

cinox® therminox®

Corrosion-resistant gear pumps
for chemical processes



cinox® therminox® gear pumps are corrosion-resistant and heatable stainless steel conveying units that satisfy the stringent quality requirements of today's chemical processing industry. Thanks to the extensive range of components and materials of construction to choose from, MAAG gear pumps can be configured to suit customers specific requirements and are therefore far superior to standard pumps in terms of performance and reliability. Whether the applications involve highly pure, corrosive, viscous or very hot media, MAAG pump systems holds the solution to meet every pumping challenge.

Your benefits

- Wide viscosity, temperature and pressure range
- High efficiencies due to tolerances being modified in line with applications
- Precise displacement volume
- Self-priming
- Corrosion-resistance
- Reliability and longevity
- Safety

cinox[®] therminox[®]

Stainless steel gear pumps for chemical processes

A range of typical pumping media

- Organic and inorganic chemicals
- Solvents
- Acids and alkalis
- Emulsions
- Sludges and condensates
- Prepolymers, oligomers, and monomers (PAN)
- Additives
- Resins
- Cellulose derivatives and pulps
- Silicones
- Waxes and paraffins
- Cosmetic products
- Pharmaceutical products
- Foodstuff extracts and flavourings
- Gum base
- Vegetable and animal oils and fats
- Molten Sulfur

Accessories

- Stands, motor flanges and base plates
- Product connecting flanges
- Couplings
- Motors and gear reducers
- Frequency converters
- Shaft seal systems (with buffer tanks)

Options

- Heated seals
- Bi-directional operation
- Special modifications for demanding applications

Certificates³⁾

- ATEX certificate
- 3.1 certificate
- German Air Quality certificate (TA-Luft)
- Performance test certificates

Application limits:

Viscosity:	0.3 to 4,000,000 mPas
Temperature:	-30 to 320 °C
Suction pressure:	Vacuum up to 65 bar
Discharge pressure:	Vacuum up to 200 bar
Flow rate¹⁾:	0.1 to 2,400 l/min

1) Higher flow rates upon request.

2) Other materials and designs available.

3) Other certificates and conformities upon request.

Technical specifications:

Housing:	<ul style="list-style-type: none"> ▪ Stainless steel ▪ Hastelloy
Gear shafts:	<ul style="list-style-type: none"> ▪ Stainless steel ▪ Ferralium ▪ Hastelloy ▪ Ceramic ▪ Peek on request
Bearing²⁾:	<ul style="list-style-type: none"> ▪ Synthetic carbon ▪ Stainless steel with carbon inserts ▪ Hardened tool steel ▪ Ceramics ▪ NiAg ▪ Bronze-CuAl
Shaft seal:	<ul style="list-style-type: none"> ▪ Single or double mechanical seal ▪ External mechanical seal ▪ Interlock or heater connections available ▪ Seal ring from a range of materials ▪ Magnetic coupling with single or double containment shell
Connections:	SAE, CETOP, DIN and ANSI flanges
Heating:	<ul style="list-style-type: none"> ▪ Electrical heating by cartridges optional for cinox[®] ▪ Integrated channels for heating/cooling by means of steam or liquids for therminox[®]

Theoretical pumping capacities in l/min at 0 bar Δp :

Size	at 500 rpm	at 750 rpm	at 1,000 rpm	at 1,500 rpm	at 3,000 rpm
22/6	0.64	0.96	1.28	1.92	3.84
22/13	1.39	2.09	2.78	4.17	8.34
22/22	2.35	3.53	4.70	7.05	14.10
28/28	5.10	7.65	10.20	15.30	30.60
36/36	12.80	19.20	25.60	38.40	76.80
45/45	23.15	34.73	46.30	69.45	139.00
56/56	46.30	69.45	92.60	138.90	–
70/70	88.00	132.00	176.00	264.00	–
90/90	186.00	278.00	371.00	557.00	–
110/110	358.00	537.00	716.00	–	–
140/140	671.00	1,007.00	1,342.00	–	–
180/180	1,606.00	2,408.00	–	–	–

The limitation of use is subject to the operating conditions.





cinox[®]-V therminox[®]-V

Stainless steel discharge pump
for chemical processes



The pump models cinox[®]-V therminox[®]-V are discharge pumps. They have been designed for highly viscous fluids, which are gently extracted from reactors and degassing devices even when the inlet pressure is low, ensuring optimum fill characteristics and short dwell times. This new pump series combines the outstanding flow characteristics of the polymer pumps with the exacting requirements of the chemical industry.

