

ARO

Diaphragm & Piston Pumps

Products Overview & Applications



TiD-extra
Industrial Technologies d.o.o.

IR Ingersoll Rand®

The pump professionals

Leader in pneumatic pumps, ARO offers a wide range of diaphragms and piston pumps for low to high viscosity fluids.

The ARO pumps benefit from 80 years experience, making them highly reliable and rugged for use in the chemical, process industries and any other difficult environment (explosive, dusty, wetted and heated atmosphere).

Engineering

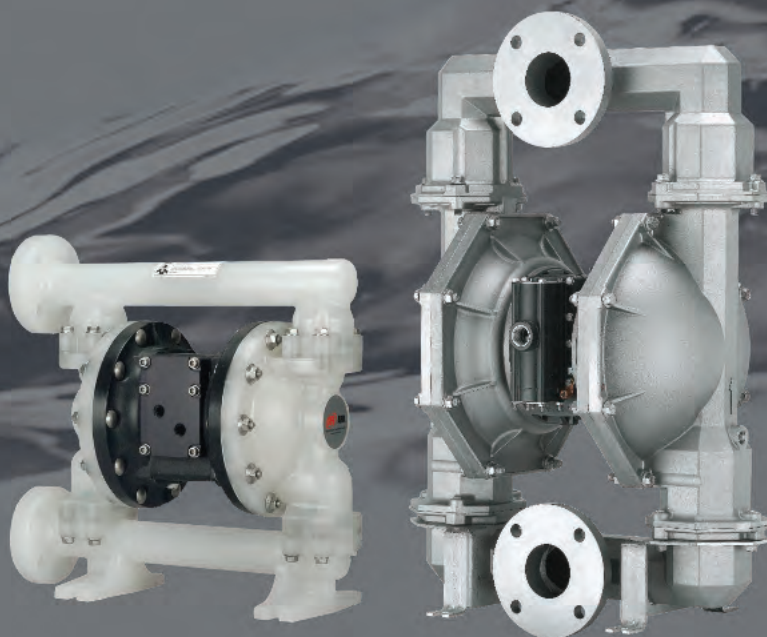
We consistently deliver best-in class technologies designed by highly skilled engineers who know how you work. We consult with you to identify your needs and customise solutions to best fit them.

Technical Support

No matter what your application or location happens to be, if you have questions or need assistance, our professional, experienced technical support personnel are merely a phone call or e-mail away.

Logistics

With our global manufacturing and distribution network, you're guaranteed to have quick access to the equipment, parts or accessories you need to keep your operation running smoothly.



The heart of your Process

Ingersoll Rand / ARO offers a wide range of Fluid Technologies for today's demanding industries and applications.

- Bulk material transfer and circulation
- Dispensing
- Filling
- Finishing
- Formulation
- High-pressure cleaning
- Lubrication
- Packaging
- Printing flexo/offset

TiD-extra
Industrial Technologies d.o.o.

Industries

Aerospace

Automotive

Ceramic

Chemical Processing

Machine Builders – Formulation

Mining and Construction

Oil / Gas Petrochemical

Paint and Finishing

Pharmaceutical and Cosmetics

Print Shop and Ink Manufacture

Shipbuilding and Marine

ARO® Diaphragm Pumps



ARO Air operated Diaphragm Pumps are designed for general use. They can easily pump from clean, light viscosity fluids to corrosive, abrasive medium viscosity fluids and can transfer large particles without damage. Due to their pneumatic motor, they can be used in potentially explosive areas. Most of the ARO Diaphragm Pumps are ATEX certified (CE ExII 2GD X).

Highly flexible

ARO diaphragm pumps offer the ability to vary the flow outlet and discharge pressure as slow as one litre per minute up to 1040 litres per minute for our larger sizes and adjust fluid pressure up to 8.6 bars, with just using an air filter / regulator and a needle valve.

