life of the diaphragms.

ALMATEC diaphragms have always been designed from the "PTFE" point of view. Result: ALMATEC diaphragms have a large diameter and short stroke with low flexural load. This ensures uniform delivery regardless of the material used for the diaphragms.

ALMATEC diaphragms can be made of either EPDM or PTFE/EPDM-composite. The PTFE/EPDM-composite diaphragm combines the corrosion-resistance of PTFE with the flexibility of an EPDM elastomer.

The optional equipments

Back flushing system (optional equipment code R)



Ball lifters are fitted to the four product valves. The valve balls are lifted out of their seats by turning the handle upwards by 180°. The pump is drained entirely on the suction side. By this, the pump and piping can be emptied without having to be dismantled.

The amount of cleaning agent and solvent required when changing products is reduced considerably and this greatly reduces environmental pollution.

Back flushing systems are primarily used in the paints and varnishes industry, as well as in the food processing industry.

Diaphragm monitoring (code D)

Although ALMATEC diaphragms are designed for an optimum service life, the diaphragms remain a wear part. In case of a diaphragm rupture a capacitive sensor in the pump muffler detects any liquid and gives a corresponding signal to a controller (can also be supplied) which then triggers an alarm or disconnects the pump via a solenoid valve.

Barrier chamber system (code B)

The ALMATEC barrier chamber system meets further safety requirements. The individual diaphragm is replaced by two diaphragms arranged in tandem with a barrier chamber of transparent PMMA filled with non-conductive liquid. The barrier chambers must always be filled completely so the driving air pressure can be transmitted to the medium.

If the diaphragm on the product side ruptures, medium merely enters the barrier chamber and the neutral barrier liquid flows into the medium. The change in conductivity of the barrier liquid is detected by sensors and signaled to a controller which triggers an alarm or disconnects the pump. The conductivity difference limit equals 22 microSiemens.

Stroke counting (code C)

A sensor is installed in the center block of the pump to count the strokes. The diaphragm movement is scanned without contact by this sensor: a safe form of monitoring totally independent of external influences and the pump's mode of operation. The issued sensor pulses can be output to existing detectors or to a stroke counter (can also be supplied). When the preset value is reached, the stroke counter outputs a signal which can then be processed further, for instance in order to shut down the pump via a solenoid valve. Another possibility is the pneumatical stroke counting. The pressure transmitter registers the changes in pressure within the air chamber behind one of the diaphragms.

Center block made of PE conductive: ATEX conformity (code E)

For inflammable liquids as well as for applications in explosion protected areas (ATEX 100 A), only pumps of the CHEMICOR series with a center block made of PE conductive instead of the routinely PA one may be used. The max. operating temperature for pumps with a center block made of PE is 80 °C.

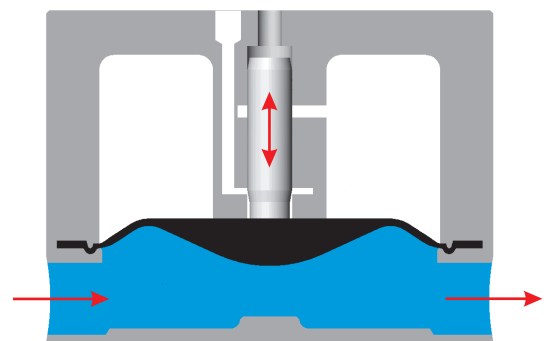
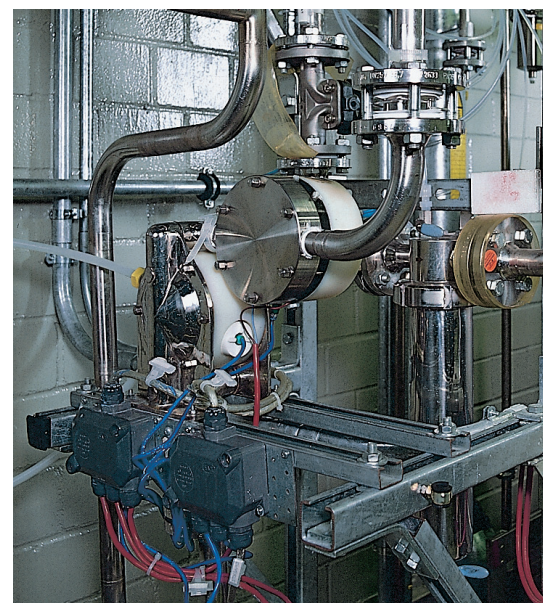
Special ports for sanitary connections

