

# VERDERAIR

diaphragm pumps



Solutions  
in Pumping  
technology

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## VERDERAIR double diaphragm Pumps

### The next generation

*VERDERAIR is the name given to a complete, well balanced series of air operated double diaphragm pumps.*

*The VERDER Group consists of a number of technical trading and production companies actively engaged in the areas of liquid, dry and synthetic materials technology.*

Since the formation of the group at the end of the 1950s, the delivery programme has been determined largely by the demand for leak free pumps, so that in the 1990s a change took place in the direction of the group: what started life purely as a trading company has changed with the takeover of some well-known production companies and with constant research and development into the VERDER group which aims at becoming a major industrial supplier for the market segments already mentioned.

During the 1970s VERDER was the first company to supply air operated double diaphragm pumps to both the process industry and to equipment suppliers. The original trading partner, failed however, to produce the necessary technological advances. As a result VERDER had to assume the responsibility for the development of its own product line; this has had the added advantage that the feedback of information from the market-place can be assimilated much more quickly and effectively with a view to future developments.

Naturally, in a period of some 30 years a considerable quantity of products have been delivered, so that with the current developments the emphasis must be laid on interchangeability, particularly in the area of dimensions. Qualitative improvements must be seen as a natural consequence, so that all products now carry a 2-year European guarantee.

VERDER continues to invest in the development of air operated double diaphragm pumps with the aim of being able to supply high quality products which can effectively compete in price with conventional pumps, and has as a motto: simple by design and at this moment steps are being taken to reach this goal.

Further on in this brochure you will find a list of all available products with a technical description of each type, together with examples of applications for both metallic and non-metallic pumps.

VERDERAIR VA 40



VERDERAIR VA 10





VERDERAIR VA 50



VERDERAIR VA 8

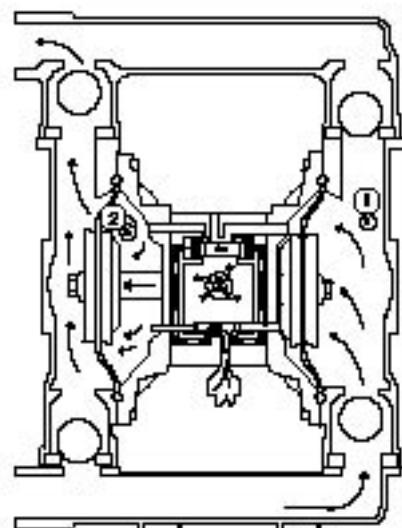
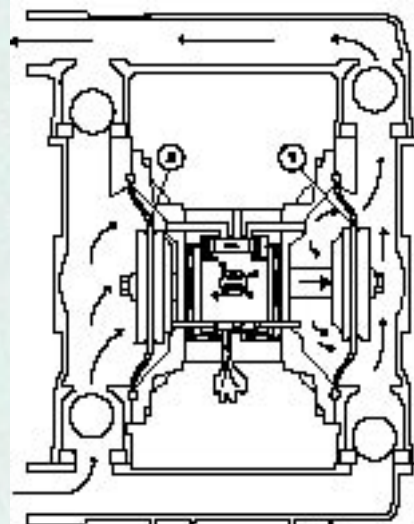
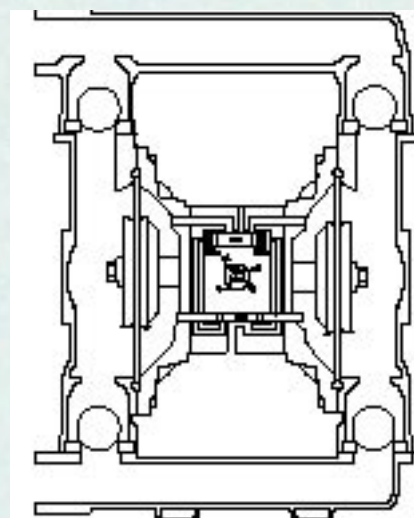
### The advantages of VERDERAIR pumps:

- easy installation
- screwed chambers for safe operation
- rugged, cast feed mounting holes keep your pump from vibrating
- available as cover-mounted, pail-mounted or wall-mounted units
- immersible in most situations
- easy to adapt
- A large scale of material options for fluid versatility with extended pump life
- air powered convenience for use in a variety of installations with no electrical hazard
- performs on-demand in remote locations
- extremely portable for multi-location use
- pumps move a wide variety of coatings, solvents, viscosity sealants, adhesives, inks, acids and more
- easy to maintain
- seal-less, leakproof design prevents fluid waste and mess
- even in wet air, the stainless steel diaphragm rod air motor is designed for long life and corrosion resistance
- easy to operate
- pumps reduce or eliminate manual filling and transport
- reduces the risk of hazardous spills and employee exposure
- multiple dispense points throughout your plant can easily be served.
- can run dry without pump damage
- no air lubrication necessary.