Your benefits

- Optimum fill characteristics due to enlarged inlet and optimum inlet geometry
- Low pulsation
- High efficiencies thanks to application-specific clearances
- Reliability
- Longevity
- Safety

cinox[®]-V therminox[®]-V

Stainless steel discharge pump for chemical processes

A range of typical pumping media

- Prepolymers, oligomers, and monomers
- Dopes
- Spandex
- Resins
- Adhesives
- Silicones
- Waxes and paraffins
- Emulsifying agents
- Gum base

Accessories

- Product connecting flanges
- Motors and gear reducers
- Universal shafts, hubs
- Frequency converters
- Sealing liquid system

Options

- Electrical heating
- Heated product flanges

Certificates¹⁾

- ATEX certificate
- 3.1 certificate
- German Air Quality certificate (TA-Luft)
- Performance test certificates

Application limits:

Viscosity: 0.3 to 4,000,000 mPas

Temperature: -30 to 320 °C

Suction pressure: Vacuum up to 16 bar

Discharge pressure: Vacuum up to 200 bar

Flow rate²⁾: 2.5 to 265 l/min

1) Other certificates and conformities upon request.

2) Higher flow rates upon request.

Technical specifications:

Housing: Stainless steel

Gear shafts: Stainless steel

Bearing: Hardened tool steel

Shaft seal:

- Double mechanical seal
- Interlock or heater connections available
- Seal ring from a range of materials
- Packing gland throttled (optional spring loaded)

Connections: Flanges (other optional) ANSI, DIN

Enlarged inlet: Enlarged inlet geometry for low NPSH at high viscosities

Thanks to the extensive range of components and materials of construction to choose from, MAAG gear pumps can be configured to suit customers' specific requirements and are therefore far superior to standard pumps in terms of performance and reliability. Whether the applications involve highly pure, corrosive, viscous, or very hot media, MAAG holds the solution to meet every pumping challenge.

Theoretical pumping capacities in l/min at 0 bar Δp :

Size	at 250 rpm	at 500 rpm	at 750 rpm	at 1,000 rpm	at 1,500 rpm
28/28	2.55	5.10	7.65	10.20	15.30
36/36	6.40	12.80	19.20	25.60	38.40
45/45	11.75	23.15	34.73	46.30	69.45
56/56	23.15	46.30	69.45	92.60	138.90
70/70	44.00	88.00	132.00	176.00	264.00

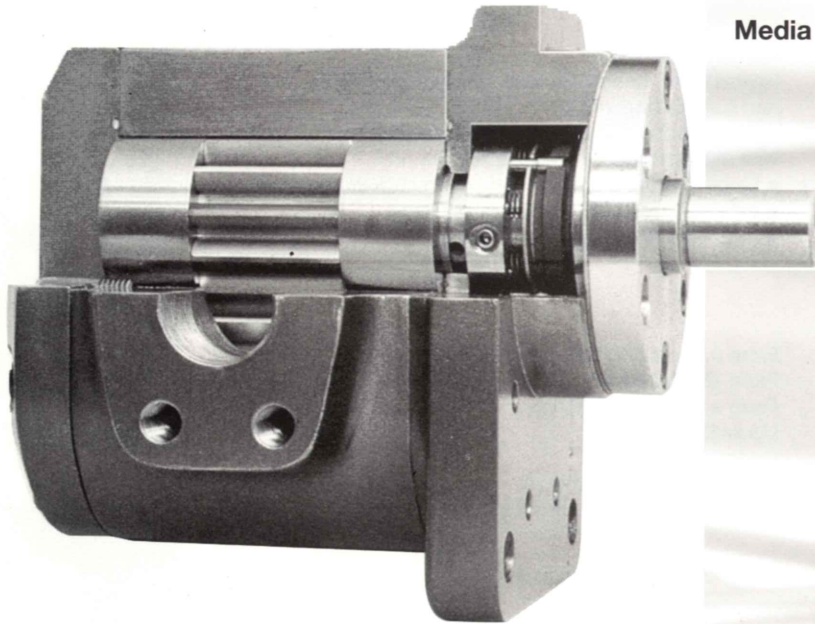
The operating limits are subject to the service conditions. Please contact us for specific applications.



maag pump systems

Maag gear pumps for industrial applications and processes

hydrolub[®] refinex[®]



Media Pumped

Fats and oils

- Diathermic oils
- Emulsified oils
- Fats
- Fuel oils
- Glycerin
- Lubricating oils
- Soap products

Organic and inorganic products

- Acids
- Additives
- Alcohol
- Amines
- Detergents
- Esters
- Fat acids
- Formaldehyde and derivatives
- Glycols
- Hardeners
- Isocyanates
- Molten sulfur

- Phenols
- Plasticizers

- Polyol
- Silicones

Paints and pigments

- Epoxy resins
- Inks
- Pastes
- Pigments in solvents
- Pigments in water
- Varnishes

Polymers

- Cellulose derivatives
- Epoxy resins
- Phenolic resins
- Plasticizers
- Polymers
- Prepolymers

Miscellaneous

- Additives
- Bitumen
- Gelatines
- Slurries
- Petroleum jelly

Efficient pumps for metering, transfer and pressure boosting for a wide range of fluids in industrial applications

Maag gear pumps can be found in many unique applications.

The high precision of the machining and the many choices of construction materials give Maag gear pumps metering, reliability, and durability that are unmatched in the industry.