Self-priming

These pumps are self-priming up to an elevation of 8.3m (with water) and can operate dry without any damage. If the fluid outlet is closed, the pump stops; it restarts with the reopening of the fluid circuit; no pressure relief valve or bypass is necessary.

Wide range of material configurations

The ARO range of diaphragm pumps offers many material of construction compatible for the chemical industry: our metallic offering consists of aluminium, cast iron, stainless steel and Hastelloy. Our non-metallic offering consists of polypropylene, acetal and PVDF.



ARO® Diaphragm Pumps Range and Applications

Compact Pumps, 1/4" to 3/4" ports

Ideal for OEM and general industrial applications, these pumps feature big performance in a small package. Flow rates up to 56 l/min with a large range of material configurations.

EXP Series Pumps, 1" to 3" ports

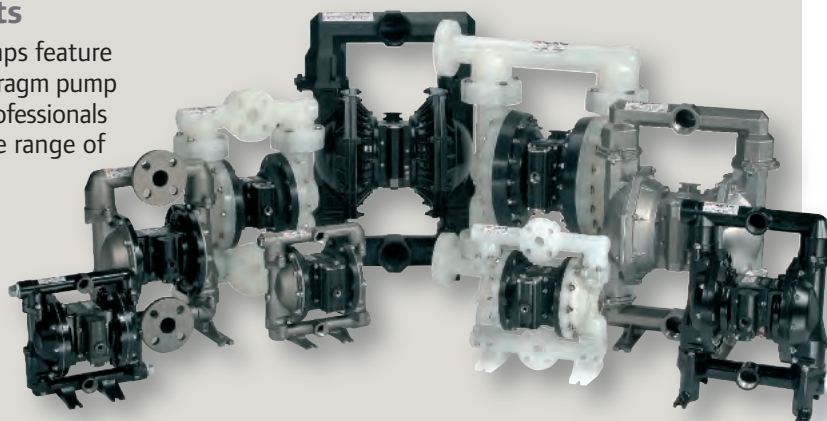
ARO's PROCESS GRADE, Expert Series Pumps feature the best total cost of ownership of any diaphragm pump on the market. A favourite among process professionals with flow rates up to 1041 l/min and a large range of material configurations.

Pro Series Pumps, 1" to 3" ports

ARO's INDUSTRIAL GRADE, Pro-Series Diaphragm Pumps provide high performance and stall-free reliability with flow rates up to 897 l/min.

Specialty Application Pumps

Pumps providing the same high level of performance and satisfaction but in a design tailored for your specific application. This range includes many specific models (see details pages 8 and 9).





Productivity: Maximised flow rates + Minimised pulsation and air consumption = Maximum Performance.



Versatility: Multiple porting options available along with interface options allow you to customise this pump specifically to your OEM application.



