AODD PUMPS
PNEUMATIC METERING PUMPS
PULSATION DAMPENERS
...there's something new in the air...

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</table>
QUALITY EXPERIENCE INNOVATION SINCE 1975
ARGAL® boasts forty years of activity in the invention and production of pumps made of thermoplastic material, compounds and corrosion-resistant metal alloys. During the past decade significant efforts were directed to research and development on the entire production and such an effort resulted in pump ranges completely new or renovated both regarding mechanical and hydraulic systems.

The mission of ARGAL® is continuous and constant technological improvement, along the path of innovation instead of emulation. Our aim is to offer the best technical performance and engineering obtaining the leadership in performance while providing appropriate responses to the needs of market dynamics by realizing a “State-of-the-art quality.

Today the company has a wide range of pumps in various constructions for industrial applications requiring temperatures ranging from -40° C to +130°C, with load capacities up to 1700 m³/h-head over the 100 m. ARGAL® also offers the most complete Italian range of AODD pumps (from ¼” to 4”) with metallic or plastic solutions to satisfy the most various market demand.

All are certified ISO 9001:2008 according to Vision ISO 9001:2008 rule. We strongly want to offer a wide production program with high quality pumps ranges and really competitive prices.
# Why an AODD pump?

<table>
<thead>
<tr>
<th>Advantage</th>
<th>Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Safe</strong></td>
<td>ARGALAIR pump is operated by compressed air and are intrinsically safe.</td>
</tr>
<tr>
<td><strong>Able to run dry</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Self-priming</strong></td>
<td>The pump design allows high suction lift even at dry-start and with heavier fluids.</td>
</tr>
<tr>
<td><strong>Shear Sensitive</strong></td>
<td>The gentle pneumatic movement makes the ARGALAIR an excellent choice for shear sensitive fluids.</td>
</tr>
<tr>
<td><strong>Portable and simple installation</strong></td>
<td>ARGALAIR pump can be easily transported to the application site. Simply connect your air supply line and liquid lines and the pump is ready to perform. There is no complex control for installing and operating.</td>
</tr>
<tr>
<td><strong>Submersible</strong></td>
<td>If external material are compatible, then the pump can run submerged in the liquid by simply running the exhaust line above the liquid level.</td>
</tr>
<tr>
<td><strong>Variable flow rate and discharge pressure</strong></td>
<td>ARGALAIR offers the ability too vary flow and discharge pressure up to 120 psi with a simple adjustment of the air supply.</td>
</tr>
<tr>
<td><strong>Handles a wide variety of fluids with high solids content</strong></td>
<td>No close fitting or rotating parts so liquids with high solids content can be easily pumped, actually any liquids with max of 90% solids.</td>
</tr>
<tr>
<td><strong>Dead-head</strong></td>
<td>Because the discharge pressure can never exceed air inlet pressure, the discharge line can be closed with no damage or wear. The pump will simply slow down and stop.</td>
</tr>
<tr>
<td>Feature</td>
<td>AODD</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>Variable Flow &amp; Head Control (inherently adjustable)</td>
<td>•</td>
</tr>
<tr>
<td>Deadheads Safely (at zero energy consumption)</td>
<td>•</td>
</tr>
<tr>
<td>Dry-Running</td>
<td>•</td>
</tr>
<tr>
<td>Dry-Priming (lift installations)</td>
<td>•</td>
</tr>
<tr>
<td>No Mechanical Installation Alignment Required</td>
<td>•</td>
</tr>
<tr>
<td>No Electrical Installation Required</td>
<td>•</td>
</tr>
<tr>
<td>Portability</td>
<td>•</td>
</tr>
<tr>
<td>Submersible</td>
<td>•</td>
</tr>
<tr>
<td>Sealless (no packing or mechanical seals)</td>
<td>•</td>
</tr>
<tr>
<td>Cavitation Tolerance (low NPSHr)</td>
<td>•</td>
</tr>
<tr>
<td>Low Shear &amp; Degradation</td>
<td>•</td>
</tr>
</tbody>
</table>

- **•** = Suitable
- **-** = Limitations
- **○** = Not Recommended
The pneumatic distribution system sends compressed air behind one of the two diaphragms (A), which pushes the fluid towards the delivery circuit. Simultaneously, the opposite diaphragm (B) is in the intake phase as it is dragged by the shaft that connects it to diaphragm (A), under pressure; air presents behind diaphragm (B) is discharged into the environment through the flow rate regulator on the pump, while a pressure drop is created in the fluid chamber which ‘sucks’ the fluid from the suction circuit. When the diaphragm (A), under pressure, reaches the stroke limit, the distributor switches the two inputs to the chamber on the diaphragms air side, putting diaphragm (B) under pressure and diaphragm (A), in discharge. When the pump reaches its original starting point, each diaphragm has carried out one air discharge stroke and one fluid delivery stroke. This sequence of movements makes up a complete pumping cycle.
Thanks to its multiple and simple installations, the pumps are convenient for every operation, from transfer to supply, circulation, injection, evacuation or liquid metering.
Why choosing an ARGALAIR AODD pump?

... high-quality materials

Our AODD pumps are obtained using the best thermoplastic polymers of Italy. Moulded with injected polymers reinforced with composite fiber, AODD pumps guarantee an optimal mechanical seal as well as a notable corrosive resistance.

Solutions are in fiberglass polypropylene (GRF/PP) and in polyvinylidene fluoride reinforced with carbon fiber (CFF+PVDF) and are also available in ATEX ZONE 1 - application version, for strict and dangerous areas.

The metallic variations can be distinguished for their reliability and low-costs versions in aluminum and AISI 316 of the ASTRA range.

Whereas the AISI 316L and exotic alloys (bronze, duplex) versions of the MISTRAL range are focused on robustness and chemical resistance.

... a complete range

A “custom-made production series” cover the entire market requirements but not only: ASTRA and MISTRAL ranges offer various alternatives for the most requested dimensions.

For the compact sizes from ¼” to ½”, Argal submits six models corresponding to the different materials.

Four other models are available for the medium sizes until 1”. Two versions are realised for the 1 ½” as well as for the 2”.

Moreover, we are part of the ring of few world designers to offer large sizes from 3” to 4”.

Last but not least, Argal designed and produced a range of economically and energetically advantageous pumps capable of sensible air consumption savings with same dimensions but different performances at an affordable price.

... Our experience into the corrosive and abrasive world

With our forty-year experience in corrosive and abrasive applications, we are specialists in design and problem-solving. Our goal is to offer a wide production program with high-quality and competitive prices solutions.
<table>
<thead>
<tr>
<th>WETTED PARTS</th>
<th>DIAPHRAGM</th>
<th>VALVE BALLS</th>
<th>VALVE SEAT</th>
<th>APPLICATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>GRF/PP</td>
<td>Teflon®</td>
<td>Teflon®</td>
<td>PP</td>
<td>Great chemical resistance. Optimal aspiration dry and silent. Adapted to paintings</td>
</tr>
<tr>
<td>GRF/PP</td>
<td>Teflon®</td>
<td>AISI 316</td>
<td>AISI 316</td>
<td>High viscosity products. Glues and resins</td>
</tr>
<tr>
<td>GRF/PP</td>
<td>Santoprene®</td>
<td>EPDM</td>
<td>UPPE</td>
<td>High abrasion resistance</td>
</tr>
<tr>
<td>Aluminum</td>
<td>Hytrel®</td>
<td>Teflon®</td>
<td>Aluminum</td>
<td>Economic solution adapted for pumping hydrocarbons</td>
</tr>
<tr>
<td>Aluminum</td>
<td>Teflon®</td>
<td>Teflon®</td>
<td>Aluminum</td>
<td>Solvents. Inks. Painting</td>
</tr>
<tr>
<td>CFF/PVDF</td>
<td>Teflon®</td>
<td>Teflon®</td>
<td>PVDF</td>
<td>Aggressive acids. High temperatures &gt;=80°C</td>
</tr>
<tr>
<td>AISI 316</td>
<td>Teflon®</td>
<td>Teflon®</td>
<td>AISI 316</td>
<td>Aggressive acids. High temperatures &lt;=110°C</td>
</tr>
<tr>
<td>AISI 316</td>
<td>Teflon®</td>
<td>AISI 316</td>
<td>AISI 316</td>
<td>Very high-viscosity and high temperatures</td>
</tr>
<tr>
<td>AISI 316 Polished</td>
<td>Teflon®</td>
<td>Teflon®</td>
<td>AISI 316 Polished</td>
<td>Food. Cosmetic (spheres version and polished AISI 316 polished seats for high viscosity products)</td>
</tr>
</tbody>
</table>
INSTRUCTION FOR CHOOSING PNEUMATIC PUMPS

Duty point - example: Flow 20 l/min - Manometric pressure 20 m.
- Air pressure - main supply: 5 bar
- Air consumption: 245 Nl/min
- Frequency of cycles: 135 cycles/min

Lifting the liquid from a negative height reduces the flow of the pump as in standard circumstances (flooded suction).