- suitable for sanitary thread DIN 11851 (code M)
- suitable for sanitary thread Naue (code N 1)
- suitable for sanitary thread Neumo (code N 2)
- suitable for Tri-Clamp (code T)

Pulsation damper AT series

Due to their design, pumps with oscillating action produce a pulsating flow. Although the double-acting design of the ALMATEC pumps and the direct pneumatic drive have already greatly reduced the pulsation, a pulsation damper must still be installed on the delivery side in order to obtain a virtually uniform flow. The dampers are self-regulating. They have their own compressed air inlet which must be supplied via the pump connection to ensure that pump and damper are always operated with the same air pressure. The pulsation can already be damped optimally with a minimum back pressure of at least approx. 1 bar.

As in the ALMATEC pumps, the diaphragm merely serves as a barrier between product and air chamber and is therefore always without pressure. If the pressure on the product side drops due to changes in the operating conditions, the pressure on the other side of the diaphragm will decline accordingly. If the pressure on the product side rises, the pressure on the other side will increase as well. This automatic adjustment optimizes the diaphragm setting and ensures a consistently good damping effect. The housings of the ALMATEC AT series are made of stainless steel 1.4571. The damper heads are available either in polyamide and PE conductive.



Technical data	AD 20	AD 32	AD 50
Dimensions (mm), length	154	203	278
width	150	200	270
height	241	325	450
Nominal port size	R 3/4	R 1 1/4	R 2
Air connection	R 1/4	R 1/4	R 1/2
Weight (kg)	6	13	29
Max. particle size of solids (mm)	9	12	14
Suction lift, dry (mWC)			
EPDM ball valves	2	2	3
PTFE ball valves	1	1,5	2
Suction lift, wet (mWC)	9	9	9
Max. operating temperature (°C)	130	130	130
with center block of PE conductive	80	80	80

The product code system of the ALMATEC pneumatic diaphragm pumps, CHEMICOR series

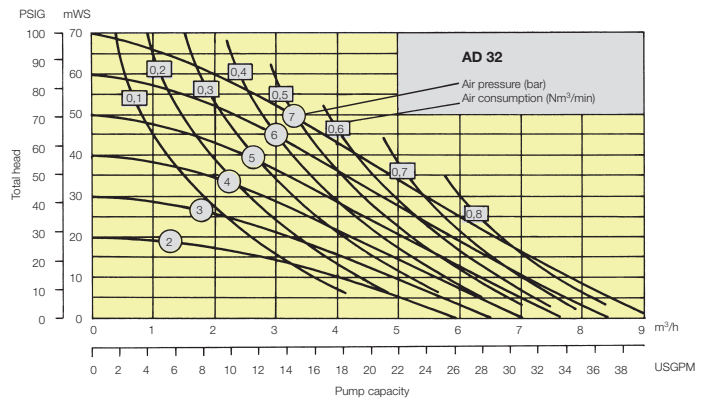
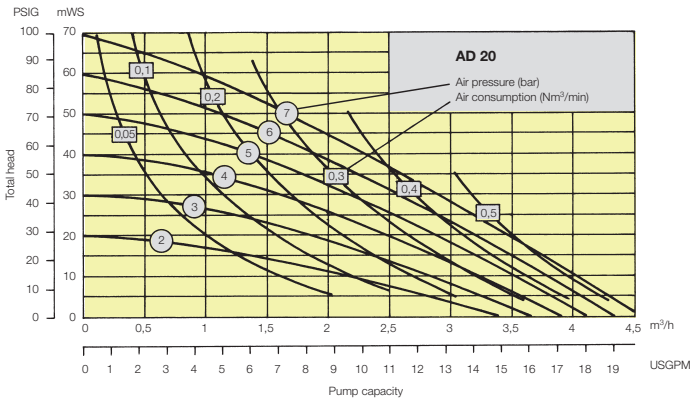
ALMATEC pneumatic diaphragm pump