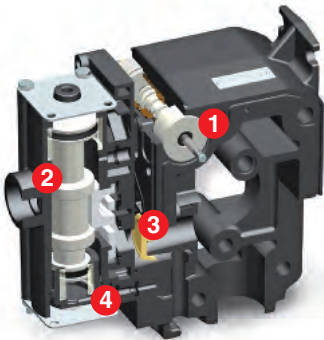
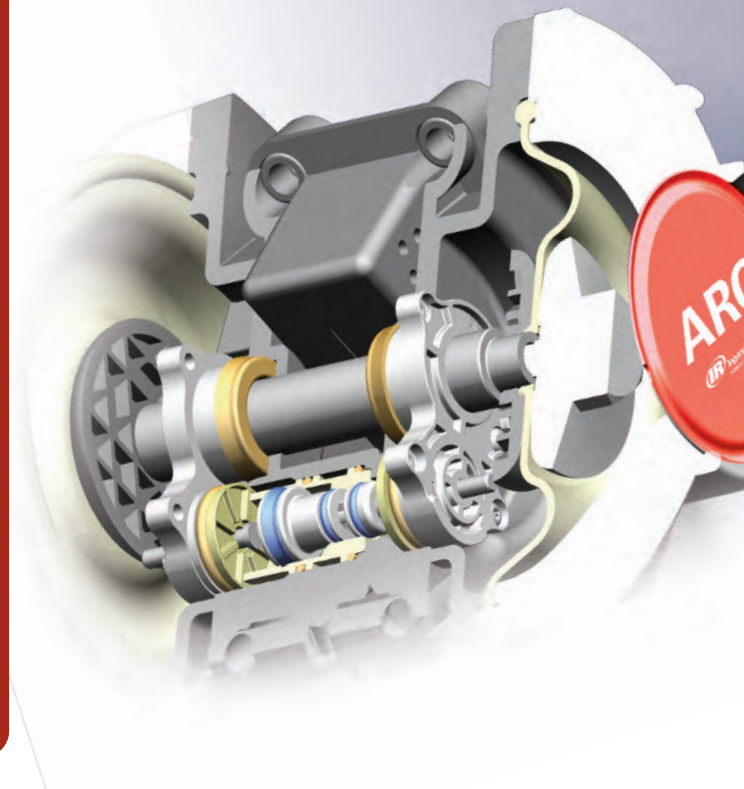
Reliability: Lube free patented differential valve both on major air valve and SimulShift™ (pilot valve) provides reliable worry free operation – fluid on demand every time.



Environmentally Sound: Bolted construction in conjunction with a wide range of material options provides maximum chemical and leak resistance.



Serviceability: Modular construction, reduced parts count and simple to use repair kits minimise repair time and cost.



Patented ARO® Air Motor Technology

- 1 SimulShift™ Valve; avoids stall-out – provides faster pump trip-over with more flow.
- 2 "Unbalanced" Major Air Valve; eliminates pump stall-out, even under low air inlet pressures.
- 3 "D" Valve for optimum energy efficiency while avoiding costly air "blow-by" – ceramic construction for long service life.
- 4 Quick Dump™ Checks, eliminates pump ice-up by diverting cold, wet exhaust air away from the major air valve.

ARO® Diaphragm Pumps: the best "total cost of ownership" in the industry

Energy Efficient: ARO EXP pumps are 20% to 40% more efficient than competitive models.

Downtime Reduction: The mean time between failure for EXP is up to four-times longer than competitive pumps.

Installation/Repairs and Spare Parts: EXP diaphragms provide up to four-times the life of competitive diaphragms. EXP spares include cost-effective service kits, not the expensive full-motor replacements of some competitors.

EXP Total Value Proposition: EXP provides the BEST total cost of ownership of any diaphragm pump on the market today.



ARO® Diaphragm Pumps



Non-Metallic Models – Range and Performance



EXPERT Series
EXPERT Series
EXPERT Series
EXPERT Series
PRO Series
EXPERT Series
PRO Series
EXPERT Series
PRO Series
EXPERT Series