The maximum negative head is a function of the plant characteristics (hydraulic losses), the fluid's physical characteristics (density, viscosity, boiling point) and of the different pressure exerted on both diaphragms; between the fluid-side diaphragm and the air-side diaphragm.

The admissible dimension of solids in suspension depends on:
- DN of the pump (max. valve passage),
- Viscosity of the fluid.

Dimension limits the admissible % concentration of solids in suspension.
Solid particles of larger dimension reduce significantly the max admissible % of solids in suspension if the liquid is low viscosity but do not reduce it much if the liquid is of high viscosity.

The power truly absorbed by the air compressor is around 70% of the value indicated in the table.
If the fluid is viscous, it increases the diameter of the pipelines by multiplying the coefficient reported below.

Multiply coefficient for pipeline diameter referred to a non viscous fluid and constant hydraulic losses.

A general indication assumes that the more fluid is viscous, and the less number of cycles per minute is performed.

Viscosity is an important parameter to select the right pump for your application. Indeed, the more fluid is viscous, and larger the pipelines must be. Viscosity is measured in Centipoise (cP).

<table>
<thead>
<tr>
<th>Products viscosity</th>
<th>Food Industry</th>
<th>Cosmetic Pharmaceutical industry</th>
<th>Varioos Industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>product</td>
<td>cP</td>
<td>product</td>
<td>cP</td>
</tr>
<tr>
<td>Butter</td>
<td>50000</td>
<td>Toothpaste</td>
<td>5000</td>
</tr>
<tr>
<td>Whipped acid cream</td>
<td>13000</td>
<td>Gel</td>
<td>2000</td>
</tr>
<tr>
<td>Mayonnaise</td>
<td>6000</td>
<td>Glycerin</td>
<td>1400</td>
</tr>
<tr>
<td>Honey</td>
<td>1500</td>
<td>Shampoo</td>
<td>250</td>
</tr>
<tr>
<td>Marmalade</td>
<td>&lt;1000</td>
<td>Barbotine</td>
<td>2000</td>
</tr>
<tr>
<td>Tomato sauce</td>
<td>180</td>
<td>Grease lubr.</td>
<td>2000</td>
</tr>
<tr>
<td>Yogurt</td>
<td>100</td>
<td>Mineral oil</td>
<td>800</td>
</tr>
<tr>
<td>Olive Oil</td>
<td>100</td>
<td>Oil SAE30</td>
<td>350</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Varnish</td>
<td>300</td>
</tr>
</tbody>
</table>

The viscosity of the moving fluid can be constant or variable. Fluids with variable viscosity can be pumped only respecting the head and flow limits as described in the chart.

- **Not viscous fluids** (1 < μ < 10) (water, acid solutions, basic solutions, organic solvents).
- **Fluids with constant viscosity** (sulphuric acid, sodium hydroxide, oil, acetyl ethanolamine, glycerine, toothpaste, mayonnaise, margarine, slurries).
- **Fluids with increasing viscosity** (corn starch, siliconic oils, raw sugar, colloidal dispersion, whipped cream).
- **Fluids with decreasing viscosity** (paper pulp in water, acrylic paint, latex, blood, ketchup, jellified enamels, jellified hydro carbons, lip gloss).
# MATERIALS

<table>
<thead>
<tr>
<th>Material</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PP</td>
<td>Polypropylene</td>
</tr>
<tr>
<td>UP</td>
<td>Ultra High Molecular Weight Polyethylene</td>
</tr>
<tr>
<td>FRP</td>
<td>Fiberglass</td>
</tr>
<tr>
<td>HYTREL</td>
<td>Hytrel</td>
</tr>
<tr>
<td>PVDF</td>
<td>Polynylidene Fluoride</td>
</tr>
<tr>
<td>PTFE</td>
<td>Poly Tetra Fluoro Ethylene (Teflon®)</td>
</tr>
<tr>
<td>POMc</td>
<td>Polyoxymethylene</td>
</tr>
<tr>
<td>Alu</td>
<td>Aluminium</td>
</tr>
<tr>
<td>DX</td>
<td>Alloy Duplex</td>
</tr>
<tr>
<td>AISI 316</td>
<td>Stainless Steel (low Carbon)</td>
</tr>
<tr>
<td>AISI 316</td>
<td>Stainless Steel</td>
</tr>
<tr>
<td>BR</td>
<td>Bronze</td>
</tr>
</tbody>
</table>

# TECHNOLOGY

- Self-priming
- Submersible

# TEMPERATURES (°C)

- 115°C
- 100°C
- 80°C
- 60°C
- 5°C
- 3°C
- 2°C
- 0°C
- 1°C
- 35°C
- 40°C

# CERTIFICATION/WARRANTY

- Atex
- Food and Drug Administration
- European Conformity
- Eurasian Conformity

# WARRANTY

- 12 months
- 24 months
- 60 months

# CONTENTS

## WETTED PARTS

<table>
<thead>
<tr>
<th>Code</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>WR</td>
<td>PP (GFR)</td>
</tr>
<tr>
<td>FC</td>
<td>PVDF (CFF)</td>
</tr>
<tr>
<td>DL</td>
<td>POMc (GFR)</td>
</tr>
<tr>
<td>AL</td>
<td>Aluminium</td>
</tr>
<tr>
<td>SS</td>
<td>AISI 316</td>
</tr>
<tr>
<td>SP</td>
<td>AISI 316 (FDA)</td>
</tr>
</tbody>
</table>

## DIAPHRAGMS

<table>
<thead>
<tr>
<th>Code</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>NT</td>
<td>NBR &amp; PTFE</td>
</tr>
<tr>
<td>HT</td>
<td>HYTREL® &amp; PTFE</td>
</tr>
<tr>
<td>MT</td>
<td>SANTOPRENE® &amp; PTFE</td>
</tr>
<tr>
<td>M</td>
<td>SANTOPRENE®</td>
</tr>
<tr>
<td>H</td>
<td>HYTREL®</td>
</tr>
<tr>
<td>D</td>
<td>EPDM RUBBER</td>
</tr>
</tbody>
</table>

## BALL VALVE

<table>
<thead>
<tr>
<th>Code</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>T</td>
<td>PTFE</td>
</tr>
<tr>
<td>S</td>
<td>AISI 316</td>
</tr>
<tr>
<td>D</td>
<td>EPDM</td>
</tr>
<tr>
<td>N</td>
<td>NBR</td>
</tr>
</tbody>
</table>

## BALL SEATS

<table>
<thead>
<tr>
<th>Code</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>P</td>
<td>PP</td>
</tr>
<tr>
<td>S</td>
<td>AISI 316</td>
</tr>
<tr>
<td>Z</td>
<td>PE (UHMW)</td>
</tr>
<tr>
<td>K</td>
<td>PVDF</td>
</tr>
<tr>
<td>O</td>
<td>POMc</td>
</tr>
<tr>
<td>A</td>
<td>ALUMINUM</td>
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## GASKETS

<table>
<thead>
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</thead>
<tbody>
<tr>
<td>T</td>
<td>PTFE</td>
</tr>
<tr>
<td>D</td>
<td>EPDM</td>
</tr>
<tr>
<td>V</td>
<td>FKM</td>
</tr>
<tr>
<td>N</td>
<td>NBR</td>
</tr>
</tbody>
</table>
ASTRA range is ideal for the most various industrial applications. This newest project is made with the very last technologies to guarantee a major reliability of the pump: lifetime and diaphragms are improved, maintenance operations are reduced and it has an enviable quality/price offer. ASTRA COMPACT range is composed of smaller sizes made for OEM customers, guaranteeing the major constructive simplicity and taking up the minimal amount of space.

