

ALMATEC®

BIOCOR SERIES

Where Innovation Flows

METAL AIR-OPERATED DOUBLE-DIAPHRAGM PUMPS
FOR STERILE APPLICATIONS WITHIN PHARMACEUTICAL,
BIOTECHNICAL AND FOOD INDUSTRY


a **DOVER** company

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BIOCOR the Aseptic Pump at a Glance

- Air operated pumps for sterile applications within pharmaceutical, biotechnical and food industry
- Built in accordance to the essential specifications (EHEDG, FDA, CLASS VI etc.)
- Integrated cleaning-system with high cleaning results
- CIP (clean in place) and SIP (sterilization in place) capabilities
- ATEX conformity
- Wetted materials made of SS316L (Basel Standard II) to $\leq 0.4 \mu\text{m}$ ($15.75 \mu\text{in}$)
- Sterile design: no horizontal areas
- Drainage of the pump by magnetical lifting of the valve balls from the outside (B20 and B32 only)
- Smooth diaphragms without disc and seals
- Diaphragms, ball valves and O-rings made of PTFE or EPDM (FDA conform)
- Maintenance-free air control system PERSWING P® without dead spot
- Gentle displacement
- No drives, no rotating parts, no shaft seals within the fluid
- Short-term temperature range up to 130°C (266°F)
- Easy to start up, step-less control via the air volume and pressure
- Proof against dry running
- Self priming
- Suction and discharge ports suitable for Tri-Clamp and other sanitary threads

Pump Models:

B20: Max capacities of $3.5 \text{ m}^3/\text{h}$ (15.4 gpm)

B32: Max capacities of $7.5 \text{ m}^3/\text{h}$ (33 gpm)

B40: Max capacities of $17 \text{ m}^3/\text{h}$ (75 gpm)



In Compliance with the Hygienics Standards

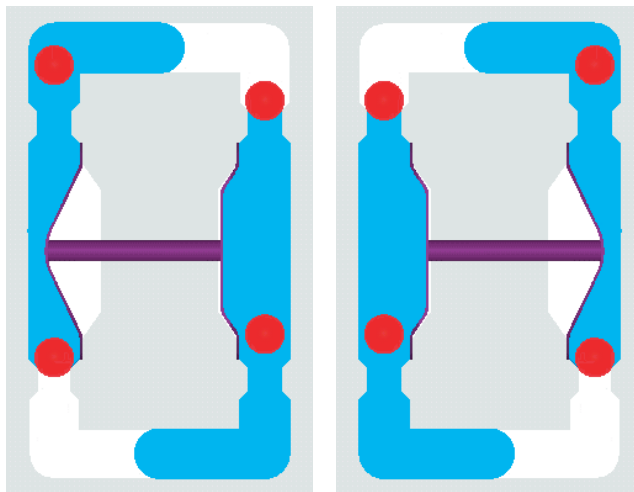
The Aseptic pumps of the BIOCOR series are built in compliance with the corresponding hygienics standards (EHEDG, FDA, Class VI etc.). The special design with the integrated cleaning-system enables the CIP (clean in place) and SIP (sterilization in place) capability. In addition the pumps are ATEX conform according to 94/9/EG directive.



Functional Principal

The ALMATEC BIOCOR Series is based on the functional principle of air-operated double-diaphragm pumps. The basic configuration consists of two external product housings with a center block between them. Each of the product housings contains a product chamber which is separated from the center block 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

The BIOCOR series is available in three pump sizes B20, B32 and B40. The material for the wetted housing parts is electropolished SS 316 L (Basel Standard II, ferrite content < 1%) with a surface roughness of $\leq 0.4 \mu\text{m}$ (15.75 μin). The frame is made of 1.4404 and the center block of polyethylene conductive. The suction and discharge ports are suitable for Tri-Clamp or different sanitary threads (Naue, Neumo, DIN 11851, DIN 11864).



The diaphragms, ball valves and O-rings are made of PTFE or EPDM (FDA); other materials on request.