Maag gear pumps are suitable for pumping a great variety of liquids with very distinct characteristics: from the lubricant to the abrasive product, with viscosity from 0.3 to 4.000,000 mPa s, with temperatures from - 30 to 320°C and with pressures up to 350 bar.

Maag has always been synonymous with high quality and is certified ISO 9001.

industrial

TEXTRON

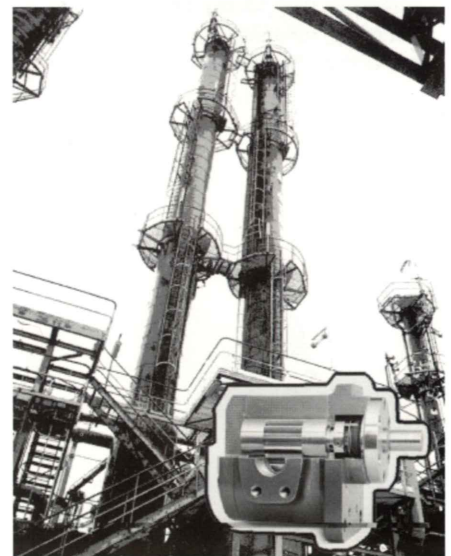
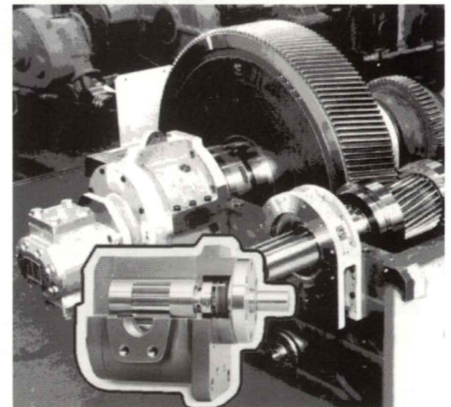
hydrolub[®] refinex[®]

Construction characteristics

Pump housing	hydrolub [®] refinex [®]	Cast iron Carbon steel
Gears		Helical teeth, or straight teeth in various materials and surface treatments
Bearings		Journal bearings in different materials and with different surface treatments
Shaft seals		<ul style="list-style-type: none"> ● Single or double mechanical seal in different materials ● Available also with magnetic coupling
Connections		<ul style="list-style-type: none"> ● SAE, and ANSI, and CETOP flanges

Technical data

Viscosity		From 0.3 to 4,000,000 mPa s
Temperature		From -30 to 320°C
Suction pressure		From a few mbar to 60 bar
Discharge pressure	hydrolub [®] refinex [®]	Up to 120 bar Up to 350 bar
Capacity		From a few l/h to 103 m ³ /h Higher capacities in special executions



Size	Model	Capacity l/min at the pressure of 0 bar at the speed of:			
		750 rpm	1000 rpm	1500 rpm	3000 rpm
22/6	NP	0.96	1.28	1.92	3.84
22/13	NP	2.08	2.78	4.17	8.34
22/22	NP-RX	3.52	4.70	7.05	14.1
22/28	NP	4.48	5.98	8.97	17.9
28/28	NP-RX	7.65	10.2	15.3	30.6
28/36	NP	9.82	13.1	19.6	39.3
36/28	NP	14.9	19.9	29.8	59.7
36/36	NP-RX	19.2	25.6	38.4	76.8
36/45	NP	24.0	32.0	48.0	96.0
45/45	NP-RX	34.7	46.3	69.4	139
45/56	NP	43.3	57.7	86.5	173
56/56	NP-RX	69.4	92.6	139	
56/70	NP	87.0	116	174	
70/70	NP-RX	132	176	264	
70/90	NP	170	227	340	
90/90	NP-RX	278	371	556	
90/110	NP	340	453	679	
110/90	NP	439	585		
110/110	NP-RX	537	716		
110/140	NP	683	911		
140/110	NP	790	1054		
140/140	NP-RX	1006	1342		
140/180	NP-RX	1294	1725		

The technical data shown are indicative of the pumps displacement and can change in consequence of the different characteristics of the fluids or of the different pumps configurations that can be achieved.


We can supply particular constructions, motor-pumps, complete motorization groups and systems on skid.





