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COMMERCIAL MARINE

DEFENSE

OIL & GAS

POWER & INDUSTRY

RELIABILITY SERVICES

# INDUSTRIAL

## GLOBAL SOLUTIONS





# REDEFINING WHAT'S POSSIBLE

CIRCOR is redefining what's possible in fluid handling for industrial applications, by partnering with engineers and facility owners like you.

As your partner in design, development, and maintenance, CIRCOR offers you more than just off-the-shelf products for your biggest challenges. We offer you the best fluid handling system for each application.

By choosing CIRCOR, you get 150 years of application experience and access to technologies whose reliability is proven on a daily basis in numerous industrial systems around the world. And you are backed by a team of product and service experts who are committed to maximizing the efficiency and reliability of your system every step of the way, from project planning and installation to final commissioning and ongoing production.

This is made possible by a wide range of pumps and systems from brands that you know and trust: Allweiler®, Houttuin™, Imo®, and Warren®. This gives you the peace of mind that comes with extraordinary reliability and a high level of technical service that is essential during configuration, commissioning, and ongoing operations. As your single-source global supplier, we call this "Total Savings of Ownership," reducing the overall costs of your operation and increasing your profitability.



## EXPERTS YOU CAN COUNT ON

### FOR OPTIMAL SOLUTIONS SPECIFIC TO YOUR INDUSTRY

You have a challenging job. Engineers and operators of industrial plants face greater challenges than ever before in terms of environmental protection, operations, safety, and availability. While the systems are becoming more complex, your customers are demanding more throughput, higher quality, and lower costs. CIRCOR can help you overcome these challenges by working with you from the beginning of the design process, all the way through to startup and operation.

The CIRCOR team of specialists will:

- Engage cross-functional team members to support all aspects of design, optimization, and maintenance.
- Use tools that simplify the design and selection process.
- Focus on keeping your plant competitive in a tough global economy.

CIRCOR offers a variety of products and technical solutions that reliably ensure the performance and effectiveness of your systems. We do this by offering pumps and solutions specifically tailored to your industry.



