



Mahr

Mahr Metering Systems

Gear Metering Pumps – Precision with the highest quality

Wide range of applications for the most precise requirements

This is the definition of Mahr Metering Systems gear metering pumps. They also ensure reliable production and consistently high quality in your company.

Metered **precisely to the μ**

Mahr gear metering pumps are known for their high precision, strong durability against pressure and temperature as well as excellent wear and corrosion resistance. Since the first pump was developed in 1948, the pumps have undergone continuous improvement and development. The result is the development of a comprehensive product portfolio, which now can be found in many diverse branches of industry.

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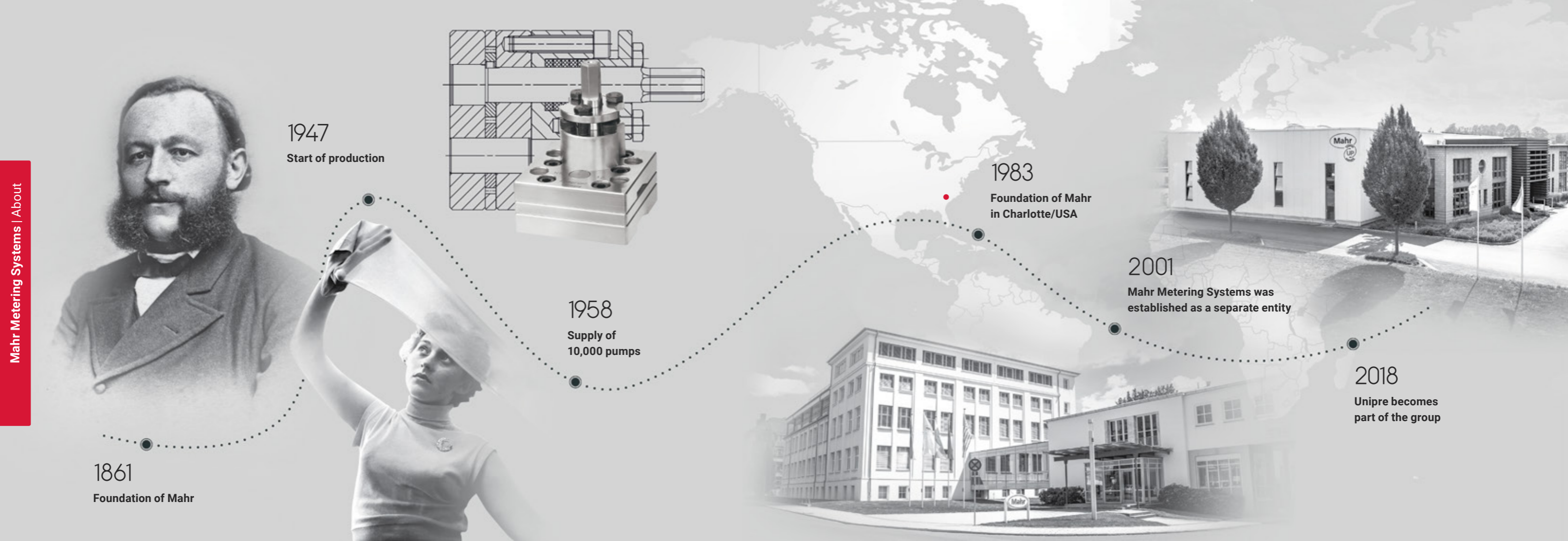
Materials &
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Test Stands



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1861
Foundation of Mahr

1947
Start of production

1958
Supply of
10,000 pumps

1983
Foundation of Mahr
in Charlotte/USA

2001
Mahr Metering Systems was
established as a separate entity

2018
Unipre becomes
part of the group

Mahr Metering Systems | History

Pioneer for precise pumps

In the mid-1930s, nylon and perlon fibers were invented almost simultaneously on both sides of the Atlantic. It was immediately a resounding success – especially in the production of women’s stockings.

The inventor of the perlon fiber, Paul Schlack, needed precise pumps to be able to produce these fibers. An essential component of these pumps were gears – the then specialty of Mahr’s Göttingen subsidiary *Feinprüf*, because this was where master gears were manufactured. And so, in the beginning of the economic miracle, the company became the producer of spinning pumps, which to this day remain the most important components of a spinning plant in the production of synthetic fibers today.

As early as 1952, 45 million nylons were produced with *Feinprüf* pumps and 3 years later the number had more than doubled – a real success story.

By 1958, *Feinprüf* had delivered almost 10,000 single spinning pumps. Later, the *Feinprüf* portfolio expanded to include a wide variety of multiple pumps, pump test stands, as well as feed pumps and pressure pumps. Sales increased steadily as more and more applications for synthetic fibers emerged worldwide.

In the early 1980s, *Feinpruef* Corporation was founded in Charlotte, USA, to serve the rapidly growing American market. A decade later, the company found its way into the Asian market – having recognized its huge potential at an early stage. The first order from China included a plant with several hundred planetary gear pumps, which *Feinprüf* supplied complete with spinning block, motor and control system. Countless orders from Asia followed – until today. The year 2001 saw the spin-off of the “*Feinprüf* Spinning Pumps” business unit, which has since become an independent corporation now known as “Mahr Metering Systems”.

Mahr Metering Systems | Company

Keeping everything flowing

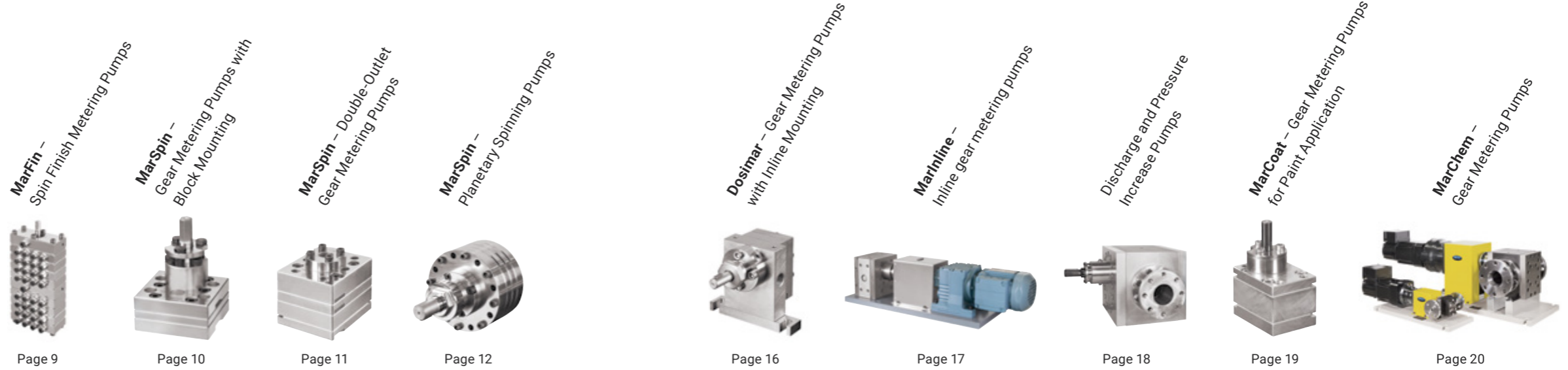
Hidden in the background and as precise as Swiss clockwork, *Feinpruef* gear pumps from Mahr Metering Systems deliver the substances from which the finest fibers are made. They deliver filaments of perfectly consistent thickness with precision down to the last thousandth of a millimeter over hundreds of kilometers of thread. Furthermore, they precisely and continuously meter the polymer melt to ensure that the best quality is delivered to the bobbin.

The gear metering pumps from Mahr can be used wherever pumpable viscous liquids have to be metered. Thus, the number of applications is almost limitless. Today, they meter hot melt adhesives and are used in the production of hollow fibers for dialysis filters or cable sheathing in the electrical industry.

In addition, the pumps produce technical yarns for various industries such as aerospace and automotive. These yarns are used in car tires, V-belts, textile roofing or airbag materials, to name just a few applications.

