

# FULL-LINE INDUSTRIAL PUMP SOLUTIONS

**GRUNDFOS**   
INDUSTRIAL SOLUTIONS™

## GRUNDFOS

### **Global Impact**

Grundfos is a global enterprise with more than 16,000 employees and 73 sister companies worldwide. From its beginning as a small factory in Bjerringbro, Denmark in 1945, Grundfos has grown to become a leading manufacturer of pumps and pumping systems – producing more than 10 million pumps annually.

### **Our Mission**

As a pioneer of innovative pumping solutions, Grundfos is dedicated to developing, producing, and selling the highest quality pumps and pumping systems while at the same time contributing to a better quality of life and a healthier environment.

### **Efficiency and Sustainability**

Grundfos constantly strives to make its pumps even more efficient and energy saving. Using state-of-the-art technology and cutting-edge design, Grundfos pumping solutions meet – and often surpass – virtually all customer requirements for efficiency, reliability, and cost effectiveness.

### **Manufacturing Standards**

Grundfos has a major influence on the levels of manufacturing standards and operating efficiency that can be achieved with pumps. Our manufacturing facilities throughout the world are certified to ISO 9001 standards, and we exhaustively check and test our pumps prior to distribution.

### **Corporate Philosophy**

The Grundfos BE>THINK>INNOVATE> philosophy shapes who we are, what we do, and how we do it. Being responsible is our foundation. Whatever we do, we make sure that we have a firm and sustainable basis for doing it. Thinking ahead makes it possible. We think – and then we act. Innovation is the essence - the soul of Grundfos.

## You Get Unrivaled Solutions From These Grundfos Companies

### **PACO Pumps**

With the addition of PACO Pumps to our family in 2006, Grundfos' portfolio of innovative pumps and pumping systems offers even more diversity of premium efficient centrifugal pumps, providing the perfect fit for your application supported by the expanded expertise of highly trained specialists and technicians for a solution you can trust.

### **Grundfos Alldos Dosing and Disinfection**

Grundfos, the pioneer of Digital Dosing Technology, expanded its network of high performance Dosing solutions through the addition of dosing specialist Alldos in 2005. Through this union, Grundfos offers an unmatched range of state-of-the-art solutions to meet every dosing need, including the highest quality mechanical and hydraulic diaphragm pumps, instrumentation and accessories.

### **Hilge Pumps**

Developing pumps that meet the strict hygienic requirements of food, beverage and pharmaceutical industries is the specialty of Hilge Pumps. Since joining the Grundfos family in 2004, Hilge's 150 years of hygienic proficiency is combined with Grundfos' general process pump offerings and expertise for industrial applications, creating a complete and full-line solution offered by one supplier—Grundfos.

Fresno, California



Oakville, Canada



Brookshire, Texas



Olathe, Kansas



Atlanta, Georgia



Allentown, Pennsylvania



Monterrey, Mexico



## Taking Responsibility with Sustainable Solutions

It's estimated that pumps use up to 20% of the world's electrical power. That's why Grundfos is proud to say that sustainability has long been at the forefront of our processes.

In fact, we have a team of qualified specialists trained in the Dept. of Energy's (DOE) Pumping System Assessment Tool (PSAT) who can identify ways to improve your system's efficiency and energy saving opportunities in your pumping system.

We invest more financial resources than any other pump manufacturer to push the limits for reaching energy-saving efficiency, and we continue to pioneer innovative designs and technology that support sustainability. For example:

- Intelligent-design electronic controls allow pumps to customize their settings to fit the needs of a particular system application and maximize energy savings.
- Variable-speed motors accommodate the change of required flows and pressures over time by matching the pump's speed to the demand, saving substantial amounts of energy.
- Our vertical stage CR pump minimizes the difference between pump capacity and required pressure and volume, allowing a pump to run at its optimum duty point, virtually eliminating over-sized pumps. CR's state-of-the-art impeller and seal design offers 15% to 20% reduction in power usage.
- Digital Dosing™ metering pumps are so precise that they conserve significant amounts of additives.
- Pumps are being manufactured that are 95% recyclable at the end of their usefulness.