Industry Products & Services

ALLWEILER® HOUTTUIN™ IMO® WARREN®

## YOUR SINGLE SOURCE

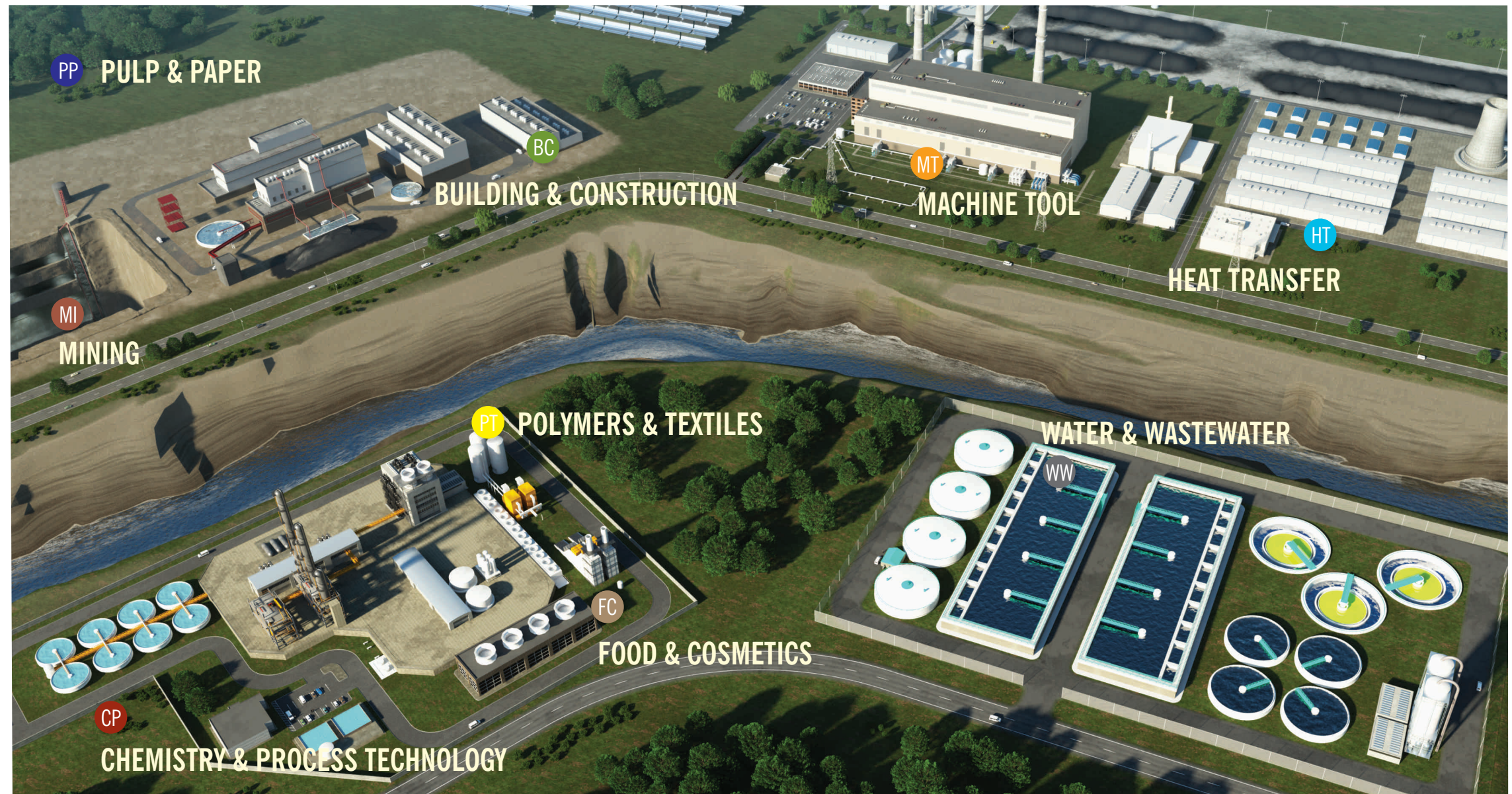
### REDEFINING WHAT MATTERS MOST TO YOU

Pumps and fluid handling systems from CIRCOR are offered under the trusted brands Allweiler®, Houttuin™, Imo®, and Warren®. These solutions support a wide range of mission critical applications and are essential for the reliable and safe operation of all types of industrial systems, including sewage plants; process technology and chemistry; mining; pulp and paper; building and construction; production of food, beverages, and cosmetics; polymers/textiles processing; heat transfer; and machine tool.

Through our standard and custom engineered solutions, we offer a wide range of designs for fluid handling systems in industrial systems.

Industrial plant operators and engineers turn to CIRCOR to help redefine the metrics that matter most to them:

- **Technology:** providing the right pumping and system solution for every application
- **Reliability:** maintaining performance of the system regardless of operating conditions
- **Availability:** maximizing the time for production
- **Uptime:** ensuring run-time consistency without fail
- **Compliance:** sustaining the commitment to environmental responsibility
- **Cost-effectiveness:** keeping the plant competitive in a tough global economy



## APPLICATIONS

|                                                                                                                                                                                                        |                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                           |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>CP CHEMISTRY &amp; PROCESS TECHNOLOGY</b></p> <ul style="list-style-type: none"> <li>Pumping of acids and lyes, washing and absorption liquids, salt solutions, solvents, hot liquids</li> </ul> | <p><b>BC BUILDING &amp; CONSTRUCTION</b></p> <ul style="list-style-type: none"> <li>Pumping of fuel oil</li> <li>Supply of warm and cold water, heating systems</li> <li>Elevator technology, lifting platforms, theatrical stages</li> </ul> | <p><b>MT MACHINE TOOL</b></p> <ul style="list-style-type: none"> <li>Pumping of cooling-lubricant solutions and emulsions, cutting and grinding oils</li> <li>High-pressure coolant feed for internally cooled tools</li> <li>Pumps for cooling-lubricant supply systems (individual and centrally managed)</li> </ul> | <p><b>PP PULP &amp; PAPER</b></p> <ul style="list-style-type: none"> <li>Pumping of coating inks (pigments, binders, additives), kaolin, calcium carbonate, latex, starch, caustic soda, paper stock</li> <li>Dosing of additives and chemicals</li> <li>Supply pumps for lamination, coatings, and cooking</li> </ul> | <p><b>WW WATER &amp; WASTEWATER</b></p> <ul style="list-style-type: none"> <li>Pumping of various sludges: raw, pre-clarification, waste, activated, digested, post-clarification, recirculated, and thickened</li> <li>Dosing of neutralizing agents and flocculants</li> <li>Complete solutions for pre- and post-clarification, recirculation, denitrification and nitrification</li> <li>Industrial wastewater treatment in clarification plants</li> </ul> | <p><b>FC FOOD &amp; COSMETICS</b></p> <ul style="list-style-type: none"> <li>Pumping of fibrous liquids, liquids with solids, high-value and sensitive liquids</li> <li>Dosing in batch operation, in filling systems, for additives, or during product blends</li> </ul> |
| <p><b>HT HEAT TRANSFER</b></p> <ul style="list-style-type: none"> <li>Pumping of thermal oil</li> <li>Pumping of hot water</li> </ul>                                                                  | <p><b>MI MINING</b></p> <ul style="list-style-type: none"> <li>Pumping and dosing of chemicals and explosive liquids</li> <li>Pumps used in: Mining, Drilling</li> <li>Lubrication and control of ore-mining machines</li> </ul>              | <p><b>PT POLYMERS &amp; TEXTILES</b></p> <ul style="list-style-type: none"> <li>Pumping of starting products for fiber production</li> <li>Process pumps in polyester manufacturing</li> </ul>                                                                                                                         | <p>Industry Products &amp; Services</p>                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                           |

