ALMATEC®

CHEMICOR SERIES

Where Innovation Flows

AIR-OPERATED DOUBLE-DIAPHRAGM PUMPS
CONSTRUCTED IN STAINLESS STEEL

PSG® a DOVER company

almatec.de

ALMATEC®

CHEMICOR Series
AODD Pump

CHEMICOR Series at a Glance

- Three sizes: AD 20, AD 32, AD 50
- Max. capacities 4.5 / 9 / 24 m^3/h (19 / 38 /105 gpm)
- Wetted housing parts made of stainless steel precision casting 1.4408
- Special shape of the product chambers
- Pump casing with only two joint faces
- Freely turnable suction and discharge ports
- No drives, no rotating parts, no shaft seals
- 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
- Unattended operation with long service life
- Compact design
- Easy to start up
- Integrated muffler
- Optional features meeting requirements

Special Features

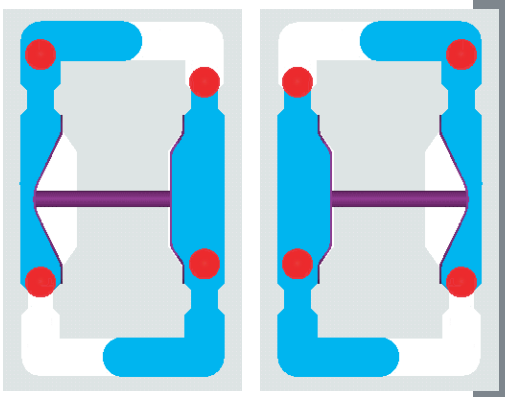
When developing the ALMATEC air-operated diaphragm pumps made of stainless steel (SS316), particular attention was paid to the shape of the product chambers. The result: soft changes of direction, smooth flows and no dead corners.

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. 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 CHEMICOR pumps offer universal possibilities for applications all over the industries.

FUNCTIONAL Principal



The ALMATEC CHEMICOR Series is based on the functional principle of double-diaphragm pumps. The basic configuration consists of two external side housing with a center housing between them. Each of the side housings contains a product chamber which is separated from the center housing by a diaphragm. The two diaphragms are interconnected by a piston rod. Directed by an air control system, they are alternately subjected to compressed air so that they move back and forth. In the first figure, 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 figure, liquid is drawn in by the left-hand diaphragm and displaced by the right-hand diaphragm. The liquid is displaced – and thus conveyed – 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.

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.

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.

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

Compatible Liquids Include:

- Sludge
- Acids
- Alkalis
- Solvents
- Slurries
- Emulsions
- Mixtures of Liquids and Solids
- Resins
- Powders
- Aqueous Solutions
- Glues
- Pastes

These Liquids May Be:

- 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

SUMMARY OF CHEMICAL RESISTANCE

				HYDROCARBONS											
	WATER	MINERAL OILS	VEG. ANIMAL FATS	ALIPHATIC	AROMATIC	HALOGENATED	CHLORINATED	ALCOHOLS	KETONES	ESTERS	ACIDS, DILUTED	ACIDS, CONCENTRATED	ALKALIS, DILUTED	ALKALIS, CONCENTRATED	SALTS
1.4408	+	+	+	+	+	+	+	+	+	+	**0**	**0**	**0**	**0**	**0**
PTFE	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
EPDM	+	–	–	–	–	–	–	**0**	+	+	+	+	+	+	+

+ = Resistant, **0** = Fairly Resistant, **–** = Not Resistant; *All Entries are merely intended for guidance!*

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Diaphragms, Ball Valves, Air Control System

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, a fact of decisive importance for the service life of the diaphragms.

ALMATEC diaphragms have always been designed from the "PTFE" point of view. As a result, ALMATEC diaphragms have a large diameter and short stroke with low flexural load, ensuring uniform delivery, regardless of the diaphragm materials used. 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 ball valves, available in EPDM, PTFE and NBR, are robust and are insensitive to liquids containing solids since they form a linear seal with the valve seat.