From reduced life cycle costs to removal of used pumps, Grundfos is your best choice for providing the most sustainable products.



## Do Your Part to Help Save Energy and Reduce Waste

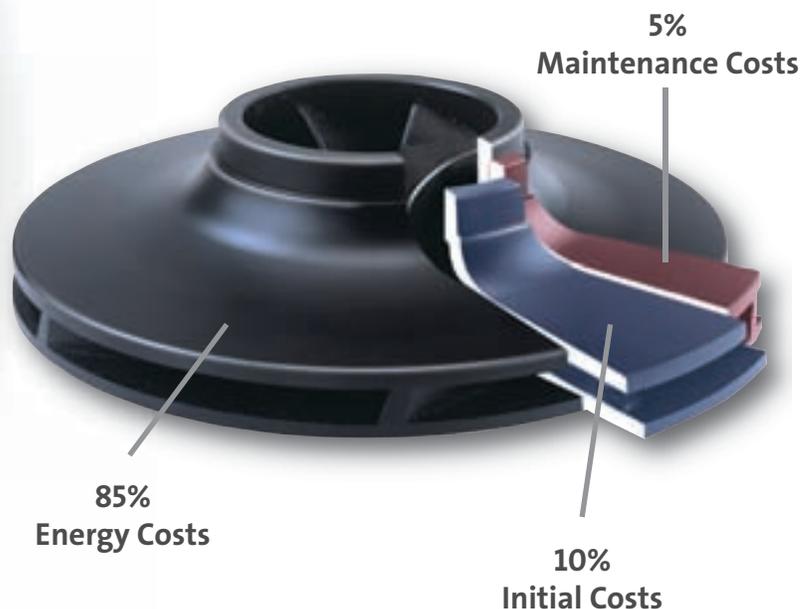
Power consumption accounts for 85% of all costs incurred during the life cycle of a pump – nine times more than the initial purchase price and cost of regular maintenance. So, even the smallest improvement in efficiency can translate to sizeable savings.

Our CR family of multi-stage pumps provides a substantial increase in pump efficiencies due to its innovative design, compared to single stage pumps. This also means a smaller motor can often be used to power the pump, resulting in lower energy and initial installation costs. Similarly, our Paco pumps utilize a Francis type impeller, allowing higher efficiencies than the industry average. Grundfos pumps coupled with our ML motors provide unbeatable wire to water efficiencies, also resulting in reduced energy costs.