# OPTIMAL SOLUTIONS FOR ALL INDUSTRIAL APPLICATIONS

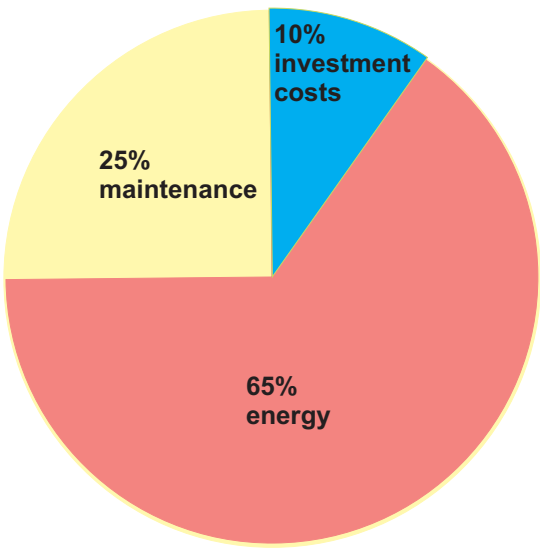
## WITH PERFORMANCE AND EFFICIENCY BUILT IN

When you consider the pump's entire service life, the purchase price accounts for only about ten percent of the total costs, while energy and availability costs account for nearly 90 percent.

Pumps from CIRCOR reduce energy costs, downtime, and costs associated with unscheduled maintenance, labor, and replacement parts.

We call this value to you and your customers, "Total Savings of Ownership."

## BREAKDOWN OF TOTAL COSTS OF OWNERSHIP FOR A PUMP



| Industry/application           | Pumps and solutions from CIRCOR |                 |                          |                   |            |            |                   |                    |                 |                          |
|--------------------------------|---------------------------------|-----------------|--------------------------|-------------------|------------|------------|-------------------|--------------------|-----------------|--------------------------|
|                                | Three-screw pumps               | Two-screw pumps | Progressing cavity pumps | Peristaltic pumps | Macerators | Gear pumps | Centrifugal pumps | Side-channel pumps | Propeller pumps | Oil mist/PurLube Systems |
| Chemistry & Process Technology | ●                               | ●               | ●                        | ●                 |            |            | ●                 | ●                  | ●               | ●                        |
| Heat Transfer                  |                                 |                 |                          |                   |            |            | ●                 |                    |                 |                          |
| Building & Construction        | ●                               |                 |                          |                   |            |            | ●                 | ●                  |                 | ●                        |
| Machine Tool                   |                                 | ●               |                          |                   |            |            |                   | ●                  |                 | ●                        |
| Mining                         |                                 | ●               | ●                        | ●                 | ●          |            | ●                 | ●                  |                 | ●                        |
| Pulp & Paper                   |                                 | ●               | ●                        | ●                 |            | ●          |                   | ●                  |                 | ●                        |
| Water & Wastewater             |                                 |                 | ●                        | ●                 | ●          |            | ●                 |                    | ●               | ●                        |
| Food & Cosmetics               |                                 |                 | ●                        |                   |            | ●          | ●                 | ●                  |                 | ●                        |
| Polymers & Textiles            |                                 |                 |                          |                   |            | ●          | ●                 |                    |                 | ●                        |

# INNOVATIVE, RELIABLE PUMPS AND SYSTEMS

## FROM THE NAMES YOU KNOW AND TRUST

CIRCOR delivers innovative and reliable pump units as well as engineered systems from names you know and trust: Allweiler®, Houttuin™, Imo® and Warren®. Our engineering and technical specialists conduct extensive research and testing before developing and manufacturing this broad portfolio of products in accordance with international standards. The focus is singular and clear: to meet the highest levels of manufacturing and product quality.