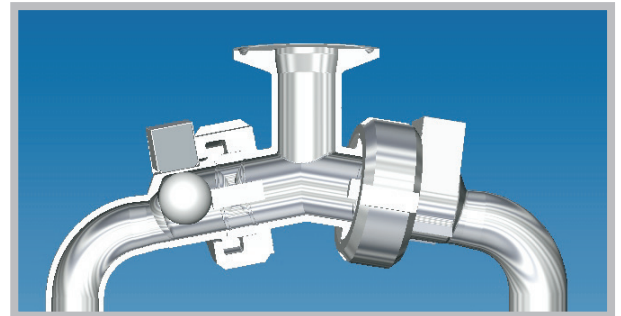


More Special Features

Always a demand for sterile applications: all housing parts of the BIOCOR pumps show no horizontal areas. Each pump of the B 20 and B 32 sizes comes with four ball lifting magnets, which can be attached to the pump housing from the outside at the location of the four ball valves. The ball valves are risen up magnetically out of their seats and the pump is drained entirely without having to be dismantled. There are no mechanical ball lifters with parts and seals in the wetted area.

Soft redirections without rotating parts and shaft seals in the product chamber together with the principle-related gentle displacement result in a special suitability for the supposed applications.

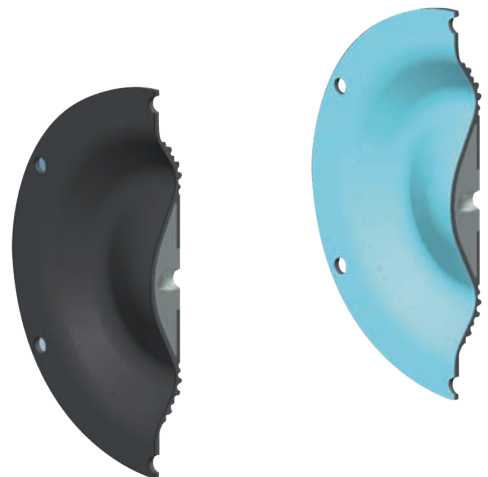
The three pump sizes B 20, B 32 and B 40 achieve max. capacities of 3.5/7.5/17 m³/h (15.4/33/75 gpm) resp. a max. discharge pressure up to 7 bar (100 psig) and a short-term temperature range of 130 °C (266 °F).



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. 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. ALMATEC diaphragms for the BIOCOR series are available in the materials EPDM (FDA) or PTFE/EPDM-composite. The ball valves, which are insensitive against solids, have a metal core for a better suction lift. In addition the use of the ball lifting magnets for the complete pump draining is possible (B20 and B32 only).

The BIOCOR pumps are equipped with the patented 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.



Optional Equipment

Diaphragm Monitoring (code D)

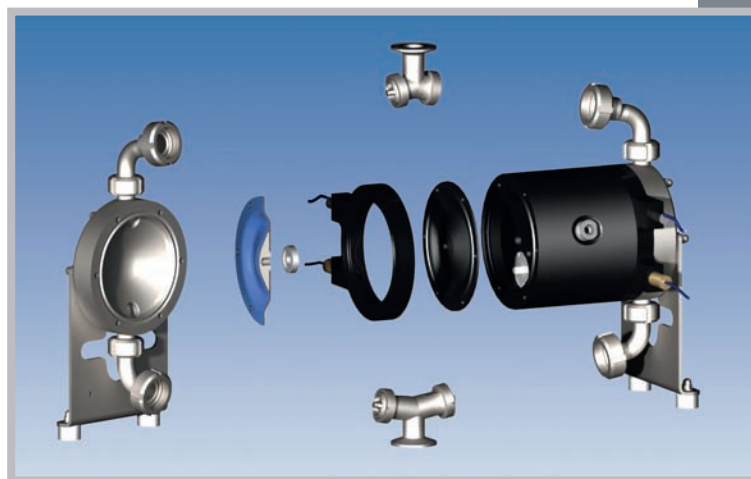
A capacitive sensor installed in the pump muffler detects all liquids and in case of a diaphragm rupture it outputs a corresponding signal to a controller which then triggers an alarm or disconnects the pump via a connected solenoid valve.



Barrier Chamber System (code BS)

The ALMATEC barrier chamber system meets further safety requirements. The individual diaphragm is replaced by two diaphragms arranged in tandem with a barrier chamber filled with non-conductive liquid. The barrier chambers must always be completely filled so the driving air pressure can be transmitted. Therefore it is monitored by level sensors.

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 limit equals 22 microSiemens.

