

***Components and System Solutions
for High Purity, Semiconductors and
Critical Fluid Management***

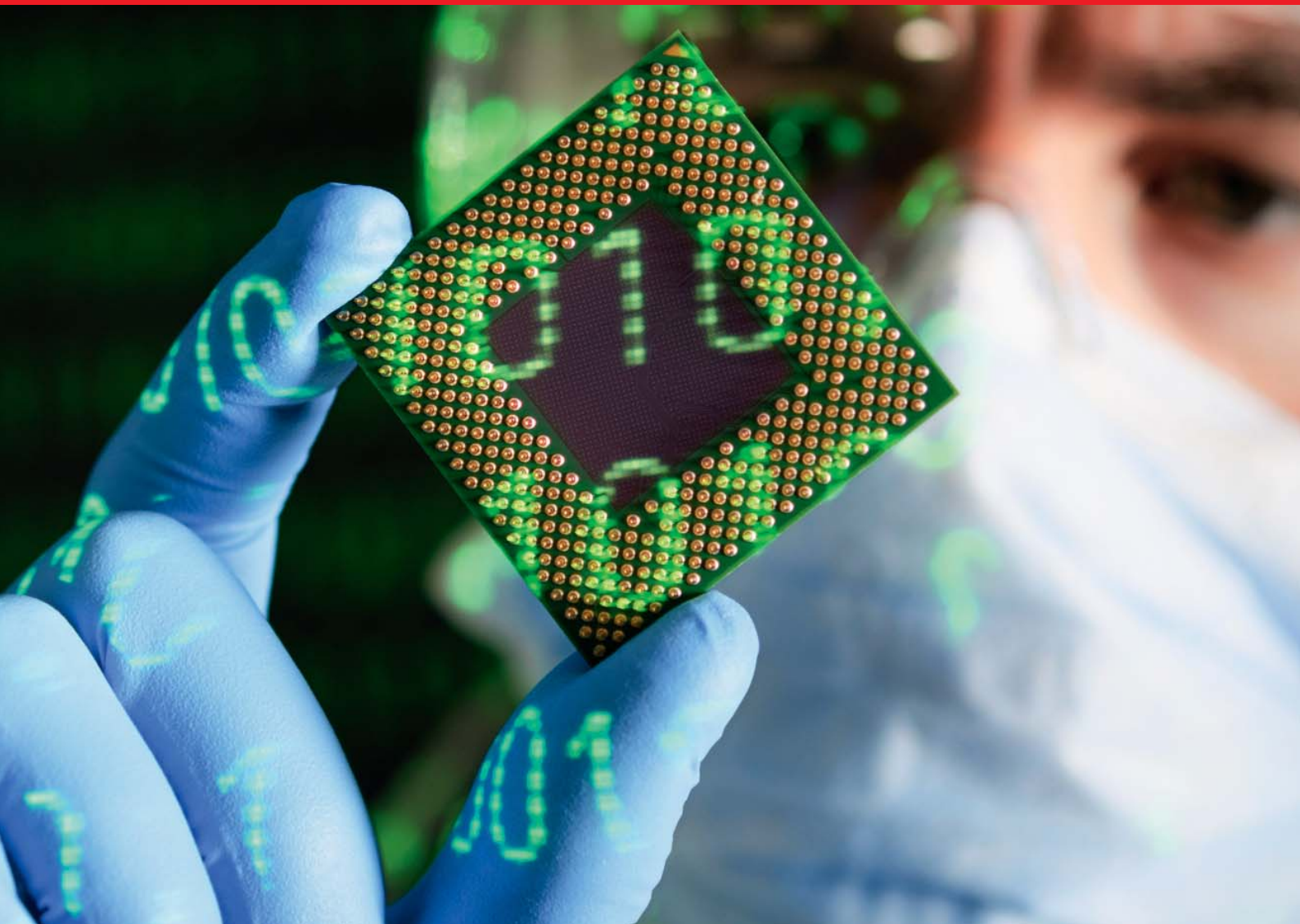
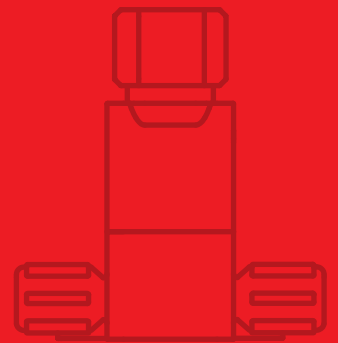




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From development and production to sales and service

Components and system solutions for High Purity, Semiconductors and Critical Fluid Management

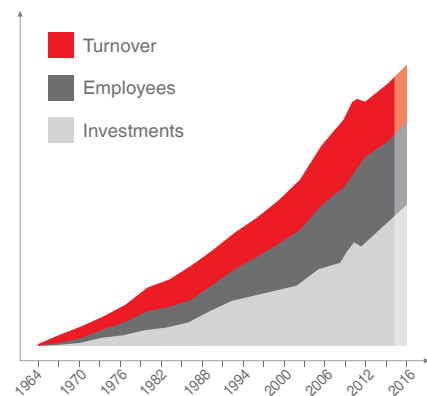
GEMÜ Group

1964
founded

over
1.500
employees worldwide

6
manufacturing sites

27
sales companies



GEMÜ company development

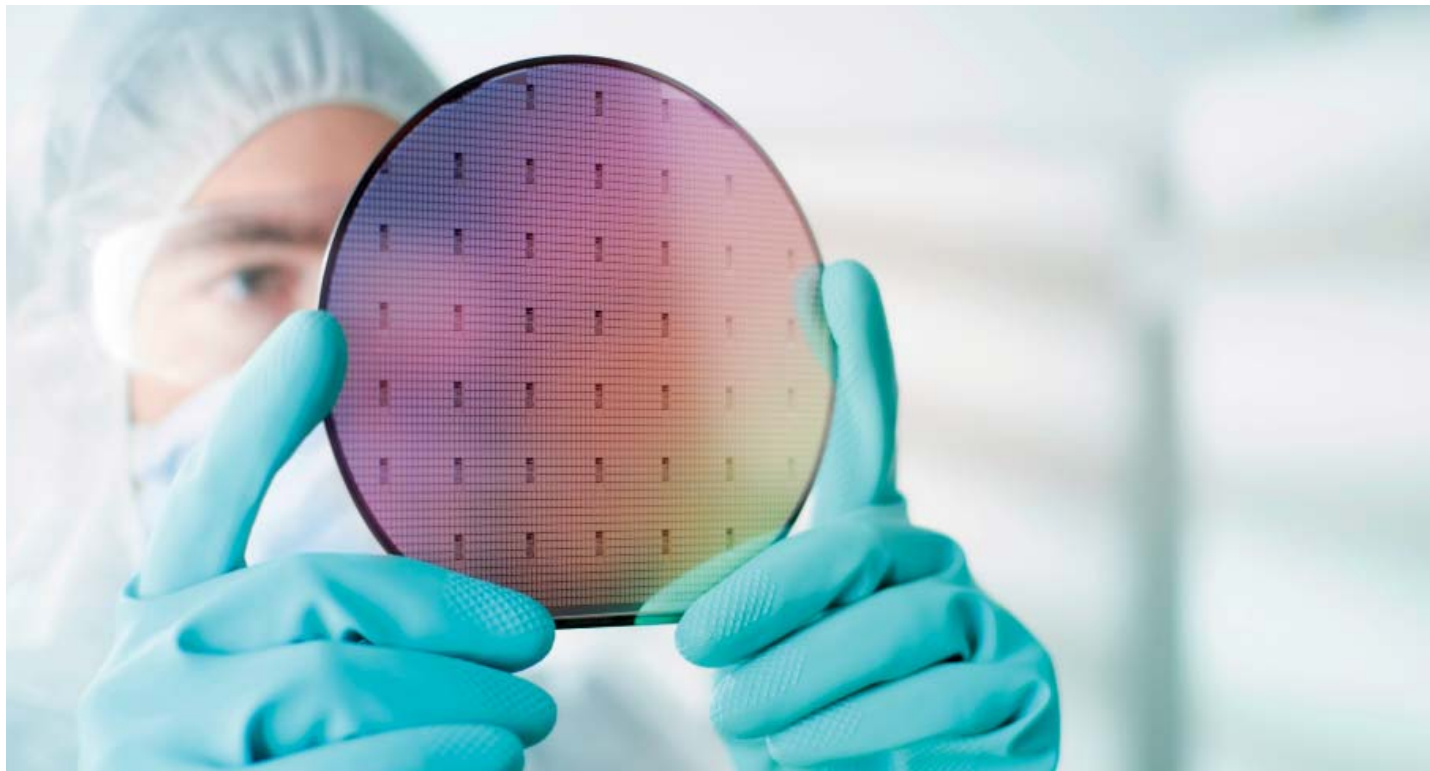
The GEMÜ Group is a leading manufacturer of valves, measurement and control systems employing over 1500 members of staff worldwide. With six manufacturing sites and 26 subsidiaries, as well as a large network of commercial partners, GEMÜ is now active in over 50 countries on all continents. GEMÜ is the world market leader for sterile valve applications in the pharmaceutical and biotechnology industries.

The GEMÜ range of services for complex system solutions

Valves, measurement and control systems from GEMÜ are used successfully in process engineering and allied fields of activity in the following industrial sectors:

- *Pharmaceutical, biotechnology and cosmetics industries*
- *Food and beverage industries*
- *Chemical industry and environmental systems*
- *Power generation*
- *Water treatment*
- *Processing industries*
- *Microelectronics and semiconductor industries*
- *Medical systems*

A broad based modular system and adapted automation components mean that individualised standard products and customised solutions can be combined to make over 400,000 product versions.



Valves, measurement and control systems for the semiconductor, microelectronics, solar and optoelectronics industries

GEMÜ has excellent references in connection with the use of valves in areas of application with purity requirements. GEMÜ products are developed specifically for process equipment, ultra pure chemical supply systems, ultra pure water treatment plants and ultra pure water distribution installations. Areas of application include optics, medicine, photovoltaics, electronics and microelectronics, semiconductor production, the pharmaceutical industry, biotechnology and gene technology as well as precision mechanics and micromechanics.

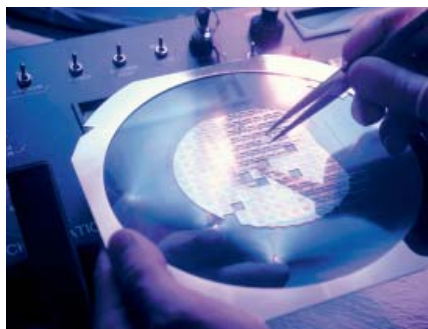
Coordinated designs for efficient, intelligent processes

GEMÜ products are the result of our close collaboration with users, designers and equipment manufacturers. Products and components for ultra pure applications are manufactured by GEMÜ in cleanroom conditions. GEMÜ recognized this necessity at an early stage and invested in a suitably adapted production plant and facilities. As of September 2012, all high purity products are manufactured at the new cleanroom facility in Emmen in the canton of Lucerne in Switzerland. The products are injection-moulded, cleaned, assembled, tested and packed there using the very latest technology and processes.



Major areas of application

Our range of products and services



We cannot imagine our modern world without semiconductor technology. Computers, telephones and flat screens only represent a fraction of the products which we use without thinking about the technology involved. These products and their components (microchips) are manufactured under highly pure conditions. Numerous plant designers and end users select GEMÜ products when equipping their devices and production plants for media control and regulation.



GEMÜ is an example of how the technology and economic cycle of solar technology and photovoltaics runs. Countless plant designers (production equipment for solar wafers and cells) and end customers (manufacturers of solar cells) use valves, measurement and control products from GEMÜ in many of their processes as part of the added value chain. This makes GEMÜ a strong supplier to the solar industry. On the other hand, GEMÜ is itself also an end customer for solar technology. The photovoltaic roof of the Development and Innovation Centre, the GEMÜ Dome, has a tower roof which can be rotated through 360° following the course of the sun.



The purity of the process media used in many high-tech areas is increasingly decisive for the quality and yield of the products.

The range of applications includes:

- *Semiconductor industry*
- *Microchip, flat panel, LED production*
- *Solar energy industry*
- *Chemical industry*
- *Food/Pharma*
- *Analysis, medical systems*
- *Renewable energy/clean energy*

Growth applications

Welcome to the future

Working for a clean environment



Energy-efficient lighting, traffic signal systems, giant screens such as those found in stadiums, advertising boards, portable games consoles, modern TV screens or even the simple LED flash bulb on your mobile phone camera – these tiny light emitting diodes are found in many places. This development is set to continue because of the long service life and low energy demand of LEDs. So with falling production costs, we should not be surprised to come across even more of these diodes in future. GEMÜ supports LED manufacturers and their plant suppliers with its broad range of products for highly complex manufacturing processes.