## TWO-SCREW PUMPS

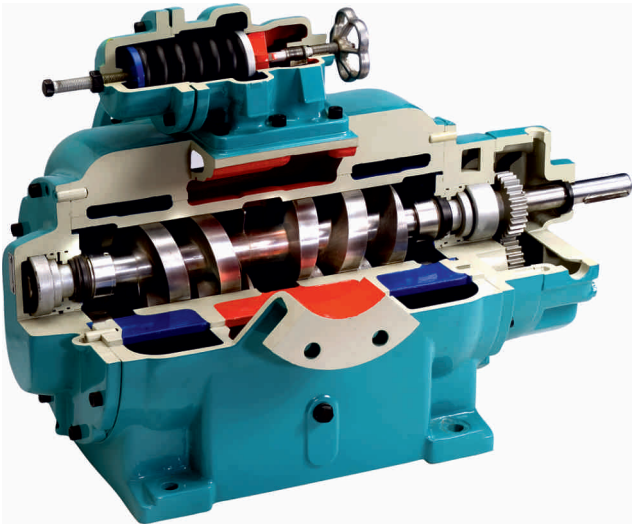
HOUTTUIN® WARREN®

Double-entry, self-priming, low NPSH values, dry-running capable.

Application: Ideal for applications in the plant periphery, for pumping large volumes of lubricating or non-lubricating liquids, and especially low-viscosity liquids.

### Performance data

|                     |                               |
|---------------------|-------------------------------|
| Capacity:           | up to 5,300 m³/h / 23,340 gpm |
| Pressure:           | up to 100 bar / 1,450 psi     |
| Viscosity:          | 0.5 to 100,000 cSt            |
| Liquid temperature: | up to 400 °C / 752 °F         |



## THREE-SCREW PUMPS

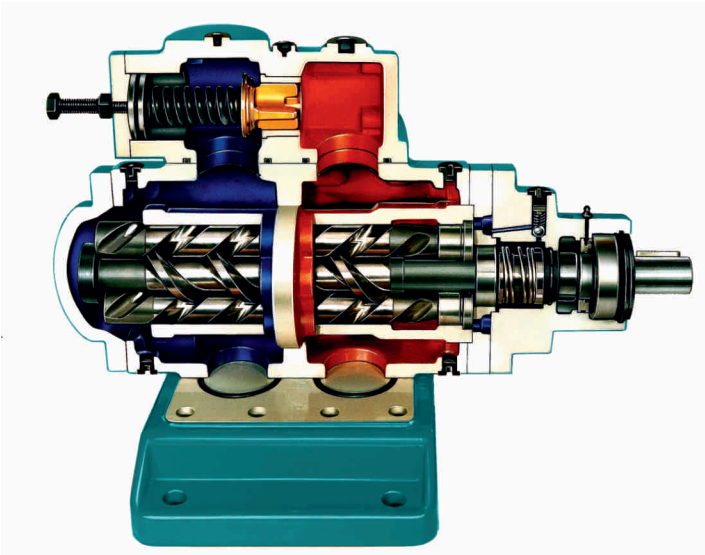
ALLWEILER® IMO®

Self-priming, very high efficiency, and low-noise. Enables fully continuous, pulsation-free pumping.

Application: For pumping oils and other lubricating and non-corrosive liquids, like those used in fuel technology, hydraulics, mechanical engineering, general industrial technology, and the chemical and petrochemical industries.

### Performance data

|                     |                            |
|---------------------|----------------------------|
| Capacity:           | up to 750 m³/h / 3,300 gpm |
| Pressure:           | up to 280 bar / 4,060 psi  |
| Viscosity:          | 1 to 5,000 cSt             |
| Liquid temperature: | up to 260 °C / 500 °F      |



Industry Products & Services

## PROGRESSING CAVITY PUMPS

ALLWEILER®

Single- or multi-stage pumps, self-priming, for use as an immersion pump in horizontal or vertical design. Pumping is continuous with virtually no pulsation and without formation of emulsions. Ideal for dosing.

Application: For pumping or dosing liquids with a variety of viscosity levels and corrosion properties. Also suitable for multi-phase liquids and contaminated liquids like sludges and waste/leak oils.



### Performance data

Capacity: up to 450 m³/h / 1,980 gpm

Pressure: up to 64 bar / 928 psi

Viscosity: 1 to 300,000 cSt

Liquid temperature: up to 150 °C / 302 °F

## PERISTALTIC PUMPS

ALLWEILER®

Dry self-priming, rotating displacement pumps without seals or valves.

as applications where the pump must be capable of dry running for extended periods.

