

# DEPA<sup>®</sup>

brands you trust.



DEPA<sup>®</sup> Air-Operated  
Double Diaphragm Pumps

**CRANE**

ChemPharma Flow Solutions

[www.cranechempharma.com](http://www.cranechempharma.com)

## Air-Operated Diaphragm Pumps Legacy of Innovation



### Legacy of Innovation and Customer Service

Designed and manufactured for over 40 years in Düsseldorf, Germany, DEPA® Air-Operated Double Diaphragm (AODD) pumps have earned industry recognition for premium quality and innovative design.

Focus on customer satisfaction is supported with quality and reliability, validated by ISO 9001 and ISO 14001 certifications.



### Product Highlights

- DEPA® offers a wide range of pumps for diverse applications, from standard pumps to highly customized and engineered products, and we supply accessories and components suitable for most AODD pump installations
- Interchangeability of components among DEPA® pumps offers unprecedented flexibility in many applications, extending product life and reducing total cost of ownership
- We are an AODD pumps manufacturer with an in-house research and development department, constantly driving product improvement and innovation, e.g. with our DEPA® diaphragm technology
- DEPA® air distribution systems are designed for high efficiency
- DEPA Nopped E<sup>4</sup>® diaphragms are available in a comprehensive selection of sizes with extended service life and an enviable safety and performance record
- Our material certifications meet hygienic standards, both for food and pharmaceutical, offering compliance with FDA, EHEDG, and 3A Sanitary Specifications
- Our products also conform to ATEX requirements for use in potentially explosive and hazardous applications: DEPA® is currently the only AODD zone 0 pumps manufacturer



For technical support and additional information, please visit our website.

## Air-Operated Diaphragm Pumps Key Features

Our Uniquely-Built Pumps Offer These Key Features:

- ① Compact design requires fewer components, resulting in lower maintenance and downtime
- ② Interchangeable modular design allows fewer spare parts inventories
- ③ Special applications can be accommodated by combining our housing and elastomer materials





## Air-Operated Diaphragm Pumps Applications



### Series M Main Applications

- Automobile
- Chemical
- Ceramic and Porcelain
- Mining, Building
- Paint and Varnish
- Wastewater
- Plant and Mechanical Engineering



### Series P Main Applications

- Chemical
- Galvanic and Coating
- Paint and Varnish
- Pulp and Paper
- Pharmaceutical
- Plant and Mechanical Engineering
- Power Stations and Waste Disposal Technology



### Series L Main Applications

- Beverage
- Biotechnology
- Chemical
- Cosmetic
- Dairies
- Food
- Medical Applications
- Pharmaceutical

Housing Material	Series	Application		
		Chemical	Industrial	Food, Pharmaceutical, and Sanitary
Aluminium	M	○	●	○
Cast Iron	M	○	●	○
Stainless Steel	M	●	●	○
Polished Stainless Steel	L	●	○	●
Polypropylene (PP)	P	●	○	○
Polytetrafluoroethylene (PTFE)	P	●	○	○

● Preferred product / first choice

○ Possible use of product

## Air-Operated Diaphragm Pumps Applications



### Pharmaceutical and Cosmetic

Pharmaceutical and Cosmetic process applications call for demanding hygienic standards (EHEDG, FDA, and 3A) and efficient “cleanability” of system components. DEPA® pumps accommodate these requirements with their design and polished surfaces (up to 0,5 µm) permitting in-place cleaning and sterilization.

*(Pictured) DEPA® 1” polished stainless steel pumps for hydrogen peroxide + additives in a hair colour production process*



### Food

DEPA® pumps were designed with an unimpeded flow-path, providing smooth transfer of product, which generates minimal shear effect even with large solid content.

*(Pictured) DEPA® 1 ½” pump for transfer of fruit juice concentrate*



### Paint and Varnish

Paints and varnish production utilizes unique applications. Two of these applications are dosing of chemicals and mixing of paints. A commonly found process—transfer of solvents—can create an explosion-prone atmosphere. Our DEPA® pumps operate safely under these conditions, and come with full ATEX certification for your peace of mind.

*(Pictured) DEPA® 3” Metallic pumps for dispersion paint for charging the filling stations*



### Tanks/Cisterns - Evacuation (or transfer between vessels)

DEPA® pumps operate effectively in applications such as emptying of mobile and stationary tanks. Their high flow rate speeds up this process. The media transferred (pumped out) can vary from solvents and acids to alkali or other products.

*(Pictured) DEPA® 1 ½” metallic pump in a tank emptying station*



### Industrial and Chemical

The selection of available housing and elastomer materials make our pumps adaptable for most highly aggressive or corrosive media. DEPA® pumps’ outstanding chemical resistance and robust design contribute to a reliable and safe operation.

*(Pictured) DEPA® 2” Polypropylene pumps for off-loading Hydrochloric Acid*

## Air-Operated Diaphragm Pumps Flexible Modular Design

A key design concept of our DEPA® air-operated double diaphragm pumps is a modular, compact design. Fewer parts lead to pump efficiency thereby reducing downtime and parts inventories.

Our pumps can easily be modified to switch from one application to another simply by changing the diaphragms, balls, and seats.

**Note:**

The illustration shows our DL Clampband version.