Classic biotechnology and medical technology applications will continue to demand a large proportion of minimal contamination production processes in the future. GEMÜ valves are at the peak of international competition for functionality and quality in this regard. That makes it possible to develop manufacturing methods for chemical compounds, e.g. as active substances in pharmaceuticals or as basic chemicals for the chemical industry, diagnostic methods, biosensors, new plant strains and many other things.



Lithium-ion rechargeable batteries supply the power for portable devices with a high energy demand and for which conventional nickel-cadmium or nickel-metal hydride batteries would be too heavy or too large, devices such as mobile phones, digital cameras, camcorders, notebook computers, handheld consoles or torches. In the field of electric mobility, they serve as energy stores for electric bicycles, electric cars and hybrid vehicles. GEMÜ supports battery manufacturers with their sensitive manufacturing processes by helping them create "contamination-free" production environments.

"Let us do everything we can to ensure that we leave the next generation, the children of today, a world that not only offers them the necessary living space but also an environment which makes life possible and worth living."
(Dr. Richard von Weizsäcker)

GEMÜ Green Engineering for a sustainable future

Focus on customer benefits and cost efficiency

green
engineering
by GEMÜ



GEMÜ multi-port valve block –
customised solutions for
cost-effective plant design



GEMÜ C60 CleanStar®
HighFlow version –
optimised valve body for
cost-effective use

Whether using 50% less material for the first GEMÜ valve compared with conventional valves or the launch of a recycling system in 1979: Right from the start, GEMÜ's planning and construction was more compact and used fewer resources than any other manufacturer, and the company was concerned about the environment long before it attracted so much media attention.

A tradition of environmental awareness

Since 2011 the GREEN ENGINEERING initiative has combined all the GEMÜ Group activities in order to ensure more sustainable, environmentally friendly corporate activity. To this end, all manufacturing processes are optimised in order to minimise the use of resources. At the same time, products are developed that satisfy important sustainability criteria. Further projects for using new technologies and introducing innovative collaborations will be supported or even planned and implemented.

1. Clean production

As part of DIN EN ISO 14001, GEMÜ sets itself definite environmental targets which are checked regularly. They have always been and will continue to be successfully implemented.

2. Clean products

Economical and environmentally friendly products have been identified as such on the GEMÜ website since 2012; ecological considerations have to be taken into account right from the earliest stage of development.

3. Clean projects

In 2011, the CLEAN PROJECTS sector was established by GEMÜ Managing Director Gert Müller. Its main focus is on the use of electric mobility and primarily ecological building within the growing group of companies.





The new high-performance generation

With its current product developments, GEMÜ has achieved material and size-related savings of up to 30 % and thus enabled its customers to implement compact, optimised plant with shorter process paths. The Group will commit itself to pursue and implement a consistent, clear environmental policy also in the future:

"We will use as little material and energy as possible for development, manufacture, processing and transport – in order to protect the environment and use the resources of the earth as sparingly as possible."

Fritz Müller
Founder of the company and pioneer of trailblazing valve designs



Product application *for chemical handling*



GEMÜ C60 CleanStar®

GEMÜ products are used for chemical handling in the following applications:

- *Etching and coating processes*
- *Chemical purification*
- *Manufacture and filling of chemicals*
- *Chemicals for water and waste water treatment*

The purity of the process media used in many high-tech areas is increasingly decisive for the quality and quantity of the products. The range here extends from sectors such as optics, aeronautics and astronautics or medicine via the pharmaceutical industry, biotechnology and gene technology through to precision mechanics and micromechanics, electronics and microelectronics or semiconductor production (including flat screen technology), photovoltaic systems and light emitting diodes. Numerous plant designers and end users select GEMÜ products when equipping their devices and production plants for media control and regulation as well as process equipment for cleaning, coating, etching, filling, etc. as well as in the accompanying chemicals supply systems.

GEMÜ offers an extensive range of products which are suitable for these applications due to their high resistance and uncompromising purity.



Detail of a chemical supply system

The *CleanStar*® valve range, e.g. GEMÜ C60 or GEMÜ C67, is particularly suitable for chemical applications. As all media wetted parts are made of PTFE or PFA, they provide the required chemical resistance.

Application examples



Chemical supply module for chip production

Chemical supply for ultra pure areas of application

The GEMÜ product range comprises products of high resistance and uncompromising purity.

These are used for:

- Chemical supply systems for wet process equipment
- Ultra pure chemical supply for LED and microchip manufacture
- Chemical filling installations

PFA components of the following GEMÜ product groups are typically used: CleanStar®, iComLine®, SonicLine®, HydraLine®, FlareStar®, TubeStar®



Chemical filling installation

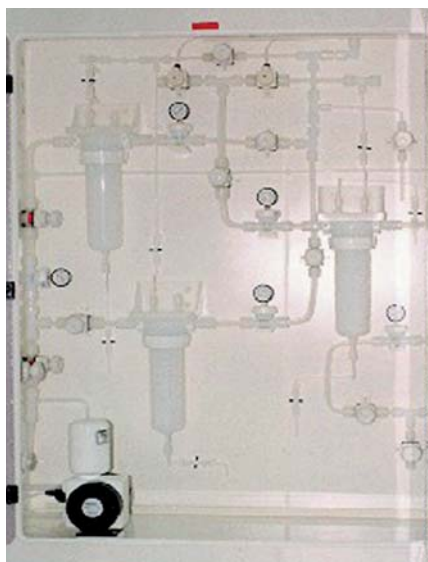
Chemical supply for pure areas of application

GEMÜ has specialised products for applications which need to be clean but not ultra pure.

These products are used for the following applications:

- Manufacture of solar wafers and flat panels
- Secondary processes in Pharma, Food and Biotech sectors
- Processes in analytical and medical equipment sectors

PFA and PVDF as well as PP components of the following GEMÜ product groups are typically used: CleanStar® SmartLine, SonicLine®, PurePlus®



Supply module for technical chemicals

Technical chemical supply

In technical chemical supply applications the resistance to media is given priority.

GEMÜ offers products for the following applications:

- Applications and processes in circuit boards manufacture and electroplating
- Chemical supply systems for waste water treatment
- Exact dosing of chemicals

PFA, PVDF, PVC, PP components of the following GEMÜ product groups are typically used: PurePlus®, iComLine® multi-port valve blocks, CleanStar® SmartLine



Product application in water treatment



GEMÜ 677

Treated water with different levels of purity and quantities is required in the following applications:

- *Microchip manufacture*
- *LED production*
- *Processes in medical technology*
- *Pharma, Food and Biotech*
- *Cooling water for processing devices*

Clean water is a valuable resource which is increasingly in short supply as the human need for water is constantly rising. In process plants ultra pure and pure water is playing an increasing role in the quality of the final products in High Tech production.

GEMÜ is a manufacturer offering a wide range of products which offer solutions for very different applications. Butterfly valves, diaphragm valves, globe and control valves, ball valves, as well as measuring and control systems, all from one established and proven supplier.



High Purity diaphragm valves have been specifically developed for ultra pure water treatment and distribution plants as well as for process equipment.

The PurePlus® valve range, e.g. GEMÜ 677, is particularly suitable for treatment plants for ultra pure water.

Application examples



Basic supply of semiconductor factories, ultra pure water treatment

UHP (Ultra High Purity) water treatment

GEMÜ offers an extensive range of products which ensure uncompromising purity.

UHP water treatment plants are used in the following sectors:

- Ultra pure silicon wafer manufacture
- Microchip manufacture
- Production of LEDs

Typically used products: PVDF-HP components from the PurePlus® product range



DI water treatment

DI water treatment for pure areas of application

GEMÜ has specialised products for the following applications where deionised (DI) water is required.

DI water treatment plants are used for the following sectors:

- Manufacture of solar wafers/cells
- Flat panel manufacture
- Analysis, Medical Systems, Pharma, Food and Biotech

Typically used products: PVDF and PP components of the following product ranges: CleanStar® SmartLine and PurePlus®



Water treatment (company Treitel Chemical Engineering LTD)

Process water treatment and supply

In addition to components for critical fluid handling GEMÜ offers an extensive range of valves, measurement and control systems for many standard applications in water treatment:

- Water conditioning and temperature control
- Water filtration
- Cooling water for demanding processing devices

Typically used products: PVDF, PP and PVC components, as well as multi-port valve block systems



Product application *in waste water treatment*



GEMÜ 690 PP

The usual chemical and physical treatment processes are:

- *Neutralization of chemically contaminated waste water*
- *Precipitation of solutes*
- *Ultra-filtration*

Due to the differences in process waste water, waste water treatment plants are high-performance installations. The demands made on the components used are enormous because the system not only has to meet high standards of quality and function, it also has to operate economically.

Due to the ever-increasing number of new process media and new demands, the physical and chemical stresses are constantly growing. At the same time, the demands for lowering emission levels are also increasing. GEMÜ can offer a compatible product portfolio for the individual treatment phases in this area.

Depending on the process media and operating parameters, valves made of PP, PVDF or PFA are generally used.



The GEMÜ 690 and GEMÜ 677 valves are especially well suited to waste water treatment plants.

Application examples



Plant with PP components

Chemical technology in the semiconductor industry

Due to the numerous corrosive chemicals used in the production processes, a large proportion of the waste water from the semiconductor industry has to be chemically neutralized.

Chemical technology for waste water treatment is used in the following areas, for example:

- Ultra pure silicon wafer manufacture
- Microchip manufacture
- Production of LEDs

Typically, components made of PFA, PVDF and PP that offer the required durability are used.



Waste water plant with PVC/PE components

Precipitation in waste water treatment

Precipitation is a typical waste water treatment process in which a solute is precipitated out of a solution by means of additives of suitable substances (precipitants).

Chemicals are added in the following precipitation processes:

- Softening
- Phosphate elimination
- Slurry-contaminated process waste water

For precise metering of the precipitants, flowmeters such as the SonicLine® are used.



Waste water plant with PVC/PE components

Waste water treatment in industry in general

Waste water has to be treated in a large number of industrial production and manufacturing processes.

As a solution provider, GEMÜ offers a wide range of products for the most varied waste water applications:

- Treatment of leachate from rubbish dumps
- Municipal waste water treatment
- Industrial waste water treatment

The fittings used are typically butterfly valves, diaphragm valves, globe and control valves, ball valves and measurement and control systems.



Product application *in wet process plants*



GEMÜ C50 iComLine®

A basic distinction is made between manual, semi-automatic and fully automatic plants which typically handle processes such as:

- Etching and coating processes
- Chemical purification processes (RCA cleaning)
- Pre-treatment of wafers for subsequent processing

An important part of the core processes of any semiconductor production system is carried out in what are known as wet process plants. The demands of the plant and/or its components differ according to the product concerned. Whilst in wet chemical processing of photovoltaic cells, smaller quantities of corrosive acid are used and purity plays a subordinate role, the production of modern microchips involves the use of numerous corrosive media which also demand very high standards in terms of particulate removal and chemical purity.

Nevertheless, the basic requirements are the same for all. A minimal footprint and flexible and compact design plus high media flow rates combined with low pressure loss (Kv value) are the characteristic features of the GEMÜ products for this type of application.



Detail of a wet process plant

The CleanStar® valve range comprising the GEMÜ C60 and GEMÜ C67 models is particularly suited to wet process plant applications. As all media wetted parts are made of PTFE or PFA, they possess the necessary chemical resistance and high purity properties.

Application examples



Chemical supply for wet processes

Wet processes in microchip manufacture

For the highest purity and resistance demands, GEMÜ offers a comprehensive range of valves, instruments and control systems.

Processes in wet process applications that require high purity components include:

- *Wafer cleaning*
- *Etching in the manufacture of micro-electronic circuits*
- *Electroplating*

Products typically used are PFA diaphragm valves, block valves and sensor systems such as the HydraLine® pressure measurement system and SonicLine® flowmeter.



Process plant

Etching, cleaning and coating processes

Wet processes, such as those used in the production of photovoltaic components, demand high levels of resistance. The purity of the media is a secondary consideration.

GEMÜ offers a comprehensive product range for the following applications:

- *Polysilicon etching in ultra pure silicon manufacture*
- *Ingot and wafer production*
- *Glass substrate cleaning and component cleaning*

Typically, components made of PFA, PVDF and PP are used.



Media area of an etching and cleaning installation

Industrial wet processes

For industrial wet process applications that demand good valve resistance, GEMÜ offers a wide range of products.