Application: For pumping or dosing liquids with a variety of viscosity levels and corrosion properties. Also suitable for multi-phase liquids and contaminated liquids as well

### Performance data

Capacity: up to 60 m³/h / 265 gpm

Pressure: up to 16 bar / 232 psi

Viscosity: 1 to 100,000 cSt

Liquid temperature: up to 80 °C / 176 °F



## GEAR PUMPS

ZENITH® IMO®

Displacement pumps, multi-stage configuration for very high or medium pressures with very low-viscosity fuels. Virtually pulsation-free, low-noise pumping with high efficiency.

Application: From lifting oils to fuel injection, the CIG gear pump from CIRCOR is the perfect pump solution for turbines that were derived from aerospace.



### Performance data

Capacity: up to 28 m³/h / 123 gpm

Pressure: up to 345 bar / 5,003 psi

Viscosity: 0.5 to 50,000 cSt

Liquid temperature: up to 510 °C / 950 °F

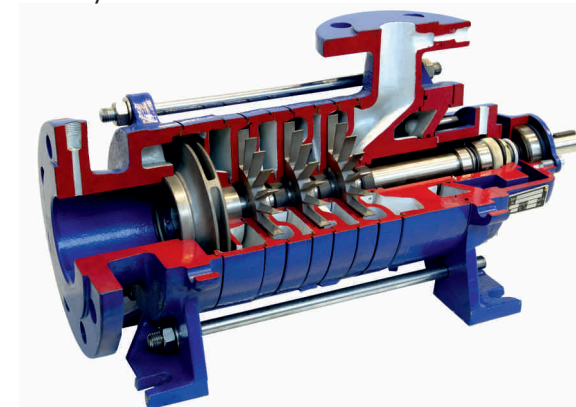
## SIDE CHANNEL PUMPS

ALLWEILER®

Self-priming, segmental type. Insensitive to cavitation at variable vapor pressure.

Application: For pumping pure, turbid, gaseous, neutral or aggressive, non-abrasive, cold or hot liquids. Also for

liquids with gas- or vapor-forming components (up to 50%), i.e. for low-boiling liquids like liquefied gas. Universal use in a variety of industries.



### Performance data

Capacity: up to 36 (50\*) m³/h / 158 (220\*) gpm

Pressure: up to 40 (25\*) bar / 568 (355\*) psi

Delivery head: up to 350 (250\*) m / 1,148 (820\*) ft

Liquid temperature: -40 to 220 °C / -40 up to 428 °F

\* Performance data for high-pressure centrifugal pumps in a modular system, up to 15 stages depending on pump size

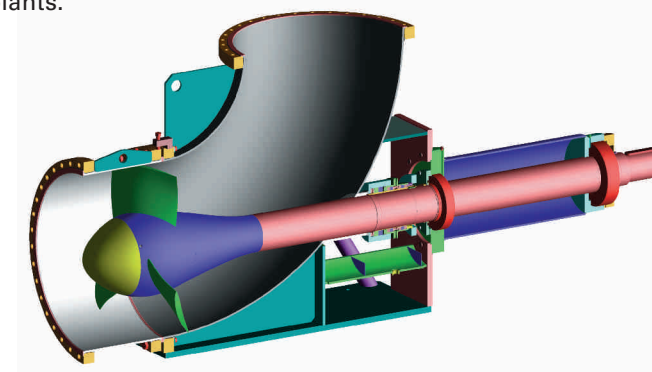
## PROPELLER PUMPS

ALLWEILER®

Horizontally or vertically installed pumps for large capacities and high heads up to 12 m. Materials and installation/drive adaptable to requirements.

Application: For pumping neutral or aggressive, pure or contaminated, cold or hot liquids or liquids interspersed

with solids in chemical engineering and process technology. Used in wastewater and clarification as recirculation pumps as well as for pumping return sludge or rainwater during potable water reclamation, e. g. in seawater desalination plants.