	1/4"	3/8"	1/2"	3/4"	1"	1"	1 1/2"	1 1/2"	2"	2"
 1 min. 	20 l/min	40.1 l/min	54.5 l/min	56 l/min	178 l/min	200 l/min	378 l/min	465 l/min	549 l/min	696 l/min
 Max. bar	8.6 bar (125 psi)	6.9 bar (100 psi)	6.9 bar (100 psi)	6.9 bar (100 psi)	8.3 bar (120 psi)	8.3 bar (120 psi)	8.3 bar (120 psi)	8.3 bar (120 psi)	8.3 bar (120 psi)	8.3 bar (120 psi)
	1/4" NPT 1/4" BSP	3/8" NPT 3/8" BSP	1/2" NPT 1/2" BSP	3/4" NPT 3/4" BSP	1" NPT 1" BSP 1" ANSI/DIN	1" NPT 1" BSP 1" ANSI/DIN	1 1/2" ANSI/DIN	1 1/2" ANSI/DIN	2" ANSI/DIN	2" ANSI/DIN
	1/4" NPT 1/4" BSP	3/8" NPT 3/8" BSP	1/2" NPT 1/2" BSP	3/4" NPT 3/4" BSP	1" NPT 1" BSP 1" ANSI/DIN	1" NPT 1" BSP 1" ANSI/DIN	1 1/2" ANSI/DIN	1 1/2" ANSI/DIN	2" ANSI/DIN	2" ANSI/DIN
Material	Polypropylene	Polypropylene	Polypropylene	Polypropylene	Polypropylene	Polypropylene	Polypropylene	Polypropylene	Polypropylene	Polypropylene
	PVDF	PVDF	PVDF		PVDF	PVDF		PVDF		
	Groundable acetal	Groundable acetal	Groundable acetal		PVDF	Conductive polypropylene	PVDF	Conductive polypropylene	PVDF	Conductive polypropylene
 Max.	1.6 mm	1.6 mm	2.4 mm	2.4 mm	3.2 mm	3.2 mm	6.4 mm	6.4 mm	6.4 mm	6.4 mm
 ATEX certified	With wetted parts in groundable acetal.	With wetted parts in groundable acetal.	With wetted parts in groundable acetal.	—	—	With conductive polypropylene motor	—	With conductive polypropylene motor	—	With conductive polypropylene motor



Metallic Models – Range and Performance



EXPERT Series
EXPERT Series
PRO Series
EXPERT Series
PRO Series
EXPERT Series
PRO Series
EXPERT Series
PRO Series
EXPERT Series

1/2"	3/4"	1"	1"	1 1/2"	1 1/2"	2"	2"	3"	3"
45.4 l/min	51.5 l/min	133 l/min	197 l/min	340 l/min	465 l/min	651 l/min	651 l/min	897 l/min	1041 l/min
6.9 bar (100 psi)	6.9 bar (100 psi)	8.3 bar (120 psi)	8.3 bar (120 psi)	8.3 bar (120 psi)	8.3 bar (120 psi)	8.3 bar (120 psi)	8.3 bar (120 psi)	8.3 bar (120 psi)	8.3 bar (120 psi)
1/2" NPT 1/2" BSP	3/4" NPT 3/4" BSP	1" NPT 1" BSP	1" NPT 1" BSP	1 1/2" NPT 1 1/2" BSP	1 1/2" NPT 1 1/2" BSP 1 1/2" ANSI/DIN	2" NPT 2" BSP	2" NPT 2" BSP 2" ANSI/DIN	3" NPT 3" BSP	3" NPT 3" BSP
1/2" NPT 1/2" BSP	3/4" NPT 3/4" BSP	1" NPT 1" BSP	1" NPT 1" BSP	1 1/2" NPT 1 1/2" BSP	1 1/2" NPT 1 1/2" BSP 1 1/2" ANSI/DIN	2" NPT 2" BSP	2" NPT 2" BSP 2" ANSI/DIN	3" NPT 3" BSP	3" NPT 3" BSP
Aluminium Stainless steel	Aluminium	Aluminium Cast iron Stainless steel	Aluminium Cast iron Stainless steel Hastelloy	Aluminium Cast iron Stainless steel	Aluminium Cast iron Stainless steel Hastelloy	Aluminium Cast iron Stainless steel	Aluminium Cast iron Stainless steel Hastelloy	Aluminium Cast iron Stainless steel	Aluminium Cast iron Stainless steel Hastelloy
2.4 mm	2.4 mm	3.2 mm	3.3 mm	6.4 mm	6.4 mm	6.4 mm	6.4 mm	9.5 mm	9.5 mm
All models	All models	All models	With aluminium or stainless steel motor	All models	With aluminium or stainless steel motor	All models	With aluminium or stainless steel motor	All models	With aluminium or stainless steel motor