GEMÜ is the company to call for the following wet industrial processes:

- *Galvanizing procedures*
- *Chemical production and filling plants*
- *Metal separation plants*

Typically, components made of PP and PVDF are used.



Product application in slurry supply



GEMÜ C60/C67 HPW 3-way

Typical slurry applications:

- Cutting ingots into wafers
- Chemical-mechanical planarization (CMP)
- Intermediate structuring processes on wafers

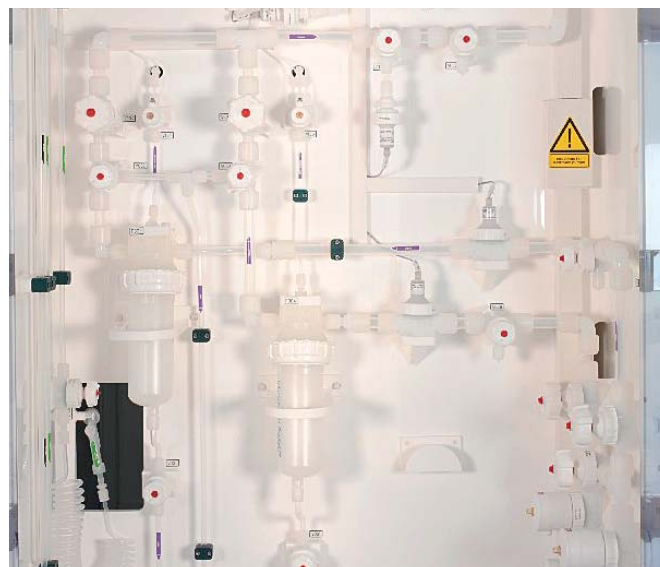
Three essential processing stages:

- Slurry preparation/mixing
- Slurry delivery
- Slurry treatment/recycling

Safe handling of abrasive media demands particular attention right from the planning and design phase. Typically, a variety of abrasive media is required for widely differing process stages in the semiconductor industry. For cutting silicon into ingots or slicing the wafers, a fluid known as "cutting slurry" is required. It is usually very coarse-grained.

Polishing slurry, which is used for the CMP process (chemical-mechanical planarization), on the other hand, tends to be fine. Polishing is an important stage in the manufacture of mirror-finish wafers, to which photoresist can then be applied for precision structuring.

GEMÜ can offer valve and media-friendly solutions thanks to the special design of the seat contour.



Detail of a fully automatic slurry mixing and supply system.
(company Puerstinger)

The CleanStar® valve range comprising the GEMÜ C60 and GEMÜ C67 models is particularly suited to CMP slurry applications. As all media wetted parts are made of PTFE or PFA, they possess the necessary chemical resistance generally required for CMP applications. They also withstand the abrasive properties of the CMP slurry for extended periods of use.

Application examples



CMP slurry

Slurry systems in microelectronics

For CMP slurry applications, GEMÜ offers components that meet the strictest demands. Due to their flow-optimised geometry, the slurry containing the abrasive particles is carefully handled.

Common application areas in microelectronics are:

- *Mixing systems for CMP slurry*
- *Supply systems and suppliers for the slurry*
- *Processing devices*

Products typically used are the PFA components in the CleanStar® range, measurement systems from the HydraLine® and SonicLine® ranges and fittings from the FlareStar® range.



Cutting slurry

Cutting slurry supply systems

As well as the plastic valves and flowmeters, GEMÜ also offers high-quality metal fittings for cutting slurry. The valve geometry also enables low-impact and safe media delivery.

Cutting slurry is used in the following applications:

- *Cutting silicon wafers from ingots*
- *Slurry manufacture*
- *Supply of the slurry from mixing and storage tanks*

Stainless steel components are typically used.



Slurry supply (company Puerstinger)

Recycling polishing agents and slurry

Recycling the expensive slurry is also becoming more common for ecological reasons.

GEMÜ can offer components in the following application areas:

- *Reconditioning and recovery of slurry in photovoltaic device production*
- *Slurry for CMP processes*
- *Supply systems*

Components typically used are plastic and metal diaphragm valves.



Product application

Solvent supply



GEMÜ 601

Solvents are liquids which can dissolve other substances without changing them chemically. In the **semiconductor industry**, a range of organic **solvents** such as isopropanol, acetone and N-methylpyrrolidon (NMP) are generally used to dissolve substances and for cleaning purposes.

GEMÜ products are used for solvent supply in the following applications:

- Microchip manufacture
- LED production
- Coatings and paint industry

What are solvents used for?

- Cleaning
- Diluting / viscosity
- Removing paint or similar substances
- Changing surface properties

Above all, due to the critical, corrosive media which are used particularly for cleaning applications in solvent supply, there is an ever-increasing demand for resistant plant components.

The systems are exposed to special conditions. This calls for valve components which are characterised by being able to meet following main requirements:

- High Kv value
- Resistance to solvents
- Costs/price/cost efficiency



Detail of a solvent supply system (company Fäth)

GEMÜ meets these criteria and offers a balanced and extensive product portfolio:

As a rule, valves made of stainless steel and PFA are used for reasons of purity.

Multi-port valve block systems are a profitable investment for future high-purity solvent supply systems due to their compact, cost-effective construction.

Application examples



Stainless steel components with plastic operators

Stainless steel components for ultra pure solvents

Normally, stainless steel bodies are used in high-purity solvent applications. Due to their chemical resistance, plastic manual and automatic actuators are also used.

Standard areas of application are:

- *Blending and solvent processes*
- *High-purity solvent supply*
- *Resistance to other etching processes*

Due to the optimised seal contour of the stainless steel body, reliable and positive external sealing is ensured.



PFA components

PFA solutions for ultra pure solvents

Due to the stringent requirements for resistance, and for cost reasons, PFA components are used.

Ultra pure solvents in the semiconductor industry are used in the following applications:

- *Microchip manufacture*
- *Blending and solvent processes*
- *High-purity solvent supply systems*

GEMÜ offers a wide range of PFA products, providing high Kv values and cost effective solutions.



M600 stainless steel multi-port valve block

Compact multi-port valve blocks in high-purity solvent supply

Due to the flexible, space-saving construction and the associated cost savings, compact multi-port valve blocks from the company GEMÜ are an exciting alternative to single valves.

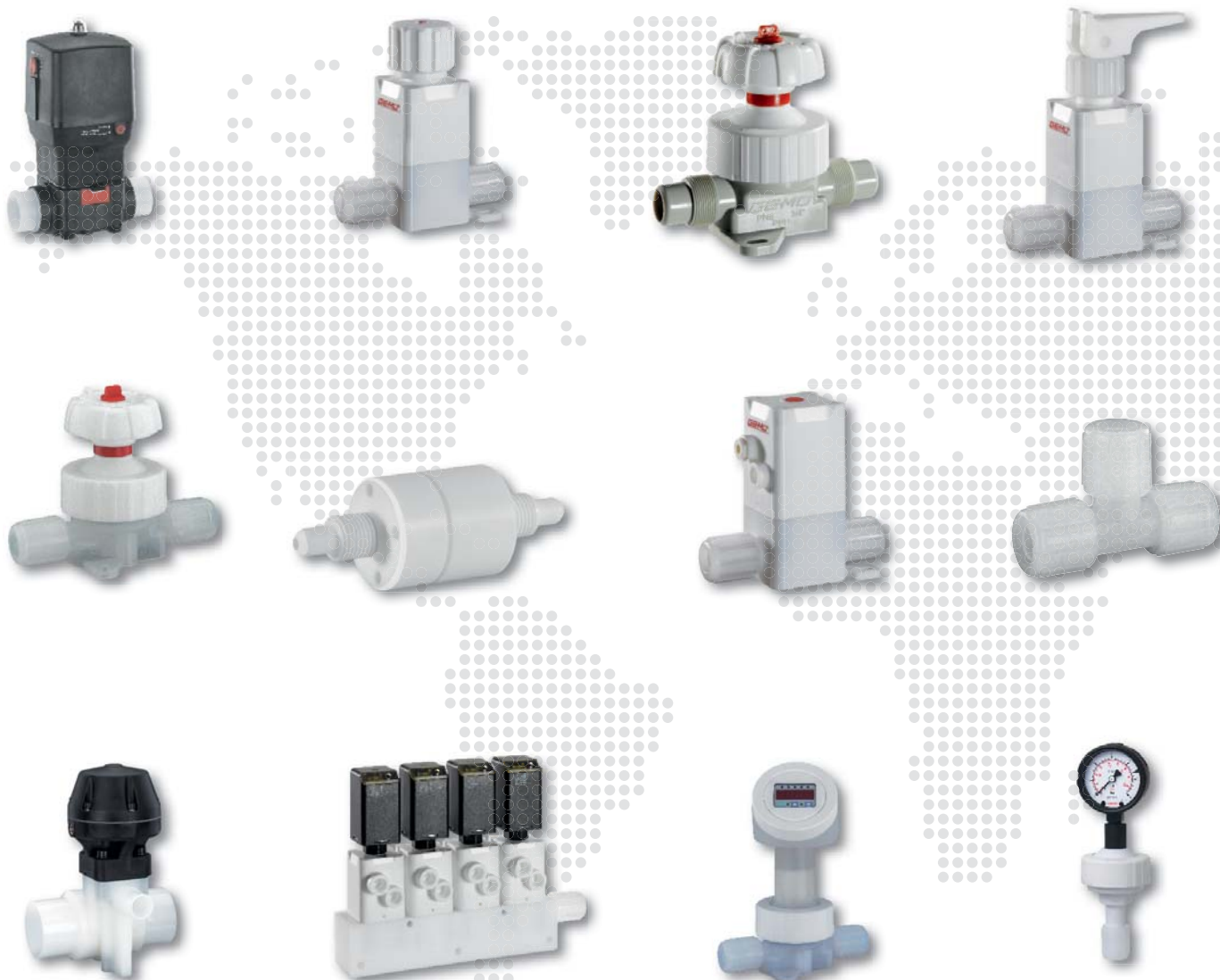
GEMÜ offers components for the following areas of application:

- *Microchip manufacture*
- *Blending and solvent processes*
- *High-purity solvent supply systems*

Stainless steel and plastic multi-port valve blocks M600 and iComline are typically used.



*for High Purity, Semiconductors and
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HP product ranges

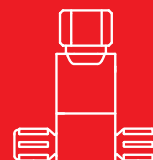
You will find a table summarizing all products on the inside of the back cover.