a **DOVER** company

F - SERIES PUMPS

Discover our latest Innovation

 **maag**
pump & filtration
systems

 **automatik scheer**
strand
pelletizers

 **gala automatik**
underwater
pelletizers

 **reduction**
pulverizing
systems

PUMP BENEFITS

LOW SHEAR

EASY MAINTENANCE AND REPLACEMENT OF INTERNAL PARTS

RELIABILITY AND LONG LIFE

PRECISE DISPLACEMENT VOLUME

LOW NPSHr

ENERGY EFFICIENT

CORROSION RESISTANCE

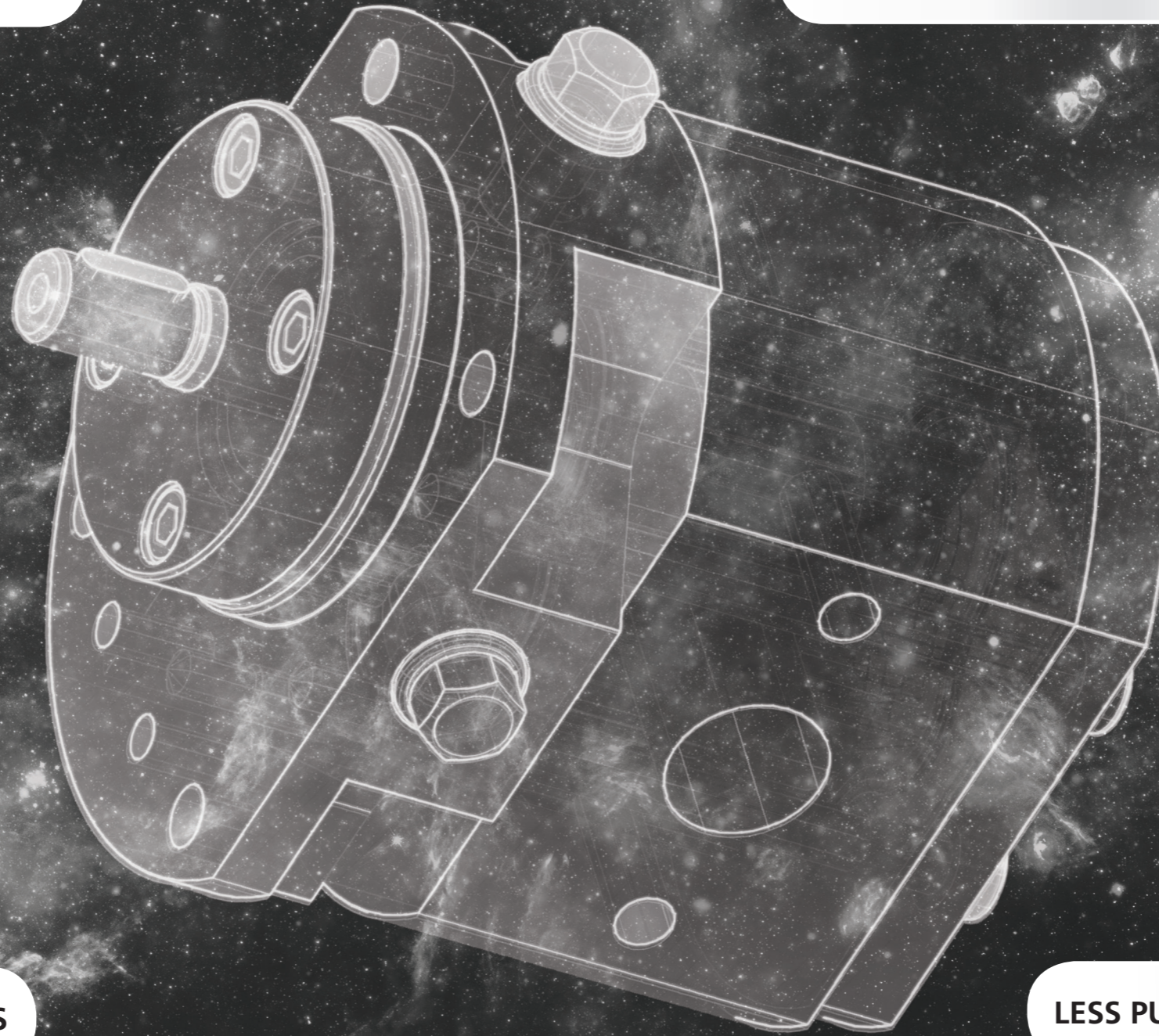
DOSING ACCURACY

EXTENSIVE PORTFOLIO OF SEALS

LESS PULSATION DURING PUMPING PHASE

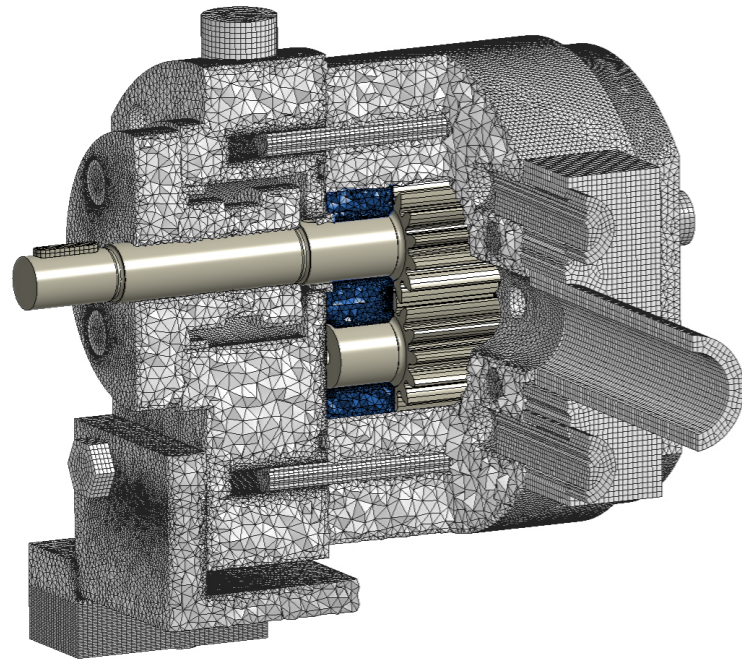
IN-HOUSE MANUFACTURING OF ALL CORE COMPONENTS