Size, nominal port size

AD 32 S E E - R

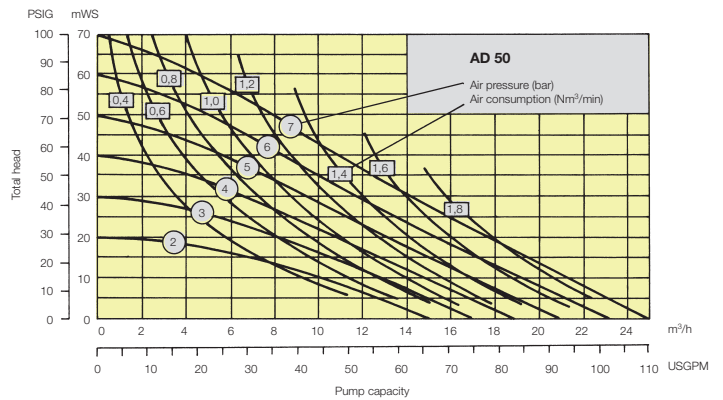
		Code	AD 20	AD 32	AD 50
Material of casing	Stainless steel precision casting 1.4408	S	●	●	●
	Stainless steel precision casting 1.4408, pol.	H	●	●	●
Material of diaphragm	EPDM	E	●	●	●
	PTFE/EPDM composite	T	●	●	●
Material of valves	Ball valves, EPDM	E	●	●	●
	Ball valves, PTFE	T	●	●	●
Optional equipments	Barrier chamber system	B	●	●	●
	Stroke counting	C	●	●	●
	Diaphragm monitoring	D	●	●	●
	Center block made of PE conductive	E	●	●	●
	Back flushing system	R	●	●	●

The performance range

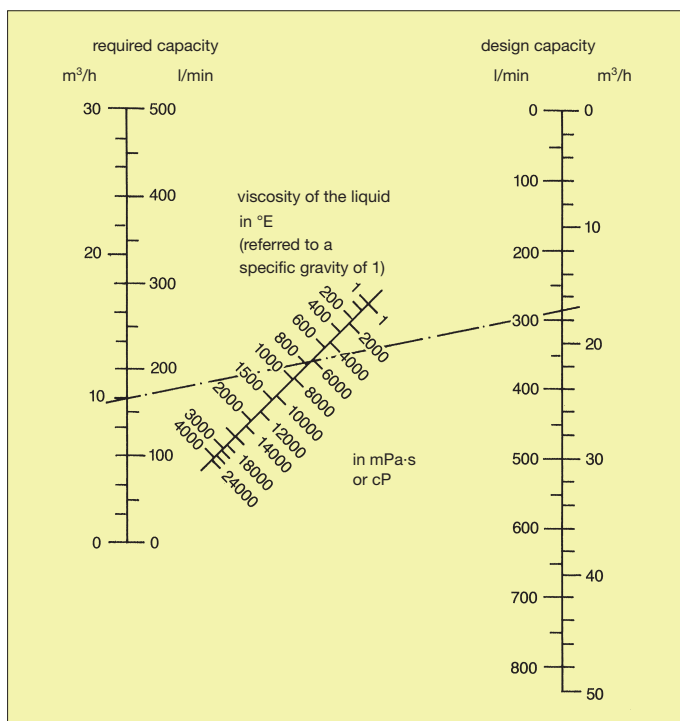


The data refer to water.

The specified performance data are warranted by ALMATEC in accordance with DIN 1944, Stage III as far as applicable.



Product viscosity affects pump capacity



The capacity specified in the pump performance charts generally refer to water (1 mPa·s).

The value must be reduced correspondingly when pumping liquids with higher viscosity. The design capacity can be read off directly from the graph and the corresponding pump size selected.

The example shown here is based on a required capacity of 10 m³/h with a product viscosity of 6000 mPa·s. The dash-dotted line intersects the design capacity scale at 17 m³/h.

ALMATEC – the specialists for pneumatic diaphragm pumps



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