

# INDUSTRIAL/CHEMICAL

## Gear pumps and systems



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Maag is the worldwide leading manufacturer of gear pumps, pelletizing systems, and filtration systems for demanding applications in the plastics, chemical, petrochemical, and food industries. Maag develops, manufactures, and distributes innovative, customized solutions for complete pump and pelletizing systems – combining the latest technology with longtime experience.

Automatik has been manufacturing innovative pelletizing systems of the highest quality for several decades. It is

the world leader in underwater strand pelletizing systems. That leadership position is founded on state-of-the-art technology and on comprehensive know-how in all pelletizing techniques and pellet forms. The company's longstanding tradition in development, production and global sales and distribution is complemented by comprehensive advice and service backup.

The whole company employs more than 500 staff at its headquarters in Switzerland and its production sites and sales offices in Germany, France, Italy, Singapore, Taiwan, Malaysia, China, Brazil, and the USA and is represented in the markets with its brands "Maag Pump Systems" and "Automatik Pelletizing Systems". Maag is a Dover Corporation company (NYSE:DOV).

# CONVEYING, DOSING, SUPPLYING

## Gear pumps made by maag: a sturdy and reliable solution

**Gear pumps made by maag are applied worldwide in most varying processes and under most demanding conditions. The outstanding operational reliability of the maag gear pumps is achieved through our expertise gained in more than 80 years of experience in theory and practice, allowing us to quickly and reliably configure new pumps according to specific requirements.**

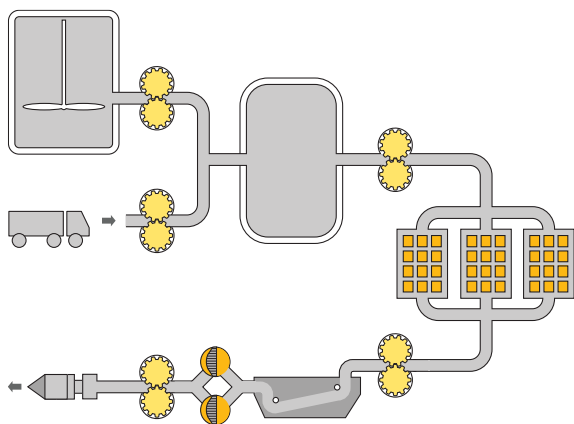
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The sturdy design of the maag gear pumps featuring medium-lubricated bearings makes the pumps withstand even highly inhospitable conditions such as corrosive and abrasive media, high pressure levels, high viscosities, high temperatures, and combinations thereof. As manufacturing the mechanical components of the maag gear pumps meets very high accuracy standards, the pumps are most suitable for precise dosing applications. Low pulsation and vibration levels as well as the adjustable conveying rate allow simple control processes. Conveying applications require a steady rotation speed under varying pressures thus ensuring a steady conveying rate. Therefore, maag gear pumps are also well suitable for applications with varying pressure levels. Optimized flow channels and a unique design make maag gear pumps the perfect choice when it comes to supplying high-viscosity media from vacuum bins.

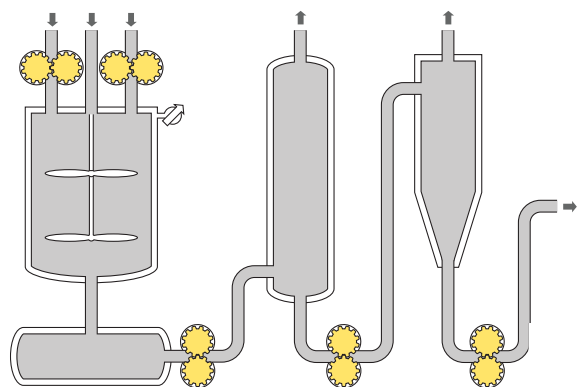
The variety of process-related tasks demands handling of a variety of media to be conveyed. With a wide range of materials and seals at hand, maag is able to meet the requirements of any medium – be it lubricants, chocolate, or even highly corrosive acids – in an optimal way, every day. The two illustrations below show typical processes for the application of maag gear pumps.