CleanStar®



iComLine®



Multi-port valve block systems



PurePlus®



600 / 677 HP



HydraLine



SonicLine®



FlareStar®



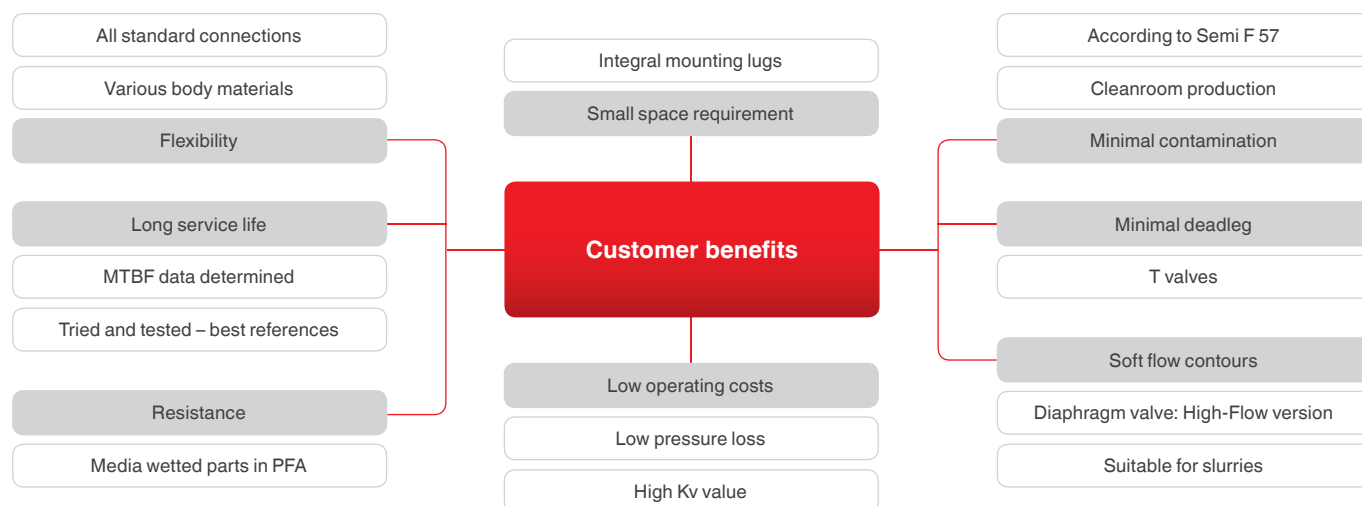
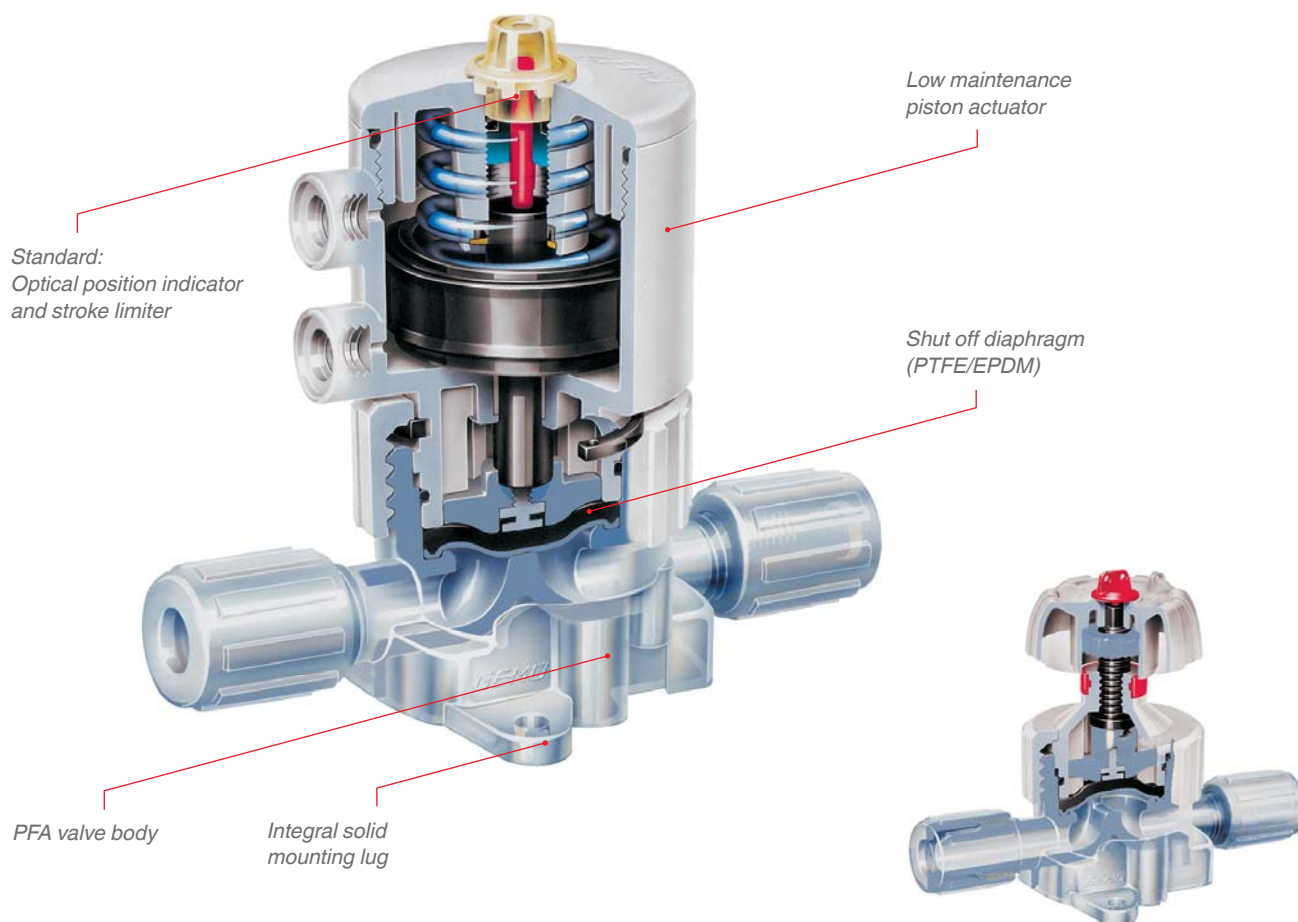
TubeStar®

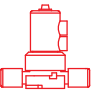




GEMÜ CleanStar®

Ultra pure PFA diaphragm valves and PP diaphragm valves





Product range



Pneumatic valve

- Low maintenance piston actuator
- Control functions: NC, NO, DA
- External actuator parts in PVDF
- Standard stroke limiter and position indicator
- Union nut optionally in ECTFE
- Electrical position indicator and process controller available



Manual valve

- Ergonomic handwheel
- Metal-free
- External operator parts in PVDF
- Standard stroke limiter and position indicator
- Union nut optionally in ECTFE
- Lock-out device



CleanStar® SmartLine manual and pneumatic valves Version with PP valve bodies

- Low cost CleanStar® version
- For areas of application with lower purity requirements
- PTFE diaphragm
- Metal-free (GEMÜ C67 and GEMÜ C60 control function DA)
- Choice of valve bodies in PP-R natural or PP-H grey
- Bodies with flare connections and DIN butt weld spigots
- Improved flow capability compared to PFA versions



GEMÜ CleanStar® – Technical data

Range overview

Operators:	GEMÜ C60 pneumatic, GEMÜ C67 manual, external operator parts in PVDF, central union nut optionally in ECTFE	Valve body materials:	PFA, PVDF, PP
Diaphragm:	PTFE face, EPDM back	Connections:	Flare connections, space savers, butt weld spigots, union ends
Valve body configurations:	2/2-way body, T body, V body	Size:	¼" – 1 ¼" (depending on body configuration and connection)

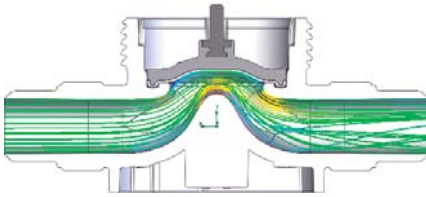
Permissible operating conditions

Material	Operating temperature	Operating pressure	Working media
PFA	max. 150 °C	max. 6 bar	Corrosive, inert, gaseous and liquid media - particularly high purity media - which have no negative impact on the physical and chemical properties of the body and diaphragm material.
PP	max. 80 °C	max. 6 bar	
PVDF	max. 120 °C	max. 6 bar	

Accessories

Valve	Accessories
GEMÜ C60	Positioners, e.g. GEMÜ 1434, GEMÜ 1436
	Electrical position indicators GEMÜ 1234/GEMÜ 1235
GEMÜ C67:	Lock out device
	Service tool for operator mounting
	Service tool for flare connections

Product highlights



High-Flow valve body

- Significantly improved flow rate due to flow-efficient seat contour
- Low pressure loss resulting in cost savings
- Low-impact media handling due to gentle flow lines
- Longlife seat contour
- Up to 100 % Kv value increase (depending on nominal size/connection)
- Same outer dimensions and connection to actuator as standard body



3-way valve with dual operator concept

- Usable as media mixing or manifold valve
- Operators can be independently controlled
- Optional flow direction
- Minimal deadleg
- High Kv value
- Standard accessories can be fitted
- Lower priced than conventional versions



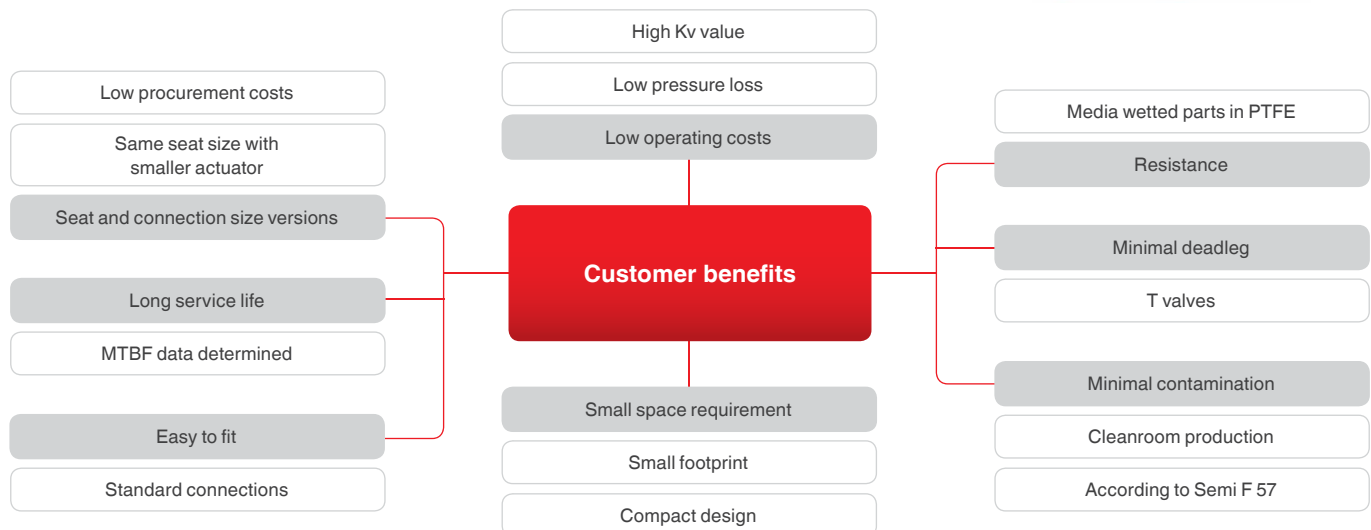
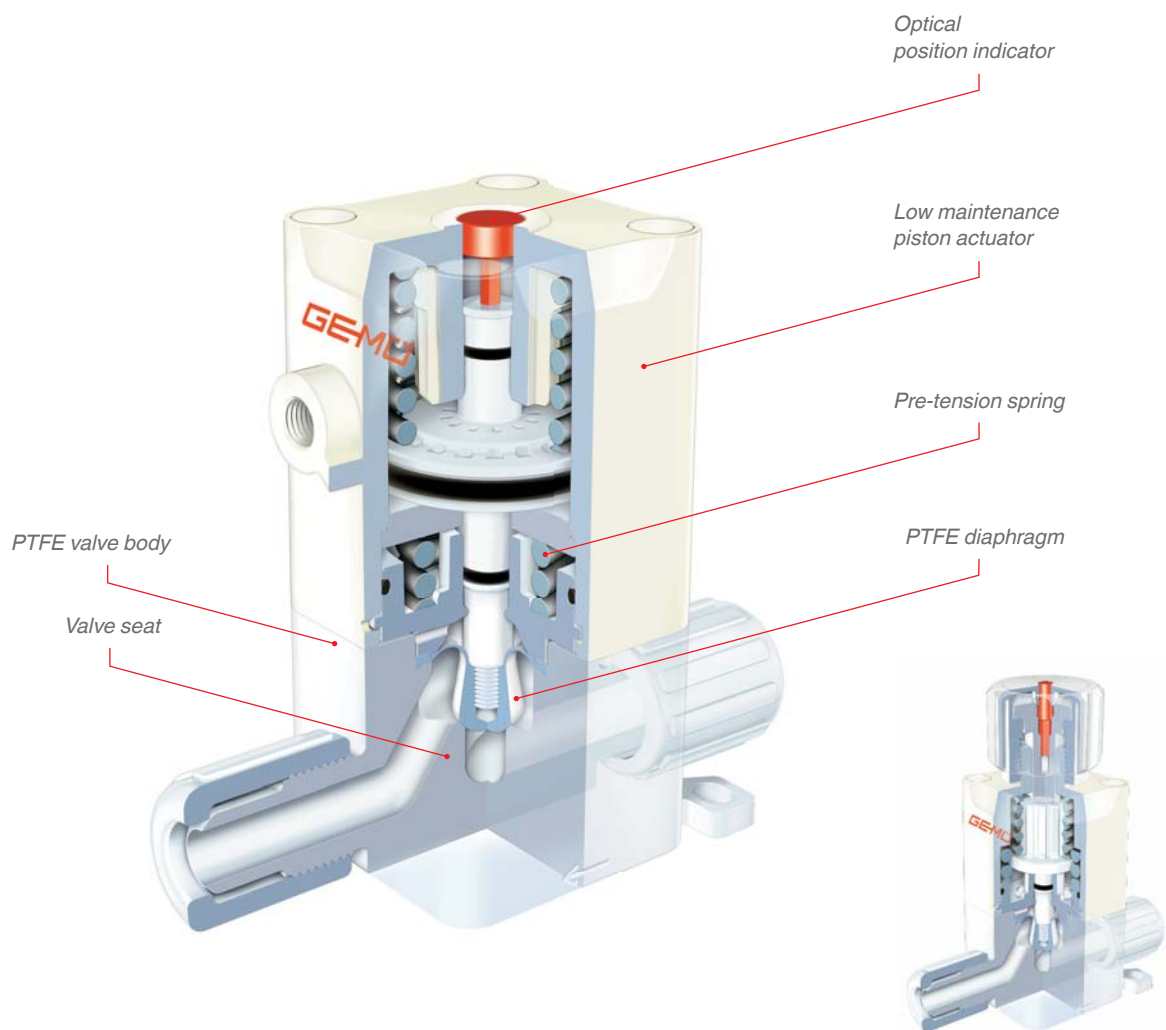
Extensive T valve range