**Material Options, Housing**

FA	Aluminium
CA	Cast Iron
CX	Cast Iron
SA	Cast Stainless Steel 316 L
SS	Cast Stainless Steel 316L
SX	Cast Stainless Steel 316 L
SF	Cast Stainless Steel 316 L Electro-Polished
SLV	Stainless Steel 304 Polished
SUV	Stainless Steel 316 L Polished
UEV	Stainless Steel 316 L Polished
PP	Polypropylene
PL	Polypropylene, Electroconductive
PM	Polypropylene, Injection Molded
PV	PVDF
PT	PTFE
TL	PTFE, Electroconductive

**Material Options, Centre Block**

FA, SA, CA	Aluminium
SX, CX	Bronze
SFS, SS, SLV, SUV, UEV	Stainless Steel
SF	Aluminium, Nickel-Coated
PP, PM, PT	Polypropylene
PL, TL	Polypropylene, Electroconductive



## Air-Operated Diaphragm Pumps Interchangeable Design



- Material Options, Valve Balls**
- B NRS
  - E EPDM
  - F FKM
  - G EPDM Grey
  - N Nitrile
  - R Stainless Steel
  - T PTFE
  - V NRS/Steel Core
  - W EPDM/Steel Core
  - X EPDM Grey/Steel Core
  - Y Nitrile/Steel Core
  - Z PTFE/Steel Core

- Material Options, Valve Seats**
- B NRS
  - E EPDM
  - F FKM
  - G EPDM Grey
  - H Stainless Steel only DB
  - N Nitrile
  - R Stainless Steel
  - T PTFE

- Material Options, Diaphragms**
- B NRS
  - E EPDM
  - F FKM
  - G EPDM Grey
  - N Nitrile
  - P PTFE (DH only)
  - S DEPA Nopped S<sup>4</sup>® (Santoprene®)
  - T PTFE
  - U EPDM Grey (DH only)
  - Z DEPA Nopped E<sup>4</sup>® (PTFE Compound Diaphragm)

<b>DL</b>	<b>25</b>	<b>- SA</b>	<b>-</b>	<b>E</b>	<b>E</b>	<b>T</b>
Pump Type	Pump Size	Material Combination Housing/Control Block		Diaphragms	Valve Seat	Valve Balls

Santoprene® is a registered trademark of Advanced Elastomer Systems L.P.



## Air-Operated Diaphragm Pumps Housing and Air Control

### Housing Materials

#### Aluminium



Multi-purpose housing material that is lightweight with versatile properties suitable for transfer of alcohols, paints, petrols, and oils.

Applications: Paints, automotive, and transportation services

Temperature Range: -10°C to +130°C (+14°F to +266°F)

#### Cast Iron



Robust, ductile material (spheroidal graphite) with resilient mechanical characteristics. Applicable for abrasive materials, alcohols, petrols, and oils.

Applications: Heavy duty industrial applications, abrasive products

Temperature Range: -10°C to +130°C (+14°F to +266°F)

#### Stainless Steel



Austenitic steel, cast or forged, with a high level of chemical and corrosion resistance. Available in highly polished versions intended for food processing. Suitable for environments containing acids, solvents, and caustic media.

Applications: Diverse chemical, food, and pharmaceutical

Temperature Range: -25°C to +130°C (-13°F to +266°F)

#### Polypropylene



Excellent chemical and corrosive resistance. Available in electroconductive variants suitable for acids, solvents, and caustic products.

Applications: All chemical industries and wastewater treatment

Temperature Range: 0°C to +60°C (+32°F to +140°F)

#### PTFE



Thermoplastic material with superior chemical and corrosive resistance properties. Available in electroconductive material for undiluted heavy acids and caustic media.

Applications: All chemical (and transfer of aggressive chemicals in "EX-areas")

Temperature Range: -20°C to +100°C (-4°F to +212°F)

### Air Valve

In applications distribution across the globe, DEPA® air-operated double diaphragm pumps are subjected to impressive ranges of operating temperatures, pressure fluctuations, full load, and intermittent operating conditions.

This often places severe demands on the air valve responsible for the distribution of air in the individual chambers, thereby regulating the operation of the pump.

In order to meet the emerging requirements of industry, DEPA® engineers conduct ongoing intensive research and development work to maintain "state-of-the-art" status for our products. Functional safety and low maintenance requirements have always been among our major guiding design principles.

DEPA® air-operated double diaphragm pumps can be equipped with either internal or external air valves.

#### Internal Air Valve

- Freezing virtually eliminated
- No dead centre
- Low maintenance, oil-free operation
- Suitable for outside applications
- Economical, energy saving
- Not affected by minor contamination of compressed air
- Very durable
- Reliable

#### External Air Valve

- Quickly replaceable
- Low start-up pressure
- No dead centre
- Low maintenance, oil-free operation
- Economical, suitable for all pumps
- Simple handling
- Very durable
- Air saving due to virtually no leakage rate













## Air-Operated Diaphragm Pumps Materials and Selection

### Elastomer Materials (for Diaphragms)

The characteristics of various elastomer compounds are taken into account in the selection of diaphragm materials to match the chemical and mechanical requirements of particular applications.

state-of-the-art manufacturing process directly contributes to the extended lifetime of our diaphragms. A remarkable part of the process is the use of fabric that is integrated during forming within the elastomer, enhancing stability.