### Industrial processes

Example: hot-melt extrusion



### Chemical processes





# INTEGRATED THINKING

Optimal performance can only be expected from systems which are truly designed to work together

**Elastomeric producers and processors need to compete in the global marketplace. With our worldwide network of service and parts centers located close to where you are, maag helps you to do this better. Together with our local representatives and OEM partners, we are always ready to provide rapid and competent support to our customers, wherever they are. In planning and optimizing your production system, the experienced sales engineers from maag provide comprehensive advice which is balanced and takes an integrated view across your entire production chain. Our entire staff understands that your success in the marketplace depends upon your product quality and operating productivity. Our approach is therefore to analyze your requirements in precise detail so that we can offer you complete, optimized solutions.**

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Our systems and components are designed for optimal rheological performance and tailored to your material and operating requirements to ensure unsurpassed process reliability and production economics. maag helps you to get the most out of your investment by recommending the processes and solutions which are best suited to your specific application.

The maag technical development and testing center provides you with expertise and equipment to perform trials on your material and to put your most innovative ideas to the test under real operating conditions. Our development and testing facility is also ready to perform test runs on your behalf or to devise solutions tailored to your exact filtration and pelletizing needs. With more than 2,000 m<sup>2</sup> of floor space, this state-of-the-art laboratory facility is fully equipped with multiple complete extrusion lines, including gear pumps, screen changers, and both underwater and strand pelletizers. We also offer a special test line for elastomer intermediates. The valuable data obtained through this precisely controlled testing, such as flow consistency, surface finish and processing temperature, helps you to maximize your product quality. The maag development and testing center also offers a drop pelletizing tower for low-viscosity melts and liquids.

If interdependent components are to seamlessly work together as an integrated system, they must be more than just "compatible". The entire product range of maag gear pump, filtration and pelletizing components is designed from the very start to fit together and work together perfectly. The end result to you is a highly efficient, trouble-free production line which delivers best possible product quality and output. Our commitment to technical excellence means that long operating life and the highest possible energy efficiency are more than just vague promises. And our commitment to you, the customer, is on-time delivery of the ideal solution at a highly competitive price – integrated and complete, from initial requirements analysis through to installation and start-up, and with training, maintenance and support you can count on from day one.

# EXTERNAL GEAR PUMPS

## Mechanical high-tech conveying equipment for chemical and industrial processes

Due to the wide range of maag products, the most cost-effective product line can be offered to meet specific medium-related and operational requirements. As each particular product line consists of modular elements, the required gear pump can be configured individually in terms of efficiency, accuracy, reliability, safety, and lifetime. Highly precise manufacturing of the mechanical pumps components leads to precise conveying rates. Replacing wear parts takes only a short time.

The **cinox®** and **therminox®** series have been especially designed to convey highly corrosive and hazardous media. Integrated heating

channels with steam or liquid ensure that the pump temperature is kept stable at the desired level. As an option, the cinox® pump can also be heated electrically.

The **cinox-V®** and **therminox-V®** series is especially suitable for applications with very low inlet pressure and high viscosities. The special design allows mounting directly at the converter. The pumps of this series can also be heated.

Pumps of the **refinex®** and **refitherm®** series are sturdy and are equipped with a heating system. They are made of cast steel and can be applied basically anywhere (e.g. at refineries).

The **hydrolub** series offers cost-effective, proven, and durable pumps made of compression-proof cast iron for non-corrosive applications.