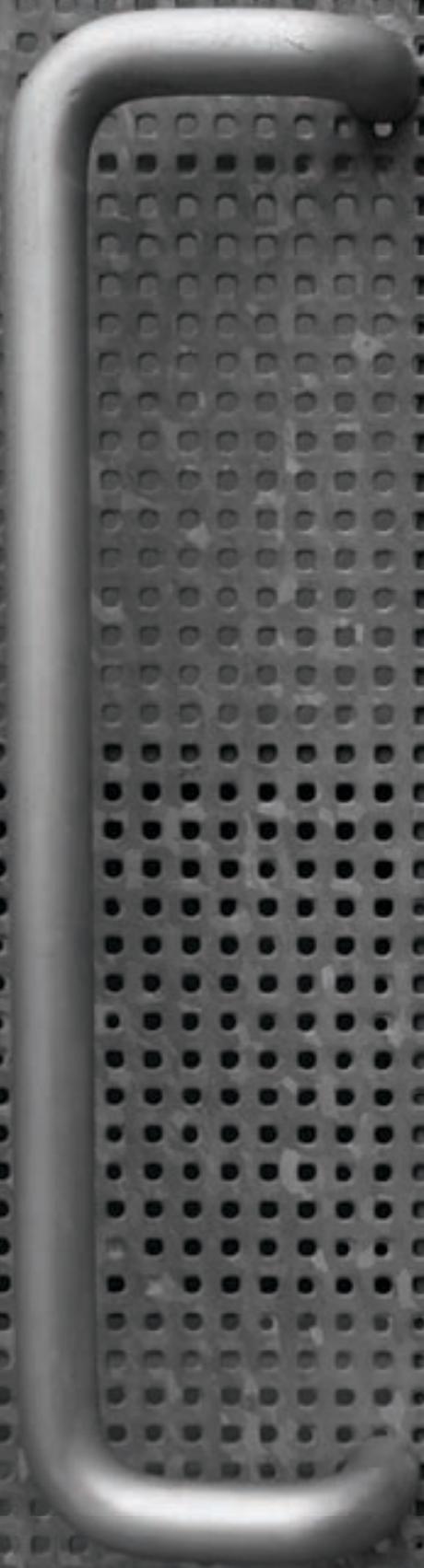
## Minimize Your Life Cycle Costs

Grundfos offers a wide range of E-pumps (electronically controlled) that enables adjustment of pump performance to meet your specific demand. Not only does this provide convenience, but it also saves a great deal of energy. For more on E-pumps, See page 14.

With Grundfos, you get more than just a pump!