WIDER RANGE OF TEMPERATURE, PRESSURE AND VISCOSITY



F - SERIES

External gear pumps



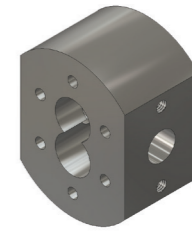
Maag external gear pumps are corrosion-resistant and electrically heatable conveying units, especially, designated for the small throughputs; they satisfy the stringent quality requirements of today's chemical processing industry and their three-piece configuration facilitates maintenance and replacement of internal parts, such as gears and bearings. Thanks to the extensive range of components and materials available, Maag gear pumps can be configured to suit customers specific requirements and are, therefore, far superior to standard pumps in terms of performance and reliability. For the applications involving highly pure, corrosive, viscous or very hot media, Maag pump systems offer the solutions to meet every pumping requirement.

Application limits:

Viscosity:	0.1 to 500 000 mPas
Temperature:	-30 to 320 °C
Suction pressure:	from Vacuum up to 50 bar
Discharge pressure:	from Vacuum up to 150 bar
Flow rate:	DX 0.05 to 12 l/min FX 1.2 to 139 l/min

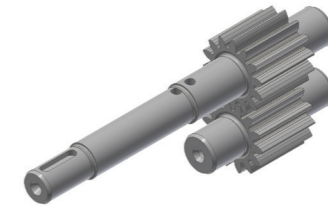
Housing:

- Stainless steel
- Hastelloy
- Plastics



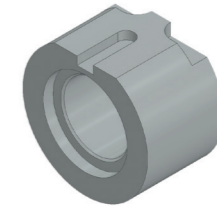
Gear shafts:

- Stainless steel
- Ferralium
- Hastelloy
- Ceramic SSiC
- Peek
- Titanium
- Zirconium Oxide ZrO2
- Technopolymer



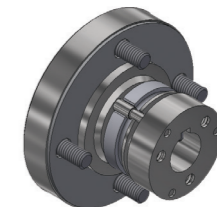
Bearing:

- Zirconium Oxide ZrO2
- Synthetic carbon
- Ceramic SSiC
- Nitrided steel TiCN - coated
- Tegodyn NiAg
- Bronze - CuAl
- Stainless steel with carbon insert



Shaft seal:

- Single or double mechanical seal
- Single or double mechanical balanced seal
- Interlock or heater connections available
- Heated seals
- Magnetic coupling with single or double containment shell



Heating:

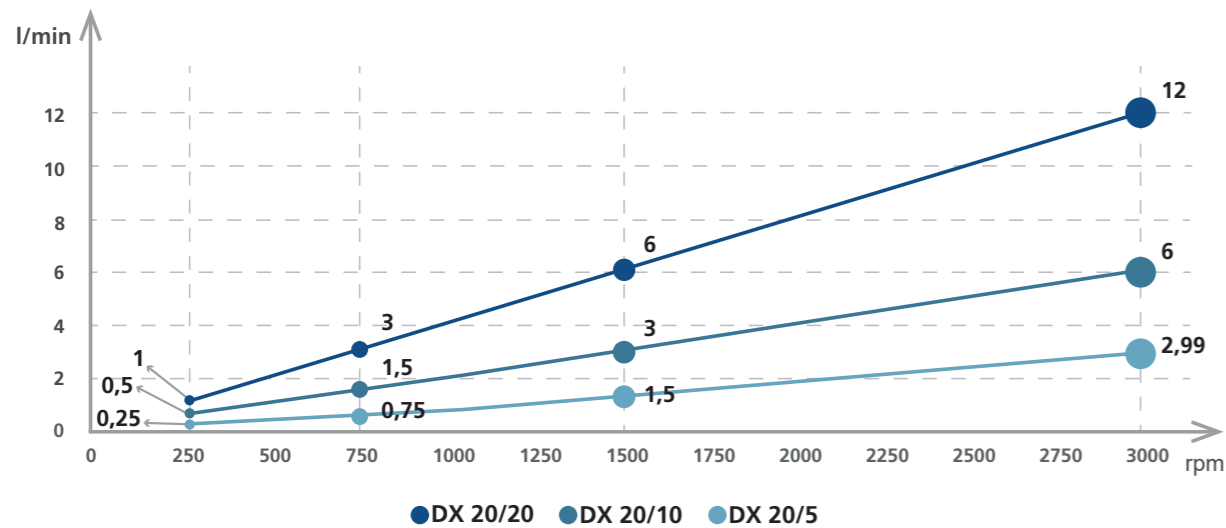
- Electrical heating by cartridges on request