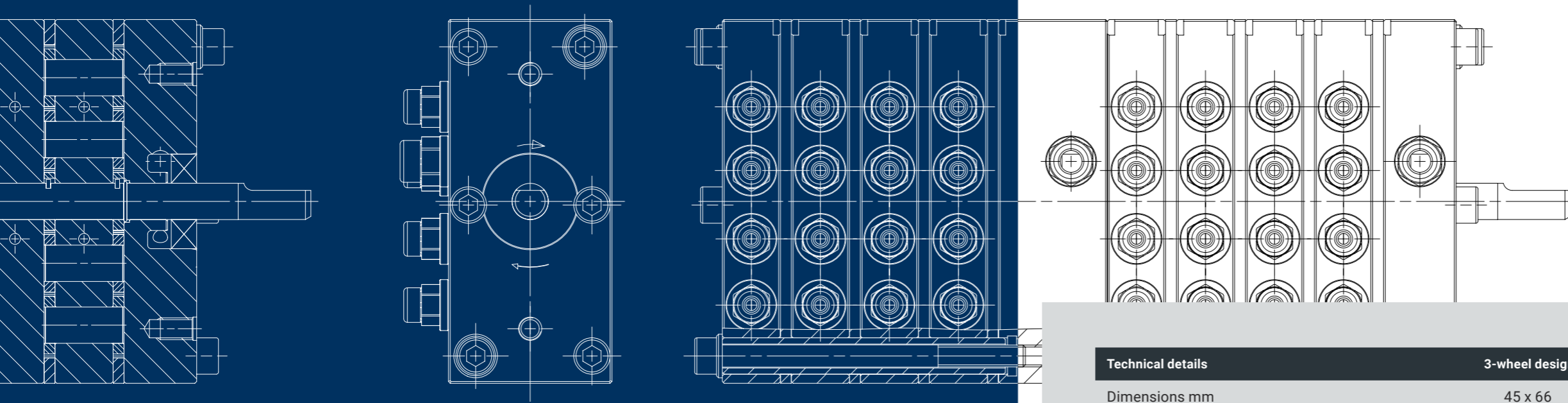
Also important for the product portfolio of Mahr Metering Systems are meter mix dispense machines for various industrial applications. For this reason, the company Unipre was acquired to further develop this new product area and to open up new fields of application. Whether spraying, casting, bonding or special material processing methods – Mahr Unipre, as part of the Mahr Group, is considered a competent partner for meter mix dispense technology.

Fields of industries & applications



	MarFin - Spin Finish Metering Pumps	MarSpin - Gear Metering Pumps with Block Mounting	MarSpin - Double-Outlet Gear Metering Pumps	MarSpin - Planetary Spinning Pumps	Dosimar - Gear Metering Pumps with Inline Mounting	Marhline - Inline gear metering pumps	Discharge and Pressure Increase Pumps	MarCoat - Gear Metering Pumps for Paint Application	MarChem - Gear Metering Pumps
Industries									
Automotive								●	
Chemicals					●	●	●	●	●
Composites									●
Fibers	●	●	●	●	●		●		
Adhesives		●	●	●	●				
Plastics						●			
Engineering	●	●			●				
Packaging					●				
Applications									
Coating			●	●					●
Composites		●			●				●
Pressure Increase		●				●	●		●
Extrusion		●				●	●		●
Fibers and Filaments		●	●	●	●	●	●		●
Liquid Metering	●	●	●	●	●			●	●
Film Lamination					●				
Foil Extrusion						●	●		
Spin Finish Process	●								
Adhesive Application		●	●	●	●				

Gear Metering Pumps Product Overview



Gear Metering Pumps | Spin Finish Process

MarFin – Spin Finish Metering Pumps

Liquids like antistatic finish, adhesive additives or other additives can avoid fiber breaks or electrostatic charging during the fast spinning process. The fibers get a better elasticity as well as better properties for the further processing. MarFin meter spin finish very precisely, which ensures exact metering of each feed stream. Furthermore, MarFin pumps currently are being applied to more applications for metering low-viscosity media such as water, organic solvents, perfume and oils.



MarFin
Spin Finish Metering
Pumps with 32 outlets



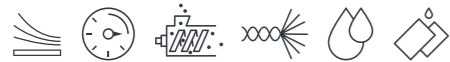
Technical details	3-wheel design	5-wheel design
Dimensions mm	45 x 66	45 x 100
Flow cc/rev	0.015 - 2.4	0.015 - 2.4
Number of outlets	1 - 8	4 - 32
Counter pressure bar (max)	0.2	0.2
in special design bar (max)	5	5

MarSpin – Gear Metering Pumps with Block Mounting

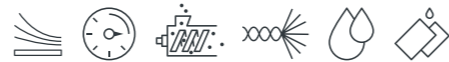
This range of gear metering pumps was originally designed for the spinning of finest filaments – the typical first generation spinning pump. As a “real” spinning pump nowadays, this design is only used for very special applications like producing of aramide and carbon fibers. For all the other kinds of industries and applications this design is typically used as a standard metering pump with almost no limits.



MarSpin
single-port gear metering pump
with extended drive shaft



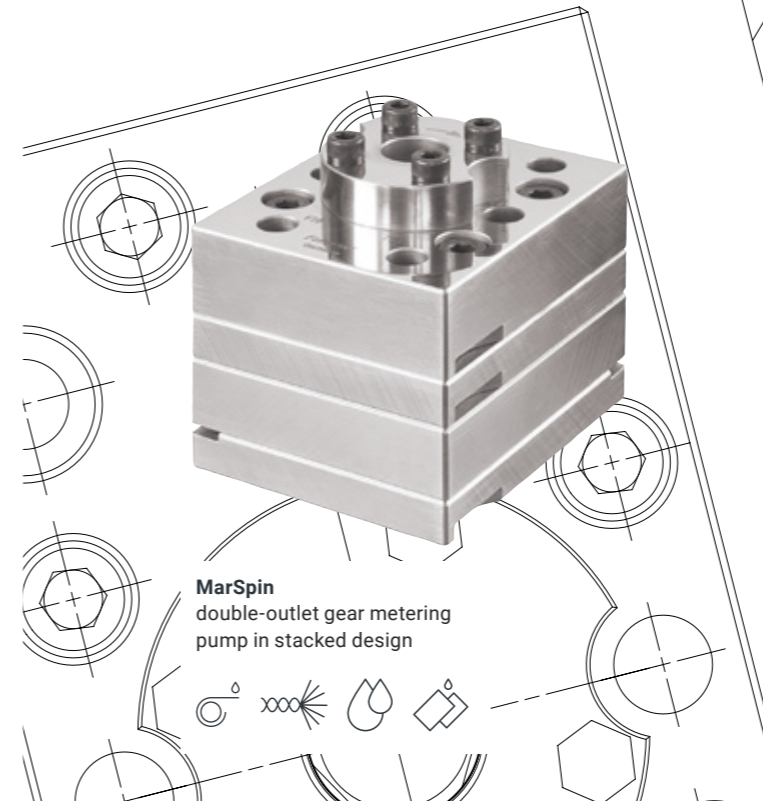
MarSpin
single-port gear metering pump with
drive plug high pressure design