**GRUNDFOS**  
**INDUSTRIAL SOLUTIONS**

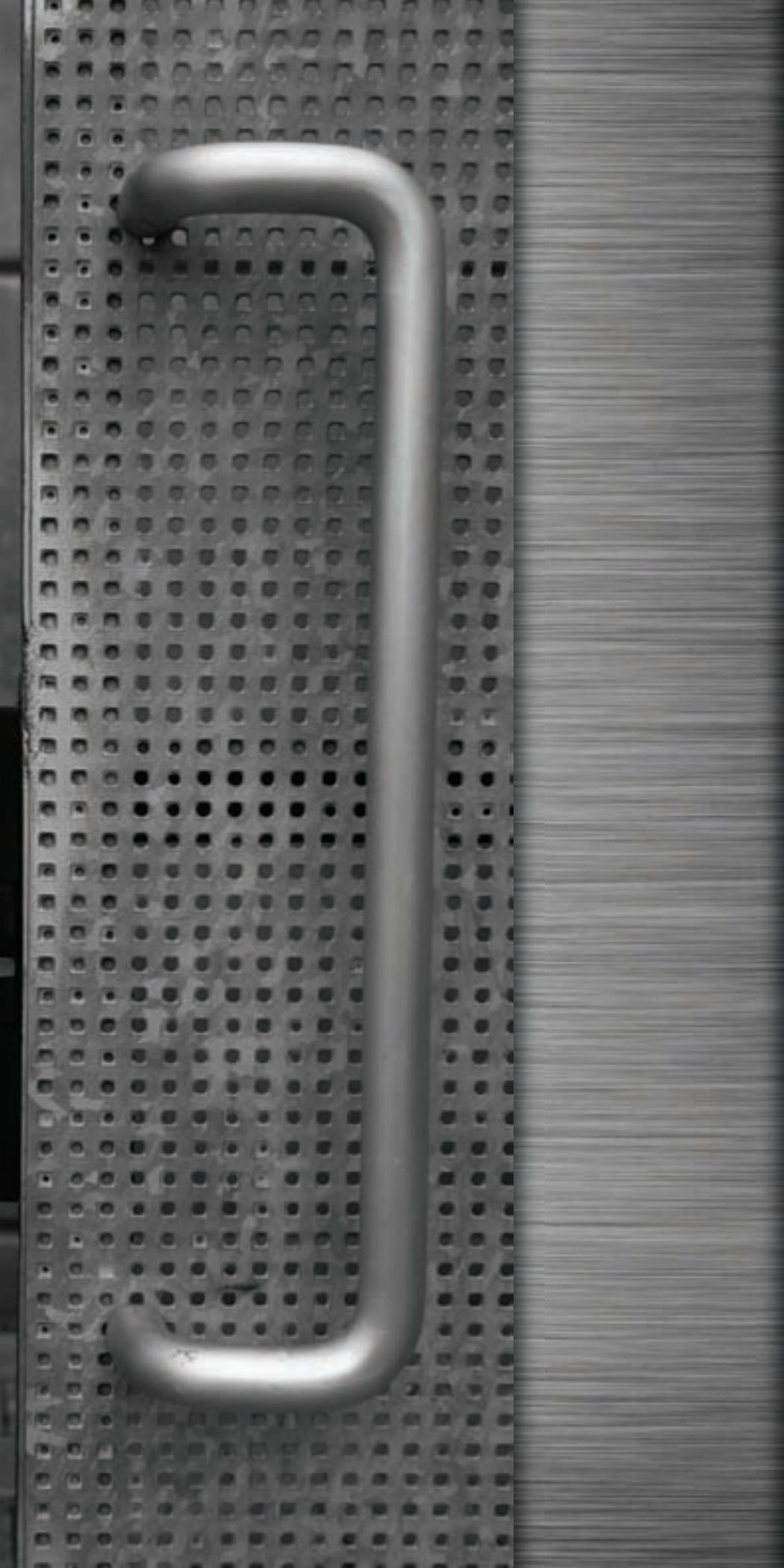


**WATER**  
**INDUSTRY**

**PROCESS**  
**INDUSTRY**

**GENERAL**  
**INDUSTRY**

**MACHINING**  
**INDUSTRY**



## WATER INDUSTRY

### WATER INDUSTRY

Grundfos has a wide range of pumps and systems that fits into present market needs. After years of dedicated research, judicious acquisitions, and partnerships, Grundfos today offers a professional range of quality products for industrial water treatment applications. From the smallest dosing and booster pump to the largest feed and high pressure pumps, every product is produced with your needs in mind. We have sensors and control units for all applications to help complete your system requirements. Naturally, most pressure requirements can be met and Grundfos helps you lower cost without compromising the quality and reliability of your system.

## PROCESS INDUSTRY

### PROCESS INDUSTRY

Industries need equipment they can trust. After all, even short periods of downtime can be extremely expensive. Grundfos has acknowledged this simple fact as a full-line supplier of pumps for plant service systems and sanitary processes. Our pumps for general processes can handle anything from abrasive media to chemicals and particle-carrying liquids. Our pumps for sanitary processes in high-grade, rolled and/or forged stainless steel can be fitted with a variety of features which enable them to adapt to various pumping tasks.

## GENERAL INDUSTRY

### GENERAL INDUSTRY

Our extensive product range includes pump systems for water boosting, cooling, A/C and heating systems, as well as lubrication, circulator and transfer systems. This makes it possible for us to find pumping solutions that meet the specific needs of the individual customer.

Grundfos is leading the market with cost-efficient pump solutions — not only do we bring the market's most reliable products, but equally important, we deliver products that minimize life cycle costs.

## MACHINING INDUSTRY

### MACHINING INDUSTRY

The Grundfos family of immersible pumps represents a wealth of expertise that is second to none. Backed by many years of experience across a wide range of industrial applications, Grundfos is in an excellent position to offer the right pump choice for your application including cooling, chilling, wire cutting, filtration, boring, washing, process cooling, or any other application you may have in your plant involving the transfer of liquids.

	PUMP TYPE											
	CR	CRH	CHI	BM	SP	MT	Booster-paQ®	Dosing	Sanitary	Paco LC/LF	Paco VL	Paco KP
Disinfection	•							•	•			
Chemical Feed Systems	•		•					•				
Reverse Osmosis/ Nano Filtration	•	•	•	•			•	•	•	•	•	•
Desalination	•	•	•	•	•		•	•				
Deionized Water	•	•	•				•	•	•	•	•	•
Micro Filtration/Ultra Filtration	•	•	•	•	•		•	•		•	•	•