### Performance data

Capacity: up to 50,000 m³/h / 220,167 gpm

Pressure: up to 6 bar / 85 psi

Delivery head: up to 12 m / 39 ft

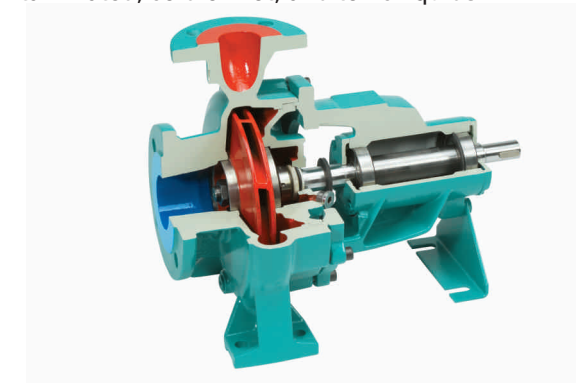
Liquid temperature: up to 200 °C / 392 °F

## CENTRIFUGAL PUMPS

ALLWEILER®

Designation, rated power, and dimensions according to EN 733 or EN 2858. The EN performance ranges have been expanded with additional sizes.

Application: For pumping neutral or aggressive, pure or contaminated, cold or hot, and toxic liquids.



### Performance data

Capacity: up to 1,500 m³/h / 6,600 gpm

Pressure: up to 16 bar / 227 psi

Delivery head: up to 150 m / 492 ft

Liquid temperature: up to 400 °C / 752 °F

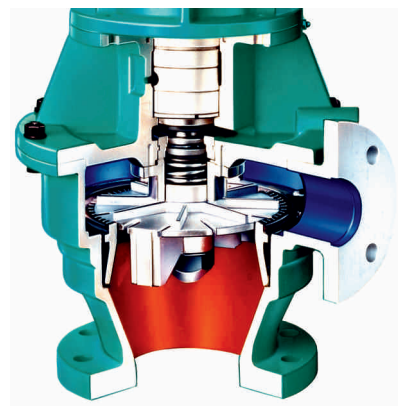
## MACERATORS

ALLWEILER®

Size-reduction elements are the rotating impeller (with exchangeable highly wear-resistant milling cutters) and a stationary cutting ring.

Application: Chopping and homogenization of fibers and solids contained in liquids. Smaller solids sizes permit pumping of the liquids; used for chopping, mixing, and

process-engineering applications; in communal and industrial wastewater-treatment plants; and in the treatment of waste products in every industrial segment.



### Performance data

Capacity: up to 160 m³/h / 705 gpm

Liquid temperature: up to 80 °C / 176 °F

## OIL SERVICES

LSC®

ThermoJet Oil® Purifier is a state-of-the-art, on-line industrial oil-purification system that removes free, emulsified and dissolved water and light hydrocarbons from industrial lubricants and hydraulic oils.

Application: The unique air/gas stripping technology makes it practical and efficient — allowing the ThermoJet Oil Purifier to outperform centrifuges, coalescers and the more complex vacuum dehydration systems.

### Performance data

Particulate filtration: ISO 4406 15/13/10

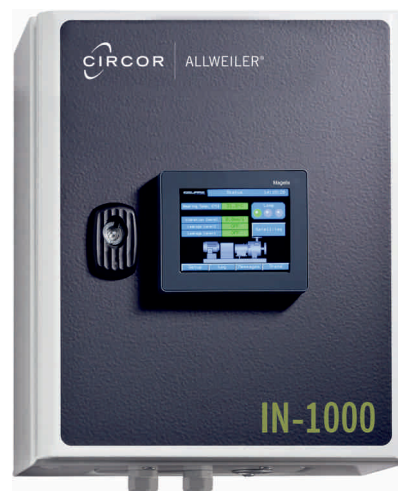
Process flow rate: 680 l/h / 180 gal/h



## PUMP MONITORING

SmartTechnology IN-1000 Series – Condition and Operation Monitoring for greater stability and lower operating costs.

IN-1000 is a modular and fully-automated electronic monitoring system with the ability to monitor several pumps simultaneously. It may be retrofitted at any time. An integrated Web server permits transfer of data to a control station and remote services. When unusual operating conditions appear, they are announced immediately and displayed on the color screen. As a result, it becomes possible to plan ahead for maintenance and repairs. Unplanned production downtime is prevented, maintenance intervals are extended, and expenses for maintenance and spare parts are reduced.



## TAILOR-MADE SOLUTIONS FOR EACH INDUSTRY

### DECADES OF EXPERIENCE COMBINED WITH MODERN DESIGN AND PRODUCTION

Pumps and systems from CIRCOR employ a variety of technologies that make them ideal for virtually any liquid in a wide range of industrial applications. When you partner with CIRCOR, you get the best solution, no matter what your industry or application.