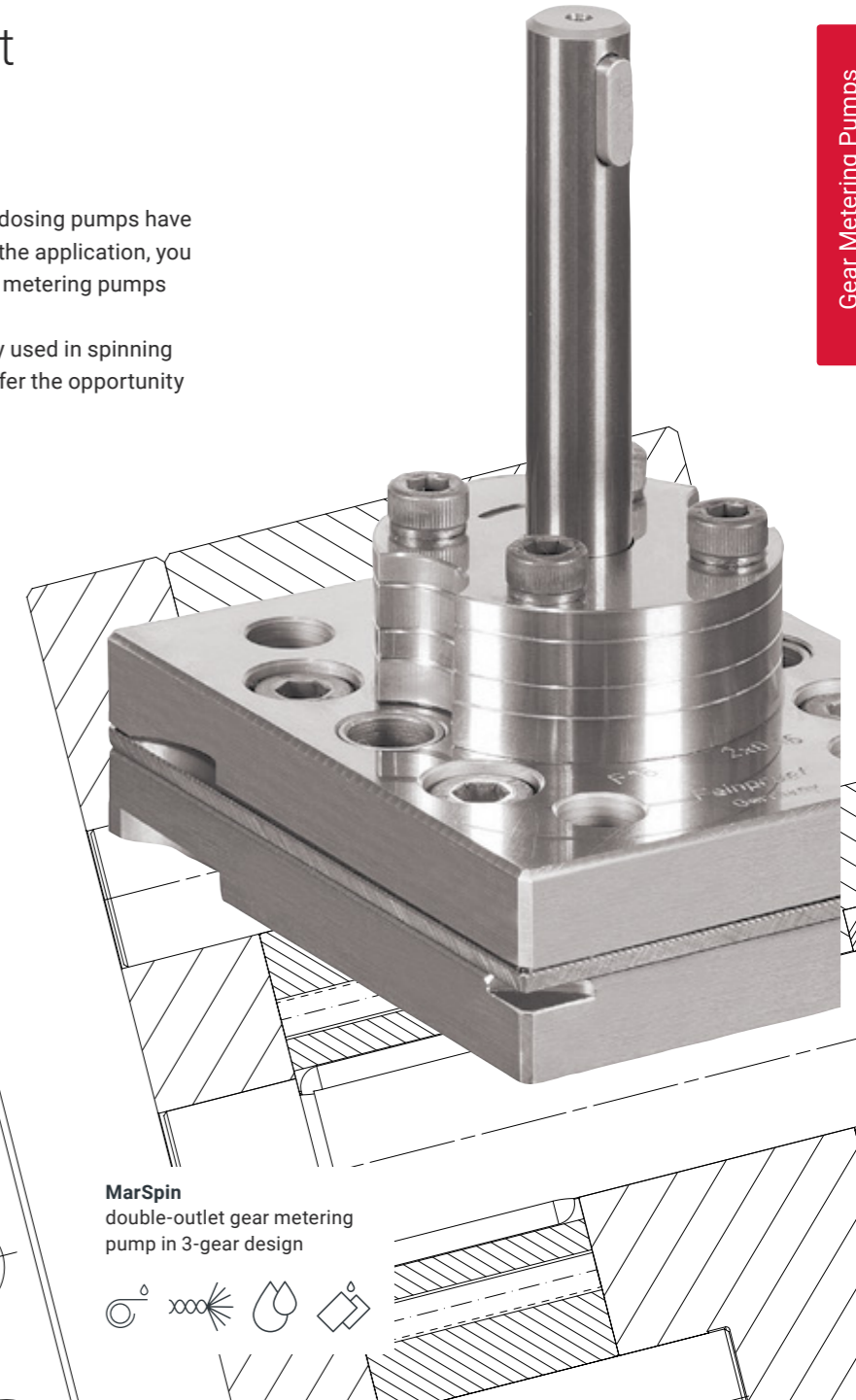
MarSpin – Double-Outlet Gear Metering Pumps

Turning one into two: The classic single-gear metering dosing pumps have evolved into double gear dosing pumps. Depending on the application, you can choose between two different versions: three-gear metering pumps with one housing level or stacked design in two layers.

The double-gear metering pumps from Mahr are mainly used in spinning and asheseive technology. With a small footprint they offer the opportunity to produce two flow rates by using only one drive.



MarSpin
double-outlet gear metering
pump in stacked design



MarSpin
double-outlet gear metering
pump in 3-gear design

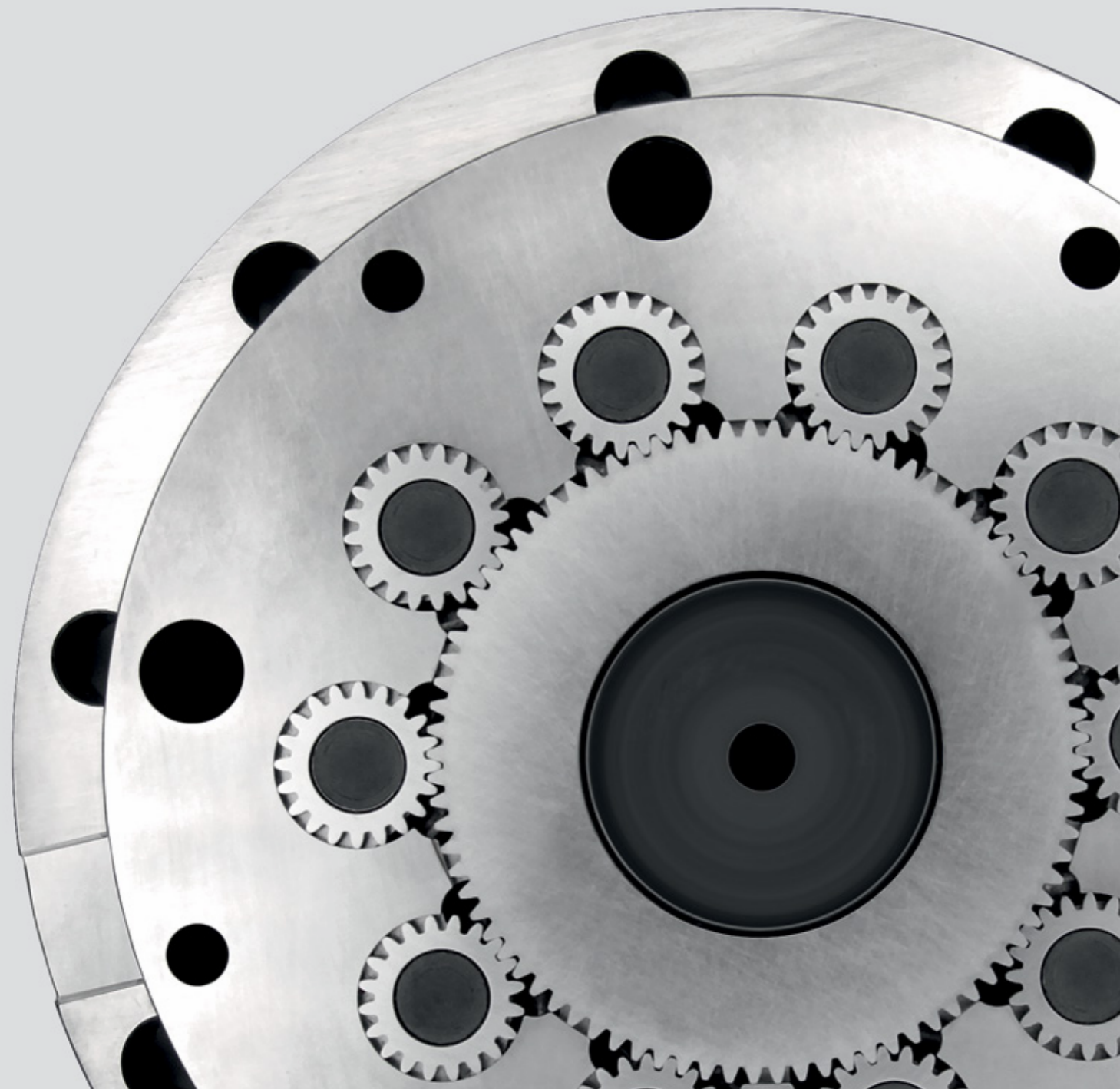


Technical details

Dimensions mm	66 x 70	80 x 122	155 x 200
Flow cc/rev	0.08 - 6	6 - 70	70 - 250

Technical details

	Stacked design			3-gear design			
Dimensions mm	66 x 70	80 x 122	88 x 132	78 x 95	80 x 145	100 x 180	160 x 280
Flow cc/rev	0.1 - 3.3	3 - 30	3 - 30	0.1 - 6	10 - 30	13 - 50	50 - 150
Counter pressure bar (max)	500	500	500	500	350	300	300