Options:

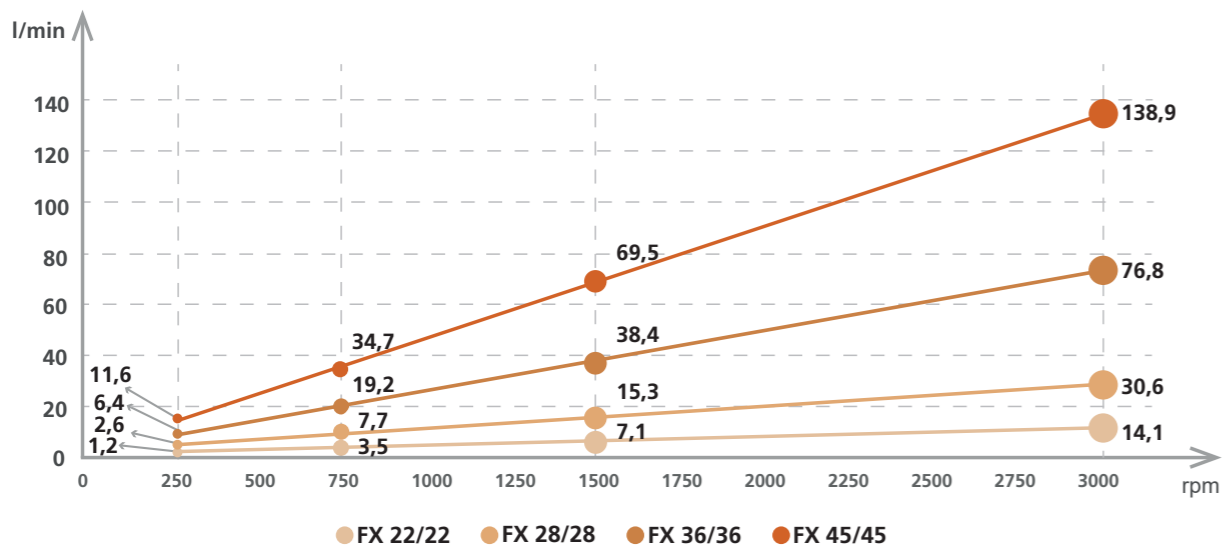
- Bi-directional operation
- Special modifications for demanding applications
- Customizable