- T body design minimizes deadleg
- Saves using a T fitting
- Requires less space
- Reduces costs
- Coupling by space saver connection requires less space
- Ideal for manifolds in valve boxes
- Can be used as a sampling valve



GEMÜ iComLine®

Ultra pure PTFE globe valves





Product range



GEMÜ C50 iComLine®

Pneumatic valve

- Low maintenance piston actuator
- Control functions: NC and NO
- All external actuator parts in PVDF
- All media wetted parts in PTFE
- Standard optical position indicator
- Stroke limiter available
- Integral mounting lugs
- Electrical position indicators and positioners can be fitted



GEMÜ C51 iComLine®

Quarter turn manual valve

- Toggle for operation
- Handwheel for setting a defined flow
- All external operator parts in PVDF
- All media wetted parts in PTFE
- Integral mounting lugs
- Available in operator sizes 1 and 2



GEMÜ C57 iComLine®

Manual valve

- Ergonomic handwheel
- All external operator parts in PVDF
- All media wetted parts in PTFE
- Optical position indicator
- Integral mounting lugs



GEMÜ iComLine® – Technical data

Range overview

Operators:	GEMÜ C50 pneumatic (NC, NO), GEMÜ C51 quarter turn manual, GEMÜ C57 manual, external operator parts in PVDF	Connection:	Flare, Pillar (Super Type 300)
Diaphragm:	PTFE	Connection size:	1/4" – 1 1/4"
Valve body configurations:	2/2-way body	Union nut material:	PFA, PVDF, C-PFA
Valve body material:	PTFE		

Permissible operating conditions

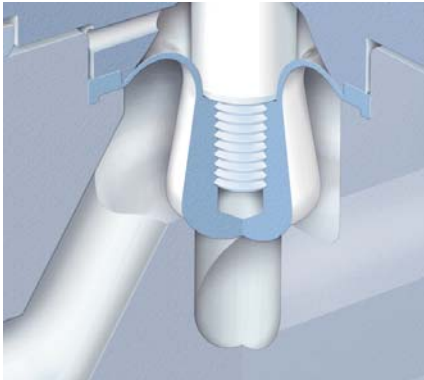
Operating temperature	Operating pressure	Working media
max. 150 °C	Standard seats: max. 6 bar	Corrosive, inert, gaseous and liquid media - particularly high purity media - which have no negative impact on the physical and chemical properties of the body and diaphragm material.
	Modified seats: max. 4.2 bar	

Accessories

Valve	Accessories
GEMÜ C50:	Positioners: e.g. GEMÜ 1434, GEMÜ 1436
	Electrical position indicators: e.g. GEMÜ 1234, GEMÜ 1235
	Service tool for flare connections

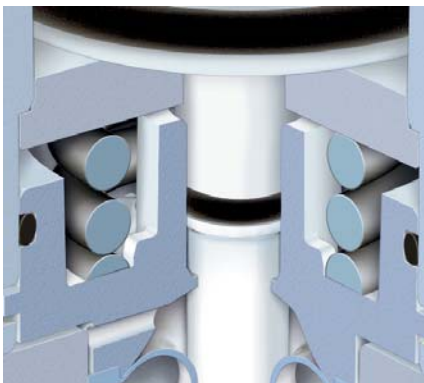


Product highlights



Globe valve – compact design

- Globe valve design enables small footprint
- PTFE diaphragm (no other material / diaphragm back)
- Long service life – expected maximum cycles: 5 million switching cycles
- Very suitable for control applications
- Very suitable for corrosive media
- Particularly suitable as dosing or filling valve
- Cost reduction possible due to intermediate seat sizes



Reliable tightness due to pre-tensioned spring

- Innovative solution offers extended areas of use
- The pre-tensioned spring presses the diaphragm against the body
- This ensures external tightness even in case of temperature fluctuations
- It also compensates the material specific flow behaviour
- The valve thus has a long service life even under extreme conditions of use



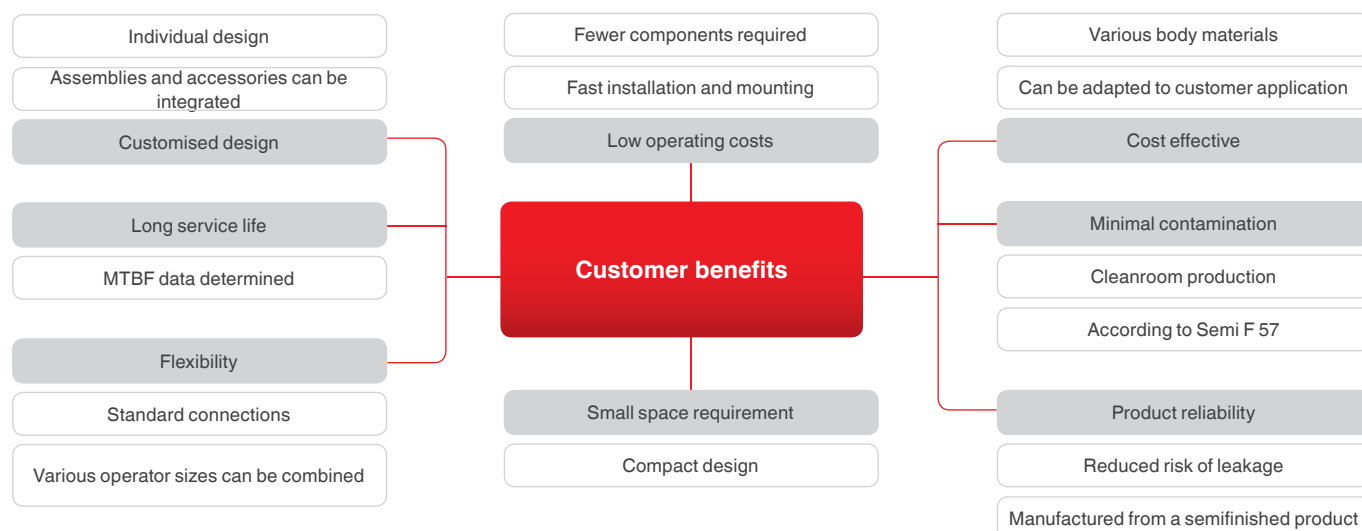
Compact multi-port valve blocks

- Individual, customised and very flexible design
- Clearly reduced space requirement
- Valve body made from a single block
- Versatile connection and operator versions possible
- Various body materials possible
- Assemblies (check valves) and sensors can be integrated



GEMÜ iComLine®

Multi-port valve block systems



Product highlights



Main advantages for the customer

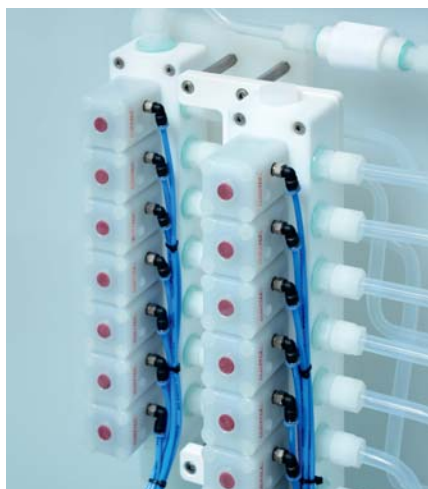
- Individual, customised and very flexible design
- Faster installation and mounting
- Reduced storage costs
- Combination of various connection and operator sizes
- Sensors can be integrated (e.g. pressure sensor, temperature sensor)
- Various body materials: PTFE (TFM), PVDF, PP, PVC
- Connections: Flare, Pillar, butt weld spigots, female threads, union ends



Implementation of compact manifolds

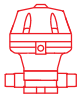


- The adjacent photo shows a compact multi-port valve block providing considerable space savings compared to conventional designs. Other benefits of the multi-port valve block:
- Reduced number of connection points
- Reduced risk of leakage
- Shorter installation time



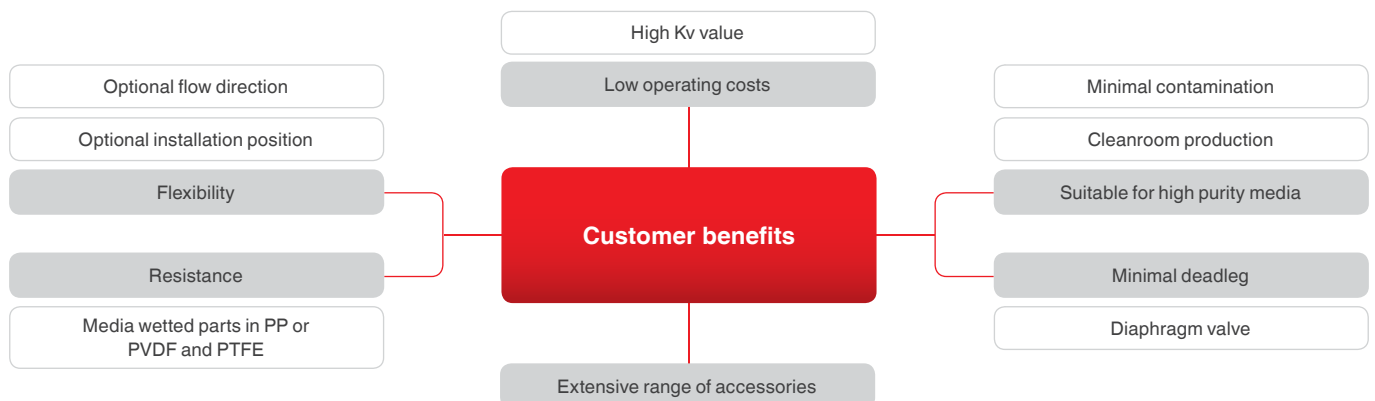
Areas of application

- Suitable for many areas of application due to choice of appropriate valve body/block materials
- PTFE/PVDF HP valve block for ultra pure applications, e.g. in the semiconductor industry
- Handling of chemicals / corrosive media with PVDF/PTFE
- PVDF and PP for applications with reduced purity requirements, such as PV production
- PP and PVC are typically used in industrial applications without purity requirements
- Various connections such as butt weld spigots, female threads, flare and clamp connections or union ends can be used depending on the requirement



GEMÜ PurePlus®

Ultra pure PVDF/PP diaphragm valves





Product range



GEMÜ 610 PurePlus®

Manual and pneumatic valves with valve bodies in PVDF-HP

- Pneumatic actuators GEMÜ 600, GEMÜ 610 or GEMÜ 690
- Manual operators GEMÜ 617 and GEMÜ 677
- PTFE/EPDM diaphragm
- Valve body in PVDF
- 2/2-way or T valve body
- Butt weld spigots and union ends
- Nominal sizes DN 15–100



GEMÜ 677 PurePlus®

Manual and pneumatic valves with valve bodies in PP-HP

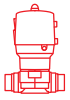
- Pneumatic actuator GEMÜ 690
- Manual operator GEMÜ 677
- PTFE/EPDM diaphragm
- Valve body with PP-H inliner and PP outliner
- 2/2-way valve body
- Butt weld spigots
- Nominal sizes DN 15-50