All ALMATEC air-operated 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.

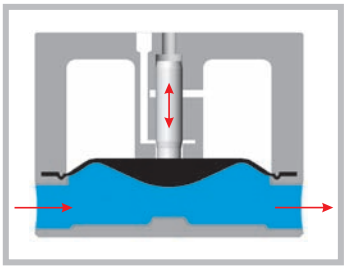
High-Pressure Design (AH-S)

In addition to the standard CHEMICOR pumps high-pressure models are also available. Pump sizes AH 20 S and AH 32 S achieve a max. capacity of 4 m^3/h (17 gpm) and 10 m^3/h (44 gpm) and a discharge pressure of 15 bar (218 psig). Due to their ATEX conformity the pumps can be used in explosion-proof areas and for flammable liquids. The non-wetted center blocks are made of conductive polyethylene (AH 20) respectively of aluminum (AH 32).

A typical field of application for the ALMATEC high-pressure diaphragm stainless-steel pumps is in the paint and varnishes industry. In modern varnishing systems, air-operated diaphragm pumps are frequently used for the transport of the paint. In this process a central paint supply with one pump only is increasingly common. The required pressures are naturally higher when using a single pump. Often the plants are designed for all-purpose use, meaning the plant should be able to varnish all current paints. Thereby, every change of the paint requires a complex cleaning process. Conventional units need multiple rinsing processes to avoid the mixture of the different paints, costing time and a bulk of cleaning fluid. The ATEX conformity of ALMATEC high pressure diaphragm pumps has a significant importance by considerably reducing the needed time and consumption of the cleaning fluid. This leads to a quicker availability, an increase of production periods, thus improving the operationality and efficiency of the plant with less costs for cleaning agent.

Active Pulsation Dampers

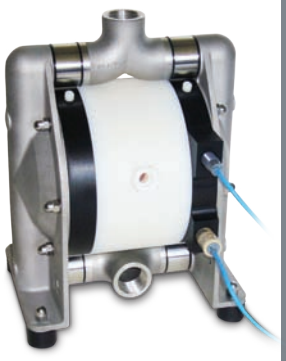
Due to their design, pumps with oscillating action produce a pulsating flow. Although the double-acting design of the ALMATEC pumps and the direct pneumatic drive have already greatly reduced the pulsation, a pulsation damper must still be installed on the discharge side in order to obtain a virtually uniform flow. The ALMATEC dampers of the AT series are self-regulating. 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. As soon as 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.



Optional Equipment

Barrier chamber system (code BS)

The ALMATEC barrier chamber system for the CHEMICOR series meets high safety requirements. The individual diaphragm is replaced by two diaphragms arranged in tandem with a barrier chamber of conductive PE between them and filled with non-conductive liquid. The barrier chambers must always be filled entirely to transmit the air pressure to the medium and must be monitored by level sensors. If the diaphragm on the product side breaks, medium merely enters the barrier chamber and the non-conductive 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.



Diaphragm monitoring (code D)

A capacitive sensor installed in the pump muffler detects all liquids and in case of a diaphragm rupture it outputs a corresponding signal to a controller which then triggers an alarm or disconnects the pump via a connected solenoid valve.

Special ports for sanitary connections

- Suitable for Sanitary Thread DIN 11851 (Code M)
- Suitable for Tri-Clamp (Code T)

Stroke counting (code C)

Almatec air-operated double diaphragm pumps can be used continuously or intermittently for hours, minutes or for an exact defined number of strokes. A sensor can be installed in the pump's center block to accurately count the strokes. This is available in a pneumatic version as well.

Special diaphragms (code L and P)

For the use of the pumps in the device group IIC (European ATEX regulation) without flanking measures diaphragms made of conductive PTFE/EPDM compound are available (code L).

For liquids with increased diffusion tendency (e.g. benzene, solvents) as well as for applications with priming out of a vacuum PTFE/EPDM compound diaphragms made of modified PTFE are obtainable (code P).