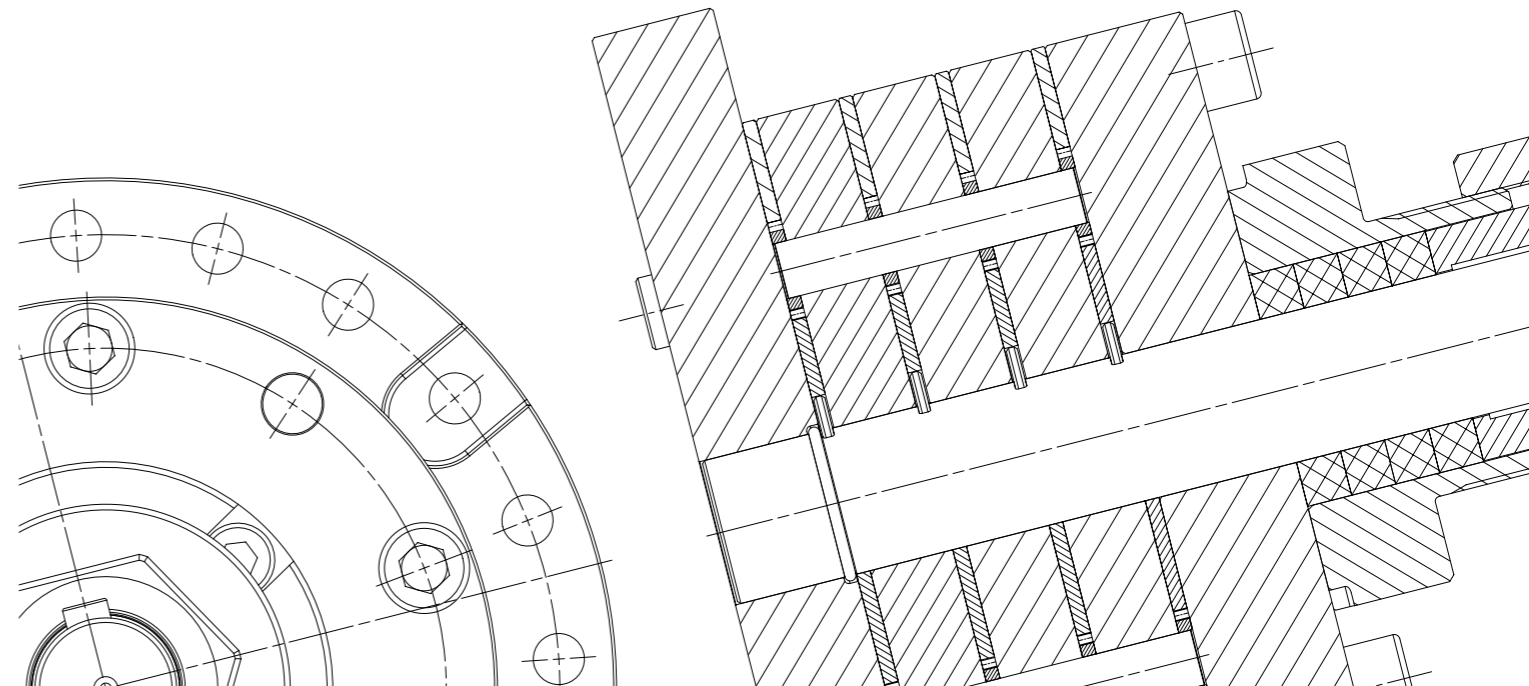


Gear Metering Pumps | Filament Production

MarSpin – Planetary Spinning Pumps

Planetary spinning pumps represent the heart of a spinning plant. They are used in large quantities. Tight production tolerances of the pumps, reliability and long life time are the key words for a high quality yarn and customer satisfaction. *Feinpruef* spinning pumps of Mahr Metering Systems are guaranteed to withstand toughest process conditions to finely spin and deliver a first class quality yarn to the winder.

The special feature of planetary spinning pumps is the dosing of a material flow into up to 64 equal individual streams. These pumps are not only used for production of many different synthetic fibers and yarn, such as micro fiber textiles, tights, spandex, protective clothing and even astronautic overalls, but they are also used for applications for dosing glue, adhesives and almost all kind of fluids.



MarSpin
Planetary Spinning Pumps



Technical details								
Dimensions ϕ in mm	90	100	120	130	138	146	160	180
Flow cc/rev	0.3 - 4.8	0.1 - 4.8	0.2 - 6	6 - 12	0.3 - 4.8	0.3 - 6	10 - 30	0.3 - 2.4
Outlets	3 - 8	2 - 8	2 - 12	2 - 16	8 - 16	8 - 32	2 - 4	24 - 64
Counter pressure bar (max)	400	400	400	400	400	400	500	300

Precise as Swiss clockwork

The gear pump plays a key role in the production of high-quality synthetic fibers. It continuously meters polymer melt at temperatures of around 300 degrees Celsius. This is forced, at up to 700 bar, through filament-forming elements such as nozzles with ultra-fine capillaries. Winding machines wind the finished filaments at speeds of around 10,000 meters per minute.

The pumps convince with highest precision and resistance to wear, corrosion and temperature. They meet all requirements of polymer melt, as well as wet and dry spinning technology. The spinning pumps not only produce synthetic fibers for the textile industry – the

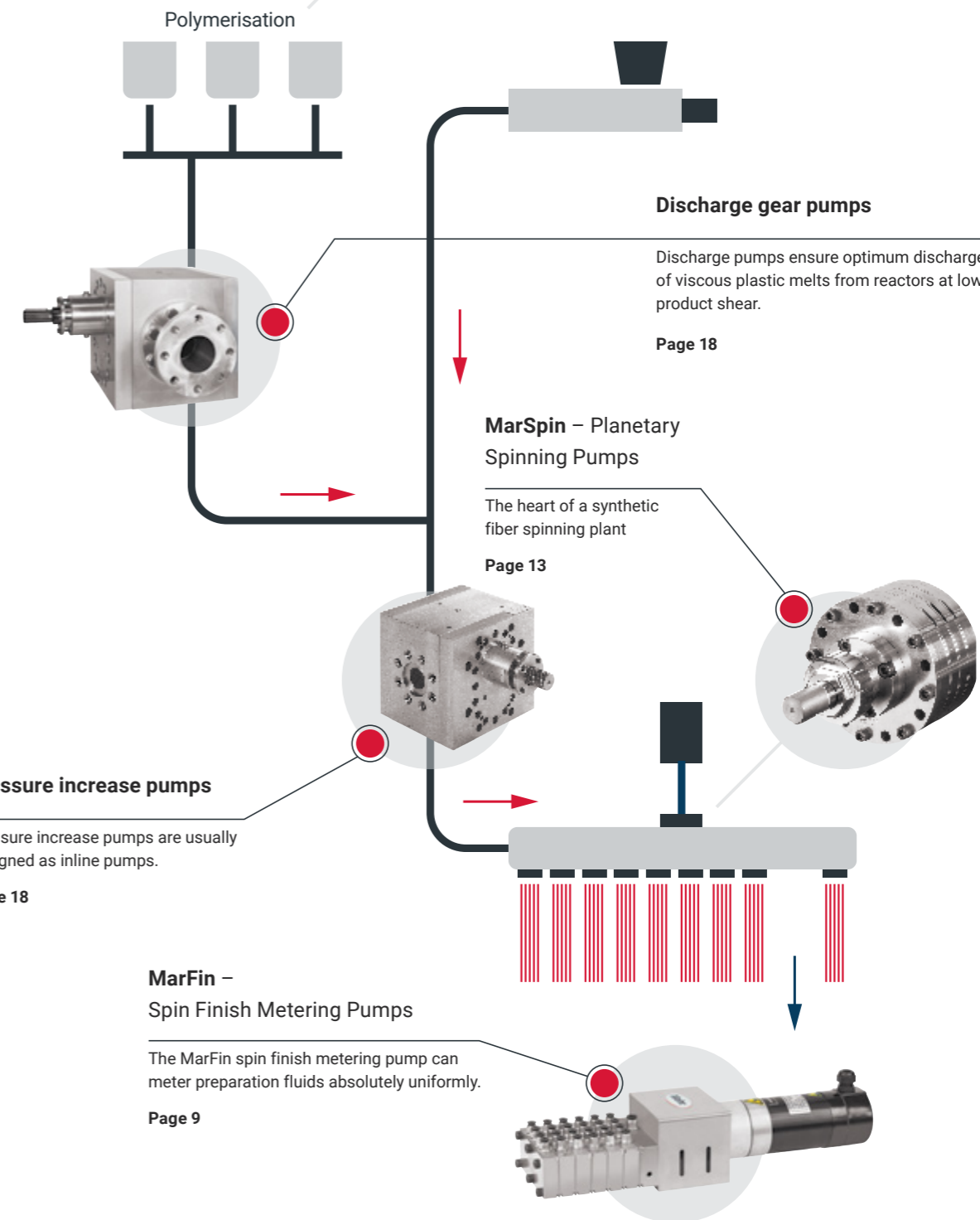
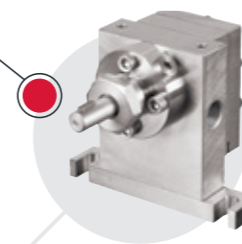
yarns are also used for the production of nonwovens and are also used in medical technology. In addition, another area of application is the production of technical yarns: for example, a piece of fiber produced by Mahr can be found in some car tires, seat belts, V-belts, airbag fabrics or protective and space suits.