The design of DEPA® diaphragms incorporates technological advances developed over years of field experience. Our

<p><b>DEPA Nopped E<sup>4</sup>® PTFE Compound Diaphragm</b></p> <p><b>Key Features:</b> Made of high A-grade PTFE and an EPDM back up; smooth and clean surface with integrated outer piston; superior chemical resistance suitable for heavy acids and caustic products; can be used in ATEX-conformant pumps.</p>  <p><b>Applications:</b> All chemical (and transfer of aggressive chemicals, also in "EX-areas")</p> <p><b>Temperature Range:</b> -10°C to +130°C (+14°F to +266°F)</p>	<p><b>EPDM</b></p> <p><b>Key Features:</b> Elastomer rubber with sound elastic properties; good chemical resistance for acidic and caustic media; frequently used with solvents and alcohols.</p>  <p><b>Applications:</b> Miscellaneous chemical and industrial</p> <p><b>Temperature Range:</b> -25°C to +90°C (-13°F to +194°F)</p>
<p><b>PTFE</b></p> <p><b>Key Features:</b> PTFE diaphragm with EPDM back up; the high chemical resistance appropriate for heavy acids and caustic products; also suitable for use in ATEX-conformant pumps.</p>  <p><b>Applications:</b> All chemical (and transfer of aggressive chemicals, also in "EX-areas")</p> <p><b>Temperature Range:</b> -5°C to +130°C (+23°F to +266°F)</p>	<p><b>EPDM Grey</b></p> <p><b>Key Features:</b> Pale elastomer rubber material with good elastic properties and viable chemical resistance for acidic and caustic products; environments with solvents and alcohols are common applications.</p>  <p><b>Applications:</b> Food, pharmaceutical, and beverage</p> <p><b>Temperature Range:</b> -25°C to +90°C (-13°F to +194°F)</p>
<p><b>DEPA Nopped S<sup>4</sup>® (Santoprene®)</b></p> <p><b>Key Features:</b> Excellent chemical and wear resistance; optimal for acidic and caustic environments.</p>  <p><b>Applications:</b> All chemical and industrial</p> <p><b>Temperature Range:</b> -20°C to +110°C (-4°F to +230°F)</p>	<p><b>NBR</b></p> <p><b>Key Features:</b> Multi-purpose diaphragm of nitrile rubber for oily or greasy service; suitable for diverse hydrocarbons, mineral oils, grease and fuels.</p>  <p><b>Applications:</b> Chemical and industrial</p> <p><b>Temperature Range:</b> -15°C to +90°C (-13°F to +194°F)</p>
<p><b>FKM</b></p> <p><b>Key Features:</b> Elastomer rubber with good chemical resistance and applicable for hydrocarbons, acidic, and caustic media. Withstands elevated temperatures.</p>  <p><b>Applications:</b> Miscellaneous chemical and industrial</p> <p><b>Temperature Range:</b> -5°C to +120°C (+23°F to +248°F)</p>	<p><b>NRS</b></p> <p><b>Key Features:</b> Versatile multi-purpose natural rubber elastomer with good wear characteristics and elasticity, especially well-suited for abrasive products and highly diluted caustic and acidic media, and water.</p>  <p><b>Applications:</b> Applications with solid content, and heavy duty applications</p> <p><b>Temperature Range:</b> -15°C to +70°C (+5°F to +158°F)</p>

## Metal Pumps, Series M Overview



DEPA® air-operated double diaphragm pumps made of cast metal have proven themselves over decades in various industrial applications. The myriad of established applications across the globe include installations on ships, at well-known ceramics manufacturers, in spray painting systems (in the automobile industry), and in mining operations, among countless others.

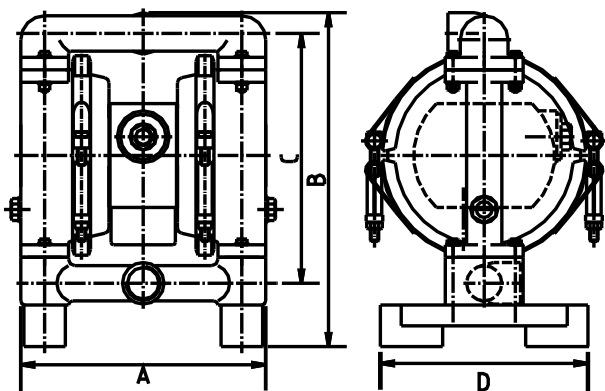
The sturdy cast metal construction provides high resistance to abrasive media and a low flow resistance, owing to its polished surface. They are available in a wide selection of temperature ratings, and offer excellent corrosion resistance and a long product life.

The compact design makes the pumps easy to transport and they can be used as mobile or stationary units.

Our pumps were designed for ease of maintenance in order to minimise downtime, and they can be easily disassembled without any special tools.

Their modular design enables flexibility and restricts the need for large spare parts inventories. DEPA® cast metal pumps can be fitted with a comprehensive assortment of accessories to match the requirements of applications. This flexibility is further enhanced by the availability of various housing and elastomer materials – extending the range of applications for which our pumps can be used.

Type	DL 15 (½")	DL 25 (1")	DL 40 (1 ½")	DL 50 (2")	DL 80 (3")
FA - Aluminium	●	●	●	●	●
CA - Cast Iron	-	●	●	●	●
CX - Cast Iron / Bronze	-	●	●	●	●
SA - Cast Stainless Steel 316L	●	●	●	●	●
SX - Cast Stainless Steel 316L / Bronze	-	●	●	●	●
SS - Cast Stainless Steel 316 L / Stainless Steel	●	●	●	●	●



Type	Dimensions mm (inch)			
	A	B	C	D
DL 15	190 (7,5)	225 (8,9)	180 (7,1)	122 (4,8)
DL 25	236 (9,3)	322 (12,7)	241 (9,5)	200 (7,9)
DL 40	310 (12,2)	407 (16,0)	306 (12,0)	255 (10,0)
DL 50	412 (16,2)	540 (21,3)	415 (16,3)	340 (13,4)
DL 80	510 (20,1)	680 (26,8)	522 (20,6)	420 (16,5)

## Non-Metallic, Series P Overview



Series P made of mechanically manufactured or specially injection moulded plastic parts was designed for problem free pumping of corrosive and abrasive products in galvanic applications, in the chemical industry, and in mechanical engineering.