### Basic Principle of Air-operated Diaphragm Pumps

The VERDERAIR diaphragm pump is an air-operated, positive displacement, self priming pump. These drawings show the flow pattern through the pump upon its initial stroke. It is assumed the pump has not been primed prior to its initial stroke.

- 1 The air valve directs pressurized air to the back side of diaphragm 1. The compressed air is applied directly to the liquid column separated by elastomeric diaphragms. The diaphragm acts as a separation membrane between the compressed air and the liquid. Driving the diaphragm with air instead of the shaft balances the load and removes mechanical stress from the diaphragm, dramatically extending diaphragm life. The compressed air moves the diaphragm away from the center block of the pump. The opposite diaphragm is pulled in by the shaft connected to the pressurized diaphragm. Diaphragm 2 is now on its air exhaust stroke; air behind the diaphragm has been forced out to the atmosphere through the exhaust port of the pump. The movement of Diaphragm 2 toward the center block of the pump creates a vacuum within chamber 2. Atmospheric pressure forces fluid into the inlet manifold forcing the inlet ball valves off its seat. Liquid is free to move past the inlet ball valves and fill the liquid chamber.
- 2 When the pressurized diaphragm, diaphragm 1 reaches the limit of its discharge stroke, the air valve redirects pressurized air to the back side of diaphragm 2. The pressurized air forces diaphragm 2 away from the center block while pulling diaphragm 1 to the centre block. Diaphragm 2 forces the inlet ball valves onto its seat due to the hydraulic forces developed. These same hydraulic forces lift the discharge ball valves off its seat, while the opposite discharge ball valves is forced onto its seat, forcing fluid to flow through the pump discharge. The movement of diaphragm 1 to the center block of the pump creates a vacuum within the liquid chamber 1. Atmospheric pressure forces fluid into the inlet manifold of the pump. The inlet ball valves is forced off its seat allowing the fluid being transferred to fill the liquid chamber.
- 3 Upon completion of the stroke, the air valve again redirects air to the back side of diaphragm 1, and starts diaphragm 2 on its air exhaust stroke. As the pump reaches its original starting point, each diaphragm has gone through one air exhaust or one fluid discharge stroke. this constitutes one complete pumping cycle. The pump may take several cycles to become completely primed depending on the conditions of the application.



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Diaphragms are pressure balanced to ensure longer life. High-pressure, high efficiency operation is achieved by the pump's unique design. Suction and discharge valves can be either ball valve or cylindrical valve.

#### **Ball Valves**

Ball valves are simple and robust in design, giving a low pressure drop on the passing flow and therefore giving a higher flow than cylindrical valves. Ball valves are also able to handle liquids with solids in suspension, because they have only a line sealing with the conical seat.

#### **Cylindrical valves**

Cylindrical valves have a surface sealing which creates a perfect sealing, even with hard valve materials like PTFE, and therefore have very good dry suction capability. Cylindrical valves close more smoothly and equally. This makes a pump with cylindrical valves used as a dosing pump more accurate than a pump with ball valves.

#### **Air valve**

The entire air valve is maintenance and stalling free, and requires no lubrication. The air valve is built from only a few components, is servicable and can be inspected without disassembling the fluid connections.



PULSTECH

#### **Accessories**

##### **1 Pulsation dampener**

Oscillating pumps produce an oscillating flow. The design of the VERDERAIR double diaphragm pump gives a smooth and greatly reduced flow pulsation. A constant steady flow can be achieved by using the Pulsatech pulsation dampener.

##### **2 Diaphragm rupture system**

In case of a diaphragm rupture, liquid can come out via the air exhaust. This can cause personal injury or environmental damage. To prevent this, a diaphragm rupture system should be installed, which can stop the pump and/or sound an alarm.

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## Application Areas for VERDERAIR Diaphragm Pumps

### **Automotive Industry**

Grinding emulsion, oil, coolant, hydraulic fluid, sulphuric acid, automotive primer, soluble oil, varnish disposal, varnish additives, degreasing baths, cutting oil, ware and glycol mixture, paint

### **Aviation**

Aircraft fuelling and drainage, satellite refuelling, solid rocket propellant, missile silos

### **Beverages**

Yeast, diatomaceous earth slurry, dregs, hot pulp, liquid hops, sugar syrup, concentrates, gas-liquid mixtures, wine, fruit pulp, fruit juice, corn syrup

### **Ceramics**

Slip, glaze, enamel slip, effluent, clay, clay slurry, lime slurry, kaolin slurry

### **Chemical Industry**

Acids, alkalites, solvents, suspensions, dispersions, magnesium hydroxide, varnishes, sump water, resins, latex, adhesives, effluent sludge, stabilizers, filter press, electrolites

### **Construction Industry**

Sump and pit drainage, cement slurry, ceramic tiles adhesive, rock slurry, ceiling coating paints, texture spray

### **Cosmetics**

Lotions, creams, shampoos, emulsions, hand creams, surfactants, hair permanents, soaps

### **Electronic industry**

Solvents, electroplating baths, ultrapure liquids, carrier fluids for ultrasonic washing, sulfuric, nitric and acid wastes, etching acids, MEK, acetone, polishing compounds

### **Food**

Brine, chocolate, vinegar, molasses, dog food, vegetable oil, soy bean oil, honey, cat food, HCl, animal blood.