# COMPONENTS AND SYSTEM SOLUTIONS

## From a broad range of components to individual system solutions

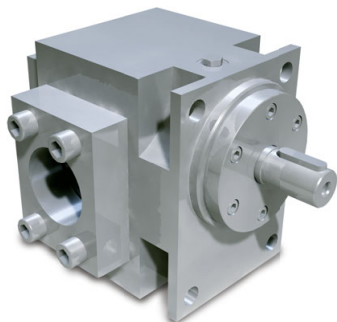
maag not only supplies the pump head itself but also a lot of useful accessories and entire pump systems such as:

- Motors
- Gears
- Drive shafts
- Mechanical or magnetic couplings
- Flanges
- Fixing frames and superstructures
- Flush tanks
- Safety valves
- Temperature controls

Benefits for the customer:

- Everything from one source
- Harmonized systems
- Selected and reliable suppliers meeting the maag quality standards
- No interface-related problems

## cinox® / therminox®



### Technical data:

<b>Sizes:</b>	22-180
<b>Flow-rate:</b>	0.1-2,400 l/min
<b>Specific volume:</b>	1.28-3,212 cm <sup>3</sup>
<b>Temperature:</b>	Up to 320 °C
<b>Heating:</b>	Electric or liquid
<b>Inlet pressure:</b>	Up to 65 bar
<b>Outlet pressure:</b>	Up to 200 bar

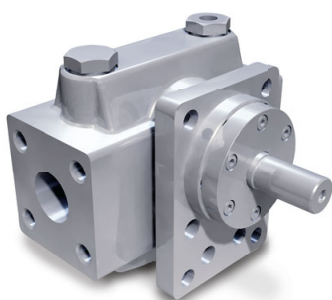
## cinox-V® / therminox-V®



### Technical data:

<b>Sizes:</b>	28-70
<b>Flow-rate:</b>	2.5-264 l/min
<b>Specific volume:</b>	10.2-176 cm <sup>3</sup>
<b>Temperature:</b>	Up to 320 °C
<b>Heating:</b>	Electric or liquid
<b>Inlet pressure:</b>	Up to 16 bar
<b>Outlet pressure:</b>	Up to 200 bar

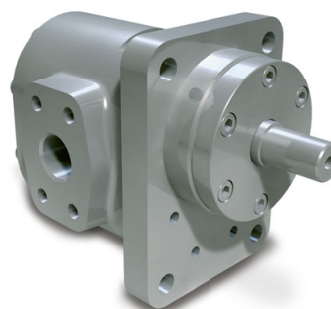
## refinex® / refitherm®



### Technical data:

<b>Sizes:</b>	22-140
<b>Flow-rate:</b>	0.5-1,750 l/min
<b>Specific volume:</b>	4.7-1,725 cm <sup>3</sup>
<b>Temperature:</b>	Up to 320 °C
<b>Heating:</b>	Electric or liquid
<b>Inlet pressure:</b>	Up to 65 bar
<b>Outlet pressure:</b>	Up to 350 bar

## hydrolub



### Technical data:

<b>Sizes:</b>	22-140
<b>Flow-rate:</b>	0.1-1,750 l/min
<b>Specific volume:</b>	1.28-1,725 cm <sup>3</sup>
<b>Temperature:</b>	Up to 150 °C
<b>Heating:</b>	–
<b>Inlet pressure:</b>	Up to 65 bar
<b>Outlet pressure:</b>	Up to 120 bar

# PARTS, ACCESSORIES, SERVICE AND SUPPORT

For maximum productivity and production reliability

**Products from maag are known not only for their superb operating performance but also for their durability and long operating life. Tailored to material-specific and customer-specific requirements, they help to maximize process efficiency – and thus ultimately profitability. Our customers can count on us for comprehensive technical and operating advice, for a complete range of accessories, and for fast, reliable service and parts delivery – where you need it, and when you need it.**