GEMÜ 833 PurePlus®

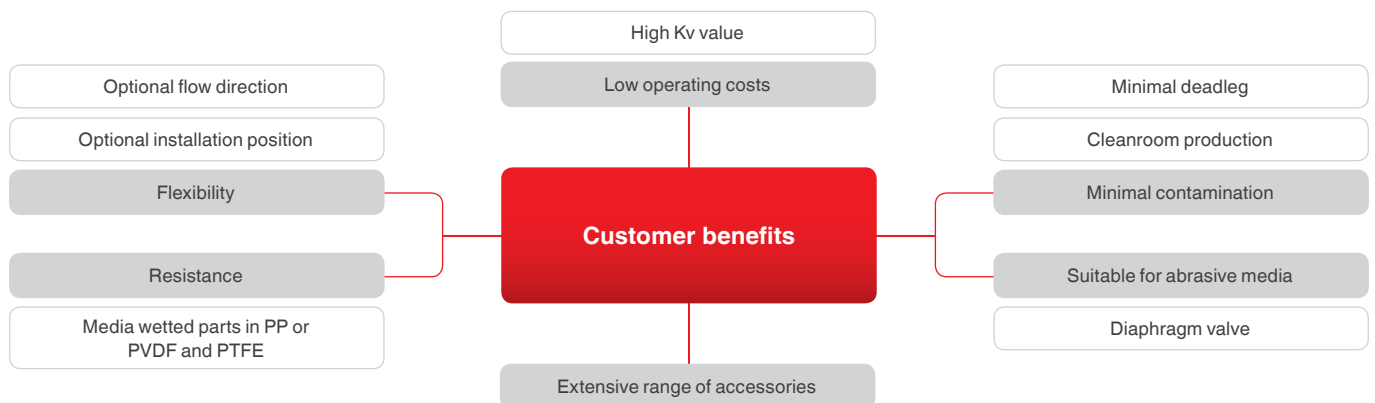
Variable area flowmeters in PVDF

- Float in PVDF with or without a magnet core
- Metering tube in PVDF
- Nominal sizes DN 15-50
- Accessories for detection of measured values
- Dovetail sections for mounting of limit switches/instrument sensors
- Radially installable/removable



GEMÜ 600 HP/677 HPW

Ultra pure PFA diaphragm valves





Product range



GEMÜ 677 HP

Manual and pneumatic valves with valve bodies in PFA-HP

- PTFE/EPDM diaphragm
- Valve body with PFA inliner and PVDF outliner (carbon-filled)
- 2/2-way valve body
- Butt weld spigots
- Sizes 1 ½" and 2" (DN 40 and DN 50)



GEMÜ 600 HP

Pneumatic actuator

- Low maintenance piston actuator
- Control functions: NC, NO, DA
- Standard stroke limiter
- Standard manual override
- Integral optical position indicator



GEMÜ 677 HPW

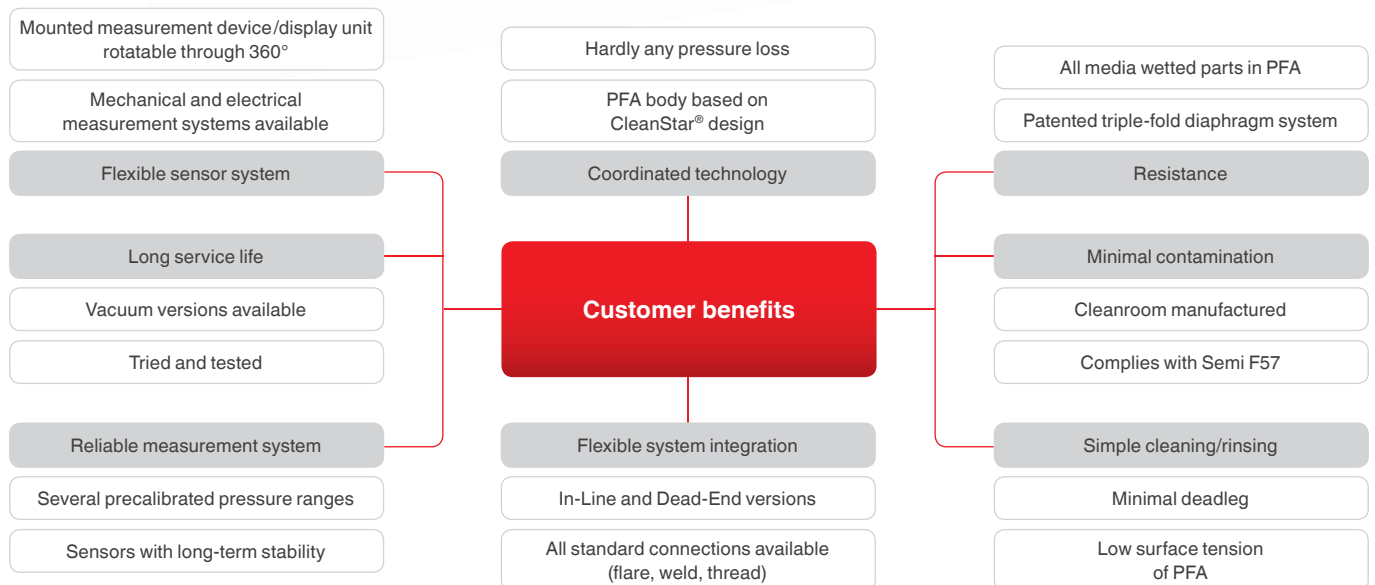
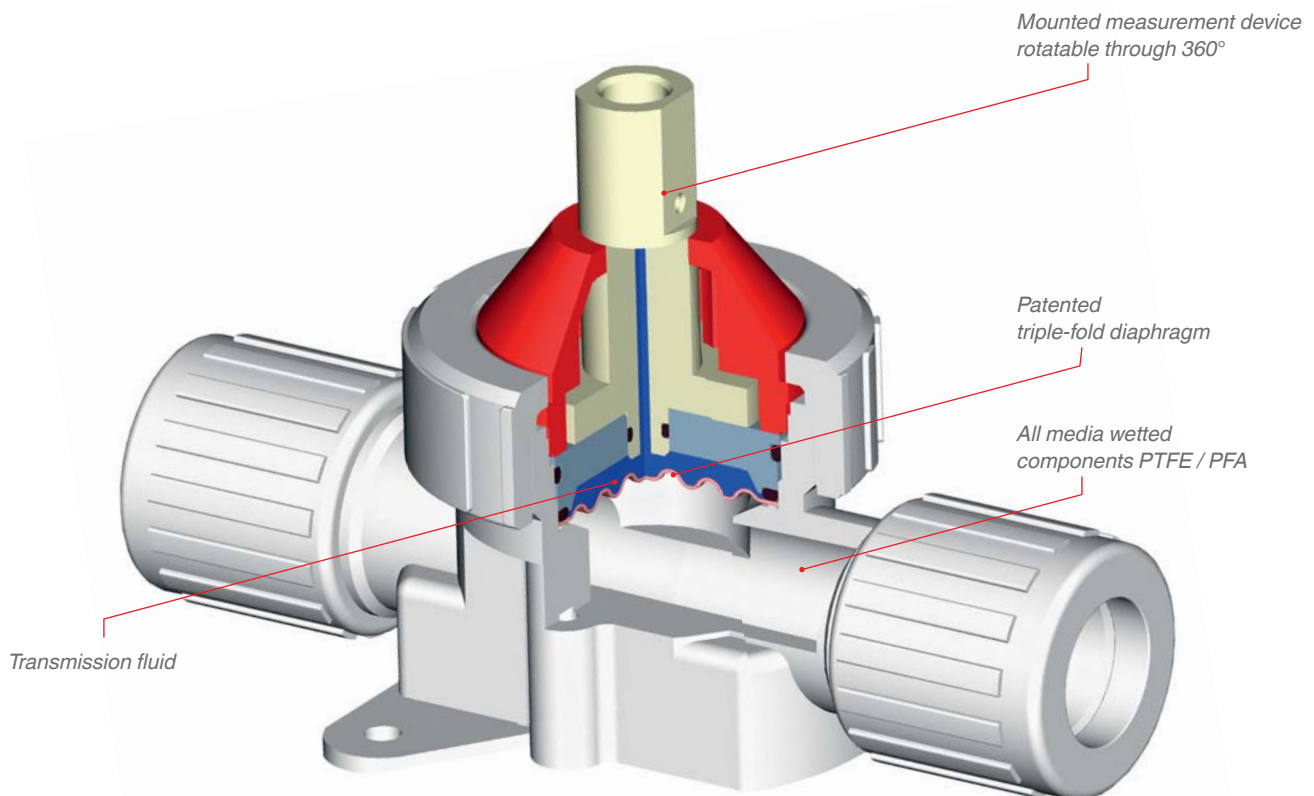
Manual operator

- Ergonomic handwheel
- Handwheel available in black or white
- Integral optical position indicator
- Assembled, tested and packaged in cleanroom class 100
- Optional accessories on request



GEMÜ HydraLine

Pressure measurement and monitoring of aggressive, corrosive and sensitive media





GEMÜ C30 Hydra-Gauge

The GEMÜ C30 Hydra-Gauge mechanical pressure measurement device is equipped with a high quality Teflon coated stainless steel gauge. The pipe type pressure gauge is actuated by the transmission fluid.

Your advantages at one glance:

- Teflon coated pressure gauge, rotatable through 360°
- Display inaccuracy 1.6 %
- Patented triple-fold diaphragm
- Safe isolation of the process medium from the transmission fluid and the pipe type pressure gauge
- All media wetted components are made of PFA/PTFE.



GEMÜ C31 Hydra-Sensor

The GEMÜ C31 Hydra-Sensor pressure measurement device has a high quality industrial pressure transmitter which is actuated by the transmission fluid.

Your advantages at one glance:

- High quality industrial sensor (long-term stability)
- Various electrical connections available as standard (IP 65 or IP 67)
- Measurement inaccuracy 0.5 %
- Patented triple-fold diaphragm
- All media wetted components are made of PFA/PTFE.



GEMÜ C32 Hydra-Dry

The GEMÜ C32 Hydra-Dry electronic pressure transducer is equipped with a ceramic capacitive sensor which is reliably isolated from the process medium by the vented triple-fold diaphragm.

Your advantages at one glance:

- No external metal parts
- High quality ceramic sensor, without transmission fluid
- Measurement inaccuracy 0.5 %
- The sensor is directly actuated by the working medium without transmission fluid
- All media wetted components are made of PFA or PTFE.



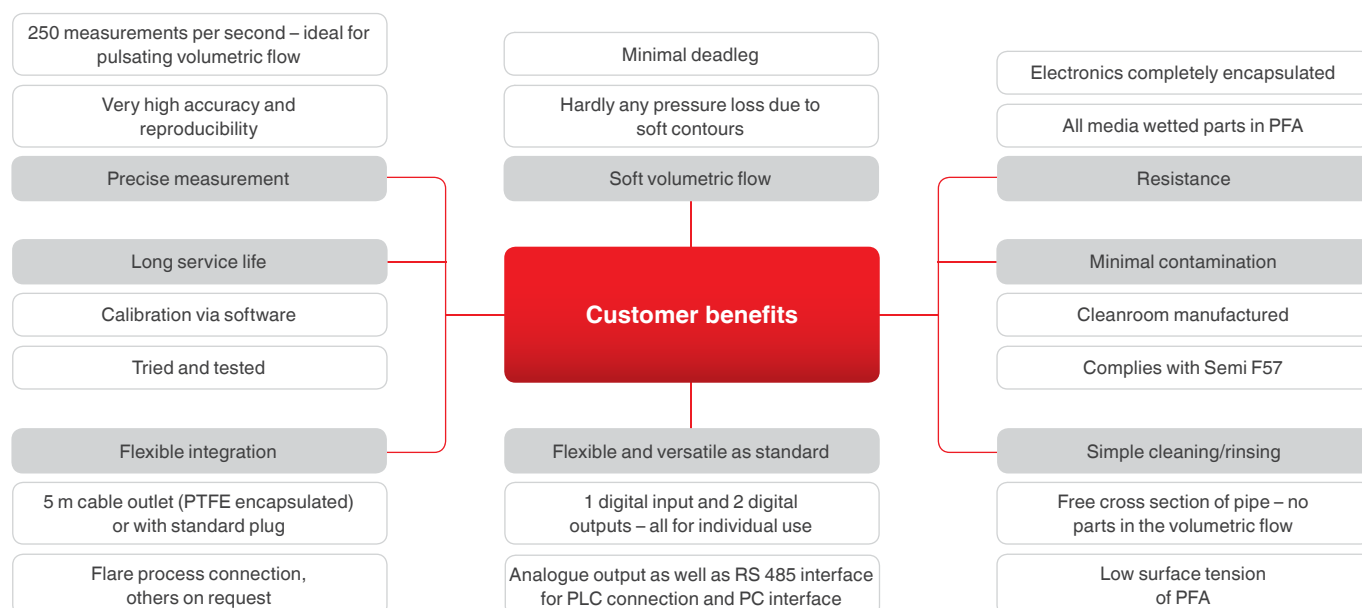
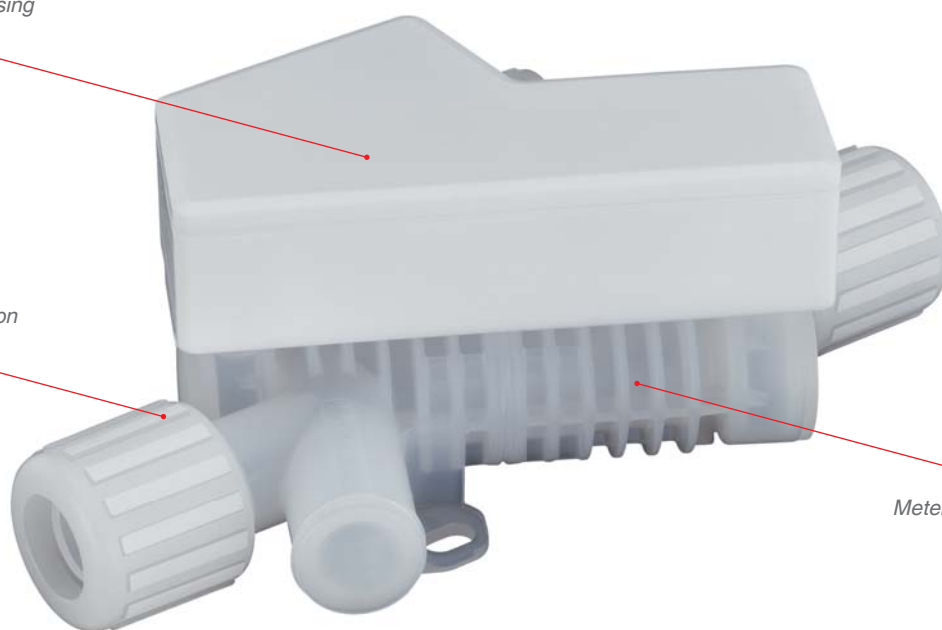
GEMÜ SonicLine®