F-SERIES PERFORMANCE

Performance DX

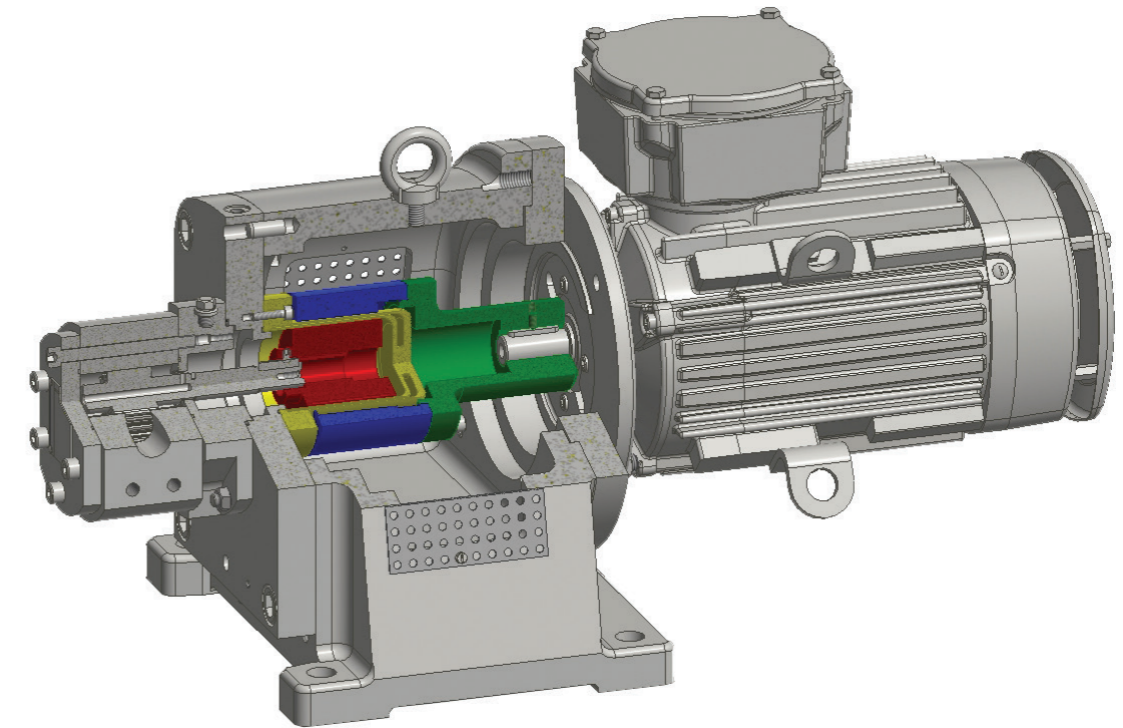


Performance FX



MAG DRIVE

MAGNETIC COUPLING FOR CHEMICAL AND INDUSTRIAL PROCESSES

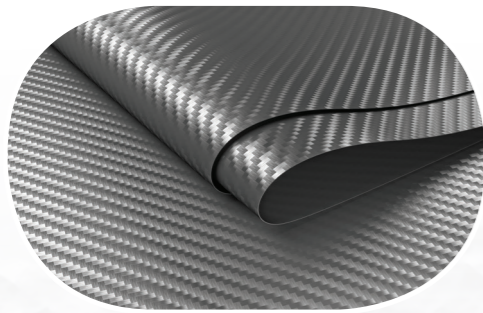


Magnetic drives are hermetically sealed, thereby, guaranteeing that environmentally hazardous, poisonous and toxic substances are pumped safely. The product chamber in the gear pump is completely separated from the environment by a containment shell. The torque is transferred from motor shaft to pump shaft without any contact by means of heavy-duty permanent magnets. This design makes the magnetic couplings extremely safe and maintenance-free.

Your benefits

- High suction pressures (standard to 25 bar, in special designs up to 100 bar)
- Hermetically sealed design
- Optimized safety and leak free
- Long service life
- Maintenance-free

APPLICATIONS



CARBON FIBRES

Maag pumps typically serve as a Dope feed/transfer pump in processing the carbon fibres. Considering the Polyacrylonitrile (PAN) in DMAc Solution, with about 20% of PAN in 80% solvent like DMAc (Dimethylacetamide) or DMSO (Dimethylsulfoxide), also consisting other components and small amounts of water, the mixture has to be pumped through a tiny injector into a chamber where the solvent evaporates and a solid fibre is left. For this purpose, Maag pumps are designed to convey and dose the solution with the high efficiency.



SPANDEX

For this application, Maag pumps are used as a Spinning or Dosing pumps. Spandex or elastane is a synthetic stretchy chemical fibre known for its exceptional elasticity. It exhibits properties similar to rubber, but is more solid and significantly more durable. Possessing viscosity of up to 1,000,000 mPas, the entire process requires a short dwelling time and is carried out under nitrogen (N₂) because the medium reacts to oxygen. Maag pumps with their special inlet and seal design fulfils the necessary requirements of all stages.



GUM BASE

Processing of Gum bases (Elastomers, Resins, Waxes, Fats, Emulsifiers, Fillers and Antioxidants) involves several stages such as melting of the gum base, mixing other ingredients and rolling of finished gum. Here, Maag pumps typically serve, as Transfer pumps or as Booster pumps in each stage.



VINYL ALCOHOL

The production of Ethylene vinyl alcohol copolymer (EVOH) is a two-step process of polymerization and saponification. Ethylene and vinyl acetate are polymerized using an initiator/activator complex. Maag pumps serve as a transfer pumps for all stages in the process.



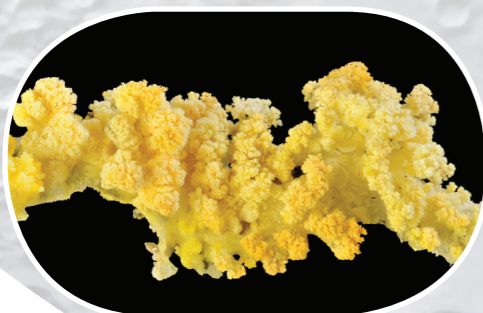
HOT MELT

For Hot melt adhesives used primarily for packaging, textiles, labels, tapes, pressure sensitive applications and other disposable products like stamps, Maag provides Metering/Transfer/Loading pumps or Booster pumps. For instance, in front of a spray nozzle.



LUBRICATION

Maag offers customized solutions with special bearings, special sealing designs for applications such as Grease lubrication, lubrication by liquid oil or atomized oil (oil mist), or even pressurized pure oil lubrication to meet adverse requirements in terms of pressure, viscosity and temperature.



MOLTEN SULFUR

Its production is ever increasing in refineries, natural gas plants, sulphuric acid plants, chemical production such as rubber additives or even in food products. It is also rapidly reaching new industries. Hence, safe handling of molten sulfur and the associated hydrogen sulfide emissions is becoming critical. Maag pumps usually aid as a High Temperature transfer pumps for such precarious applications.