Mahr offers a comprehensive product portfolio of these high-precision gear metering pumps. On request, we manufacture customized pumps to the customer's specifications in order to guarantee a design for the individual production process of fibers.

Dosimar – Gear Metering Pumps with Inline Mounting

The pumps of the Dosimar series ensure the exact metering of various additives.

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Discharge gear pumps

Discharge pumps ensure optimum discharge of viscous plastic melts from reactors at low product shear.

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MarSpin – Planetary Spinning Pumps

The heart of a synthetic fiber spinning plant

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Pressure increase pumps

Pressure increase pumps are usually designed as inline pumps.

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MarFin – Spin Finish Metering Pumps

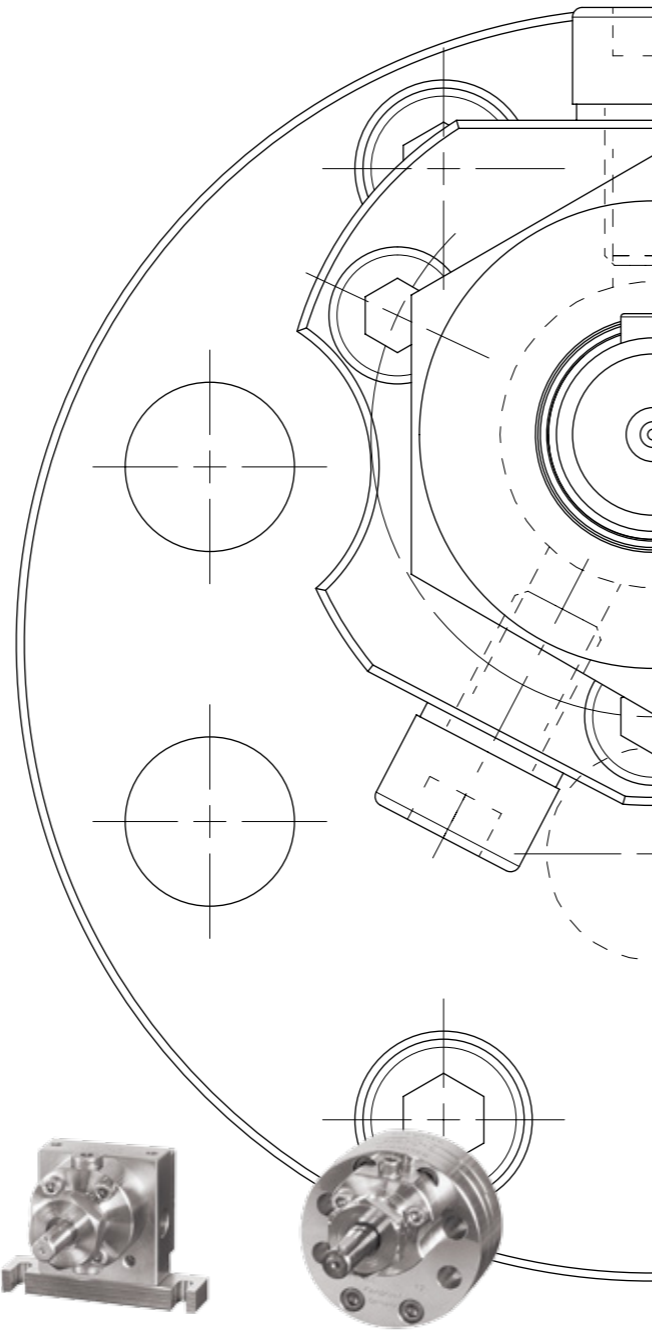
The MarFin spin finish metering pump can meter preparation fluids absolutely uniformly.

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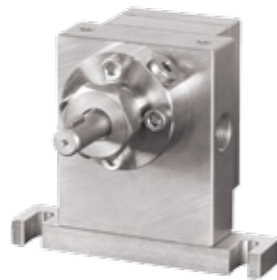
Dosimar – Gear Metering Pumps with Inline Mounting

Thanks to its lateral drilling, the Dosimar gear metering pump can be integrated directly into a wide variety of installation situations. It is often installed in metering machines, for example. The so-called mounting gib allows easy mounting of the pump in the machine.

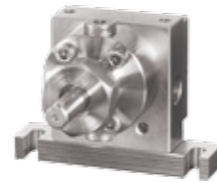
In addition to dosing polyurethane components (isocyanates and polyols), various resins, pigments and other liquids, this pump series is also used in the production of various fibres, such as aramid and PAN fibres. In addition, this pump meters additives in the polymerization process.



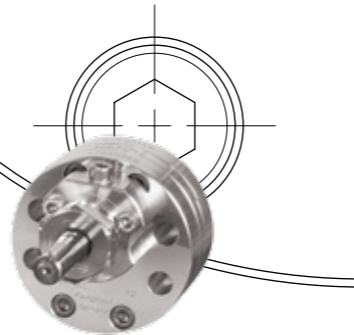
Dosimar
large design



Dosimar
medium design



Dosimar
small design

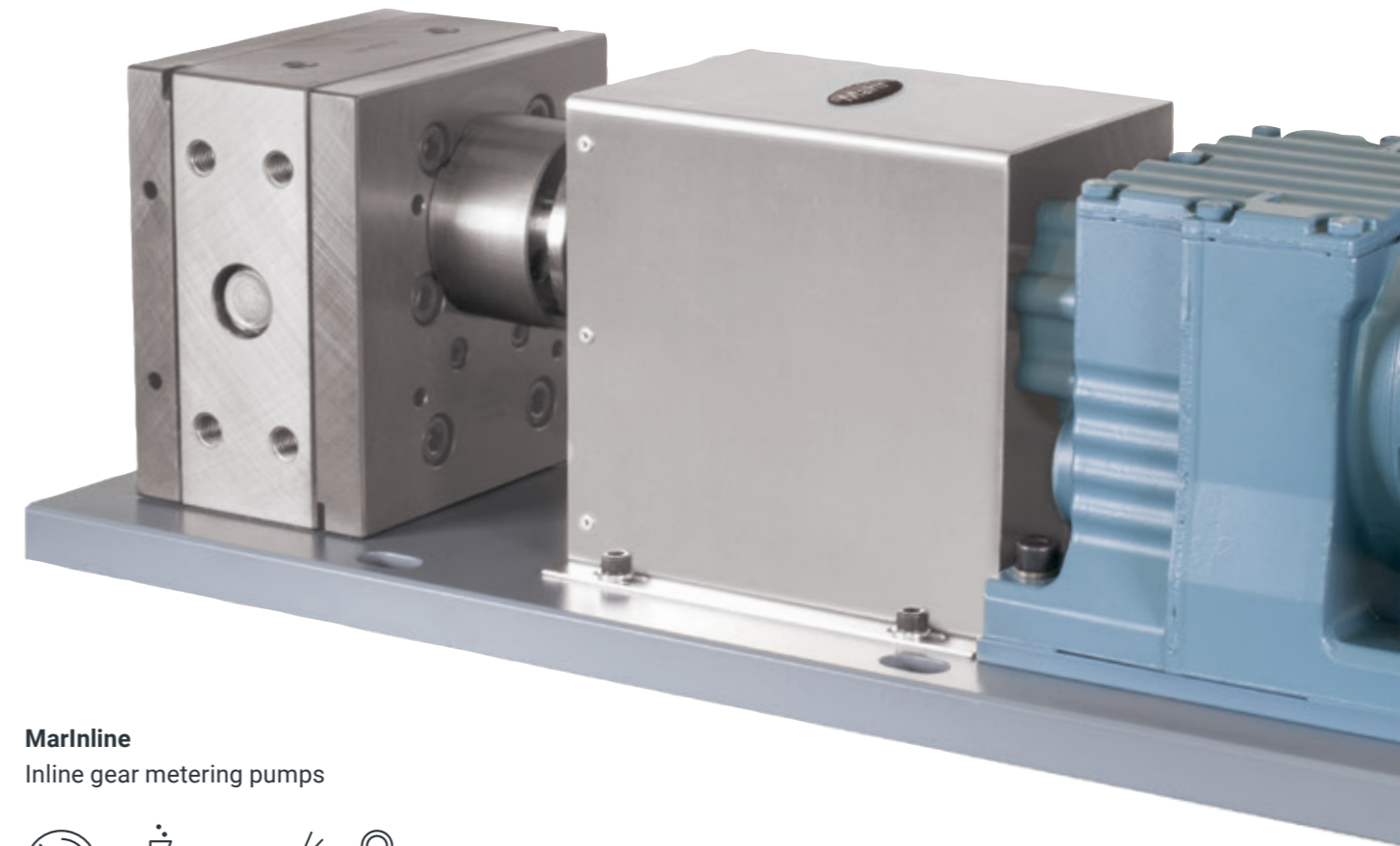


Dosimar
round design

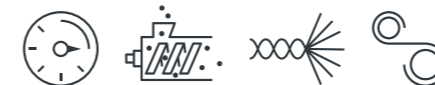


MarInline – Inline gear metering pumps

Inline gear metering pumps are single stream pumps and directly installed in the product lines, eliminating the need for an additional pump block. The design allows the medium to pass the pump without any flow direction changes. The inline gear metering pumps can be used for all applications. Especially under high pressure ratios, they perform with excellent process stability.