ATEX conformity (code E)

For inflammable liquids as well as for applications in explosion protected areas (ATEX), 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.

Draining system (code R)

CHEMICOR pumps are available with the special ALMATEC draining system. Ball lifters are fitted to the four product valves. The ball valves are lifted out of their seats by turning the handle upwards by 180°. The pump and piping can then be drained without having to be dismounted, considerably reducing the amount of cleaning agent and solvent required when changing products, greatly reducing environmental pollution.

Transport Cart

A lot of industrial applications need not only stationary air-operated diaphragm pumps but also mobile pumping units (e. g. as emergency pump, as short-dated replacement for a pump to be repaired or for decanting between two containers).

The transport cart consists of a square-pipe frame made of stainless steel and four fixable conductive castors. Room is available for product and air hoses. Possible accessories are:

- complete air supply with clamp connection
- regulator with integrated filter
- air supply for pump and damper

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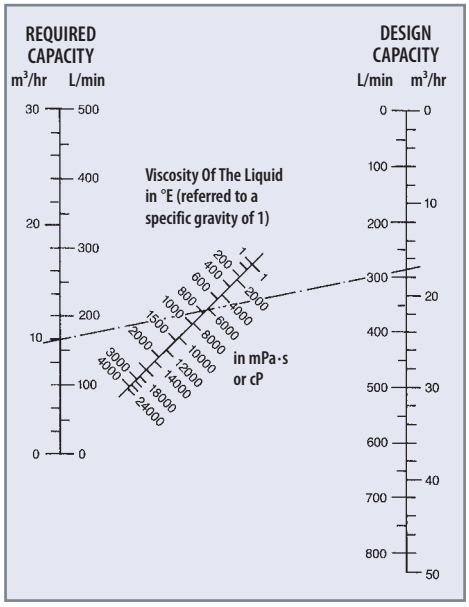
TECHNICAL DATA

	AD 20	AD 32	AD 50
Dimension (mm/inch): length	154 (6.1)	203 (8.0)	278 (10.9)
width	150 (5.9)	200 (7.9)	270 (10.6)
height	241 (9.5)	325 (12.8)	450 (17.7)
Nominal port size, BSP	3/4"	1-1/4"	2"
Air connection, BSP	1/4"	1/4"	1/2"
Weight (kg/lbs)	6 (13)	13 (29)	29 (64)
Max. particle size of solids (mm/inch)	9 (0.35)	12 (0.47)	14 (0.55)
Suction lift, dry (mWC/ftWC):			
EPDM ball valves	2 (6.6)	2 (6.6)	3 (9.8)
PTFE ball valves	1 (3.3)	1.5 (4.9)	2 (6.6)
Suction lift, wet (mWC/ftWC)	9 (29.5)	9 (29.5)	9 (29.5)
Max. operating temperature (°C/°F)	130° (266°)	130° (266°)	130° (266°)
with center block of PE conductive	80° (176°)	80° (176°)	80° (176°)
Max. driving and operating pressure (bar/psig)	7 (100)	7 (100)	7 (100)

Viscosity and 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.

Code System

Optional equipment:

BS = Barrier chamber system
C = Stroke counting
D = Diaphragm monitoring
E = ATEX conformity - Center block PE conductive
L = Special diaphragms - Conductive PTFE/EPDM
P = Special diaphragms - Modified PTFE
R = Draining system
(M, T) = Special ports for sanitary connections (AD20/32 only)