ARO[®] Diaphragm Pumps



Specialty Models – Range and Performance



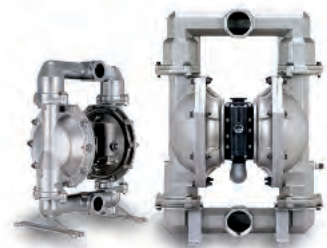
PP Series



PM Series



Pit Boss Series



PH Series

	Powder Pumps		Sanitary Pumps					Dewatering Pumps			High Pressure Pumps			
?:1	1:1		1:1					1:1			3:1	2:1	2:1	2:1
Ø	2"	3"	1/2"	1"	1 1/2"	2"	3"	1 1/2"	2"	3"	1"	1 1/2"	2"	3"
1 min. 	Max. powder density = 800 kg/m ³		49.2 l/min	198 l/min	465 l/min	651 l/min	1041 l/min	302.8 l/min	590.5 l/min	821.3 l/min	50 l/min	238 l/min	348 l/min	605 l/min
Max. 	6.9 bar (100 psi)		6.9 bar (100 psi)	8.3 bar (120 psi)			8.3 bar (120 psi)			6.9 bar (100 psi)				
	2" NPT 2" BSP	3" NPT 3" BSP	1 1/2" Tri-clamp	2" Tri-clamp	2 1/2" Tri-clamp	3" Tri-clamp	1 1/2" BSP	2" BSP	3" BSP	1" NPT 1" BSP	1 1/2" NPT 1 1/2" BSP 1 1/2" ANSI DIN	2" NPT 2" BSP 2" ANSI DIN	3" NPT 3" BSP	
Material	Aluminium Stainless steel		FDA accepted material					Aluminium			Stainless steel			
Max. 	6.4 mm	9.5 mm	2.4 mm	3.3 mm	6.4 mm	6.5 mm	9.5 mm	12.7 mm	19.1 mm	25.4 mm	3.2 mm	6.4 mm	6.4 mm	9.5 mm
ATEX certified 	All models		All models	With aluminium or stainless steel motor			All models			All models				

ARO® Diaphragm Pump Applications

Here are some examples. Other application pictures are presented on page 14.



PF Series

DAB05 Series

P Series

Flap Valve Pumps	Drum Pumps		Submersible Pumps	
1:1	1:1	1:1	—	—
2"	1/2"		2 1/2"	2"
651 l/min	45.4 l/min	54.5 l/min	757 l/min	870 l/min
8.3 bar (120 psi)	6.9 bar (100 psi)		6.2 bar (90 psi)	
2" NPT 2" BSP	Siphon tube		Screened inlet	
Aluminium Cast iron Stainless steel	Aluminium Stainless steel	Polypropylene	Cast iron	
51mm (semi-solids)	2.4 mm	2.4 mm	6.4 mm	6.4 mm
With aluminium or stainless steel motor	With aluminium motor	—	—	—



1 1/2" diaphragm pump installed in a chemical process to transfer chloride methylene



2" stainless steel diaphragm pumps assembled with PVDF pulsation dampeners used to download hydrofluoric acid



UL approved fuel pump 1" size, used assembled on skid dedicated in the aviation to fill and unload kerosene



3" diaphragm pumps mounted on a skid to transfer clay in a ceramic manufacture



3" sanitary pump used to transfer cosmetic basis for shampoos

ARO® Piston Pumps



ARO piston pumps provide industry proven dependability, economy and precision control for the delivery of a wide range of flowable materials. Whether you are moving a small amount of low viscosity fluid a few feet or a large amount of high viscosity material a longer distance, ARO has a pump to meet your application needs.

Simply reliable and safe air motor

At the heart of ARO-Force piston pumps are superior air motors, featuring our proprietary AFX technology. With only five moving parts, our air motors are truly advanced yet simple. No other air motor out there delivers the precise performance, flexibility, and simplicity of an AFX air motor.