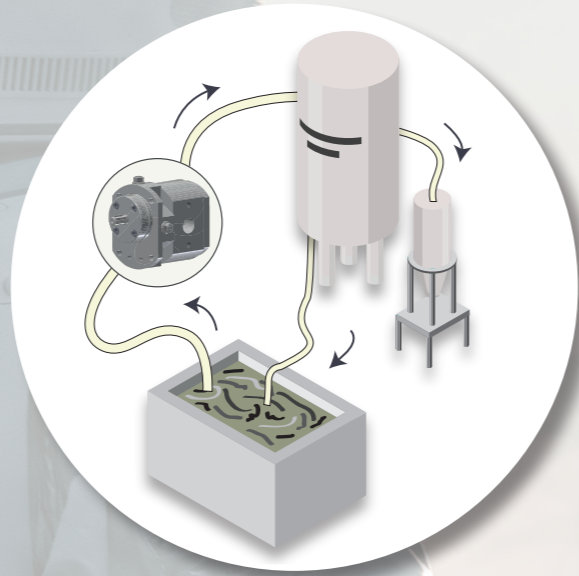
AUTOMOTIVE

Maag has a dedicated pump portfolio for the lubrication of the turbines and systems which require suitable pumps to reach high pressures in wide range of temperature environment.

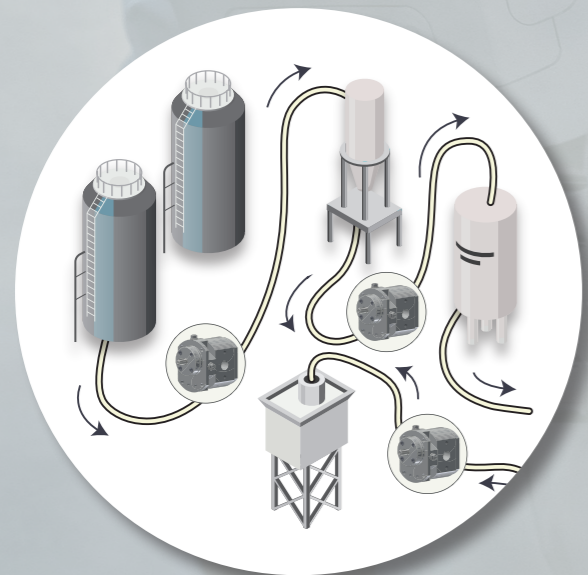
APPLICATION AT SITE



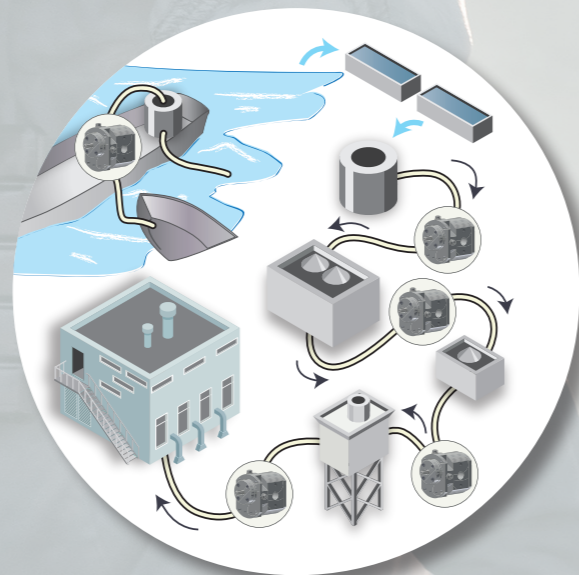
Unloading from truck to storage silos for various product range



Extraction from the container baths to the purifiers



Loading the storage silos from different phases of production



Unloading from the marine tankers to the process areas

OUR PROMISE TO YOU

Technology:

Maag is known worldwide as a pioneer and technology leader in the development and manufacturing of gear pump systems and solutions. Maag has always focused on the keeping its technology up-to-date and tailor it to meet the needs of individual customers.

We promise to go beyond your expectations in this regards, yet again with this F-series.



Innovation:

The result of our values and aspiration for customer satisfaction, made our new F-series come alive. We are confident that the new optimized design, materials used, opens new doors in the application ranges.

We promise that this innovation takes the flexibility and maintenance to the next level and ease the efforts put in by the customer in a pump's lifetime.



Quality:

Our customer satisfaction has been our top-most priority. Hence, we dedicate a major part of our resources in maintaining and enhancing the quality time-to-time.

We promise the same or even better standards of quality with this new F-series.



YOUR GLOBAL PARTNER

Benefits for the customer

Maag external gear pumps are reliable in Chemical, Petrochemical and Lubrication (Pharma and food) industries:

- A specific flexible and special pump design ensures a constant product flow with constant filling rate. This leads to a smaller pump size and price advantages.
- We focus on designing pumps and solutions with the highest price-to-performance ratio, in the most demanding applications.
- Our broader range of alternatives provides a higher life span for the pump and high performance on each application.
- The entire in-house manufacturing, reflects on the high quality of each component of our pump.
- Our extensive network of subsidiaries around the globe provides dedicated service activities with a team of experts and engineers.



For detailed information
please find our datasheets
and brochures on
www.maag.com/en/brochures