## WATER & WASTEWATER

CIRCOR supplies OEMs, operators, and engineering firms with solutions that are optimized for all areas of wastewater treatment, including water treatment, wastewater purification, drainage, water supply, and wastewater disposal. Pumps in the sewage plant's inlet must lift arriving raw wastewater up to the operational level. Since this liquid still contains a high proportion of solids, it is essential for the pump units to resist clogging and abrasion. Progressing cavity pumps are particularly well-suited for this purpose. With a variety of designs and options, such as rotor coatings, various geometries, one or two feed screws as needed, and approximately 20 different elastomers for the stator, these pumps adapt fully to the liquid. If the sludge contains clogs and cakes, macerators are needed to reduce solid sizes. In the purification stages, insensitive, self-aerating centrifugal pumps and progressing cavity pumps move the thin sludges to prevent gas formation.



In the chemical cleaning process, special proportioning pumps are used to move additives like acids, lyes, lime, or polymers that are needed as precipitation and flocculant aids for eliminating phosphate and facilitating drainage.

## CHEMISTRY & PROCESS TECHNOLOGY



Pumps used in the chemical processing industry (CPI) must pump a wide variety of liquids used in organic and inorganic chemistry. Examples include lyes and acids, solvents, pigments, coatings, explosives, rubber, resin, and fertilizers. The international and regional standards that are demanded of chemical companies make this industry one of the most dynamic in the world. For operators, this makes it even more important to have trustworthy suppliers for devices and solutions that enable continuous and safe production processes with the highest possible efficiency.

CIRCOR develops, designs, and manufactures reliable solutions for even the most complex chemical processes. Chemical pumps from CIRCOR meet these requirements through a wide offering of materials, the capability to handle a wide range of viscosities, pressures, and temperatures, and compliance with ISO 2858/EN 2858.

Industry Products & Services

ALLWEILER® HOUTTUIN™ IMO® WARREN®

## MINING

In an increasingly global economy with high demand for raw materials, productivity of mining and extraction operations is critically important.

CIRCOR supports productivity and reliability of mining operations with pumps to supply lubricating and control oil to equipment, hermetically sealed pumps to safely handle environmentally hazardous and explosive liquids, and dosing pumps for the preparation of mined materials.



## PULP & PAPER

In the cellulose and paper industry, production typically runs 24/7/365, making service and support critical to a profitable operation. With pumps to cover all applications – from supply pumps for lamination and cooking, dosing of additives and chemicals to pumps for coating inks – and a global service and support network, CIRCOR supports owners and operators of pulp & paper plants with the most reliable fluid handling solutions.



## BUILDING & CONSTRUCTION

Industrial plants, administrative buildings, large structures, and community heating plants move fuel oils with high-efficiency pumps from CIRCOR. High-efficiency pumps also supply hot and warm water and move liquid through heating and cooling systems. In addition, pumps from CIRCOR are commonly used with low-noise, maintenance-free, and compact elevator systems.



## FOOD & COSMETICS



CIRCOR pumps and solutions are used in applications that must fulfill the most stringent regulations for hygiene when pumping high-value and sensitive liquids. Examples include the production of food and beverages, dairy processing, and pharmaceuticals and cosmetics. Special stainless steel pumps in CIP configuration are capable of residual- and bacteria-free cleaning. They have a gentle, low-pulsation pumping action

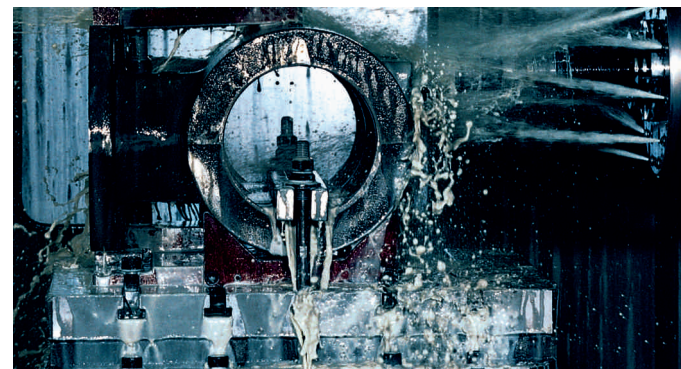
that is economical and uniform. Even fibers and solid particles will not interrupt their operation. All pumps fulfill FDA and 3A-US Sanitary Standards.

## POLYMERS & TEXTILES

CIRCOR delivers pumps that are specifically adapted to pumping polymers, synthetic fibers, and non-woven fabrics. Examples of applications are textile manufacturing, the manufacturing of PET objects, and thicker industrial yarns. The pumps move high-viscosity liquids at high pressure and extreme temperatures. The solutions are ideal in situations that require repetitive, precise dosing of liquids or movement of hot liquids, such as during the production of nylon and polymers.