- Minimised failure risk due to fewer moving parts
- True Link Valve™ virtually eliminates pulse profile.
- No springs to fail due to fatigue or corrosion.
- Requires no lubrication and no lubricator installation.
- Backed by a 5-year warranty.

We incorporated important features to make our AFX air motors safe (dump pressure manually, groundable / ATEX-compliant, standard muffler).

Superior performance with abrasive fluids

- Plunger rods and cylinder tubes feature the exclusive ARO ceramic ultra-coating, extending service life up to twice as long.
- Chrome-plated stainless steel plungers for superior resistance to rust and corrosion.
- Eight packing options are available, including ultra-high molecular weight polyethylene (UHMW-PE), for even better material compatibility and maximum abrasion resistance.



AFX Application Package: The right package for your application

Most applications require more than just a pump. ARO offers a wide range of transfer, extrusion, and finishing packages that not only enhance your productivity, but also simplify the ordering process. We provide you with the right configuration of air motor, piston pump, mount, follower, controls, and downstream accessories.

**FINISHING, COATINGS,
SEALANTS, INKS & ADHESIVES**



Two-post Ram Packages

Features a two-post ram, pump, follower plate and controls designed for high viscosity applications.



Single-post Ram Packages

Single-post ram with pump, follower plate, and controls for medium to heavy viscosity extrusion.



Airless Spray Pump Packages

Popular in airless spray applications, these packages are delivered with air control, material filter, and suction hose.



Cart-mounted Pump Packages

When portability is required for light- to medium-viscosity (less than 50K cPs) extrusion.



Agitator Lift Packages

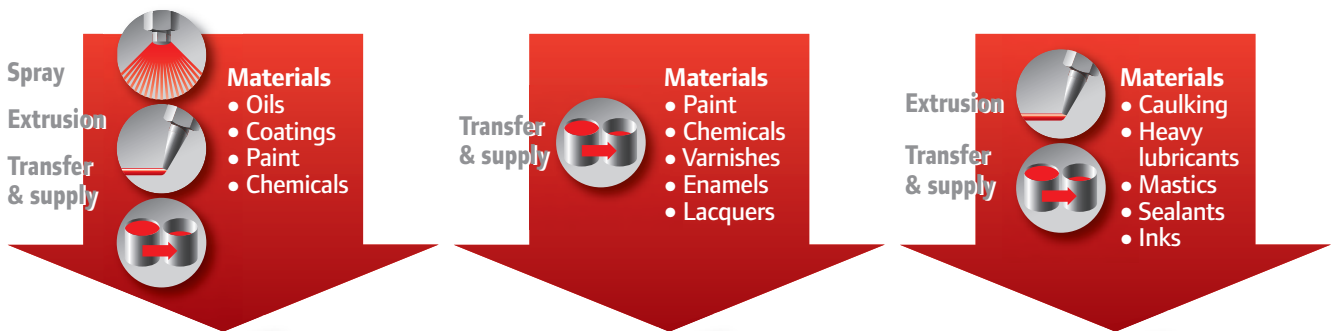
Ideal for finishing and adhesive applications where you need to keep fluid mixed.

ARO® Piston Pump Types and Applications

Transfer: Involves moving a low-to-medium viscosity fluid. 2-ball and 4-ball pumps are most frequently used in transfer applications.

Extrusion: Involves using a Piston Pump to apply medium-to-high viscosity materials. Typical extrusion applications require accessories like rams and fluid regulators. Chop-Check and 2-ball pumps are used in extrusion applications.

Coating Application: Involves application of a material by either spray or dipping. Coating applications use 2-ball and 4-ball pumps.



2 Balls

2-ball Pumps

The most versatile pumps in the ARO line. They are capable of handling applications from simple transfer to the extrusion of low to medium viscosity materials up to 100,000 centipoise (cPs) with fluid delivery up to 68.6 l/min.