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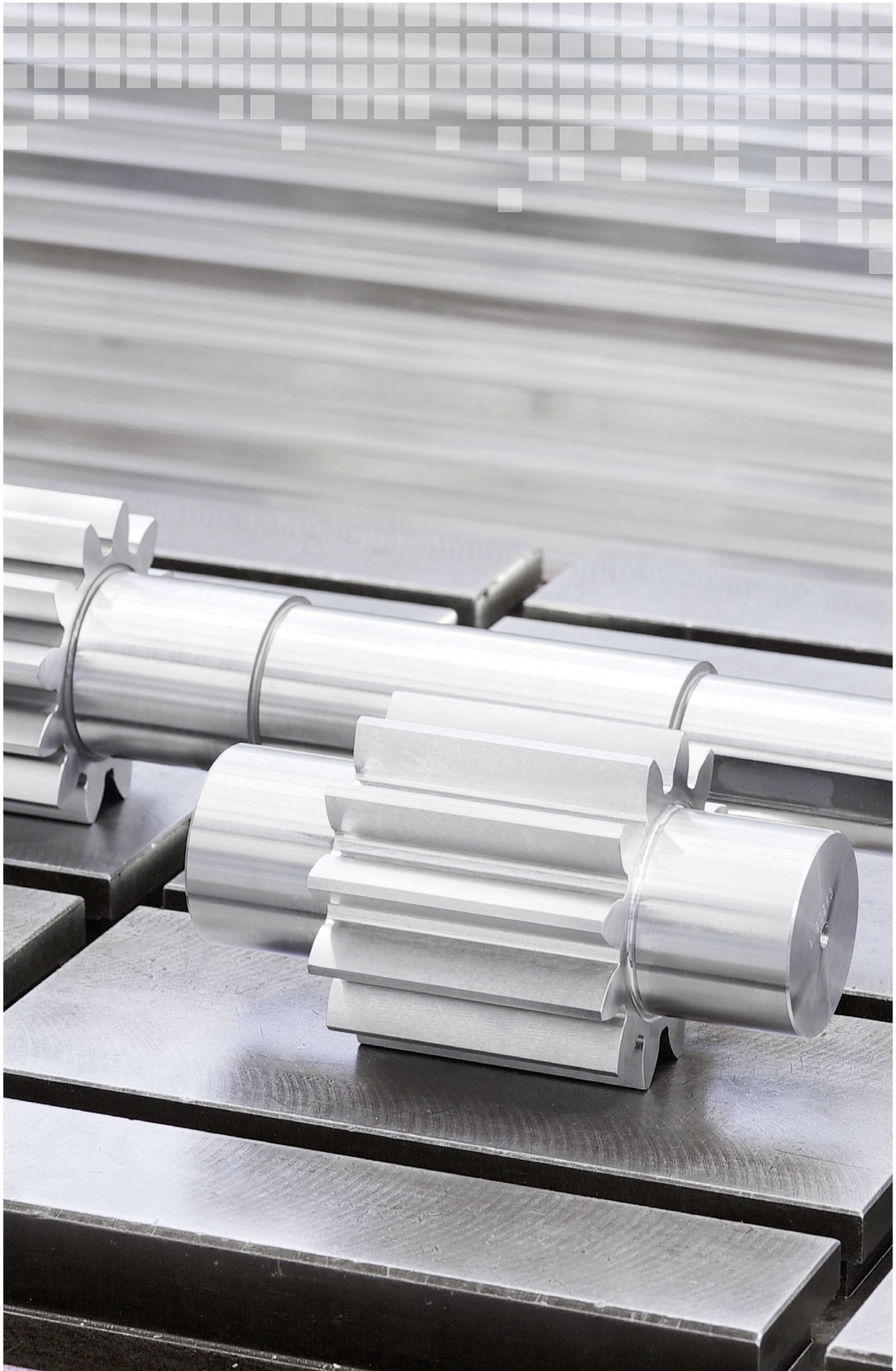
Process reliability and precisely controlled product quality are critical to your competitiveness in the marketplace – and a promise that maag makes to its customers from planning and start-up through to maintenance and ongoing system operation. Our gear pumps, screen changers and pelletizing systems are installed and put into service by our experienced technicians, working closely with the customer to optimize operating parameters and system configuration according to technical requirements. Following successful installation, we then provide comprehensive, hands-on training to your operators and production staff. And needless to say, the technical support team at maag is always just a phone call away, whether for routine maintenance or any other needs. This ensures maximum availability and minimum downtime.

maag offers its customers the benefits of a truly global service network, including the world's largest network of rotor and knife regrinding services in the pelletizing industry. This enables us to provide fast, reliable, expert service and support which is close to where you are. Rounded out with our pump repair service, our comprehensive range of service offerings means that you can rely on us to meet all your needs. maag repairs and overhauls gear pumps for an extremely wide range of chemical, extrusion, polymer, compounding and other industrial applications.