	PUMP TYPE											
	CR	CRH	CHI	BM	SP	MT	Booster-paQ®	Dosing	Sanitary	Paco LC/LF	Paco VL	Paco KP
Food	•			•			•	•	•	•		•
Beverage	•			•			•	•	•	•		•
Pharmaceutical	•		•	•			•	•	•	•		•
Bio-fuel	•	•			•		•	•	•	•	•	•
Chemical	•	•					•	•		•		•
Pulp and Paper	•	•					•	•		•		•
Textile	•	•						•		•	•	•

	PUMP TYPE											
	CR	CRH	CHI	BM	SP	MT	Booster-paQ®	Dosing	Sanitary	Paco LC/LF	Paco VL	Paco KP
Cooling & Temp	•	•	•							•	•	•
Clean & Wash	•	•		•		•		•		•		•
Marine	•	•	•			•		•		•	•	
Industrial Boiler	•	•				•		•		•	•	•
Mining	•	•		•		•	•	•		•		•
Steel	•	•				•	•	•		•		•

	PUMP TYPE											
	CR	CRH	CHI	BM	SP	MT	Booster-paQ®	Dosing	Sanitary	Paco LC/LF	Paco VL	Paco KP
Machine Tool	•	•	•			•		•		•	•	•
Tank & Filter System	•	•	•	•	•	•		•		•	•	•
Washers & Cooling	•	•	•	•		•		•		•		•
Automotive	•	•	•	•		•	•	•		•		•

**CR** > **Vertical Multi-stage Centrifugal Pump**  
**Flow, Q:** max. 790 gpm  
**Head, H:** max. 995 ft  
**Liquid temp.:** -22°F to + 355°F  
**Working press.:** max. 435 psi

**CRH** > **Horizontal Multi-stage Centrifugal Pump**  
**Flow, Q:** max. 630 gpm  
**Head, H:** max. 995 ft  
**Liquid temp.:** -22°F to + 248°F  
**Working press.:** max. 435 psi

**CHI** > **Multi-stage Centrifugal Pump**  
**Flow, Q:** max. 70 gpm  
**Head, H:** max. 260 ft  
**Liquid temp.:** +5°F to + 230°F  
**Working press.:** max. 145 psi

**BM** > **Booster Module**  
**Flow, Q:** max. 1,320 gpm  
**Head, H:** max. 1,595 ft  
**Liquid temp.:** +32°F to + 104°F  
**Working press.:** max. 1,160 psi

**SP** > **Submersible Pump**  
**Flow, Q:** max. 1,400 gpm  
**Head, H:** max. 2,100 ft  
**Liquid temp.:** +32°F to + 140°F  
**Instal. depth:** max. 1,968 ft

**MT** > **Immersible Pump**  
**Flow, Q:** max. 450 gpm  
**Head, H:** max. 970 ft  
**Liquid temp.:** -4°F to + 194°F  
**Working press.:** max. 362 psi

**BoosterpaQ®** > **Packaged Booster Pump System**  
**Flow, Q (4-pump):** max. 2,540 gpm  
**Flow, Q (6-pump):** max. 3,800 gpm  
**Head, H (6-pump):** max. 500 ft  
**Liquid temp.:** -32°F to + 176°F  
**Working press.:** max. 232 psi

**Dosing** > **Chemical Feed Pumps (Diaphragm)**  
**Flow, Q:** From 0.00066 up to 248 gph  
**Pressure, p:** Up to 260 psi  
**Turndown ratio:** 1:1000 (1:800)

**Sanitary** > **Hygienic Pumps (Centrifugal)**  
**Flow, Q:** max. 415 gpm  
**Head, H:** max. 803 ft  
**Operating temp.:** 203°F  
**Working press.:** max. 363 psi

**Sanitary** > **Hygienic Pumps ( Rotary Positive Displacement)**  
**Flow, Q:** From 0.008 to 0.502 gal/rev  
**Head, H:** max. 300 psi  
**Operating temp.:** 302°F  
**Working press.:** max. 580 psi