MarInline
Inline gear metering pumps



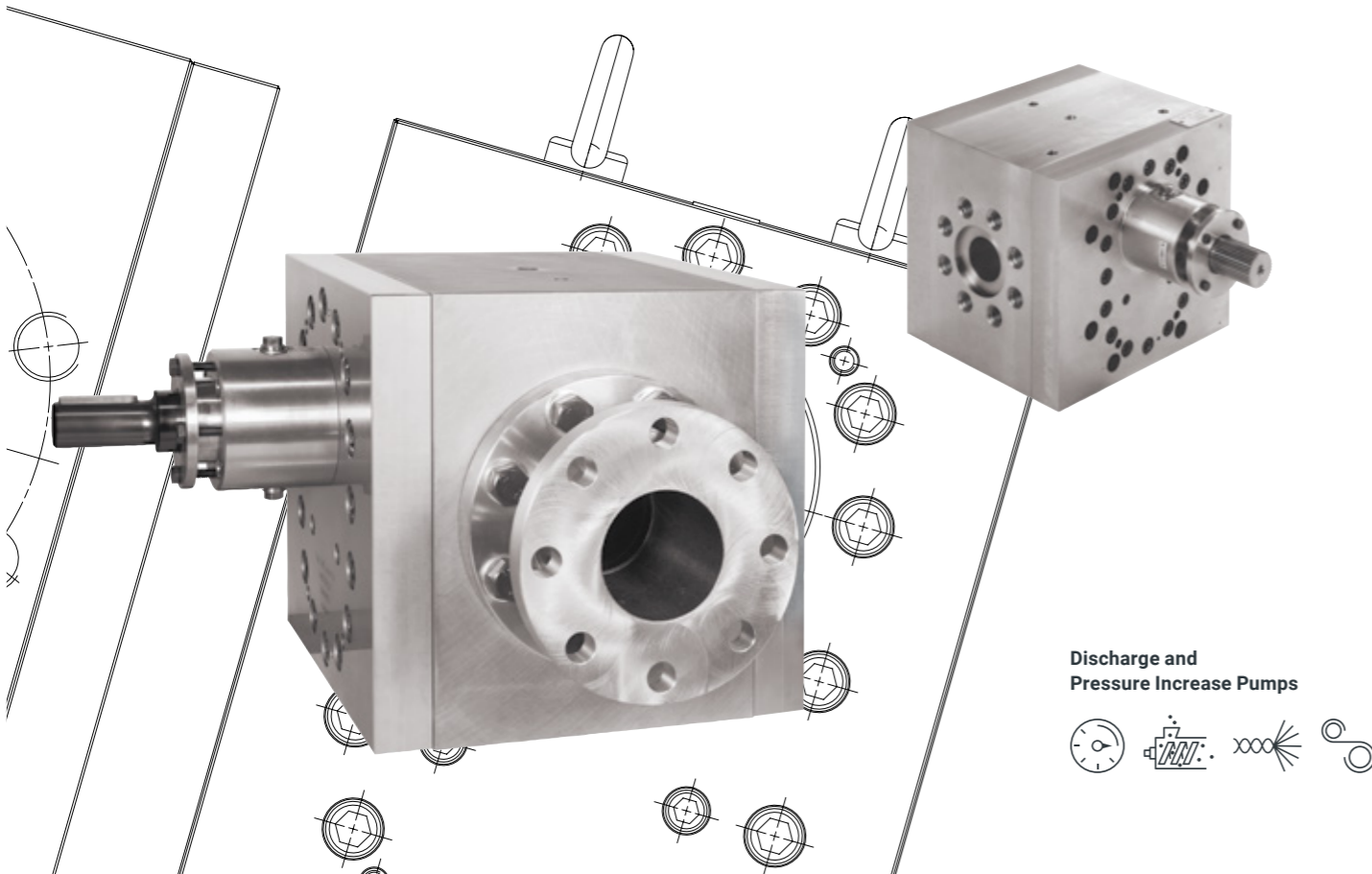
Technical details						
Dimensions mm	55 x 67.5	75 x 102	96 x 125	100 x 152	245 x 260	ø 79
Flow cc/rev	0.02 - 3	0.08 - 6	6 - 50	70 - 100	150 - 200	0.08 - 6
Counter pressure bar (max)	30	100	100	100	100	100

Technical details	
Flow cc/rev	0.16 - 3000
Counter pressure bar (max)	700

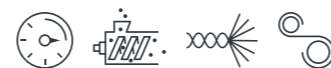
Discharge and Pressure Increase Pumps

Discharge pumps with low product shearing ensure an optimal discharge of viscous polymer melts of reactors. The discharge pumps can be supplied both liquid and electrically heated. Booster pumps are usually treated as an inline pump. They are mainly used after an extruder or a discharge pump. They create appropriate filling pressure for the following pumps or tools.

These pumps are also used as dosing pumps and ensure a smooth and gentle dosing and conveying polymer melts in the production of foils, films, profiles, granulates etc. Booster pumps are unheated, heated electrically or available for liquid or steam heating.