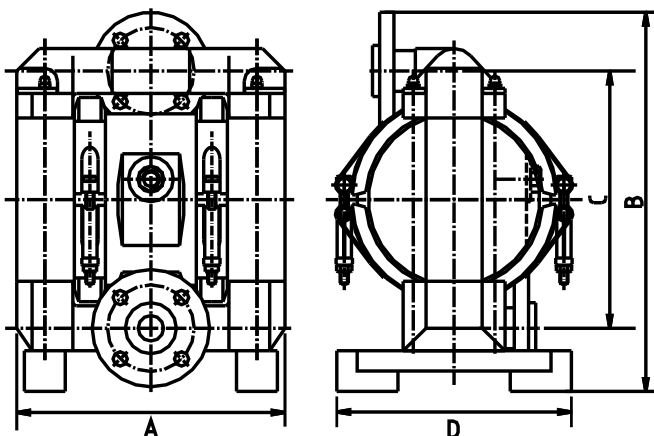
Mechanically stable metals do not necessarily possess the required chemical resistance needed for certain corrosive media. For applications needing such resistance, we developed our DEPA® Series P air-operated double diaphragm pump versions that are made of plastic materials.

The Series P operating pressure tolerances compare with cast metal pumps, handling pressures up to 7 bar.

Computer-aided injection moulding methods deliver uniform, high quality surface finishes, minimizing flow loss while providing excellent abrasion resistance. High mechanical stability is achieved in a compact construction.

Our broad selection of construction materials allows the Series P pumps to be used in diverse applications. Internally and externally mounted air control valves are available, and our customers can choose from ANSI, DIN, and JIS flanges and threaded connections. To ensure suitability for a variety of media, wetted parts are available in numerous optional materials.

Type	DL 15 (½")	DL 25 (1")	DL 40 (1 ½")	DL 50 (2")	DL 80 (3")
PM - Polypropylene, Injection Moulded	●	●	●	-	-
PP - Polypropylene, Solid	●	●	●	●	●
PL - Polypropylene, Conductive	●	●	●	●	-
PT - PTFE	●	●	●	●	-
TL - PTFE Conductive	●	●	●	●	-



Type	Dimensions mm (inch)			
	A	B	C	D
DL 15	212 (8,4)	293 (11,5)	185 (7,3)	195 (7,7)
DL 25	263 (10,4)	372 (14,7)	252 (9,9)	230 (9,1)
DL 40	353 (13,9)	489 (19,3)	334 (13,2)	255 (10,0)
DL 50	450 (17,7)	622 (24,5)	448 (17,6)	340 (13,4)
DL 80	558 (22,0)	785 (30,9)	578 (22,8)	420 (16,5)



## Stainless Steel Pumps, Series L Overview



**Series L pumps are made of high-gloss polished stainless steel developed for applications in food, pharmaceutical, cosmetic, and beverage industries.**

Our Series L pumps meet relevant industry standards applicable to housing and approved elastomer materials (EHEDG, FDA, and 3A) and surface quality (up to 0,5 µm).

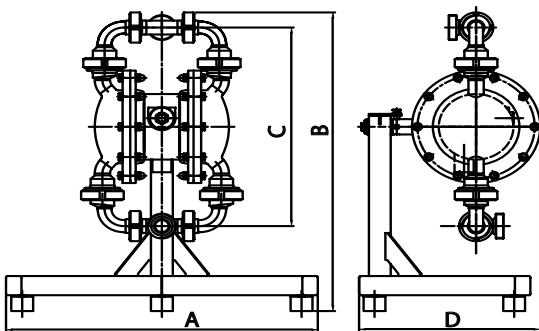
Clean In Place (CIP) and Sterilize in Place (SIP) standards are not uniform throughout the world, and our pumps were designed to take into account regional requirements. Consequently, we have made our pumps available in polished stainless steel 304 or 316L, with high-gloss clamp bands, and as a DH-UE version in a flanged construction design.

By using a large ball valve clearance, our pumps can handle media containing solids, such as pieces of fruit, meat or vegetable, without suffering damage.

Pumps can be supplied with connections for fluids, such as DIN11851, DIN 11864, Triclamp, Neumo or SMS, as required by the application. Some models are supplied with a height-adjustable bright polished frame.

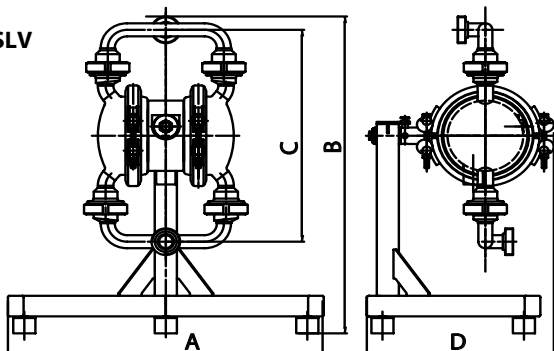
Type	DL 15 (½")	DL 25 (1")	DL 40 (1 ½")	DL 50 (2")	DL 80 (3")
DL-SF - Cast Stainless Steel 316 L Electro Polished	●	●	●	●	●
DL-SLV - Stainless Steel 304 Polished	-	●	●	●	●
DL-SUV - Stainless Steel 316 L Polished	-	●	●	●	-
DL-UEV - Stainless Steel 316 L, up to Ra<0,5µm Electro Polished	-	●	●	●	●
DH-UEV - Stainless Steel 316 L1, up to Ra<0,5µm Electro Polished (Flanged Design)	-	●	●	●	-