**PACO LC/LF** > **Single-stage End Suction Pumps**  
**Flow, Q:** max. 4,000 gpm (LC)  
max. 6,500 gpm (LF)  
**Head, H:** max. 995 ft  
**Liquid temp.:** max. + 275°F  
**Working press.:** max. 175 psi

**PACO VL** > **Vertical Inline Pump**  
**Flow, Q:** max. 3,900 gpm  
**Head, H:** max. 420 ft  
**Liquid temp.:** max. 275°F  
**Working press.:** max. 175 psi

**PACO KP** > **Split Case Double Suction Pump**  
**Flow, Q:** max. 20,000 gpm  
**Head, H:** max. 730 ft  
**Liquid temp.:** max. 300°F  
**Working press.:** max. 400 psi

**CR**  
Vertical Multi-stage  
Centrifugal Pump



**CRH**  
Horizontal End-Suction  
Multi-stage Centrifugal Pump



**CHI**  
Compact Horizontal  
Multi-stage Centrifugal Pump



**BM**  
Booster Module



**SP**  
Submersible  
Pump



**MT**  
Immersible  
Pump



**BoosterpaQ®  
Hydro MPC**  
Packaged Booster  
Pump System



**Dosing**  
Chemical Feed  
Pump



**FB**  
Hygienic Pump  
(Centrifugal)



**NL**  
Hygienic Pump  
(Rotary Positive Displacement)



**PACO LC**  
Single-stage End Suction  
Pump



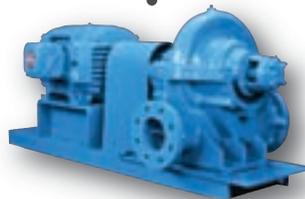
**PACO LF**  
Frame Mounted  
End Suction Pump



**PACO VL**  
Vertical Inline  
Pump



**PACO KP**  
Horizontal Split Case  
Double Suction Pump



**GRUNDFOS**  
**HAS YOUR PRODUCTION COVERED**

## Quality in Construction, Reliability in Use

Reliability, one of the hallmarks of Grundfos pump technology, is built into every aspect of our pumps. We are committed to constructing high quality pumps through our critical attention to the detail and investment in innovative research and development.

Your systems will benefit from our constant process of improvement with reduced life cycle costs and maintenance. Our alternative materials and components raise the bar for producing energy-efficient pumps that are durable and easy to install and maintain.



### Eliminate Corrosion with Electrocoating

Cataphoresis treatment on all housing surfaces of Grundfos inline pumps virtually eliminates corrosion. Pictured: an electrocoated, cataphoresis-treated pump housing from a CR pump.



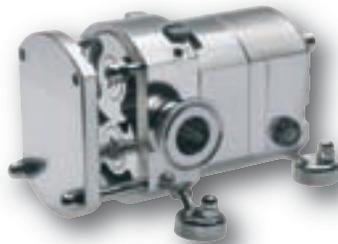
### Double Volute Protects Mechanical Seals and Bearings

PACO pump's double volute design ensures that the hydraulic radial loads are equal and opposed and thereby nullified. Pump operation remains stable throughout the entire performance curve, with minimal shaft deflection, prolonging the seal, bearing, and shaft life. Pictured: double volute design with opposing radial forces.



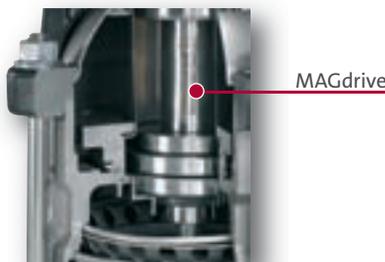
### Mechanical Seals Provide Optimum Pump Protection

Grundfos' innovative mechanical seals protect the pump from seal failure and offer the best solution for harsh conditions. Various material configurations are available to meet the needs of your specific environment.