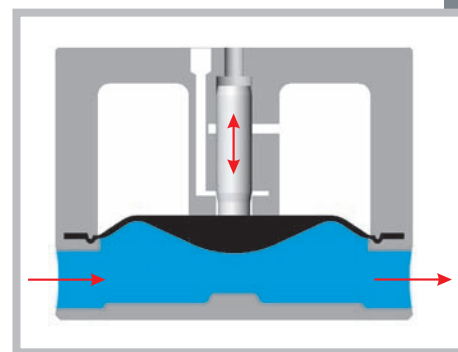


Stroke counting (code C)

A sensor is installed in the center block of the pump to count the strokes. The diaphragm movement is scanned without contact. 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.

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 P 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.





TECHNICAL DATA

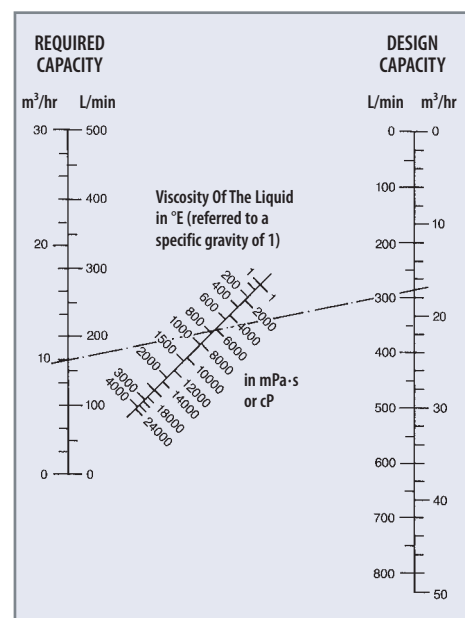
	B20	B32	B40
Dimension (mm/inch): length	244 (9.6)	284 (11.2)	462 (18.2)
width	150 (5.9)	200 (7.9)	270 (10.6)
height	381 (15)	484 (19)	681 (26.8)
Nominal port size (depends of the choosen suction and discharge connection)	DN 20	DN 32	DN 40
Air connection, BSP	1/4"	1/4"	1/2"
Weight (kg/lbs)	12 (27)	26 (57)	67 (147)
Max. particle size of solids (mm/inch)	3 (0.12)	5 (0.20)	9 (0.35)
Suction lift, dry (mWC/ftWC)	2 (6.6)	2.5 (8.2)	3 (9.8)
Suction lift, wet (mWC/ftWC)	9 (29.5)	9 (29.5)	9 (29.5)
Max. driving and operating pressure (bar/psig)	7 (100)	7 (100)	7 (100)
Max. operating temperature (°C/°F)	80 (176)	80 (176)	80 (176)

Viscosity and Pump Capacity

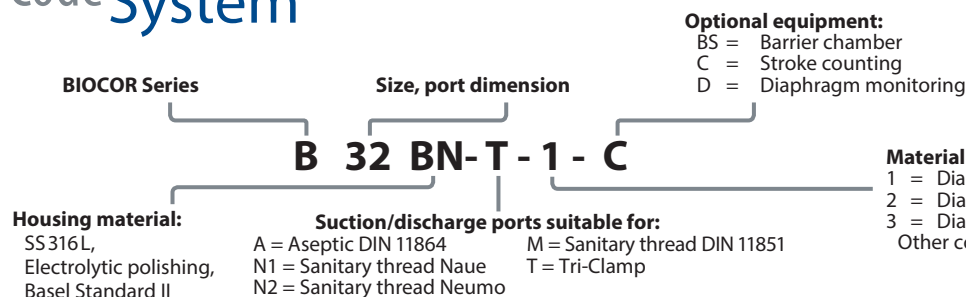
The capacity specified in the pump performance charts generally refer to water (1 mPa-s).