**Main Applications**

- Chemical industry
- Automotive
- Textile
- Graphic
- Leather tanning
- Electroplating ceramics
- Paints
- Ink
- Paper
- Construction
- Water and Waste treatment
<table>
<thead>
<tr>
<th>ASTRA (*)</th>
<th>Flow rate (l/min**)</th>
<th>Ports (inch)</th>
<th>Materials</th>
<th>Solids (mm)</th>
<th>The best selling</th>
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</thead>
<tbody>
<tr>
<td>25-09</td>
<td>9</td>
<td>¼&quot;</td>
<td>• POMc • PP • PVDF</td>
<td>2,5</td>
<td>• WR NT TPD</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• FC NT TKT</td>
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<td>• DL NT TOT</td>
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<td>• FC MT TKT</td>
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<td>• DL HT TOT</td>
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<tr>
<td>50-30</td>
<td>30</td>
<td>½&quot;</td>
<td>• POMc • PP • PVDF • AISI 316</td>
<td>3,5</td>
<td>• WR HT TPD</td>
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<td></td>
<td></td>
<td></td>
<td>• FC MT TKT</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td>• SS HT TST</td>
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<tr>
<td>50-50</td>
<td>50</td>
<td>½&quot;</td>
<td>• PP • PVDF • ALU • AISI 316</td>
<td>3,5</td>
<td>• WR HT TPD</td>
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<tr>
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<td></td>
<td>• WR M-DZD</td>
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<td>½&quot;</td>
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<td>• WR HT TPD</td>
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<td>• WR M-DZD</td>
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<td>¾&quot;</td>
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<td>• WR HT TPD</td>
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<td>• WR M-DZD</td>
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<td>• FC NT TKT</td>
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<td>100-100</td>
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<td>1&quot;</td>
<td>• PP • PVDF</td>
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<td>• AR HT TPD</td>
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<td>7,5</td>
<td>• AR HT TPD</td>
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<td></td>
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<td>• AL HT TAT</td>
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<td></td>
<td></td>
<td>• SS HT TST</td>
</tr>
<tr>
<td>125-250</td>
<td>250</td>
<td>1 ¼&quot;</td>
<td>• PP • PVDF</td>
<td>7,5</td>
<td>• AR HT TPD</td>
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<td>• SS HT TST</td>
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<td></td>
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<td>• AL HT TAT</td>
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<td>• SS HT TST</td>
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<td>• AR HT TPD</td>
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<td>• AL HT TAT</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• SS HT TST</td>
</tr>
</tbody>
</table>

(*) Max pressure 8 bar
**ASTRA COMPACT**

**DDA 25-09**

**COMPOSITION**
- **Wetted parts**
  - PP
  - PVDF
  - POMc
- **Diaphragms**
  - NBR+PTFE
- **Valve Balls**
  - PTFE
  - AISI 316
- **Valve Seats**
  - PP
  - PVDF
  - POMc
- **Gaskets**
  - EPDM
  - FKM
  - NBR
  - PTFE

**TECHNICAL DATA**
- **Fluid connections**: ¼” BSP • NPT*
- **Air connection**: 4 mm
- **Max flow rate**: 9 l/m'
- **Max air pressure**: 8 bar
- **Max delivery head**: 80 mca
- **Max suction lift dry**: 3 mca
- **Max suction lift wet**: 9.8 mca
- **Max size solids**: 2.5 mm
- **Noise level**: 62 dB(A)
- **Max viscosity**: 6.000 cPs

**DIMENSIONS (mm)**

- **PP A**: 129 B 112 C 68
- **PVDF A**: 129 B 112 C 68
- **POMc A**: 129 B 112 C 68

**Connections scheme page 30**

*Optional

---

**Made in Italy** 17
ASTRA COMPACT
DDA 38-18

**Wetted parts**
- PP
- PVDF
- POMc
- AISI 316

**Diaphragms**
- HYTREL + PTFE
- SANTOPRENE + PTFE
- HYTREL
- SANTOPRENE

**Valve Balls**
- PTFE
- AISI 316

**Valve Seats**
- PP
- PVDF
- POMc
- AISI 316

**Gaskets**
- EPDM
- FKM
- NBR
- PTFE

**TECHNICAL DATA**

**Fluid connections**
- ¾” BSP • NPT*

**Air connection**
- 6 mm

**Max flow rate**
- 18 l/m'

**Max air pressure**
- 8 bar

**Max delivery head**
- 80 mca

**Max suction lift dry**
- 6 mca

**Max suction lift wet**
- 9,8 mca

**Max size solids**
- 3 mm

**Noise level**
- 65 dB(A)

**Max viscosity**
- 12.000 cPs

**DIMENSIONS (mm)**

<table>
<thead>
<tr>
<th>Material</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
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<tr>
<td>AISI 316</td>
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<td>92</td>
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</tbody>
</table>

**Connections scheme page 30**

* Optional
ASTRA COMPACT
DDA 50-30

**Wetted parts**
- PP
- PVDF
- POMc
- AISI 316

**Diaphragms**
- HYTREL + PTFE
- SANTOPRENE + PTFE
- HYTREL
- SANTOPRENE

**Valve Balls**
- PTFE
- AISI 316
- EPDM
- NBR

**Valve Seats**
- EPDM
- FKM
- NBR
- PTFE

**Gaskets**
- EPDM
- FKM
- NBR
- PTFE

**Fluid connections**
- ½" BSP • NPT*
- FLANGED* DN15

**Air connection**
- 6 mm

**Max flow rate**
- 30 l/m'

**Max air pressure**
- 8 bar

**Max delivery head**
- 80 mca

**Max suction lift dry**
- 5 mca

**Max suction lift wet**
- 9.8 mca

**Max size solids**
- 3.5 mm

**Noise level**
- 65 dB(A)

**Max viscosity**
- 15,000 cPs

**TECHNICAL DATA**

**DIMENSIONS (mm)**

<table>
<thead>
<tr>
<th>Material</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
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<td>POMc</td>
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<tr>
<td>AISI 316</td>
<td>182</td>
<td>190</td>
<td>104</td>
</tr>
</tbody>
</table>

**Connections scheme page 30**

* Optional
COMPOSITION
Wetted parts
• PP • PVDF
• ALU • AISI 316
Diaphragms
• HYTREL + PTFE • SANTOPRENE + PTFE • HYTREL • SANTOPRENE
Valve Balls
• PTFE • AISI 316 • EPDM • NBR
Valve Seats
• PP • PVDF • ALU • AISI 316 • UPPE
Gaskets
• EPDM • FKM • NBR • PTFE

TECHNICAL DATA
Fluid connections
½” BSP • NPT* • FLANGED* DNIS
Air connection
¼” BSP
Max flow rate
50 l/min
Max air pressure
8 bar
Max delivery head
80 mca
Max suction lift dry
6 mca
Max suction lift wet
9.8 mca
Max size solids
3.5 mm
Noise level
68 dB(A)
Max viscosity
20,000 cPs

DIMENSIONS (mm)

<table>
<thead>
<tr>
<th>Material</th>
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<th>C</th>
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<td>ALU</td>
<td>225</td>
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<td>230</td>
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<tr>
<td>AISI 316</td>
<td>225</td>
<td>156</td>
<td>230</td>
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</table>

Connections scheme page 30

* Optional
**TECHNICAL DATA**

- **Fluid connections**: ½" BSP • NPT* • FLANGED* • DN15
- **Air connection**: ⅜" BSP
- **Max flow rate**: 65 l/min
- **Max air pressure**: 8 bar
- **Max delivery head**: 80 mca
- **Max suction lift dry**: 6 mca
- **Max suction lift wet**: 9.8 mca
- **Max size solids**: 3.5 mm
- **Noise level**: 72 dB(A)
- **Max viscosity**: 25,000 cPs

**DIMENSIONS (mm)**

- **PP**: A 265 B 175 C 245
- **PVDF**: A 265 B 175 C 245
- **ALU**: A 265 B 175 C 245
- **AISI 316**: A 250 B 175 C 250

**Connections scheme page 30**

* Optional

**COMPOSITION**

- **Wetted parts**: • PP • PVDF • ALU • AISI 316
- **Diaphragms**: • HYTREL + PTFE • SANTOPRENE + PTFE • HYTREL • SANTOPRENE • EPDM • NBR
- **Valve Balls**: • PTFE • AISI 316 • EPDM • NBR
- **Valve Seats**: • PP • PVDF • ALU • AISI 316 • UPPE
- **Gaskets**: • EPDM • FKM • NBR • PTFE