*Flowmeters for aggressive,
corrosive and pure media*

Electronics housing

Media connection

Metering tube





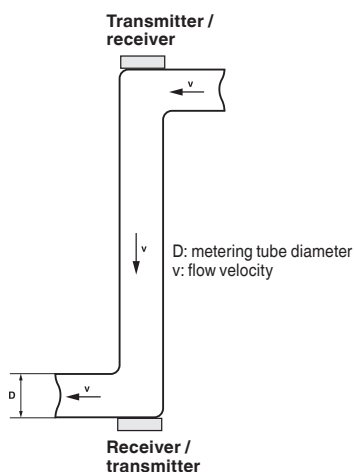
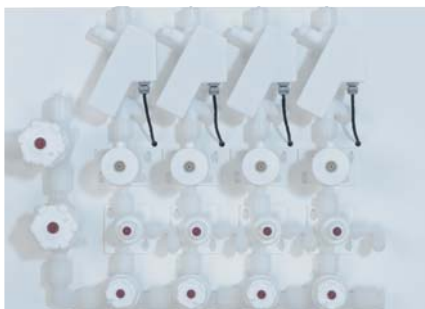
SonicLine® C38

The GEMÜ SonicLine® C38 flowmeter is a contactless measurement device for liquid media with a high level of accuracy. As there are no moving or fixed parts in the measurement area the medium flows unhindered through the flowmeter. Therefore there is hardly any pressure loss and the device is easy to clean. All media wetted components are made of high quality PFA. The electronics housing is made of polypropylene and is completely encapsulated.



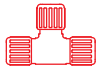
SonicLine® - Advantages at one glance:

- Ideal for pulsating media currents
- Extensive PC software with analysis functions (multilingual)
- Reproducibility of measured values 0.5 %
- Deviation of measured values $\pm 1 \%$
- Extremely fast detection of measured values (250 measured values/sec.)
- Empty pipe monitoring with alarm connection
- Digital inputs and outputs, can be individually assigned as standard
- Analogue output standard
- Process parameters freely programmable
- Space-saving installation



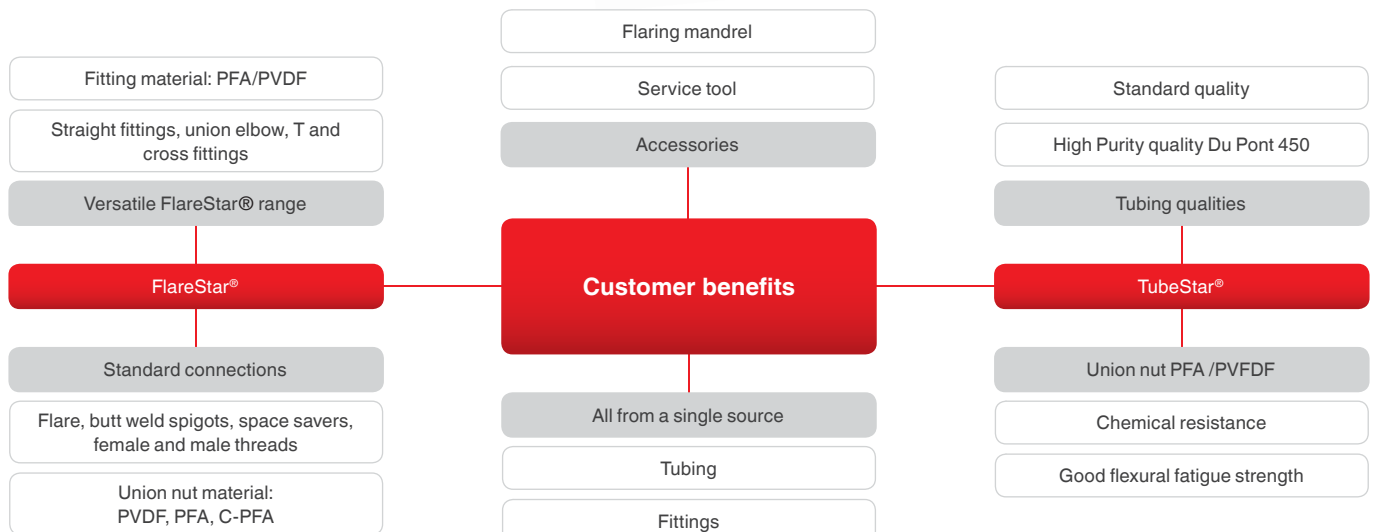
Measurement principle and functionality:

- Two sensors in opposite position reciprocally send and receive ultrasonic signals
- With a standing medium, both sensors receive the sent ultrasonic signals within the same phase, i.e. no difference in phase occurs
- With a flowing medium a phase shifting takes place
- This phase difference is directly proportional to the flow velocity (v)
- The flow volume is determined from the flow velocity and the pipe diameter (D)



GEMÜ FlareStar®/TubeStar®

Ultra pure PFA fitting and tubing system



Product range



FlareStar® – High Purity PFA tube and weld fittings

The FlareStar® product range includes numerous tube and weld fitting versions such as union elbow, union tee, straight fittings.

- Tube fittings are available in sizes 1/4", 3/8", 1/2", 3/4", 1" and 1 1/4"
- Weld fittings are available in sizes 1/4", 1/2", 3/4", 1" and 2"
- The fittings are made of Du Pont 440 HP material



TubeStar® – High Purity and Standard PFA tubing

The TubeStar® PFA tubing range comprises tubing spools and straight tube pieces in High Purity and standard quality.

- All available tube sizes are 1/4", 3/8", 1/2", 3/4", 1" and 1 1/4".
- All tube lengths are available in 10 m, 20 m, 50 m, 100 m spools as well as in 6 m straight tube pieces
- The HP tubes are made of Du Pont 450 HP material



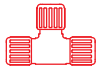
Accessories and tools

GEMÜ 1098

- Flaring mandrel
- Assembly tool for PFA-HP flare connections

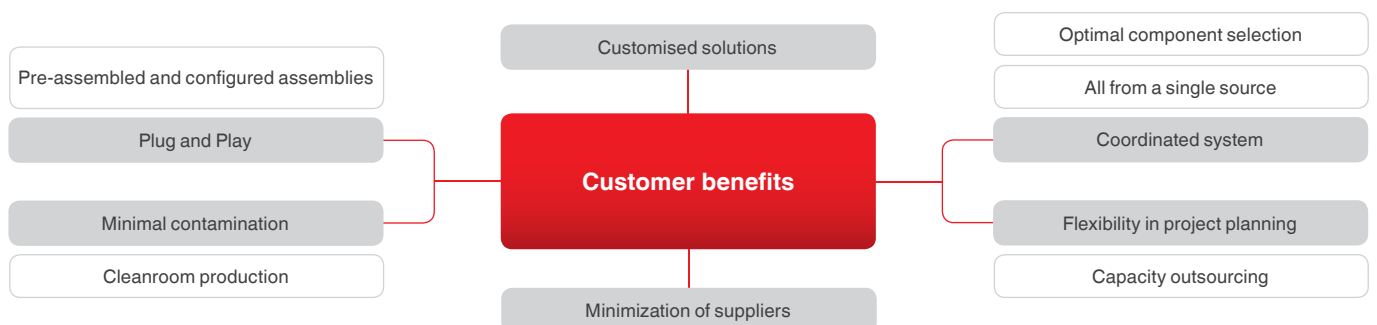
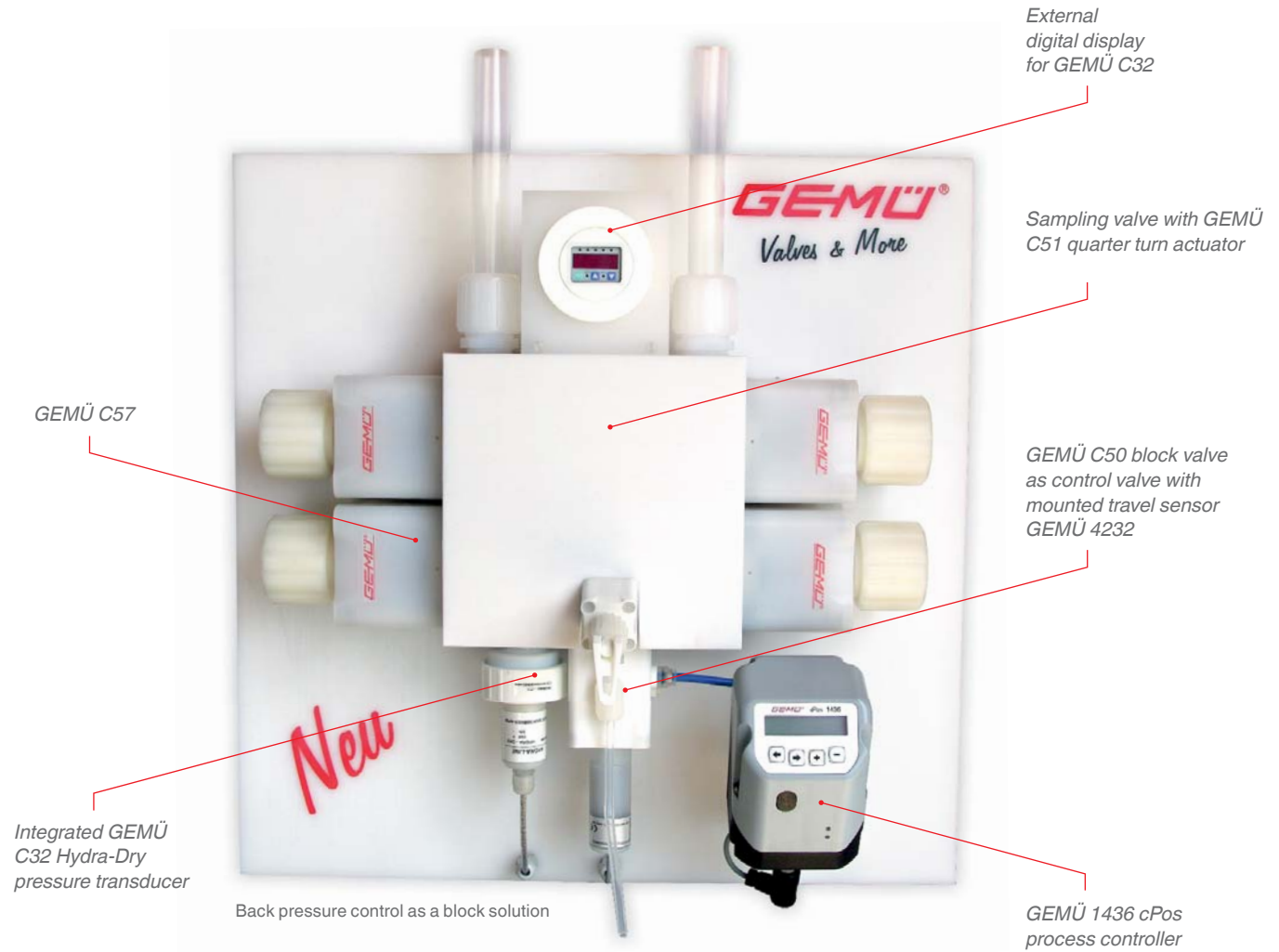
GEMÜ CF

- Service tool for FlareStar® union nuts



GEMÜ system solutions

Meeting customer requirements





Back pressure control system in a box

Back pressure control

The illustration on the left shows a back pressure control system consisting of various different GEMÜ products. By means of the GEMÜ 4232 travel sensor, the GEMÜ 1436 cPos process controller controls the position of the GEMÜ C60 CleanStar® diaphragm valve, which serves as the actuator. In order to correctly set the position of the GEMÜ C60 CleanStar®, the GEMÜ 1436 cPos compares the specified set value with the actual value. For detection of the actual value, a GEMÜ C32 HydraDry with external display is used.