4 Balls

4-ball Pumps

Designed to transfer high volumes of low and medium viscosity fluids up to 12,500 cPs with fluid delivery up to 124 l/min. A common use involves circulating fluid from the original container, to the point of use, and then back.

Chop Check

Chop-check Pumps

The heavy-hitters of the line, ARO chop-check pumps are designed to move medium to high viscosity fluids ranging from 15,000 to more than 1,000,000 cPs, and at delivery rates up to 46.3 l/min.

TiD-extra
Industrial Technologies d.o.o.

LUBRICATION

Lubrication Packages

The ARO line of lubrication pumps for the transfer and supply of oil and grease – Fitted with drum cover, or with bung adaptor to thread into the container.

BULK MATERIAL TRANSFER / CIRCULATION

Floor Mount Packages

Ideal for fluid transfer from tanks and piping systems.

Wall Mount Packages

The compact design of our piston pumps make them ideal for mounting on walls or appropriate structures.

HIGH PRESSURE CLEANING

Wash Pump Packages

When it is time to clean up, our wash pump is a great high-power cleaning solution.

ARO® Piston Pumps



Range and Performance

2-ball
Piston Pumps



2-ball Piston Pumps

?:1	1 min. 	Max. bar 			Material	Motor Dia.	
1:1		18 l/min	0-10	Immersed	3/4"	Carbon steel	2"
2:1		8.1 l/min	4-21	1 1/4" or immersed	3/4"	Carbon steel or stainless steel	2"
4:1		8 l/min	8-41	1 1/4" or immersed	3/4"	Carbon steel or stainless steel	3"
9:1		10.5 l/min	0-90	1 1/2" or immersed	3/4"	Carbon steel	4 1/4"
9:1		10.8 l/min	0-90	1 1/4" NPT	3/4"	Stainless steel	4 1/4"
10:1		58.9 l/min	0-80	2" NPT	1 1/4"	Stainless steel	8"
11:1		14 l/min	25-120	1" NPT	1"	Stainless steel	4 1/4"
15:1		68.6 l/min	30-90	2" NPT	1 1/4"	Stainless steel	10"
18:1		2.3 l/min	35-185	1/2" NPT	1/4"	Stainless steel	3"
22:1		7.3 l/min	45-235	1" NPT	1"	Stainless steel	4 1/4"
23:1		14.3 l/min	45-240	1" NPT	1"	Stainless steel	6"
23:1		68.6 l/min	45-140	2" NPT	1 1/4"	Stainless steel	12"
28:1		1.4 l/min	56-288	1/2" NPT	1/4"	Stainless steel	3"
28:1		23.7 l/min	60-230	2" NPT	1"	Stainless steel	8"
30:1		4.9 l/min	60-320	1" NPT	1"	Stainless steel	4 1/4"
40:1		14 l/min	80-340	1" NPT	1"	Stainless steel	8"
45:1		7.3 l/min	95-375	1" NPT	1"	Stainless steel	6"
45:1		23.7 l/min	95-280	2" NPT	1"	Carbon steel	10"
60:1		5.4 l/min	125-425	1" NPT	1"	Stainless steel	6"
65:1		23.7 l/min	135-400	2" NPT	1"	Carbon steel	12"

4-ball Piston Pumps



Chop-Check Pumps



4-ball Piston Pumps

?:1	1 min. 	Max. bar 			Material	Motor Dia.
2:1	80.6 l/min	4 - 21	1 1/2" NPT	1"	Stainless steel	4 1/4"
3:1	110.8 l/min	6 - 31	1 1/2" NPT	1"	Stainless steel	6"
4:1	80.6 l/min	8 - 45	1 1/2" NPT	1"	Stainless steel	6"
5:1	124 l/min	10 - 48	1 1/2" NPT	1"	Stainless steel	8"
7:1	88.8 l/min	15 - 70	1 1/2" NPT	1"	Stainless steel	8"