The engineering team at maag is constantly working to offer upgrades for existing systems, so that your production line is always at the leading edge. This serves not only to improve production reliability but also to improve process efficiency, such as by reducing energy costs. Maximizing the operating life of your capital equipment, minimizing production waste, improving operator convenience and safety, and ultimately helping you to achieve the best possible final product quality at the lowest cost – these are our objectives in serving you.

Because of our installed worldwide base of thousands of systems, along with our own commitment to ongoing R&D, our customers are in a unique position to benefit from our expertise in providing state-of-the-art solutions tailored to individual process requirements. Superior product quality together with high operating productivity – that's our commitment to you.





# YOUR BENEFITS WORLDWIDE

## Reliable, expert service and support

- Our global team of experts and qualified engineers ensure that your production equipment is correctly maintained for maximum reliability.
- Your components and systems are tailored to your exact requirements, thus optimizing production efficiency from the very start.
- Your system is installed and put into service by our own qualified engineers.
- maag components and systems are designed to work together perfectly and built to ensure long, trouble-free operation, thus yielding excellent production economics and reliable operation long into the future.
- We provide you with a single comprehensive source to furnish and maintain all your production equipment, thus reducing the cost and administrative burden associated with purchasing, operation and maintenance – and eliminating the “finger pointing” among different individual providers.
- You can count on fast, guaranteed repair and maintenance service from our experienced, highly trained specialists.
- Because your production availability depends on getting critical parts quickly, our global service network puts our spare parts and accessories close to your doorstep.
- We offer training for your staff – on your premises, or in our service centers – helping you to motivate your employees while maximizing operational efficiency, thus ultimately lowering production costs.
- Our technical support is ready to assist you, or to answer your questions, quickly and unbureaucratically, saving you time and money.
- Among our application-related services are viscosity measurements and flow simulations by our experienced application engineers, bringing process transparency to help you (and us) perform better.



Maag has business roots extending back more than 100 years. The foundations for today's Maag Pump Systems AG were laid by Max Maag in the year 1910, beginning with gear manufacture. The business grew, and in 1928 the company's factory in Zurich shipped its first gear pump. In the decades to follow, Maag engineers developed ever more sophisticated and capable gear pumps. Today, these process pumps are in operation around the world, serving customers in the plastics, chemical, petrochemical and food processing industries. At the start of the new millennium, Maag Pump Systems expanded its product range to include high-performance screen changers and large-area filtration units so that, since this time, it has been able to offer complete systems.

After more than six decades serving the plastics industry, it is hard to even imagine this market without pelletizing systems from Automatik Plastics Machinery. Originally founded in 1947 as Automatik Apparate- und Maschinenbau GmbH, the company began developing strand pelletizing systems from its earliest days, bringing the first automated strand pelletizer to the market in the 1960s. The 1970s saw a further burst of innovation, particularly the company's launch of the first underwater strand pelletizer in the middle of that decade. In the late 1990s, Automatik went on to bring its unique drop pelletizing system for low-viscosity products to the market, filling yet another industry need. The company completed its product portfolio in 2003 with the introduction of its SPHERO® underwater pelletizing technology. Since this time, Automatik has offered solutions covering a comprehensive range of pellet shapes, operating throughputs and production requirements.

The paths of these two extraordinary companies have crossed many times over the years, as both have long been providers of complementary, superior quality systems and components to the plastics processing industry. With their merger in 2010, Maag Pump Systems and Automatik Plastics Machinery were brought together under the umbrella of Maag, offering complete and highly efficient production solutions from a single source. Maag has been a part of Dover Corporation, a U.S. industrial conglomerate, since 2012.

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