Made in Italy
COMPOSITION

Wetted parts
- PP
- PVDF
- ALU
- AISI 316

Diaphragms
- HYTREL + PTFE
- SANTOPRENE + PTFE
- HYTREL
- SANTOPRENE
- EPDM + NBR

Valve Balls
- PTFE
- AISI 316
- EPDM
- NBR

Valve Seats
- PP
- PVDF
- ALU
- AISI 316
- UPPE

Gaskets
- EPDM
- FKM
- NBR
- PTFE

TECHNICAL DATA

Fluid connections
- ¾" BSP
- NPT
- FLANGED
- DN20

Air connection
- ¼" BSP

Max flow rate
- 100 l/min

Max air pressure
- 8 bar

Max delivery head
- 80 mca

Max suction lift dry
- 6 mca

Max suction lift wet
- 9,8 mca

Max size solids
- 3,5 mm

Noise level
- 72 dB(A)

Max viscosity
- 25,000 cPs

DIMENSIONS (mm)

PP
- A 265 B 175 C 245

PVDF
- A 265 B 175 C 245

ALU
- A 265 B 175 C 245

AISI 316
- A 250 B 175 C 250

Connections scheme page 30

* Optional
**TECHNICAL DATA**

<table>
<thead>
<tr>
<th>Fluid connections</th>
<th>1&quot; BSP • NPT* • FLANGED* DN25</th>
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</thead>
<tbody>
<tr>
<td>Air connection</td>
<td>⅜&quot; BSP</td>
</tr>
<tr>
<td>Max flow rate</td>
<td>100 l/min</td>
</tr>
<tr>
<td>Max air pressure</td>
<td>8 bar</td>
</tr>
<tr>
<td>Max delivery head</td>
<td>80 mca</td>
</tr>
<tr>
<td>Max suction lift dry</td>
<td>6 mca</td>
</tr>
<tr>
<td>Max suction lift wet</td>
<td>9.8 mca</td>
</tr>
<tr>
<td>Max size solids</td>
<td>3.5 mm</td>
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<tr>
<td>Noise level</td>
<td>72 dB(A)</td>
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<tr>
<td>Max viscosity</td>
<td>25.000 cPs</td>
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**DIMENSIONS (mm)**

<table>
<thead>
<tr>
<th>Material</th>
<th>Dimension</th>
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<th>PP B</th>
<th>PP C</th>
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<table>
<thead>
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<th>PVDF B</th>
<th>PVDF C</th>
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<tr>
<td></td>
<td></td>
<td>265</td>
<td>175</td>
<td>245</td>
</tr>
</tbody>
</table>

**COMPOSITION**

- **Wetted parts**: PP • PVDF
- **Diaphragms**: HYTREL + PTFE • SANTOPRENE + PTFE • HYTREL • SANTOPRENE • EPDM • NBR
- **Valve Balls**: PTFE • SS • EPDM • NBR
- **Valve Seats**: PP • PVDF • AISI 316 • UPPE
- **Gaskets**: EPDM • FKM • NBR • PTFE

**Connections scheme page 30**

* Optional

Made in Italy
### COMPOSITION

- **Wetted parts**
  - PP • PVDF
  - ALU • AISI 316

- **Diaphragms**
  - HYTREL + PTFE
  - SANTOPRENE + PTFE
  - HYTREL
  - SANTOPRENE
  - EPDM • NBR

- **Valve Balls**
  - PTFE • AISI 316
  - EPDM • NBR

- **Valve Seats**
  - PP • PVDF • ALU • AISI 316 • UPPE

- **Gaskets**
  - EPDM • FKM
  - NBR • PTFE

---

### TECHNICAL DATA

- **Fluid connections**
  - 1" BSP • NPT * • FLANGED* DN25

- **Air connection**
  - ½" BSP

- **Max flow rate**
  - 160 l/m²

- **Max air pressure**
  - 8 bar

- **Max delivery head**
  - 80 mca

- **Max suction lift dry**
  - 6 mca

- **Max suction lift wet**
  - 9,8 mca

- **Max size solids**
  - 7,5 mm

- **Noise level**
  - 75 dB(A)

- **Max viscosity**
  - 35,000 cPs

---

### DIMENSIONS (mm)

<table>
<thead>
<tr>
<th>Material</th>
<th>A</th>
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<th>C</th>
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</thead>
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<tr>
<td>AISI 316</td>
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<td>346</td>
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</tbody>
</table>

---

**Connections scheme page 30**

* Optional
**TECHNICAL DATA**

**Fluid connections**
- 1 1/4" BSP • NPT
- FLANGED* DN32

**Air connection**
- 1/2" BSP

**Max flow rate**
- 250 l/min

**Max air pressure**
- 8 bar

**Max delivery head**
- 80 mca

**Max suction lift dry**
- 6 mca

**Max suction lift wet**
- 9.8 mca

**Max size solids**
- 7.5 mm

**Noise level**
- 75 dB(A)

**Max viscosity**
- 35,000 cPs

---

**COMPOSITION**

**Wetted parts**
- PP • PVDF
- ALU • AISI 316

**Diaphragms**
- HYTREL + PTFE
- SANTOPRENE + PTFE
- HYTREL
- SANTOPRENE
- EPDM • NBR

**Valve Balls**
- PTFE • AISI 316
- EPDM • NBR

**Valve Seats**
- PP • PVDF • ALU
- AISI 316 • UPPE

**Gaskets**
- EPDM • FKM
- NBR • PTFE

---

**DIMENSIONS (mm)**

<table>
<thead>
<tr>
<th>Material</th>
<th>A</th>
<th>B</th>
<th>C</th>
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<td>ALU</td>
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<tr>
<td>AISI 316</td>
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</tr>
</tbody>
</table>

---

Connections scheme page 30

* Optional

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**Made in Italy**
**ASTRA**

**DDA 150-400**

---

**COMPOSITION**

Wetted parts
- PP • PVDF • ALU • AISI 316

Diaphragms
- HYTREL + PTFE
- SANTOPRENE + PTFE
- HYTREL
- SANTOPRENE
- EPDM • NBR

Valve Balls
- PTFE • AISI 316 • EPDM • NBR

Valve Seats
- PP • PVDF • ALU • AISI 316 • UPPE

Gaskets
- EPDM • FKM • NBR • PTFE

---

**TECHNICAL DATA**

- Fluid connections: 1½" BSP • NPT* • FLANGED* DN40
- Air connection: ¾" BSP
- Max flow rate: 400 l/m'
- Max air pressure: 8 bar
- Max delivery head: 80 mca
- Max suction lift dry: 5 mca
- Max suction lift wet: 9.8 mca
- Max size solids: 8.5 mm
- Noise level: 78 dB(A)
- Max viscosity: 50,000 cPs

---

**DIMENSIONS (mm)**

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<thead>
<tr>
<th>Material</th>
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<th>C</th>
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<td>AISI 316</td>
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</tbody>
</table>

**Connections scheme page 30**

* Optional

---

* DIMENSIONI SBAGLIATE VEDERE CON GIOVANNI
**TECHNICAL DATA**

**Fluid connections**
- 2” BSP • NPT*
- FLANGED* DN50

**Air connection**
- ¾” BSP

Max flow rate
- 650 l/m'

Max air pressure
- 8 bar

Max delivery head
- 80 mca

Max suction lift dry
- 5 mca

Max suction lift wet
- 9.8 mca

Max size solids
- 8.5 mm

Noise level
- 78 dB(A)

Max viscosity
- 50.000 cPs

---

**DIMENSIONS (mm)**

<table>
<thead>
<tr>
<th>Material</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>PP</td>
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<tr>
<td>ALU</td>
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<td>AISI 316</td>
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<td>345</td>
<td>599</td>
</tr>
</tbody>
</table>

Connections scheme page 30

* Optional

---

**COMPOSITION**

**Wetted parts**
- PP • PVDF
- ALU • AISI 316

**Diaphragms**
- HYTREL + PTFE
- SANTOPRENE + PTFE
- HYTREL
- SANTOPRENE
- EPDM • NBR

**Valve Balls**
- PTFE • AISI 316
- EPDM • NBR

**Valve Seats**
- PP • PVDF • ALU • AISI 316 • UPPE

**Gaskets**
- EPDM • FKM
- NBR • PTFE

---

Made in Italy
SPECIAL CONFIGURATIONS

ASTRA DRUM

Perfect for emptying barrels, drums, cans.

ASTRA GEMINI

Delivery and suction manifolds can be doubled in this configuration so that two products can simultaneously be pumped.

MAIN APPLICATIONS

• AUTOMOTIVE INDUSTRY
• CHEMICAL INDUSTRY
• FOOD INDUSTRY
• WASTE DISPOSAL TECHNOLOGY

PUMPS

• ASTRA COMPACT
• ASTRA

MAIN APPLICATIONS

• FLEXOGRAPHIC INDUSTRY
• PAINTING INDUSTRY
• PAPER PROCESSING
• PRINTING INDUSTRY
• WASTE WATER TECHNOLOGY

PUMPS

• ASTRA
SPECIAL CONFIGURATIONS

ASTRA FREE

The fluid is carried by compressed air while an electric signal controls the speed. In this way, metering, measurement and other applications of the electric command can be majorly accurate. The “ASTRA FREE” versions can be interconnected with a large range of devices to completely automise the operation.