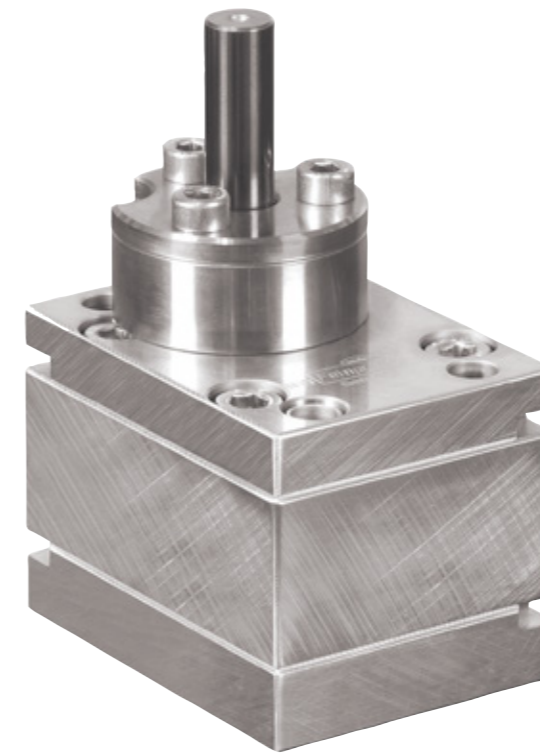


Discharge and Pressure Increase Pumps

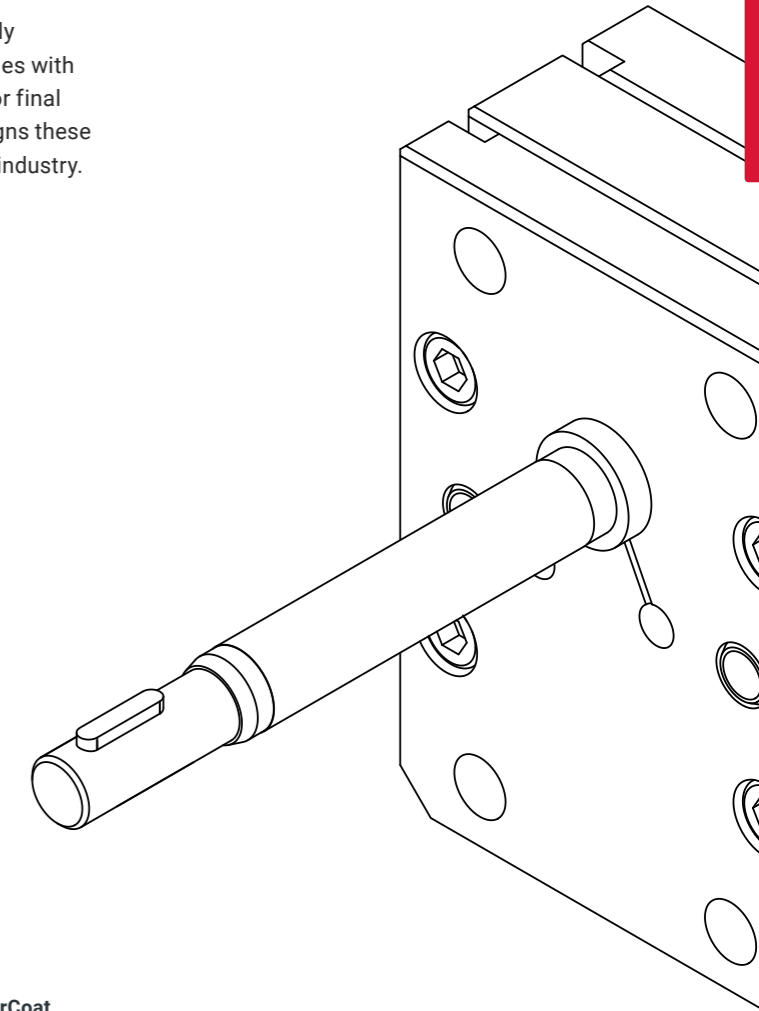


MarCoat – Gear Metering Pumps for Paint Application

With the MarCoat pump series, coatings and inks can be precisely metered. At the same time, MarCoat has very short cleaning cycles with the best purging results – regardless of whether color changes or final cleaning are involved. Due to different sizes and connection designs these pumps offer a wide range of mounting options for the whole paint industry. Also these pumps are best suitable for robot applications.



MarCoat Gear metering pump for robot paint application



Technical details

Flow cc/rev	100 - 3000
Counter pressure bar (max)	700

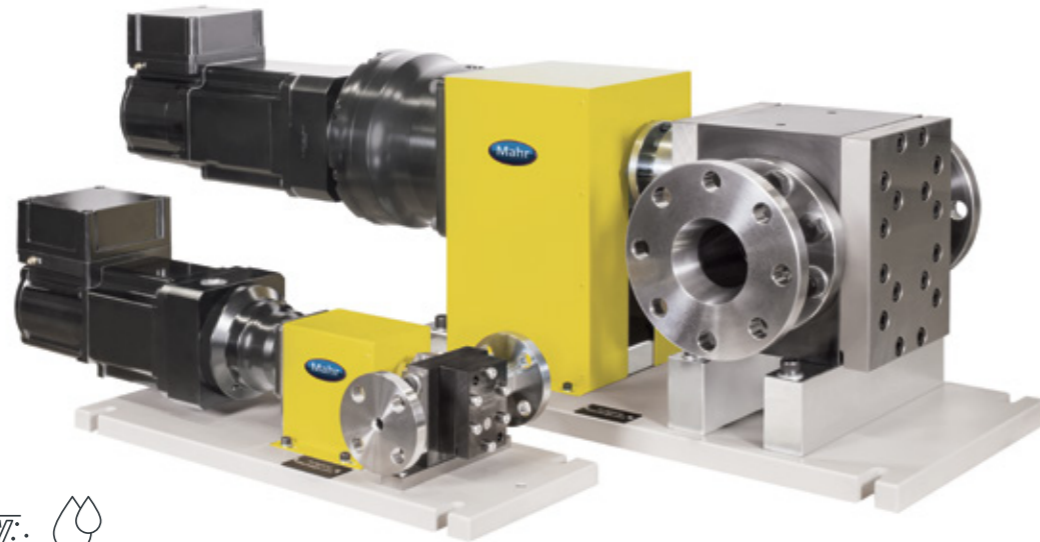
Technical details

Dimensions mm	48 x 64	45 x 77	56 x 71
Flow cc/rev	0.6 - 6	0.6 - 6	0.6 - 12
Counter pressure bar (max)	30	75	50

MarChem – Gear Metering Pumps

Precise and low pulsation metering of liquids – this is the need in many industries. For this purpose, Mahr provides gear metering pumps which stand apart due to their excellent efficiency even at low viscosity at a significant counter pressure and achieves low-shear metering of liquids. Years of experience as well as successful completion of various projects has resulted in an evolution from a bare pump to the development of a whole metering system.

By means of modern sensor technology, it is also possible to continuously monitor processing values of gear metering pumps like pressure, temperature, flow rate, leakage etc. Thus, production breakdowns can be prevented. This is because monitoring process parameters is not only common, but a must in many areas.



MarChem with
flanges and drive



Technical details

Flow cc/rev	0.01 - 3000
Speed range U/min	20 - 200
Viscosity mPas	0.5 - 100,000
Operating temperature	room temperature up to 400°C
Pump Material	in correlation to the metered liquids a variety of specialised steels and special materials are available
DLC coatings (others on request)	Diamond-Like Carbon (DLC) coating improves the wear resistancy
Medium to be pumped	all kind of liquids including corrosive and abrasive media (on request)

Gear metering pumps from Mahr Metering Systems are high-precision positive dis- placement pumps for the exact metering of liquid media.

Wide range of applications for the highest requirements

The entire pump portfolio cannot be completely listed due to the large number of available designs. The same applies to the fields of application. Please contact us!

Gear metering pump with drive

The pump drive connection to the drive is available as shaft or plug type. The drive units are designed according to the oper:



Drive unit with gear metering pump type 300 cc / rev.

Gear pump with drive consist of:

Base plate

- with connection block

Coupling

- curved teeth coupling
- cardan shaft
- all steel coupling
- magnetic coupling

Motors

- asynchronous geared motor
- synchronous geared motor
- servo geared motor

The drive units are designed according to the operating conditions.

Sealings

- gland packing
- radial shaft seal ring (optionally with barrier liquid)
- labyrinth seal
- mechanical seal in all variants
- hermetically sealed because of magnetic coupling

Tempering of gear pumps

Electrical heating, liquid heating and cooling are available.

Explosion-proof

Pump and drive unit design according to ATEX II2Gc can be offered.

Further features

The dosing pumps can be supplied with additional equipment according to requirements:

- speed control by inverter / servo controller
- pressure monitoring or control
- temperature monitoring or control
- flow monitoring or control
- stand-alone dosing station or dosing module prepared for inte-gration in machine environment
- communication to other machines or control systems

Available with different flange versions.

Focus on surfaces

Coating technologies take a significant key position in the development of new products. The various coating technologies increase the application possibilities of the base materials. Furthermore, a coating reduces friction, wear and corrosion. In principle, all named materials can be coated depending on the specification.

This also includes Diamond-Like Carbon (DLC), a diamond-like carbon coating. It improves the usage properties by:

- high surface hardness
- high wear protection
- smaller coefficient of friction
- better corrosion reduction to aggressive media
- higher chemical resistance / stability
- non-stick effect (reduced adhesion of polymers and other materials)
- high temperature firmness to 250°C
- excellent accuracy to size (no change of the high discharge accuracies)
- high economic efficiency through longer endurance and improvement of technological properties
- biocompatible, allows the use in the food industry and in the medical field

For all cases: additional accessories

To keep everything moving and the medium flowing in the desired paths, regular replacement of the seals is advisable. Mahr Metering Systems has a wide range of accessories available for this purpose, which reliably prevent the material from escaping.

Atex Directive 2014/34/EU

A version according to the Atex directive is available for the pump as well as for the drive.

Tempering of gear pump

Electrical heating, liquid heating and cooling are available.