### **Furniture Industry**

Adhesives, varnishes, dispersions, solvents, stains, Elmers Glue, white wood glue, solvents, glue (5-6000 cps) epoxy, starch adhesives, spray packages

### **Mining**

Sump gallery drainage, sewer cleaning, coal sludge and rock slurry, cement slurry, grouting mortar, oil transfer, explosive slurry, adhesives, lube oil, foaming.

### **Municipalities**

Tank and sump drainage, sewer cleaning chemicals, contaminated surface water, emergency pumping, spill clean-up, waste-oil, oil/water separators

### **Paint and coatings**

Resins, solvents, acrylic, wood preservative stain, concrete paints, varnishes, titanium dioxide slurry, primers, stains, dispersions, varnish cleaning baths, alkalo resin.

### **Pharmaceutical Industry**

Vegetable extracts, tablet pastes, ointments, alcohols, filtering aids, ultrafiltration, blood plasma, waste solvents, sump waste.

### **Plating**

Anodic sludge, electroplating baths, varnishes, enamels, solvents, cleaning baths, filtering.

### **Pulp/Paper/Packaging**

Latex, adhesives, paints, resins, printing inks, dispersions, TiO<sub>2</sub> slurry, Kaolin clay, hydrogen peroxide

### **Refineries**

Tank roof drainage, oil sludge, tank cleaning, tank moat drainage, portable pumping

### **Road Tanker Trucks**

Loading and draining of tank by means of pump on vehicle, tank vehicle washing facilities, acid spraying, foaming

### **Shipbuilding**

Tank and bilge drainage, ship cleaning, stripping, oil skimming, seawater

### **Smelters, Foundries and Dye Casting**

Metal slurry, hydroxide and carbide slurry, dust scrubbing slurry, back wash for flushing of cores, mould release.

### **Textile and Carpet**

Dyeing chemical, Scotchguard\*, starch and sizing, resins, dyes, latex

### **Water and sewage treatment**

Milk of lime, thin slurry, effluents, chemicals, charging of filter presses, polymer, waste water

### **Utility**

Contaminated liquids, charging of scrubbers, milk of lime, transformer oil, resins

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## Typical Applications for VERDERAIR diaphragm pumps

### VERDERAIR VA non-metallic

From the paint industry we had a question for a solution for dosing 15 different colours of paint and 1 varnish for creating different colours of paint.

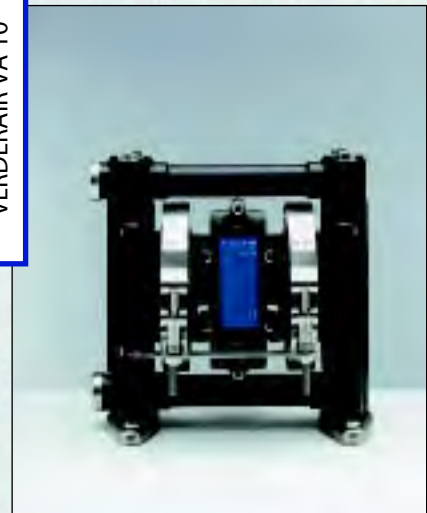
16 VERDERAIR VA pumps were used for transferring the fluids into a mixing machine. Each pump is dosing a certain quantity of paint, so each colour can be manufactured exactly according to Pantone and RAL standards. The pumps dose between 100 grams and 5 kg.

VERDERAIR was chosen because of its compact size, good self priming, non-stalling capabilities and perfect dosing capacity.

### VERDERAIR VA metallic

A VERDERAIR VA 25 is used for spraying ceramics and enamel. Because of the abrasive product, VERDER selected an aluminium pump with special hardened seats. This gave a perfect result over a long period of time. Because of spraying enamel on ceramics we were not allowed to have any pulsations in the enamel spray. Together with the Pulstech pulsation dampener we created a pulsation free flow. Thanks to this combination we had a perfect thickness of enamel on all the ceramics and brought down the number of substandard products.

VERDERAIR VA 10



VERDERAIR VA 50



Available at [www.appliedpumps.co.uk](http://www.appliedpumps.co.uk)

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