MAIN APPLICATIONS

- CHEMICAL INDUSTRY
- FLEXOGRAPHIC INDUSTRY
- PAINTING INDUSTRY
- PRINTING INDUSTRY
- WASTE WATER TECHNOLOGY

PUMPS

- ASTRA COMPACT
- ASTRA
Maximise the pump flow rate
**ASTRA FOOD**

**ASTRA FOOD** range can be used for handling and pumping products from food industry and related ones. These pumps comply with **FDA recommendations**, as the parts in contact with the fluid are made of **AISI 316 electro-polished** with **125 Ra** finish and **PTFE** - both certified for food usage.
Thanks to their characteristics and design, the Astrafood "DFA" series can be applied for the transfer of fluids deployed in industries as food, the cosmetics, pharmaceuticals, or chemical additives, beverages, dairy, biotechnologies, medical appliances, paint and in all those applications where a quick release clamp connection is required or appreciated.

These pumps are usually used to transfer or remove the products from the mixing contains or storage basins or to pack them in bottles or similar containers. The air operated double diaphragm pumps Astrafood are constructed with materials compliant with the FDA regulation: the wet parts are made of AISI 316 electro-polished and the surface finish is realised in $125 \text{ Ra}$ (average $2,7 \mu m$) both certified for food applications. All Astrafood pumps comply with ATEX Zona 2 regulation and are adequate to operate in areas with atmosphere potentially explosive and, with the variant of the conductive executions, can operate also in areas classified ATEX Zone 1.

These pumps are capable to pump fluids with very high viscosity and temperature up to $95^\circ C$.

All other constructive and functional characteristics are equal to those of the Astra.

<table>
<thead>
<tr>
<th>FOOD INDUSTRY</th>
<th>COSMETIC PHARMACEUTICAL INDUSTRY</th>
<th>VARIOUS INDUSTRY</th>
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<tbody>
<tr>
<td>Product</td>
<td>cP</td>
<td>Product</td>
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<tr>
<td>Butter</td>
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<td>Toothpaste</td>
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<td>Whipped acid cream</td>
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<td>Gel</td>
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<td>Mayonnaise</td>
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<td>1.500+3.000</td>
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<td>Marmalade</td>
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<tr>
<td>Tomato sauce</td>
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<td>Yogurt</td>
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<tr>
<td>Olive oil</td>
<td>100</td>
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</tr>
</tbody>
</table>

**PRODUCTS VISCOSITY**

1. Delivery manifold
2. Ball valve
3. Diaphragm
4. Air Distributor
5. Central casing
6. Wetted washer
7. Pump casing
8. Suction manifold
**DFA 38-18**

**COMPOSITION**
- Wetted parts: AISI 316 Polished
- Diaphragms: NBR + PTFE
- Valve Balls: PTFE • AISI 316
- Valve Seats: AISI 316
- Gaskets: PTFE

**TECHNICAL DATA**
- Fluid connections: Tri-Clamp ½\" • BSP • NPT
- Air connection: 6 mm
- Max flow rate: 18 l/m
- Max air pressure: 8 bar
- Max viscosity: 12,000 cPs

**Connections scheme page 30**

**DFA 50-30**

**COMPOSITION**
- Wetted parts: AISI 316 Polished
- Diaphragms: HYTREL+PTFE
- Valve Balls: PTFE • AISI 316
- Valve Seats: AISI 316
- Gaskets: PTFE

**TECHNICAL DATA**
- Fluid connections: Tri-Clamp 1\" • BSP • NPT
- Air connection: 6 mm
- Max flow rate: 30 l/m
- Max air pressure: 8 bar
- Max viscosity: 15,000 cPs

**Connections scheme page 30**
**COMPOSITION**

- **Wetted parts**
  - AISI 316 Polished
  - HYTREL + PTFE
  - PTFE • AISI 316
  - AISI 316
  - PTFE

**TECHNICAL DATA**

- **Fluid connections**
  - Tri-Clamp 1"
  - BSP • NPT

- **Air connection**
  - ¼” BSP

- **Max flow rate**
  - 50 l/m’

- **Max air pressure**
  - 8 bar

- **Max viscosity**
  - 20,000 cPs

**DIMENSIONS (mm)**

<table>
<thead>
<tr>
<th>AISI 316</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>291</td>
<td>249</td>
<td>177</td>
</tr>
</tbody>
</table>

Connections scheme page 30
**DFA 75-100**

**TECHNICAL DATA**
- Fluid connections: Tri-Clamp 1" BSP
- Air connection: ¾" BSP
- Max flow rate: 100 l/min
- Max air pressure: 8 bar
- Max viscosity: 25,000 cPs

**COMPOSITION**
- Wetted parts: AISI 316 Polished
- Diaphragms: HYTREL + PTFE
- Valve Balls: PTFE • AISI 316
- Valve Seats: AISI 316
- Gaskets: PTFE

**DIMENSIONS (mm)**
- AISI 316 A 247 B 249 C 177

**Connections scheme page 30**

**DFA 125-250**

**TECHNICAL DATA**
- Fluid connections: Tri-Clamp 1¼" BSP
- Air connection: ½" BSP
- Max flow rate: 250 l/min
- Max air pressure: 8 bar
- Max viscosity: 35,000 cPs

**COMPOSITION**
- Wetted parts: AISI 316 Polished
- Diaphragms: HYTREL + PTFE
- Valve Balls: PTFE • AISI 316
- Valve Seats: AISI 316
- Gaskets: PTFE

**DIMENSIONS (mm)**
- AISI 316 A 360 B 222 C 346

**Connections scheme page 30**

* Optional
### DFA 150-400

**COMPOSITION**
- Wetted parts: AISI 316 Polished
- Diaphragms: NBR+PTFE
- Valve Balls: PTFE • AISI 316
- Valve Seats: AISI 316
- Gaskets: PTFE

**TECHNICAL DATA**
- Fluid connections: Tri-Clamp 2"
- Air connection: ¾” BSP
- Max flow rate: 400 l/m'
- Max air pressure: 8 bar
- Max viscosity: 50,000 cPs

**DIMENSIONS (mm)**
- AISI 316 A 361 B 260 C 502

**Connections scheme page 30** *Optional*

### DFA 200-650

**COMPOSITION**
- Wetted parts: AISI 316 Polished
- Diaphragms: HYTREL+PTFE
- Valve Balls: PTFE • AISI 316
- Valve Seats: AISI 316
- Gaskets: PTFE

**TECHNICAL DATA**
- Fluid connections: Tri-Clamp 2½” • BSP
- Air connection: ¾” BSP
- Max flow rate: 650 l/m'
- Max air pressure: 8 bar
- Max viscosity: 50,000 cPs

**DIMENSIONS (mm)**
- AISI 316 A 487 B 598

**Connections scheme page 30** *Optional*
MISTRAL range represents the safest and most efficient solution for heavy dangerous and even explosive applications but also for process applications. The entire construction of the body pumps and of the distributor is realised in AISI 316L (low carbon content) making the pumps extremely resistant to corrosion, robust and perfect for continuous operation.

Main Applications

- Off-Shore platforms
- Marine
- Chemical process
- Cleaning/Cement mixer sewage
- Mining
The significant advantages of the distribution system designed for the MISTRAL:

- simple and maintenance free 5-component construction,
- material of construction resistant to wear and chemicals for longer lifetime without damage,
- affordable cost,
- High-shift speed and high-discharge speed of the exhaust air,
- low consumption as consequence of the fine tuned air quantity supplied to the diaphragms.

**“PROGRESS” VALVE**

Argal designed a special adaptive air distributor to turn on and off the pump and to fine tune the air flow consumption to the liquid pumped and the required performance with a real reduction of consumption and operational cost.