Flow control system

Flow control

As with back pressure control systems, flow control systems can also be constructed using GEMÜ products. In this case, the GEMÜ C38 ultrasonic flowmeter is used to detect the actual value. The GEMÜ 1436 cPos process controller sets the GEMÜ C60 CleanStar® to the required flow rate with the aid of the GEMÜ 4232 travel sensor in order to obtain the desired set value.



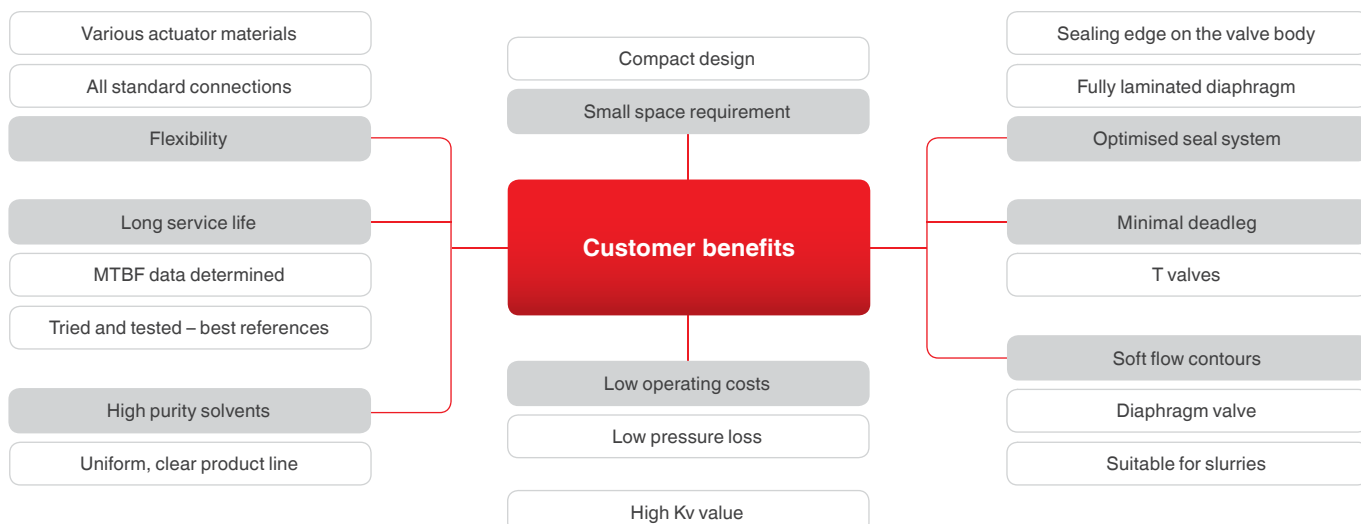
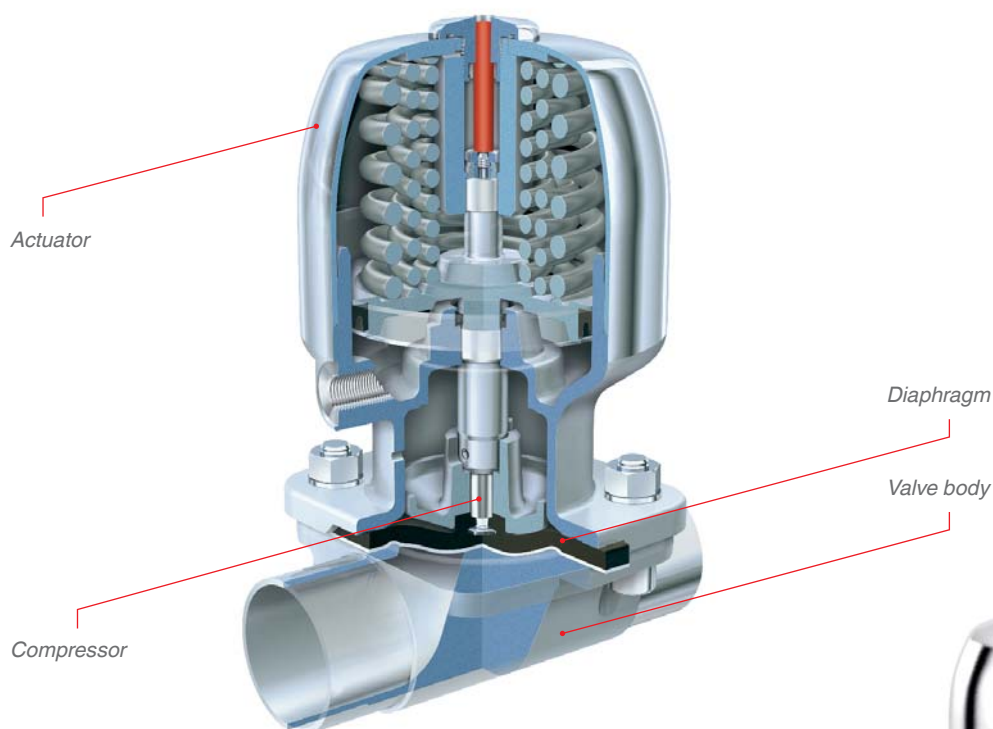
Manifold

Manifolds

Manifolds are pre-assembled configurations of valves and fittings. They are put together according to customer-specific requirements. They generally consist of a main pipe and an optional number of branch pipes (sticks). The valves and fittings are joined by welded and/or flared connections.



Stainless steel components





Stainless steel components



GEMÜ 673

Ergonomic plastic handwheels

- *Pneumatic actuator GEMÜ 695*
- *Manual operator GEMÜ 673*
- *PTFE/EPDM diaphragm*
- *Valve bodies in stainless steel*
- *Plastic operators*
- *Various connection options*
- *Nominal sizes DN 15- 50*



GEMÜ 650 BioStar®

High-quality stainless steel versions

- *Pneumatic actuator GEMÜ 650*
- *Manual operator GEMÜ 654*
- *PTFE/EPDM diaphragm*
- *Valve bodies in stainless steel*
- *Metal operators*
- *Various connection options*
- *High-quality design*



GEMÜ P600
stainless steel

Implementation of compact manifolds

- *Individual, customised and compact design*
- *Significantly smaller space requirement*
- *Valve body machined from one block of material*
- *Versatile connection and operator versions possible*
- *Assemblies and sensors can be integrated*
- *Shorter installation time*

Permanently controlled quality

Manufactured under cleanroom conditions

Purity, perfection, safety

To guarantee the highest purity all High Purity products are manufactured, cleaned, assembled and packed under cleanroom conditions.

Injection moulding

- *In separate rooms (materials used for high purity products are processed exclusively in separate rooms)*
- *In cleanroom ISO class 8, critical area (tools) under laminar flow, class 6*

Cleaning of High Purity products

Cleaning in four steps in a fully automated 3-chamber cleaning system:

- **Pre-cleaning (chamber 1 – spray cleaning)**
With DI water/tenside and special HP cleaning agent
- **Ultrasonic cleaning (chamber 2)**
Ultrasonic immersion cleaning using DI water
- **Final rinse with ultra pure water (chamber 3 – spray process)**
Final rinse using fresh DI water
- **Drying (chamber 3)**
Final hot air drying cycle using ultra pure air, ISO cleanroom class 6

Assembly, testing, packaging

The entire process comprising cleaning, assembly, test and packaging is taken care of in the cleanroom. The control of particle numbers/cleanroom class is made at regular intervals via GEMÜ standard operating procedures.

Ultra pure quality

GEMÜ products are subject to continuous quality management and monitoring. Tests carried out by independent test laboratories and users ensure that the quality is consistent and reproducible:

- *Use of specified/controlled raw materials, continuous incoming inspection*
- *Reference sampling for traceability*
- *SPC – statistic process control*
- *Continuous further development for staff*
- *Voluntary supervision*
- *Customer audits*
- *Continuous improvement process*
- *Certified in accordance with ISO 9001:2008*

DI water treatment plant

The quality of the DI water from the DI water system complies with the highest specifications:

18.2 MΩ DI water for cleaning and examination, pendulum softening. Reverse osmosis, UV sterilization, ion exchanger, polisher, submicron filter, PVDF loop, recirculation, continuous TOC value measurement.



Outdoor photo of the new building in Emmen / Canton Lucerne / CH

The manufacture of GEMÜ High Purity products is subject to a modern, continuous quality management system.

Constant reproducible quality in compliance with application and customer requirements is assured by e.g.

- *Use of specified and controlled raw materials*
- *SPC – statistic process control*
- *Constant training of staff*
- *Supervision*
- *Customer audits*
- *Continuous improvement (Deming circle / PDCA cycle)*





Headquarters in Ingelfingen-Criesbach

We would be happy to advise you on our comprehensive product range, as well as our highly efficient system solutions.

Get in touch with us so that we can tell you about the advantages and options for GEMÜ's High Purity/Critical Fluid Management solutions.

If requested, we can send you detailed product datasheets and descriptions about selected applications.



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and Semiconductor Department

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Product overview



			Valves			
Range / Type			CleanStar®	iComLine®	iComLine Multi-port valve blocks	PurePlus® 1 ½" and 2"
Features	Type		C60/C67	C50/C51/C57	C50/C51/C57	600/610/613/617/677/690/693
	Design		Diaphragm valve	Globe valve	Globe valve	Diaphragm valve
	Pressure range*		0 - 6 bar	0 - 6 bar	0 - 6 bar	0 - 6 bar
	Temperature		max. 150 °C	max. 150 °C	max. 150 °C	max. 90 °C
	Nominal size		DN 4 – 25 (1/4" – 1 ¼")	DN 4 – 25 (1/4" – 1 ¼")	DN 4 – 25 (1/4" – 1 ¼")	DN 15 - 100
Configuration	Operator	Manual	●	●	●	●
		Pneumatic	●	●	●	●
		Motorized				●
	Body material	PFA	●			
		PFA				●
		PTFE		●	●	
		PVDF	●		●	●
		PP	●		●	●
		PVC			●	
		Stainless steel			●	
	Seal material	PTFE	●	●	●	●
		FPM				
	Connection	Flare	●	●	●	
		Pillar		●	●	
		Weld	●		●	●
		Thread			●	
		Other			●	
Accessories	Positioners		●	●	●	●
	Electrical position indicators		●	●	●	●
Areas of application	Chemical handling		●	●	●	●
	Water treatment		●	●	●	●
	Waste water treatment		●	●	●	●
	Wet process equipment		●	●	●	●
	Slurry supply		●	●	●	●
	Solvent supply		●	●	●	●

* relative pressure



 Stainless steel valves	Measurement systems			Connection technology	
	HydraLine	SonicLine®	Flowmeters	TubeStar®	FlareStar®
601/602/605/612/ 625/650/654/673/ 687	C30/C31/C32	C38	823/824/833/834/ 873/883	Tubing	Fittings
Diaphragm valve	Pressure gauge	Ultrasonic flowmeter	Variable area flowmeter	Spools and straight tube pieces	Various versions
0 - 6 bar	0 - 6 bar	0 - 6 bar	0 - 10 bar	0 - 6 bar	0 - 6 bar
max. 150 °C	max. 60 °C	max. 60 °C	max. 90 °C	max. 150 °C	max. 150 °C
DN 8 - 50	DN 4 – 25 (1/4" – 1 1/4")	DN 6 – 20 (3/8" – 1")	DN 15- 50	DN 4 – 25 (1/4" – 1 1/4")	DN 4 – 25 (1/4" – 1 1/4")
●					
●					
	●	●		●	●
	●				
			●		
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	●	●			●
●			●		●
					●
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	●	●		●	●
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	●	●		●	●
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●	●	●		●	●



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