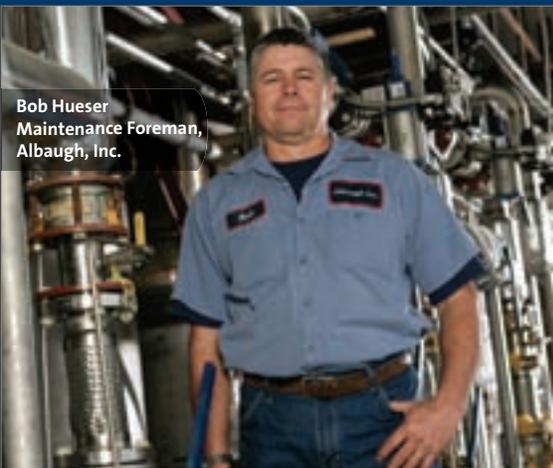
### Sanitary Pump's Unique Hygienic Design Maintains Product Quality Standards

Grundfos' sanitary pumps have been designed in accordance with the strictest hygienic criteria. The materials used, along with construction and surface finish are paramount to the prevention of possible breeding grounds for bacteria, and allow for efficient and effective cleaning in place.



### Sealless Solutions are 100% Leak Free

Grundfos' CRN MAGdrive pumps eliminate the need for shaft seals via a patent pending magnetic-drive system where the power from the motor is transmitted to the pump by magnetic force. Combined with a hermetically-sealed liquid end, the pump is totally leak-free.



Bob Hueser  
Maintenance Foreman,  
Albaugh, Inc.

## Versatile CR Solution Simplifies Herbicide Producer's Choice

Albaugh, Inc., is one of the largest producers of generic herbicide in the U.S. The unique challenge to simplify operation by finding a pump for three different applications including hot water filter wash, vacuum pump water displacement, and condensation of evaporation was addressed with just one pump — the versatile Grundfos CR.

The CR solution for the hot water wash application boosted wash down by 100 percent and provided the plant with immediate energy savings after it was installed in place of four centrifugal pumps. Today, the wash down of a batch takes seven minutes compared to 30 minutes with the former pumps. The plant's maintenance foreman reports that the CR system simplified and improved wash down and paid for itself in just two batches, and with 40 batches per day, that's significant time and money saved.

Yet another simplification was provided by the replacement CR system: the cartridge shaft seal. Albaugh is not only pleased with the cartridge seal's quick and easy replacement, but the three different shaft seals found in the previous pumps were reduced to one: the Grundfos patented cartridge shaft seal.

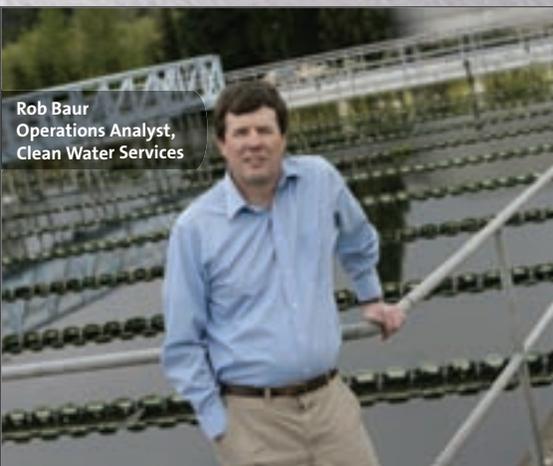


Chris Walker  
Lead Maintenance,  
Albaugh, Inc.

## Digital Dosing™ Provides Accurate and Straight-forward Solutions for Public Utility

Clean Water Services, a public utility in Washington County, OR, was seeking cutting edge, proven technology in a critical disinfection system. When tested against a peristaltic hypochlorite pump, Operations Analyst Rob Baur reported that the Digital Dosing™ performed flawlessly with an amazing 800:1 turndown, and matched the facility's low flow demand, where the peristaltic couldn't turn down enough to meet minimum demand and required a tubing change during the test period.