The materials used, the switching speed and the distribution spool shift speed all highly resist to the formation of ice that detaches itself from the surface to get then ejected from the discharge tube. Possible remaining will never affect the pump operation.
**TECHNICAL DATA**

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<thead>
<tr>
<th></th>
<th>200 (2&quot;)</th>
<th>300 (3&quot;)</th>
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<tbody>
<tr>
<td><strong>Maximum Capacity Litres/Minute</strong></td>
<td>680</td>
<td>1100</td>
<td>1280</td>
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<tr>
<td><strong>Materials of Pump Housings &amp; Center Block</strong></td>
<td>AISI 316L</td>
<td>AISI 316L</td>
<td>AISI 316L</td>
</tr>
<tr>
<td><strong>Fluid Port (ISO-ANSI Flange) Intake &amp; Discharge Connections</strong></td>
<td>2&quot; BSP</td>
<td>3&quot; DN80</td>
<td>4&quot; DN100</td>
</tr>
<tr>
<td><strong>Air Inlet</strong></td>
<td>½&quot; female NPT</td>
<td>¾&quot; female NPT</td>
<td>¾&quot; female NPT</td>
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<tr>
<td><strong>Air Exhaust (included silencer)</strong></td>
<td>¾&quot; female NPT</td>
<td>1&quot; female NPT</td>
<td>1&quot; female NPT</td>
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<tr>
<td><strong>Maximum Working Pressure</strong></td>
<td>8 bar</td>
<td>8 bar</td>
<td>8 bar</td>
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<tr>
<td><strong>Maximum Cycles per Minutes</strong></td>
<td>140</td>
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<td>96</td>
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<tr>
<td><strong>Max. Discharge Volume/Cycles</strong></td>
<td>3.7 litres</td>
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<td><strong>Maximum Solids Particle Size</strong></td>
<td>9 mm</td>
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<tr>
<td><strong>Suction Lift (dry)</strong></td>
<td>6 m</td>
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<td>4.5 m</td>
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**DIMENSIONS**

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<td>B</td>
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<td>C</td>
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<td>815</td>
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<td>M</td>
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<tr>
<td>D</td>
<td>235</td>
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<tr>
<td>M</td>
<td>570</td>
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**DIMENSIONS**

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<th>200 (2&quot;)</th>
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<tbody>
<tr>
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<td>220</td>
<td>250</td>
</tr>
<tr>
<td>M</td>
<td>460</td>
<td>570</td>
</tr>
</tbody>
</table>
AODD PUMPS
WITH AISI 316L CENTRAL BLOCK

AIRSATURN
"COMPOSITE MATERIALS PNEUMATIC PUMPS".
Thanks to the experience obtained with our pneumatic pumps ASTRA from size \(\frac{1}{4}\)” to 2” and the know how acquired manufacturing the Fiberglass centrifugal pumps SATURN under his belt, Argal could design and propose first to market these new air pumps made of thermoset resins. The main functional characteristics and peculiarities of the air pumps and its main applications are widespread and generally known.

So far the market lacked a solid and effective proposal for pneumatic pumps of large sizes made of non-metallic materials.

Some competitor offers 3” pumps made of plastics with the physical-and mechanical limits intrinsic to the nature of the thermoplastic resins and to overcome these limitations resort to metal alloys with in turn have limits themselves (one overall the high cost but even the corrosion-abrasion resistance).

"The composites MADE by ARGAL PUMPS, do not suffer the limits mentioned above and are proposed as the solution of synthesis and/or alternative".

MAXIMUM CHEMICAL AND MECHANICAL STRENGTH.

These pumps are obtained deploying composite materials made of vinyl ester resins reinforced with long strand only glass fibres moulded with RTM technique in its factory located in Brescia.

The parts wet by the liquid pumped in particular have important prerogatives:

- high chemical resistance (the highest among resins, polyester);
- mechanical strength comparable to some metal alloys;
- dimensional stability, characteristic of the thermosetting resins which during catalysis transform themselves irreversibly becoming insoluble and infusible;
- abrasion resistance and resistance to aging;
- resistance to low and high temperatures (from \(-35°C\) to \(+115°C\));
- lightness typical of composites which, because of differentiated modulus of elasticity for the various parts of the pump and with the minimum thickness of 20 mm exceed the hydrostatic tests from 20 to 50 bar;
- resistance to flame propagation in case of fire.

MATERIALS PROFILE Pump Casings

Pump casings of AIRSATURN are of the following types of FRP:

- V1G standard vinyl ester resin for general use;
- V1A mixture of vinyl ester resin for abrasive liquids;
- V1C mixture of vinyl ester resin for liquids with chlorine;
- V1F mixture of vinyl ester resin for liquids with fluorine.
The significant advantages of the distribution system designed for the AIRSATURN:

- simple and maintenance free 5-component construction,
- material of construction resistant to wear and chemicals for longer lifetime without damage,
- affordable cost,
- High-shift speed and high-discharge speed of the exhaust air,
- low consumption as consequence of the fine tuned air quantity supplied to the diaphragms.

"PROGRESS" VALVE
Argal designed a special adaptive air distributor to turn on and off the pump and to fine tune the air flow consumption to the liquid pumped and the required performance with a real reduction of consumption and operational cost.

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</thead>
<tbody>
<tr>
<td>Maximum Capacity Litres/Minute</td>
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<td>1280</td>
</tr>
<tr>
<td>Materials of Pump Housings &amp; Central Block</td>
<td>FRP + AISI 316L</td>
<td>FRP + AISI 316L</td>
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<tr>
<td>Fluid Port (ISO-ANSI Flange) Intake &amp; Discharge Connections</td>
<td>3” DN80</td>
<td>4” DN100</td>
</tr>
<tr>
<td>Air Inlet</td>
<td>¾” F NPT</td>
<td>¾” F NPT</td>
</tr>
<tr>
<td>Air Exhaust (included silencer)</td>
<td>1” F NPT</td>
<td>1” F NPT</td>
</tr>
<tr>
<td>Maximum Working Pressure</td>
<td>8 bar</td>
<td>8 bar</td>
</tr>
<tr>
<td>Maximum Cycles per Minutes</td>
<td>96</td>
<td>96</td>
</tr>
<tr>
<td>Max. Discharge Volume/Cycles</td>
<td>8,5 litri</td>
<td>8,5 litri</td>
</tr>
<tr>
<td>Maximum Solids Particle Size</td>
<td>11 mm</td>
<td>13 mm</td>
</tr>
<tr>
<td>Suction Lift (dry)</td>
<td>6 m</td>
<td>4,5 m</td>
</tr>
</tbody>
</table>

DIMENSIONS (mm)

<table>
<thead>
<tr>
<th></th>
<th>300 (3&quot;)</th>
<th>400 (4&quot;)</th>
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<tbody>
<tr>
<td>A</td>
<td>662</td>
<td>728</td>
</tr>
<tr>
<td>B</td>
<td>436</td>
<td>482</td>
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<tr>
<td>C</td>
<td>803</td>
<td>904</td>
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TEMPERATURES

<table>
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<tr>
<th>DIAPHRAGM MATERIALS</th>
<th>TEMP. ºC MIN/MAX</th>
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<tbody>
<tr>
<td>EPDM</td>
<td>+100 -35</td>
</tr>
<tr>
<td>NBR</td>
<td>+80 -20</td>
</tr>
<tr>
<td>EPDM + PTFE</td>
<td>+120 -35</td>
</tr>
<tr>
<td>NBR + PTFE</td>
<td>+80 -20</td>
</tr>
</tbody>
</table>

Connections scheme 1 C - 1 O page 30
The AIRPISTON piston pumps family addresses the problems inherent to metering products with high viscosity up to 1,000,000 cPs.

These pumps are made combining synthetic materials for the body with stainless steel AISI 316 for most of the wet parts.

AIRPISTON range complies with the requirements of ATEX Class 3: Zone 2 (Serie II 3/3GD IIB T 275°F). AIRPISTON pumps are offered in inline or submerged versions:

- **In-line pumps**, meant for “passing through” installation with suction pipe and delivery pipe connected to the system.
- **Submerged pumps**, with casing submerged in the liquid and delivery pipe connected to the system.

**MAIN APPLICATIONS**

- **Mechanics**: Lubricants and lubro-refrigerants
- **Energy**: Gas odorization
- **Ecology**: Coagulant, flocculent, deodorization
- **Surface Treatment**: Colorant liquids, varnish
- **Cosmetics**: Essences, pastes, lotions, soaps, shampoos
- **Textile**: Basic resins preparation and mix of additive.
Both versions share the pneumatic motor which is the most sophisticated and important part of the device and is responsible for:

- **Actuating the piston to the required stroke length;** adjustable by ergonomic handle command from 0 to 100%
- **controlling the piston speed** movement as well as the frequency drive *from a minimum of 3 pumping per minute to 100 pumping per minute*;
- regulating one of the two lengths without affecting the other (frequency/cycles);
- **accepting external inputs** to execute single stroke metering or **batch dosing**;
- generating outputs to **command external devices** for a total dosing control.