The value must be reduced correspondingly when pumping media 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

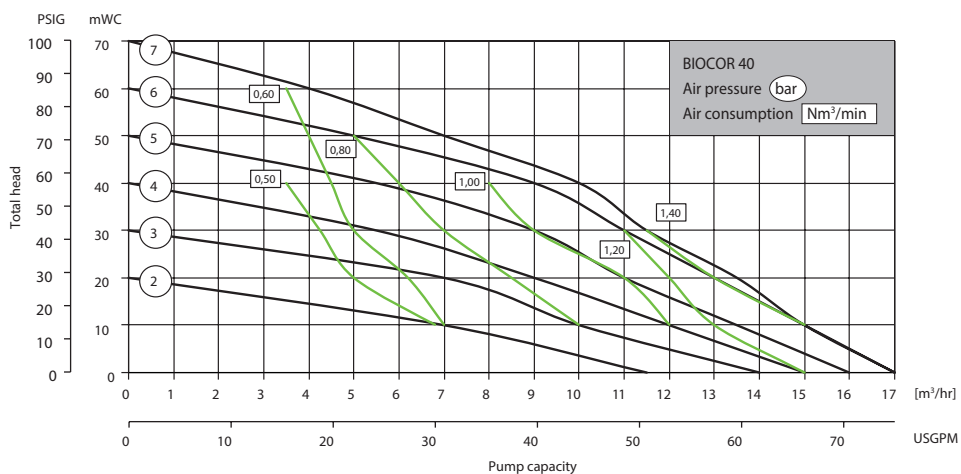
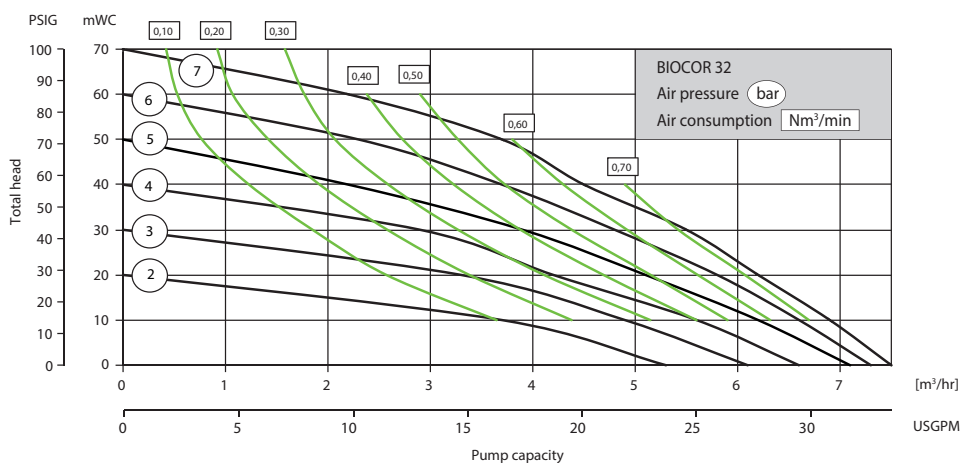
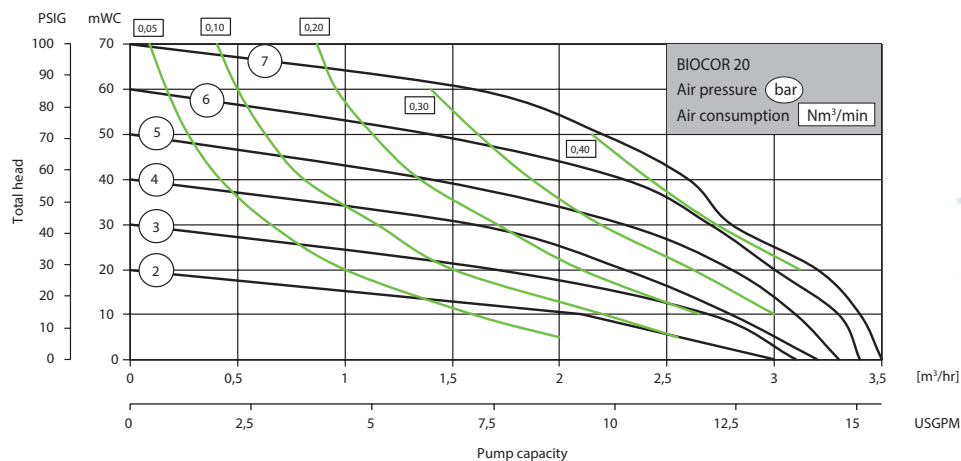


Material combinations:

- 1 = Diaphragms/valve balls PTFE, O-rings EPDM (FDA)
 - 2 = Diaphragms/valve balls/O-rings PTFE
 - 3 = Diaphragms/valve balls/O-rings EPDM (FDA)
- Other combinations on request

Performance Charts

The following data refer to water at 20°C / 68°F (referring to DIN EN ISO 9906)



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