Pleased with the pump's precise, trouble-free dosing, Clean Water Services added them in two facilities. The 100% fill stroke and smooth dosing discharge matched the chemical demand at the odor scrubbers, prevented untreated odor from escaping, and eliminated off-gassing experienced by solenoid-type hypochlorite pumps at their Durham plant. At their Rock Creek facility, as obsolete alum and hypochlorite pumps are retired, Digital Dosing™ is the replacement choice. The 800:1 turndown provides a standardized solution for different chemicals and doses, and in addition cuts costs by reducing training and parts inventory, according to Baur.



Rob Baur  
Operations Analyst,  
Clean Water Services



## Custom Solutions to Suit Your Unique Applications

Standard pump ranges cannot match all applications. Customers may need to pick and choose pump elements or “modules” to cover unique situations. Grundfos provides customized solutions, offering over a million combinations to meet the requirements of your specific application. With expert assistance from our engineers, customers can choose from an unmatched range of designs, features, options, and materials, to create a tailor-made solution. Applications include:

- › **High temperatures**
- › **High pressures**
- › **Aggressive/hazardous liquids**
- › **Vaporous liquids**
- › **Low NPSH level**
- › **Belt drive**
- › **Paints**
- › **Varnishes**
- › **High viscosity liquids**
- › **Explosive liquids**
- › **Horizontal mounting**

Grundfos customized pumps are constructed to your exact requirements. Working closely with you, our skilled specialists carefully analyze your application to ensure the solution meets your expectations.

## Energy-Saving E-Solutions with Grundfos E-Pumps

Grundfos has decades of experience in building state-of-the-art E-pumps with energy saving and speed-control functionality for domestic, commercial and industrial pump applications. The world’s first speed-controlled pump with integrated frequency converter was developed in our laboratories back in the late 1980’s.

Our comprehensive E-pump program features the high-efficiency MLE motor with built-in frequency converter and controller with pump-related functions.

E-pumps are ideal anywhere you need an integrated pump solution in variable-load operations and in applications where a high degree of process control is critical. E-pumps are typically used in pressure boosting systems, industrial cooling systems, and process systems with fluctuating loads.

For applications where an integrated solution is either undesirable or prohibited — such as submersible, water supply, sanitary and hazardous areas, Grundfos offers the space-saving CUE, a pump and motor with a wall-mounted frequency converter with E-pump functionality.



## Maximum Service for Minimum Downtime

Every Grundfos product is built to set new standards in performance and reliability. High-quality equipment backed by high-quality service is what you can expect from Grundfos Service.

- › Global Service Centers are strategically located to provide fast, responsive service
- › Service technicians offer expertise, experience and strong knowledge of Grundfos products
- › Complete testing services ensure dependable product performance
- › Pump audits provide an efficiency check of your pumps and recommendations for optimizing your system with associated cost savings
- › Remanufactured products are backed by a full 12-month warranty
- › Service tools and technical documentation are available for all Grundfos products
- › Service kits are available for most Grundfos products, complete with easy-to-follow instructions

## Select the Right Pump — Fast!

With Grundfos WebCAPS and PACO Express, you can get quick and easy access to online tools that will help you select the right pump – fast! Our user-friendly tools let you simply enter the system requirements to find the best pump match.

- › Help with pump sizing and selection
- › CAD drawings you can import into your own applications
- › Performance data and pump curves
- › Life cycle cost calculations
- › Installation and operation manuals

Give our online tools a try. Visit [www.grundfos.us](http://www.grundfos.us) for Webcaps and [www.pacopumps.com](http://www.pacopumps.com) for PACO Express.



## Grundfos Industrial Solutions

Grundfos is a full-line supplier of premium pump solutions for Water, Process, General and Machining industries. Our comprehensive range of pump solutions means that you can rely on Grundfos know-how and our complete dedication to quality and service for your precise pump needs.

That's why we want to be your *preferred* pump manufacturer. Visit us at [www.grundfos.us/industry](http://www.grundfos.us/industry) for more information.

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