Type DH-UEV



Type	Dimensions mm (inch)			
	A	B	C	D
DL 25	571 (22,5)	624 (24,6)	415 (16,3)	332 (13,1)
DL 40	571 (22,5)	711 (28,0)	575 (22,6)	347 (13,7)
DL 50	834 (32,8)	981 (38,6)	714 (28,1)	487 (19,2)

Type DL-SLV



Type	Dimensions mm (inch)			
	A	B	C	D
DL 25	571 (22,5)	618 (24,3)	415 (16,3)	337 (13,3)
DL 40	571 (22,5)	705 (27,8)	575 (22,6)	363 (14,3)
DL 50	834 (32,8)	974 (28,3)	714 (28,1)	495 (19,5)
DL 80	834 (32,8)	1063 (41,9)	857 (33,7)	540 (21,3)

## Air-Operated Diaphragm Pumps Special Designs

### Powder Pumps - Type DP

#### Main applications:

- Manufacturing of plastic products
- Basic chemistry
- Pharmaceutical industry
- Breweries
- Food industry



DEPA® air-operated double diaphragm pumps type DP can transfer easy-to-fluidize powders economically, in a virtually dust-free and smooth process. In many industrial applications, powder pumps are used for rapid displacement of contents from vehicles or reusable containers, especially where transfer time and imminent mobility of vehicles/containers impact operating costs.

Our DP 125 is known to be the world's largest air-operated diaphragm pump, and it was developed in cooperation with industry. This pump has been successfully deployed over several years in special applications, providing high capacity transfer of powder.

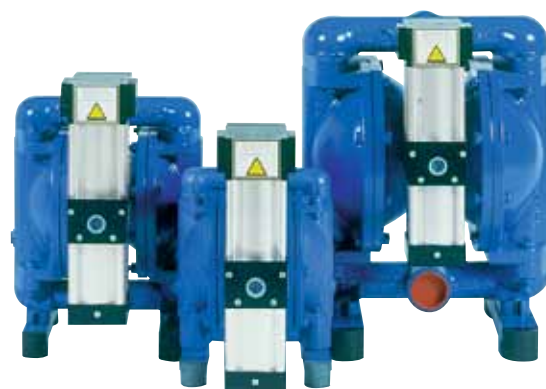
For gentle transfer of powder the pumps are, depending on type, equipped with a Y-shaped suction and discharge manifolds as standard, in order to significantly improve powder flow. DP pumps are equipped with an additional aeration valve on the suction side inlet to enable finely controlled regulation of the required vacuum. They may also be equipped with a complete fluidization capability.

Type	DP 40 (1 ½")	DP 50 (2")	DP 80 (3")	DP 125 (5")
<b>FA</b> (Aluminium)	●	●	●	●
<b>CX</b> (Cast iron)	-	●	●	-
<b>SLV</b> (Stainless steel 304)	-	-	●	-

### High Pressure Pumps - Type DB

#### Main applications:

- Ceramic industry
- Automobile industry
- Wastewater industry
- Chemical industry
- Environmental technology



DEPA® air-operated double diaphragm pumps type DB are the latest generation of high-pressure pumps. Industrial pressure requirements can be demanding and varied (13, 16, or 21 bar are common), and high pumping capacities in the low pressure range (up to 7 bar) are also in demand. Our DB pumps accommodate such requirements.

DB high-pressure pumps are available in three different sizes, and are made of stainless steel. DB Pumps are designed as flanged versions to accommodate high pressures. Safety valves prevent pressure increases beyond stipulated (permitted) discharge pressures.

All high pressure pumps are fitted with a separate booster unit, which can be either directly mounted onto the pump or installed independently. Where compressed air at a suitable pressure is available, the pumps can operate without the booster. The booster increases unassisted pressure by up to a 3:1 ratio, without which DB pumps perform at the top range of our standard pumps (7 bar).

Type	DB 25 (1")	DB 40 (1 ½")	DB 50 (2")
<b>SA</b> (Stainless steel 316L)	●	●	●

## Air-Operated Diaphragm Pumps Special Designs

### Drum Pumps - Type DF

**Main applications:**

- Chemical industry
- Waste disposal technology
- Automobile industry
- Furniture industry
- Heavy industry



DEPA® air-operated double diaphragm pumps type DF are designed for emptying drums and containers, and provide an economical and wear resistant alternative to other pumping systems.

In order to handle a wide range of fluids, DF 25 pumps are available in alternate housing material options (e.g. aluminium, and stainless steel).

The pump can be quickly and easily mounted on the drum using a drum adapter. The drum will be completely emptied with a suction pipe. Both drum adapter and suction pipe are part of the supply.

All DEPA® pumps are resistant against damage due to dry running, and are "infinitely" adjustable within their performance range. Many drum pumps can be combined with DEPA® special accessories and are used by industry for dosing or as filling stations.

Type	DF 25 (1")
<b>FA</b> (Aluminium)	●
<b>SA</b> (Stainless steel 316L)	●
<b>SX</b> (Stainless steel 316L)	●
<b>SS</b> (Stainless steel 316L)	●

### Dual Action Pumps - Type DZ

**Main applications:**

- Surface treatment technology
- Wastewater technology
- Printing industry
- Paper processing
- Furniture industry



DEPA® air-operated double diaphragm pumps type DZ are mainly used in the textile and paper processing industry.

These dual action pumps are able to transfer two different media independently and simultaneously. This is accomplished by using separate connections on the suction and discharge ports, keeping two pumped media isolated from each other, preventing unwanted mixing.