## MACHINE TOOL



Cooling lubricant pumps from CIRCOR are used in every aspect of mechanical engineering, plant construction, machine tools, and the automotive industry. They contribute to excellent surface quality of machined parts and are valued particularly in the automotive industry for their long service life. In addition to cooling lubricants and emulsions, pumps from CIRCOR are also well suited for cutting and grinding oils.

When used in conjunction with the redesigned ALLSPEED® control system, operating costs for machine tools are reduced by as much as 75% with the same investment volume.

## HEAT TRANSFER



Within the realm of heat-transfer technology, centrifugal pumps from CIRCOR are used in supply loops, solar power stations, recirculation systems, and heating systems. They move hot water and heat-transfer oil. Pumps from the ALLHEAT® series reflect one of the few pump designs on the market that (with absolutely no changes) can pump thermal oil up to 350 °C/662 °F or hot water up to about 207 °C/405 °F.

ALLHEAT® pumps are also suited for use with modern, very low-viscosity synthetic thermal oils.

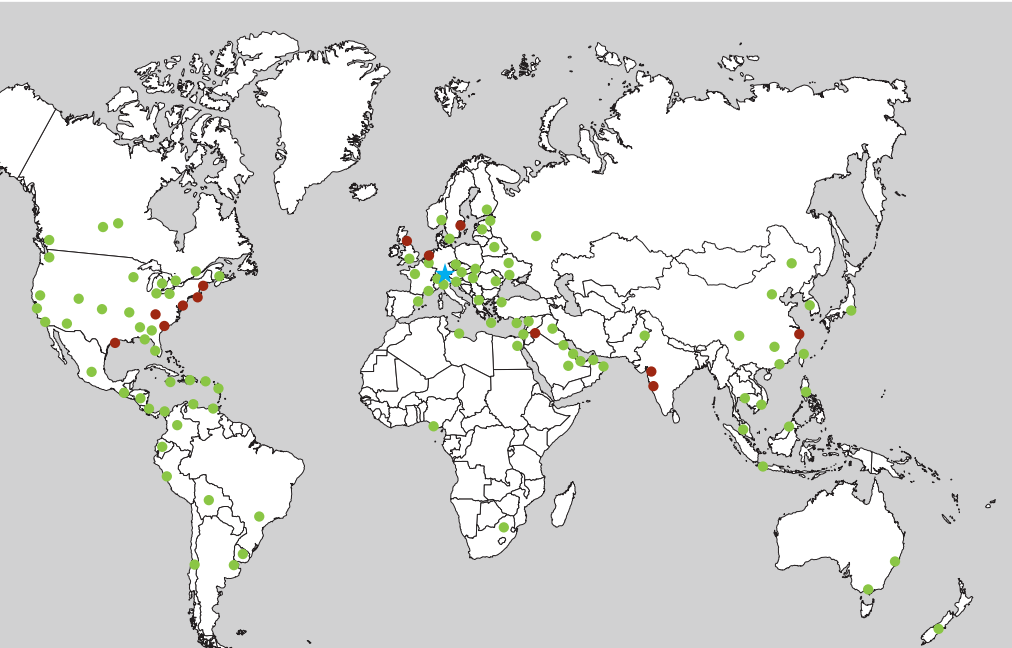


# THE BEST FLUID HANDLING SYSTEM AT THE CORE OF EVERY INDUSTRIAL PLANT

Pumps and engineered systems from CIRCOR are the most trusted names in fluid handling applications all over the world.

Your CIRCOR team focuses on developing and delivering the best solution for individual requirements, whatever your challenges, wherever they are in the world. We call this "Total Savings of Ownership." Savings from CIRCOR begins with a fair price, but "Total Savings of Ownership" involves an understanding of what it takes to optimize profitability throughout the life of your plant.

Partner with CIRCOR for our deep base of industry knowledge, engineering experience, and application expertise that allows us to optimize system performance while ensuring your team has the knowledge and training it needs. With the tools to simplify your design and engineering processes and the global presence to ensure you have what you need when you need it, we are committed to being a partner in your success by redefining what's possible for you and your customers.



## REDEFINING GLOBAL SOLUTIONS

CIRCOR maintains regional engineering and manufacturing facilities to support you around the world and around the clock.

- ★ Global Headquarters
- Regional Manufacturing and Engineering Support Facilities
- Global Distributor Network

### CIRCOR

|                                                                  |                                              |                                                                                                    |                                                                                                            |
|------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
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[www.circorpt.com](http://www.circorpt.com)



Power & Industry Products & Services

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