Motor is provided with control connection.
External pneumatic devices can be added (e.g., pilot-operated valve) and the piston pump does not require additional piping.

**APL IN-LINE PUMPS - HIGH VISCOITY**

APL pumps operate with viscosity up to 1,000,000 cPs.
The volume of liquid delivered by each single pump stroke and its **frequency per minute** are controlled.
The pump **generates a signal** at the end of the **metering cycle** as an integrated characteristic.
The frequency is controlled by **pneumatically operated unstable oscillator** or external pneumatic or electric devices **(remote control)**.

**APS SUBMERGED PUMPS - VERY HIGH VISCOITY**

This version is deployed to pump liquids of high-level of viscosity.
The casing is immersed in the fluid to minimise risks of cavitation and consequent erosion and premature wear of parts which is the main cause of failure of pumps to address this service.
The neat design of APS pumps simplifies installation and integrates:
- Suction valve integrated within the casing.
- Delivery valve integrated within the pumping piston.
- Sealed pumping piston.
- 2 spheres within its valves.
The motor actuates the piston by means of a metallic stem hosted within the dual purpose metallic (or synthetic) tube.
The liquid pumped by the piston passes through the dual purpose pipe and is delivered from its hydraulic connection.
The length of the dual purpose tube can be customised to match as much as possible the required dive depth.
IN-LINE OR SUBMERGED METERING BASE PUMPS (ABL - ABS - ACL) ARE PERFECT FOR METERING HIGH AND VERY HIGH-LEVEL OF VISCOSITY.

The volume regulator control is integrated while the metering command is provided by an external unit.

The ABL and the ABS are realised in two different typologies: “In-line” (ABL) or “Submerged” (ABS).

**ACL-** The ACL realised “in-line” are ideal for metering high-viscosity fluids (<3000 cPs). Control devices can be assembled on to the ACL pump on pre-set positions thanks to its parallelepiped shape.
Liquid connections can be oriented in many positions.

All the BASE pumps models are in fact metering pumps that can regulate the dosed fluid volume.
Though, they are not equipped with an autonomous control as the metering command is provided by an external unit (on ACL model, a working frequency control can be added for example).
Pumps can be deployed in batteries (of 2 or more units) and a be run simultaneously with single command.

**COMMAND DEVICES**

- “Main” APS or APL piston metering pumps
- Frequency generator with pneumatic output
- Transducer with pneumatic output operated by the system cycle (where the pump is installed).

In **CDS system**, pumps have a flow rate equal or inferior to the main pump’s one.
PISTON METERING PUMPS
AIRPISTON

CDS COMBINED METERING SYSTEM

It smartly combines one main metering pump with one minor metering pump to deliver a single modular device to precisely mix two products of different physical characteristics. It is a standard feature of main pump models APL and APS 2.

SPECIFIC APPLICATIONS:
MECHANICS:
Lubro-refrigerants metering
Automatic refill with lubro-refrigerants

ECOLOGY AND ENVIRONMENT:
Dilution and dosage of flocculent liquids, dilution and metering of deodorizers.

It requires the addition of static auto-lube system SMX if the products have various viscosity.

SMX STATIC BLENDER

This device is built in 2 lengths and is used for blending two products with different physical characteristics to obtain one homogeneous compound.
The cylindrical construction made of synthetic materials encases the calibrated internal casing of the blending element.
The two outputs are equipped with non return valves.

ACCESSORIES SHARED BY ALL AIRPISTON

AIRPISTON pumps share a list of accessories to match different scenarios and satisfy different requirements:

• External timer (to set time lapse between metering cycles from 0 to many minutes).
• Cycle counter (presettable).
• Cycle counter (to actuate dosing batch).
• Solenoid valve (for remote electric command).
• Transducer (to convert the “end of cycle” signal from pneumatic to electric).
• Static blender (to instantly meter and blend meter products).
• Combined metering system kit consisting of: APL pump support, SMX static blender, water main supply adaptor, ABS pumps connexions.
PISTON METERING PUMPS
AIRPISTON

AIRPISTON METERING PUMPS MAIN CHARACTERISTICS

<table>
<thead>
<tr>
<th>MODEL</th>
<th>FLOW RATE l/h min-max</th>
<th>MAX volume per cycle in CC</th>
<th>MAX frequency (cycle per min')</th>
<th>MAX delivery pressure (bar)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABL/ABS/ACL 1</td>
<td>0,003 - 1</td>
<td>0,18</td>
<td>100</td>
<td>30</td>
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<tr>
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<tr>
<td>APL/APS 450</td>
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**ADJUSTABLE CYCLE VOLUME:** from 10 to 100%
**ADJUSTABLE FREQUENCY:** from 3 to 60/100 CYCLE per MIN’
**INLET PRESSURE:** from 2 to 8 BAR

**MATERIALS: MAIN CONFIGURATIONS** (Custom layouts available on request).

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<th>VERSION</th>
<th>CASING</th>
<th>PUMPING PISTON</th>
<th>GASKET</th>
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<tr>
<td>SS S T</td>
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</table>
AIRDRAIN series was designed to operate in wells. The main applications are reclaimed areas drainage, ground level control, supernatant and leachate from municipal solid waste collecting areas.

AIRDRAIN is composed of 4 models with different operating system:

- **BSD** BASIC STATIC DRAIN
- **ASD** AUTOMATIC STATIC DRAIN
- **ADD** AUTOMATIC DIAPHRAGM DRAIN
- **ABD** AUTOMATIC BELLOWS DRAIN

**BSD - BASIC STATIC DRAIN** is the most reliable pump of AIRDRAIN series. The pump casing consisting of a hollow vessel is fitted with one intake and one evacuation liquid valve. An airline connects the pump casing with the pneumatic operating central block located at the top of the well. Once submerged, the pump casing is flooded till filled up through the intake valve because of the liquid's hydrostatic pressure and the air contained inside is displaced through the airline connected to the control unit.

**ASD - AUTOMATIC STATIC DRAIN** is similar in operating principle to BSD pumps. ASD differ from BSD pumps as for BSD pumps do not require the external pneumatic operating central block. The replenishment and the evacuation phases of the BSD pumps are controlled by its internal air compressor control device assisted by a floating probe to detect the liquid level. ASD pumps evacuate exhausted air through a dedicated pipe. ASD pumps do not need the bathymetric probe to monitor the level of the liquid pumped for the function is delivered by the mentioned floating probe. BSD and ASD pump comply with the requirements of ATEX Class 3.

**ADD - AUTOMATIC DIAPHRAGM DRAIN** These automatic pumps do not require external controls. ADD model delivers the pumping effect by a flexible diaphragm coupled to suction and delivery valves. It can be supplied with liquid level detection to stop once the liquid is missing. The pump does not fail if run dry. This design is advantageous for the pump that can operate properly till the liquid is completely run out even if the pump is not entirely submerged. As an additional bonus, these pumps are extremely short which reduces the risk for the pump to be abandoned inside the well if it deforms.

**ABD - AUTOMATIC BELLOWS DRAIN** is similar to ADD with the difference that the element responsible for delivering the liquid flow is not a flexible diaphragm but a bellow. Thanks to the reduced diameter of the bellow and the diameter of the diaphragm, the ABD pumps are more compact than ADD pumps hence easier to install into minor-size wells.
**ADD and ABD** pumps are special for they comply with the requirements of ATEX Class 2 zone 1, as such pumps can be safely operated into wells and ideal for extracting percolate from municipal solid waste collecting areas with biogas presence and consequent risk of explosion.

Options for all AIRDRAIN Pumps:
- Installation kit for wells (pressure reducer, suspension cable, air compressed and liquid pipes).
- Lamellar filter on the intake.
- Level control probe for liquid collection tanks, with min. max.
- Only for BSD pumps: level control bathymetric probe.
- Only for ADD and ABD pumps: level control device.