A typical application in printing and paint industries is the simultaneous supply of disparate viscous media to the production line. Economy and environmental protection concerns are thereby alleviated. All DZ pumps can be combined with DEPA® accessories.

Type	DZ 15 (½")	DZ 25 (1")	DZ 40 (1 ½")	DZ 50 (2")
<b>FA</b> (Aluminium)	●	●	●	●
<b>CA</b> (Cast iron)	-	●	●	●
<b>CX</b> (Cast iron)	-	●	●	●
<b>SA</b> (Stainless steel 316L)	●	●	●	●
<b>SX</b> (Stainless steel 316L)	-	●	●	●
<b>PM</b> (Polypropylene, Injection Moulded)	●	●	-	-
<b>PP</b> (Polypropylene, Solid)	●	●	-	-



## Air-Operated Diaphragm Pumps Accessories and Automation

### Pulsation Dampners



Active



Passive

DEPA® air-operated double diaphragm pumps can be equipped with an active pulsation dampner mounted on the discharge manifold. This minimises any remaining pulsations.

Active pulsation dampners are particularly suitable for intermittent operating conditions and, due to their integrated control, they automatically adjust to provide an optimal degree of dampning. A separate air supply is required.

As with the air-operated double diaphragm pumps, a principle guiding the development of pulsation dampners was the modular use of common components.

Pulsation dampners require minimum maintenance and are, subject to the requirements of the application, available in the same housing and diaphragm materials as the pump.

As an alternative to the active pulsation dampner, DEPA® air-operated double diaphragm pumps can also be supplied with a passive pulsation pipe dampner mounted on the discharge pipe. This type is particularly suitable for uninterrupted operating conditions.

Passive pulsation dampners are available in several housing materials - painted steel, polypropylene, or stainless steel - and, depending on the design, can be fitted with an internal diaphragm.

### Filling Control



DEPA® air-operated double diaphragm pumps can be used with an automatic filling control. The required pumped volume can be programmed in litres. The pump delivers the medium until the set quantity is reached, and then shuts down.

Type	DL 15	DL 25	DL 40	DL 50	DL 80
FS	●	●	●	●	●
CS	-	●	●	●	●
SS	●	●	●	●	●
SL	-	●	●	●	●
SU	-	●	●	●	●
UE	-	●	●	●	●
PP	●	●	●	●	●
PL	●	●	●	●	-
PT	●	●	●	●	-
TL	●	●	●	●	-

### Mobile Units

DEPA® air-operated double diaphragm pumps can be supplied as mobile units. Trolleys are in paint-finished steel or high-gloss stainless steel.

They can be fitted with a handle, two or four castors, a collecting basin, or other accessories as required by the customer.

### Diaphragm Monitoring System



DEPA® air-operated double diaphragm pumps can be equipped with a diaphragm monitoring system. This option is recommended wherever chemically aggressive, environmentally hazardous, or toxic media are handled.

The diaphragm monitoring system is available for conductive and non-conductive media, as well as for ATEX-applications.

## Air-Operated Diaphragm Pumps Accessories and Automation

### Slow Start Up Air Valve



For pumps that have not been primed for operation, the unthrottled opening of the compressed air supply can create severe loads on housing materials and diaphragms, resulting in an unwanted wear. These pressure shocks can be mitigated by increasing operating pressure in a slow and gradual manner. To automate this process, we have produced our Slow Start-Up Air Valve that can be used with all DEPA® pumps.

### Air Service Units



If available compressed air is “unfiltered,” DEPA® air-operated diaphragm pumps should be fitted with an upstream service unit. The special filter in our Air Service Units cleans the compressed air by removing residues of water and oil droplets. The integrated pressure regulator maintains the working pressure at a stable level, unaffected by pressure fluctuations in the main air supply.

### Flanges, Fittings, Quick Couplings



DEPA® air-operated double diaphragm pumps can be equipped with a range of accessories, including couplings, flanges and fittings.

Depending on the type of pump, these can be supplied in aluminium, brass, stainless steel, or plastic.

### Suction Pipes



DEPA® air-operated double diaphragm pumps can be fitted with a suction hose and various types of suction pipes to handle liquid or powder media.

Depending on the application, suction pipes are available with or without aeration, in various lengths, in steel or stainless steel.

### Suction Filters



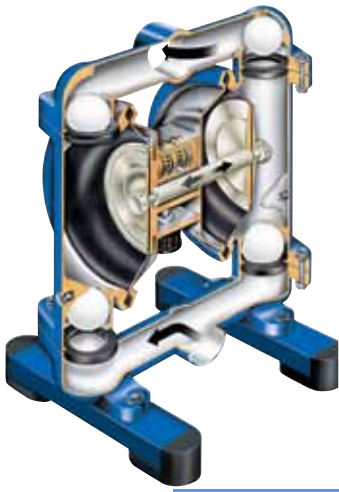
DEPA® air-operated double diaphragm pumps series M can be fitted with a suction filter connected to the inlet side for handling slurries. Filters are available in steel or stainless steel for all pump sizes.