Chop-Check Piston Pumps

?:1	1 min. 	Max. bar 			Material	Motor Dia.
12:1	12.3 l/min	0 - 144	Flange mount	1"	Carbon steel	4 1/4"
13:1	46.3 l/min	27 - 130	Flange mount	1 1/2"	Carbon steel	8"
20:1	39.7 l/min	40 - 155	Flange mount	1 1/2"	Carbon steel	10"
22:1	1.9 l/min	44 - 225	Follower plate or immersed	3/4"	Carbon steel or stainless steel	3"
23:1	6.9 l/min	0 - 254	Flange mount	1"	Carbon steel	4 1/4"
23:1	12.3 l/min	0 - 290	Flange mount	1"	Carbon steel	6"
28:1	22.7 l/min	60 - 230	Flange mount	1 1/4"	Carbon steel	8"
30:1	46.3 l/min	60 - 220	Flange mount	1 1/2"	Carbon steel	12"
43:1	2.8 l/min	0 - 450	Follower plate	1/2"	Carbon steel or stainless steel	4 1/4"
44:1	14.3 l/min	90 - 410	Flange mount	1"	Carbon steel	8"
44:1	22.9 l/min	90 - 270	Flange mount	1 1/4"	Carbon steel	10"
46:1	6.9 l/min	0 - 515	Flange mount	1"	Carbon steel	6"
65:1	5.1 l/min	0 - 515	Flange mount	3/4"	Carbon steel	6"
65:1	22.9 l/min	135 - 400	Flange mount	1 1/4"	Carbon steel	12"

Overview of ARO® Pump Applications

Diaphragm Pumps Applications



1/2" diaphragm pumps assembled in an ink formulation system



1/2" diaphragm pumps installed in a colouring process



1 1/2" aluminium diaphragm pumps installed to feed a chemical reactor



3" stainless steel diaphragm pumps installed on a bulk transfer process

Piston Pumps Applications



2-ball piston pumps 4:1 ratio, used in a painting process manufacturing



2-ball piston pumps, 11:1 ratio, used in a painting circulating system



2-ball piston pump 9:1 ratio, used in a customised lubrication process



Large extrusion piston pumps, 13:1 ratio, installed on an offset ink formulation system process



Extrusion pumps 23:1 ratio, used in a multi component skids to transfer silicon



4-ball piston pumps, 4:1 ratio, installed on a paint formulation process

Visit us online

- **List of Ingersoll Rand Specialists worldwide**
Allows to contact easily a local Distributor.
- **Easy access to operator's manuals and product data**
Users can now search with complete or partial model numbers, gaining access to documents in multiple languages.
- **Pump selection software**
Allows you to identify the best pump for your application.
- **Competitive model crossover**
Visitors can easily and quickly crossover competitive units to ARO models.
- **Productivity Park**
An interactive 3D tour of markets and industries where Ingersoll Rand Fluid products are utilised.



ingersollrandproducts.com



arohotline@irco.com



+ 33 1 75 73 20 00



youtube.com/aropumps

Many of the Ingersoll Rand / ARO products feature patented, market-leading energy efficient designs. This is just one of the ways we help our customers minimise their impact on the environment.



Ingersoll Rand (NYSE:IR) advances the quality of life by creating comfortable, sustainable and efficient environments. Our people and our family of brands—including Club Car®, Ingersoll Rand®, Thermo King® and Trane®—work together to enhance the quality and comfort of air in homes and buildings; transport and protect food and perishables; and increase industrial productivity and efficiency. We are a global business committed to a world of sustainable progress and enduring results.



ingersollrandproducts.com

We are committed to using environmentally conscious print practices.

Nothing contained on these pages is intended to extend any warranty or representation, expressed or implied, regarding the product described herein. Any such warranties or other terms and conditions of sale of product shall be in accordance with Ingersoll Rand's standard terms and conditions of sale for such products, which are available upon request. Product improvement is a continuing goal at Ingersoll Rand. Designs and specifications are subject to change without notice or obligation.