---

### AIRDRAIN PUMPS MAIN CHARACTERISTICS

<table>
<thead>
<tr>
<th>MODEL</th>
<th>PUMP DIAMETER mm</th>
<th>FLOW RATE l/h min-max</th>
<th>MAX volume per cycle in CC</th>
<th>MAX frequency (cycle per min')</th>
<th>MAX delivery pressure (bar)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BSD / ASD</td>
<td>63</td>
<td>6</td>
<td>0,18</td>
<td>10</td>
<td>8</td>
</tr>
<tr>
<td>BSD / ASD</td>
<td>90</td>
<td>20</td>
<td>0,75</td>
<td>10</td>
<td>8</td>
</tr>
<tr>
<td>ADD</td>
<td>125</td>
<td>18</td>
<td>2</td>
<td>150</td>
<td>8</td>
</tr>
<tr>
<td>ABD</td>
<td>70</td>
<td>10</td>
<td>4,5</td>
<td>100</td>
<td>8</td>
</tr>
<tr>
<td>ABD</td>
<td>90</td>
<td>18</td>
<td>9</td>
<td>100</td>
<td>8</td>
</tr>
</tbody>
</table>

---

### MATERIALS: MAIN CONFIGURATIONS

<table>
<thead>
<tr>
<th>VERSION</th>
<th>HEAD/CASING</th>
<th>DISCHARGE VALVE</th>
<th>INTAKE VALVE</th>
<th>GASKETS</th>
<th>DIAPHRAGM BELLOW</th>
</tr>
</thead>
<tbody>
<tr>
<td>BSD / ASD WS</td>
<td>PP • AISI 316</td>
<td>AISI 316</td>
<td>PTFE • AISI 316</td>
<td>FKM</td>
<td>-</td>
</tr>
<tr>
<td>ADD WW M</td>
<td>PP</td>
<td>AISI 316</td>
<td>PTFE • AISI 316</td>
<td>FKM</td>
<td>SANTOPRENE®</td>
</tr>
<tr>
<td>ABD 70 WS T</td>
<td>PP • AISI 316</td>
<td>AISI 316</td>
<td>PTFE • AISI 316</td>
<td>FKM</td>
<td>PTFE</td>
</tr>
<tr>
<td>ABD 90 WS T</td>
<td>PP • AISI 316</td>
<td>AISI 316</td>
<td>PTFE • AISI 316</td>
<td>FKM</td>
<td>PTFE</td>
</tr>
</tbody>
</table>

SANTOPRENE® is a registered trademark of Exxon Mobil.
The range of SELENE & ZEFIRO flow pulsation dampeners exploits a new technology which minimises the pulsation typical of the flow delivered by air operated double diaphragm pumps. All volumetric pumps as metering pumps with double diaphragm or plumber piston generate pulsations from their pumping alternative motion and hydraulic shocks potentially capable to damage the complete device. The pulsation dampeners Selene are mounted on the line where the liquid is delivered and reduce drastically pulsation, liquid hammers and vibration of the pump. The dampener needs its source of pressurised air supply.

Its use is advised when the hydraulic circuit of the pump suffers peaks of pressure, thermal expansions, sudden starts and stops or fast valve shut offs of delivery valves.
SELENE dampeners are “active” and do no need tuning or pre-loading for they are self-adaptive; their can dampen the amplitude of the pulsations up to 90% of their max. amplitude.

Dampeners require a minimal maintenance and are available in the same construction materials of the liquid chambers and diaphragms for thermoplastic pumps and in stainless steel SUS 316 for the metallic versions. For pumps made of aluminium the SELENE dampeners are constructed in PPS (Ryton®).

SELENE dampeners are available in ATEX compliant version and are adequate to operate in areas at risk of explosion, classified as Atex Zone 1.
The major advantages of the Selene dampener are:
- Stabilizing the flow generated by volumetric pumps
- Reducing significantly the vibrations
- Reducing liquid hammers
- Preventing potentially damaging pressure peaks
- Reducing significantly the noise of the system
- Protecting the appliances connected along the same hydraulic line
- Reducing the maintenance cost of the plant
- Increasing global productivity
- Is operating with liquids viscous or laden with solids.

### PDA 75 TECHNICAL DATA

| Connections | • Threaded BSP  
• Threaded NPT  
• Flanged (1) |
| Inlet/Outlet | ¾” |
| Air connection | ø 6 mm |
| Air exhaust plug | ¼” |
| Max pressure | 8 bar |
| Dimension | ø 120x125 mm |

### MATERIALS
- • PP + Glass fibre
- • PP + Carbon fibre
- • PVDF + Carbon fibre
- • POMC + Carbon fibre
- • POMC
- • AISI 316
- • AISI 316 Polished

### APPLICABILITY
- • DDA 25-09
- • DDA 38-18
- • DDA 50-30

### PDA 100 TECHNICAL DATA

| Connections | • Threaded BSP  
• Threaded NPT  
• Flanged (1) |
| Inlet/Outlet | 1”  
½” solo per i corpi in AISI |
| Air connection | ø 8 mm |
| Air exhaust plug | ¼” |
| Max pressure | 8 bar |
| Dimension | ø 182x175 mm |

### MATERIALS
- • PP + Glass fibre
- • PP + Carbon fibre
- • PVDF + Carbon fibre
- • POMC + Carbon fibre
- • POMC
- • AISI 316
- • AISI 316 Polished

### APPLICABILITY
- • DDA 50-50
- • DDA 50-65
- • DDA 75-100
- • DDA 100-100
### PDA 150 TECHNICAL DATA

<table>
<thead>
<tr>
<th>Connections</th>
<th>MATERIALS</th>
<th>APPLICABILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Threaded BSP</td>
<td>• PP + Glass fibre</td>
<td>• DDA 100-160</td>
</tr>
<tr>
<td>• Threaded NPT</td>
<td>• PP + Carbon fibre</td>
<td>• DDA 125-250</td>
</tr>
<tr>
<td>• Flanged (1)</td>
<td>• PVDF + Carbon fibre</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• POMC + Carbon fibre</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• POMC</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• AISI 316</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• AISI 316 Polished</td>
<td></td>
</tr>
<tr>
<td>Inlet/Outlet</td>
<td>1 ½&quot;</td>
<td></td>
</tr>
<tr>
<td>Air connection</td>
<td>ø 10 mm</td>
<td></td>
</tr>
<tr>
<td>Air exhaust plug</td>
<td>½&quot;</td>
<td></td>
</tr>
<tr>
<td>Max pressure</td>
<td>8 bar</td>
<td></td>
</tr>
<tr>
<td>Dimension</td>
<td>ø 231x252 mm</td>
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</table>

### PDZ 200 TECHNICAL DATA

<table>
<thead>
<tr>
<th>Connections</th>
<th>MATERIALS</th>
<th>APPLICABILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Threaded BSP</td>
<td>• PP + Glass fibre</td>
<td>• DDA 150-500</td>
</tr>
<tr>
<td>• Threaded NPT</td>
<td>• PP + Carbon fibre</td>
<td>• DDA 200-650</td>
</tr>
<tr>
<td>• Flanged (1)</td>
<td>• PVDF + Carbon fibre</td>
<td>• MISTRAL 200</td>
</tr>
<tr>
<td></td>
<td>• ALUMINUM</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• AISI 316</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• AISI 316 Polished</td>
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</tr>
<tr>
<td></td>
<td>• AISI 316 Lined</td>
<td></td>
</tr>
<tr>
<td>Inlet/Outlet</td>
<td>2&quot;</td>
<td></td>
</tr>
<tr>
<td>Air connection</td>
<td>ø 12 mm</td>
<td></td>
</tr>
<tr>
<td>Air exhaust plug</td>
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<td></td>
</tr>
<tr>
<td>Max pressure</td>
<td>8 bar</td>
<td></td>
</tr>
<tr>
<td>Dimension</td>
<td>ø 350x405 mm</td>
<td></td>
</tr>
</tbody>
</table>
ACCESSORIES

CYCLE-COUNTER
Delivers on/off switch signal at any pumping cycle. This signal can be used as an input for a remote cycle counter device; if coupled to the AODD pump, it may constitute a simple and effective dosing system.

COMPATIBILITY
- ASTRA COMPACT
- ASTRA
- MISTRAL
- AIRPISTON

ANTI VIBRATION MOUNTINGS
Minimise the vibrations transmitted from pump to system.
ACCESSORIES

1. Air supply input
2. Pump supply output
3. Start command
4. Stop command
5. Pump signal input
7. Remote start command
8. Remote stop command
9. Light-activated output
10. Preselection impulse counter

STROKE-COUNTER
Counts the number of strokes and is connected to a PCL or a counter to allow several control modes.

TROLLEY
Easy to apply on the installation site.
Find **ARGAL** in Apple **APPSTORE** and Google **PLAYSTORE** to get precious features:

**CATALOGS** all catalogues continually updated;
**CONVERTER** of the principal measure units;
**SETTINGS** to set up your pump through your smartphone or tablet.

**DO YOU NEED HELP?**
Just take a **PICTURE** of the pump to repair or to change. You’ll get in touch with our custom care or sales office to have a quick answer.