### Suction and Discharge Hoses



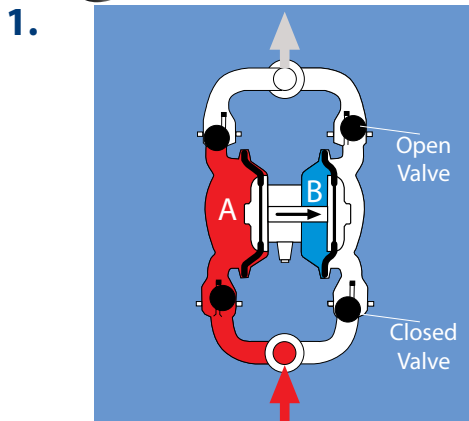
DEPA® air-operated double diaphragm pumps can be fitted with suitable suction and discharge hoses. These are available in nominal sizes ranging from 1” to 4” diameter. They can be connected with “quick couplings” (or other accessories). All hoses are pressure tested. The product range includes standard spiral hoses with plastic or steel reinforcement, hoses for chemical applications, and hoses approved for food applications.

## Air-Operated Diaphragm Pumps Operation

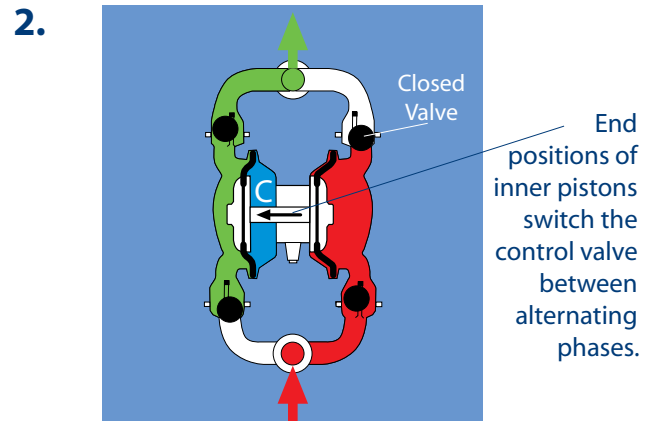


### Operation

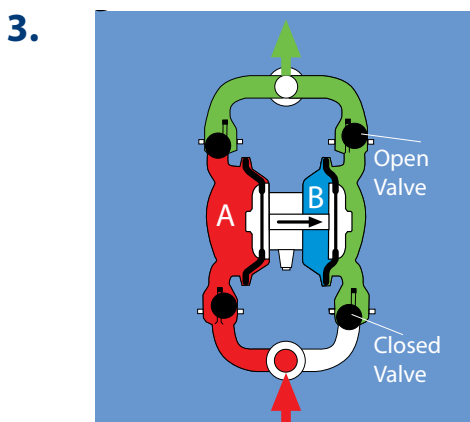
DEPA® air-operated double diaphragm pumps work on the principle of oscillating positive displacement, with two back-to-back pump chambers. Both are divided by a diaphragm into an air and a fluid region. The two diaphragms are connected by a piston rod, creating the effect that during one cycle medium is expressed out of one pump chamber while medium is being drawn into the other pump chamber. The four drawings depict the sequence of a complete cycle consisting of suction and pressure strokes, showing an empty and a "full" air-operated diaphragm pump. The medium is presented in colour (red/green), for ease of demonstration.



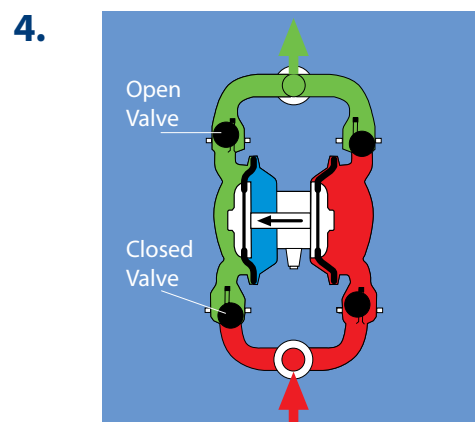
On start-up, pressurized air in region B (acting via connected diaphragms) lowers the pressure in chamber A.



Pressurized air in region C acts on the diaphragm to displace product out of the pump.



The process continues by again creating pressure in region B, this time expelling product from the pump while drawing in new product into chamber A where simultaneously a low pressure had been generated.



The cycle repeats by alternately producing pressure in regions B and C while the pump is in operation.



## Air-Operated Diaphragm Pumps Selection

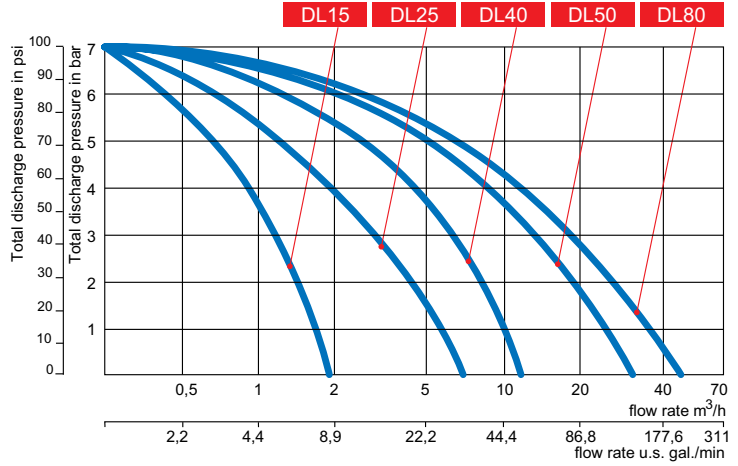
### Selection

#### Pump Capacity

To select the right DEPA® pump for your application, the following factors should be considered to achieve economy of operation, long pump life, and minimal maintenance costs:

- The nature of the medium to be pumped, its viscosity, and the solids content (proportion to total content)
- Pumping capacity in relation to the desired output (per unit of time)
- Suction and pressure conditions