Sealing systems for the gear pumps

- gland packing optionally with barrier liquid
- radial shaft seal ring optionally with barrier liquid
- labyrinth seal
- mechanical seal, single, double and optionally with sealing liquid
- magnetic coupling

The right material for every application

Material	Material properties	Field of application	Permissible operating temperature max.	Permissible cleaning temperature max.
E20	high chromium alloyed high grade tool steel with additions of vanadium, tungsten and molybdenum	• for larger flow rates from 30 cc/rev	400°C 750°F	500°C 930°F
F16	high tungsten, vanadium and chromium alloyed high speed steel	• extremely high wear resistant • exclusively produced made for Mahr	450°C 840°F	550°C 1020°F
F24	molybdenum, tungsten, vanadium and chromium alloyed high speed steel	• highly wear-resistant	450°C 840°F	550°C 1020°F
Hastelloy	acid-resistant nickel alloy, additions of molybdenum and chromium	• very good resistance especially to mineral and organic acids	250°C 480°F	300°C 570°F
N17	high chromium alloyed stainless steel, additions of nickel, molybdenum and titanium	• good resistance • good weldability • suitable for higher temperatures • suitable in food and pharmaceutical industry, apparatus and pipeline construction	300°C	400°C
N19	high chromium alloyed stainless steel, additions of molybdenum and vanadium	• optimal combination of resistance to wear and corrosion • for use with chemically aggressive media	180°C 356°F	200°C 392°F
N31	High chromium alloyed stainless steel, additions of molybdenum and vanadium Can be used in combination with Stellite S2.	• Very good resistance and polishability • suitable in food and pharmaceutical industries	250°C 480°F	300°C 570°F
Stellite S2	cobalt-based alloy with high chromium content and additions of tungsten and nickel Can be used in combination with N31.	• highly wear resistant • corrosion resistant	150°C depending on material combination	300°C depending on material combination
N33	High chromium alloyed stainless steel, additions of nickel, molybdenum and manganese Can be used in combination with N33-4.	• high degree of hardness with excellent corrosion resistance • for highly stressed components	200°C 392°F	220°C 428°F
N33-4	High chromium alloyed stainless steel, additives of nickel, molybdenum and manganese Can be used in combination with N33.	• high degree of hardness with good corrosion resistance • suitable for higher temperatures	350°C 665°F	450°C 840°F

Pumps on the test stand

Pumps are real endurance runners, working reliably in the background and doing their job day in and day out. For example, they can produce threads hundreds of kilometers long. To ensure that the quality is right in the long term, they should be subjected to regular flow checks.

MarCheck test stands can be used to test pumps with one to 72 outlets – including pumps from other manufacturers, provided that their dimensions and designs permit. A wide range of accessories and their ease of use make it possible to test different types of gear pumps with a minimum of effort. Thanks to clear and simple menu navigation, MarCheck is intuitive to use and can be operated either via the keyboard or the

touch interface. The automated weighing of the measuring points eliminates errors that can occur during manual testing. The integrated test oil cooling system also allows the test stand to be positioned close to production.

All parameters required for pump testing are stored in an integrated database and are thus available for every test procedure. Finally, the measurement results obtained are automatically stored and can be retrieved at any time. Data transfer to other application programs (PDF, Excel) is easily possible. And just in case, the test stand can be checked remotely via the RJ45 interface connection.



1-72 outlets
Number of pump outlets

5 Test pressures
Up to five sub. test pressures
in one test procedure

3-100 bar
Automatic test pressure
adjustment

Technical details

Number of Pump outlets	1-72 outlets with up to 200 ccm/rev flow rate
Testing	up to five sub. test pressures within one test procedure / (max. test pressure 100 bar, depending on pump type)
Pump inlet pressure	max. 2.5 bar, manually adjustable
Drive speed	frequency controlled / up to 200 min ⁻¹
Installation temperature	+5 - +30°C (at 85% humidity)

Pump contact pressure	force controlled from 15-50 kN
Automatic test pressure adjustment	3 to 100 bar
Test medium	silicone oil 500 mPas
Operation	via 21.5" panel PC; touch and manual input (keyboard / mouse)
Nominal electric power	12 KW
Weight	1600 kg

Making perfection measurable

MarCheck prepare - this is the pump test stand for spin finish metering pumps from Mahr. It can be operated intuitively either via keypad or by touch function on the user interface. Apart from a few manual operations when setting up the test specimen, the pump test stand works fully automatically according to the gravimetric measuring principle. Practical: Due to its compact design, the pump test stand is mobile, allowing easy relocation.

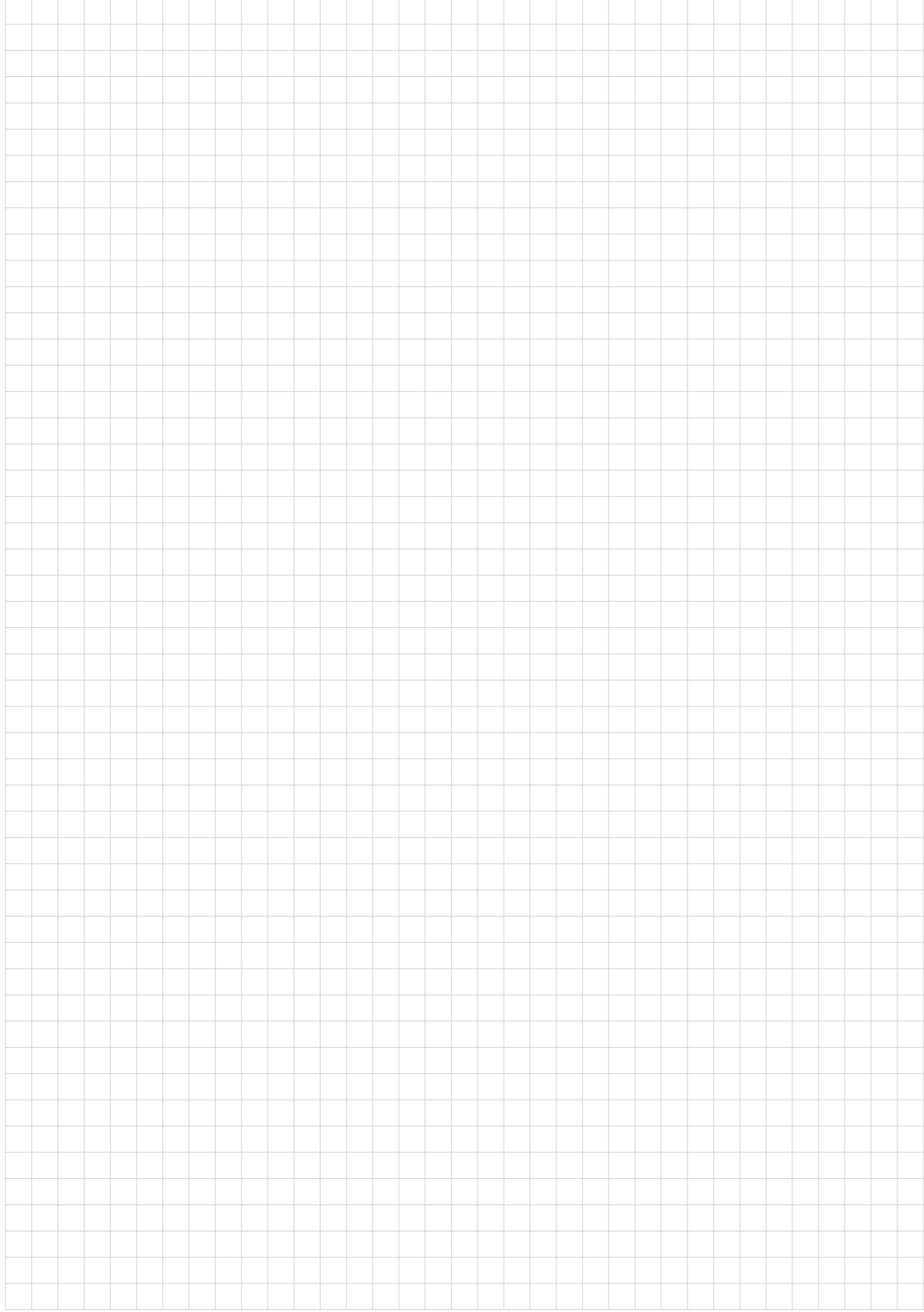
Important test parameters are stored in the integrated data-base and can be easily retrieved for each new test procedure. By entering tolerances, the evaluation takes place in real time – a detailed test report is included. After testing, the measurement results are automatically stored and are available for viewing at any time. Depending on your wishes or individual requirements, the measured values can be displayed in tabular or graphical form, and data can be easily transferred to other application programs (PDF, Excel).



Technical details

Testing	testing of preparation and multi-gear pumps with 1 to 32 pump outlets
Drive speed	frequency controlled / up to 60 min ⁻¹
Set-up temperature	+5 - +30°C (at 85% humidity)
LAN connection	for connection to a network

Test medium	bead breaking fluid 30 mPas
Operation	via 21.5" panel PC; touch and manual input (keyboard / mouse)
Nominal electrical power	0.6 KW
Weight	320 kg





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