AD Series — **Size, port dimension**

AD 32 S - E - E - R

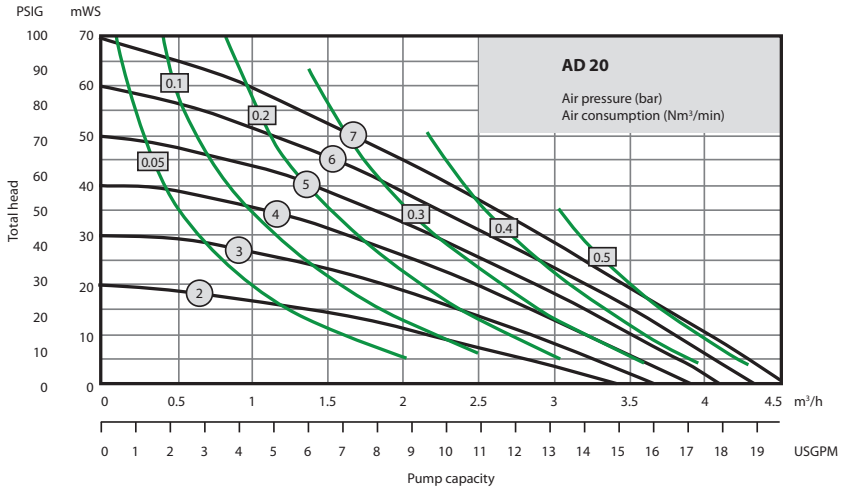
Material of casing:
S = Stainless steel precision casting 1.4408

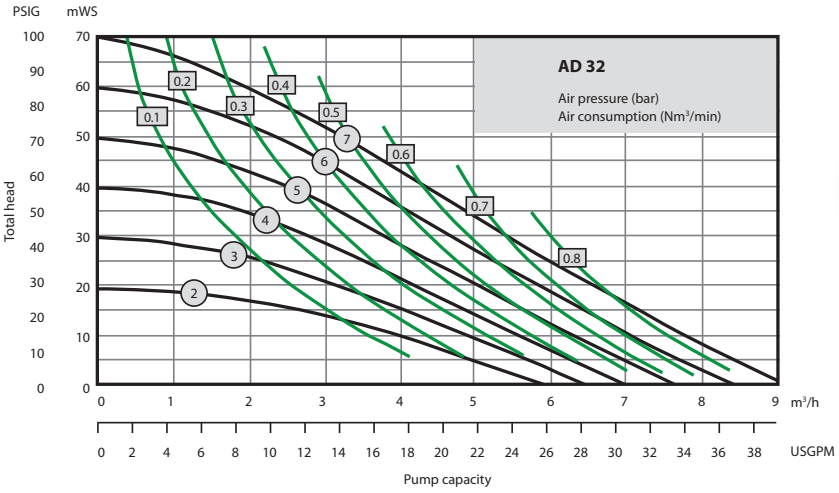
Diaphragm material:
E = EPDM
T = PTFE/EPDM compound
N = NBR

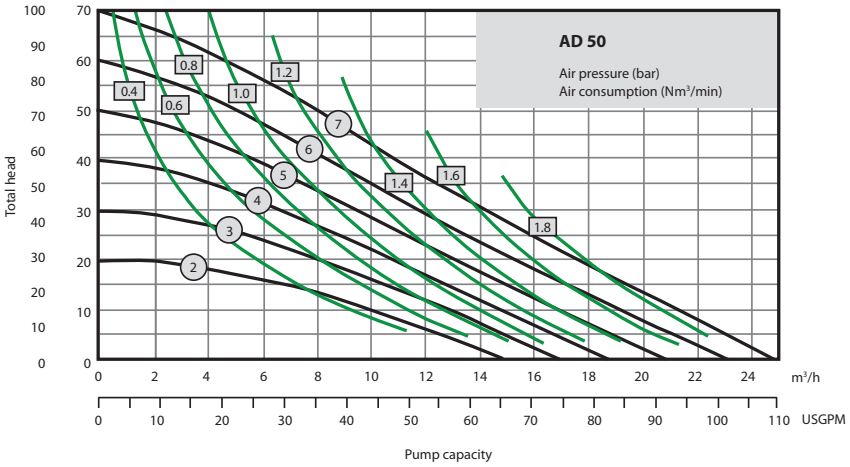
Ball valve material:
E = EPDM
T = PTFE
N = NBR

Performance Charts

The data refer to water. The specified performance data are warranted by ALMATEC in accordance with DIN EN ISO 9906.







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ALM-30000-C-02-A4