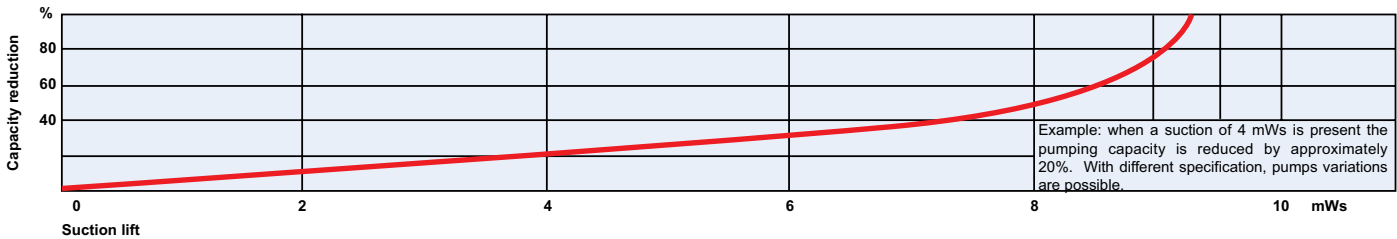
Considering these parameters, an optimal pump size is selected when the intersection of the intended installation “pressure vs. flow rate” is near the middle section of the curves. (Please contact your DEPA® representative for assistance in specifying Special Design pumps.)



The graph is for orientation only.

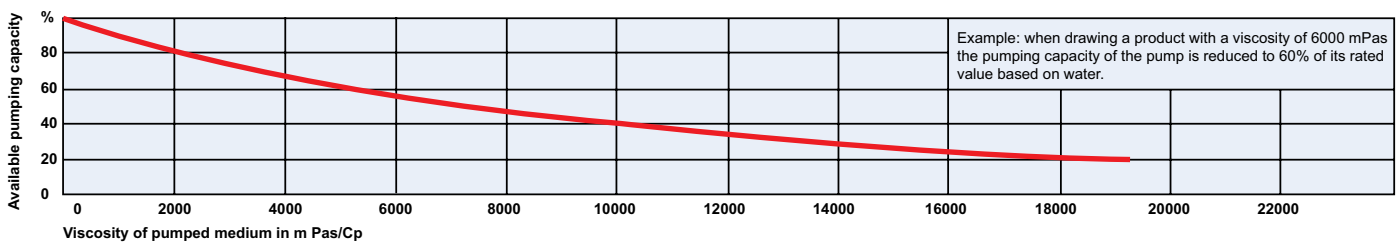
### Capacities with Specified Suction Lift

All DEPA® air-operated double diaphragm pumps are self-priming. There is a difference between “dry” (without medium) and “wet” (with medium) priming. When calculating the pumping capacity, the specific gravity of the product and the respective suction lift must be taken into consideration. Furthermore, losses attributed to piping or hoses on the suction side and the specific properties of housing and diaphragm materials must also be factored in.



### Capacities with Viscous Fluids

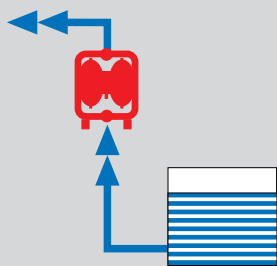
All capacity curves shown in the diagram are related to water (1 mPa·s). In order to determine the appropriate pump capacity for viscous media, the realized capacity reductions shown in the diagram must be considered in relation to the known viscosity. In addition, factors such as product flow properties, length and cross-section of piping or hoses on suction and discharge sides, and valve and pump sizes with their specific characteristics must be taken into account.



## Air-Operated Diaphragm Pumps Installation Overview

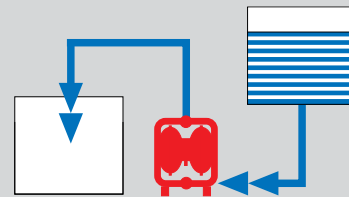
### Installation

DEPA® air-operated double diaphragm pumps are suitable for an endless variety of applications and are not restricted to only certain industries or processes. Our pumps can be deployed in stationary (fixed) installations within a process flow system, or used as portable or mobile units that can be transported to where it is to be used.



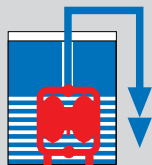
#### Pump, self-priming

DEPA® air-operated double diaphragm pumps are dry self-priming. Depending on the pump specification a suction lift of up to 9 m WC can be achieved with a filled suction pipe.



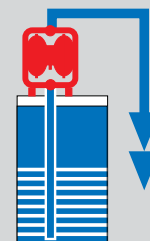
#### Pump with positive suction

Depending on the pump type, the suction side inlet pressure may need to be limited to a max. pressure 0.7 bar. In such cases a valve is required to isolate the suction pipe.



#### Pump, submerged

DEPA® air-operated double diaphragm pumps can be totally submerged in the pumped medium. The chemical compatibility of the pump material must be checked beforehand. The exhaust outlet must remain above the fluid level.



#### Pump for drums

DEPA® air-operated double diaphragm pumps of type DF 25 can be directly mounted on drums or containers. For ease of use the pump is mounted on the container complete with adapter. The suction pipe is supplied with the pump.

### Air-Operated Diaphragm Pumps Key Features:

- gentle conveyance of liquid or viscous products
- ideal for abrasive, viscous, and shear sensitive media
- can handle media with entrained solids
- tolerant of dry running
- no dynamic or pressure loaded seals
- mobile, easy to transport units
- infinite regulation of pumping capacity
- dry self-priming
- can run against closed valves
- modern compressed air control, low maintenance, oil free
- submersible designs
- also suitable for use in explosive and hazardous areas
- operation and maintenance friendly

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