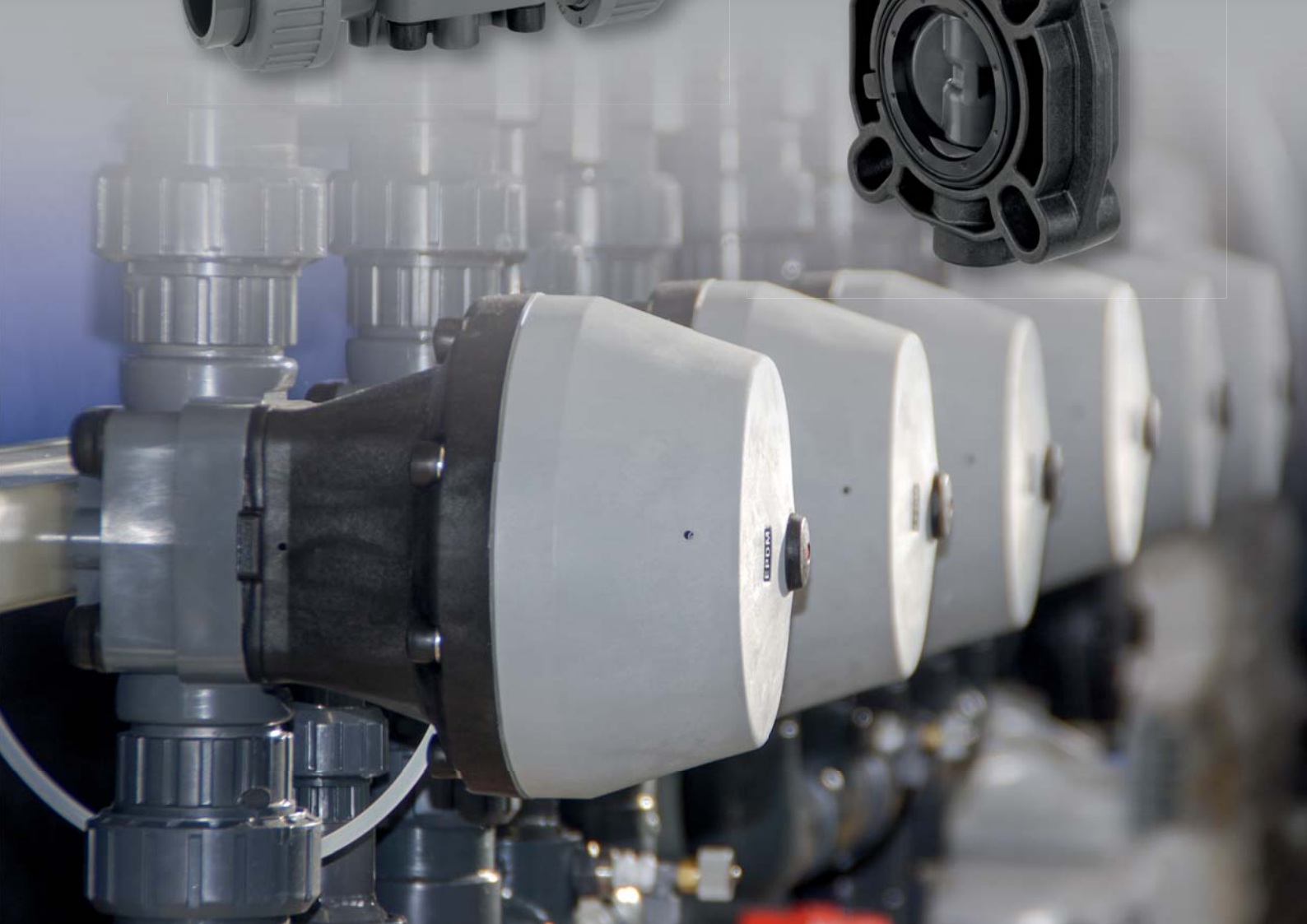


**GEMÜ®**

VALVES, MEASUREMENT AND  
CONTROL SYSTEMS

## *Plastic Valves and Flowmeters*





### The correct valve selection creates security

Within the various areas of application, valves are subject to widely different requirements. Chemical and physical properties of the working media have a direct influence on material selection of the components. Moreover, both mechanical and process-specific requirements have an immediate effect on the valve. To do justice to the given operating conditions on an individual basis, GEMÜ offers its customers a wide range of valve types as well as many material, connection and actuation options. Basically, the manufacturer's information and the interaction between the operating pressure / temperature must be taken into account.

GEMÜ is your valve and instrumentation partner. State-of-the-art factory equipment and machinery plus a motivated team ensure the best service through our world-wide network of distributors and sales subsidiaries. We are constantly making investments in order to optimise our existing products and to develop new products. Thus we can provide technical solutions for individual applications.



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# Diaphragm valves DN 12 - 100

## Product overview



Type	GEMÜ 617	GEMÜ R677	GEMÜ 610	GEMÜ R690
Operator	manual	manual	pneumatic	pneumatic
Nominal size	DN 12 to 20	DN 15 to 100	DN 12 to 20	DN 15 to 100
Connection	Spigots for welding, threaded spigots for unions with insert, threaded and solvent cement sockets, flare connection with union nut	Spigots for solvent cementing and welding, flanges, threaded spigots for unions with insert	Spigots for welding, threaded spigots for unions with insert, threaded and solvent cement sockets, flare connection with union nut	Spigots for solvent cementing and welding, flanges, threaded spigots for unions with insert. Different standards and designs available
Valve body material	PVC-U grey, PP reinforced, PP-H natural, PVDF	PVC-U grey, ABS, PP reinforced, PVDF	PVC-U grey, PP reinforced, PP-H natural, PVDF	PVC-U grey, ABS, PP reinforced, PVDF, inliner PP-H, grey / outliner PP reinforced, inliner PVDF / outliner PP reinforced
Media temperature *	-10 to 80 °C	-10 to 80 °C	-10 to 80 °C	-10 to 80 °C
Operating pressure *	0 to 6 bar	0 to 10 bar	0 to 6 bar	0 to 10 bar
Diaphragm material	EPDM, FPM, NBR, PTFE	EPDM, FPM, NBR, PTFE	EPDM, FPM, NBR, PTFE	NBR, FPM, EPDM, PTFE
Voltage	-	-	-	-

\* dependent on diaphragm material

**Elastomer diaphragms**  
diaphragm sizes 10 - 100  
choice of EPDM, NBR, FPM



**PTFE diaphragms**  
diaphragm sizes 10 - 100  
PTFE/EPDM laminated







GEMÜ R647	GEMÜ R680	GEMÜ 613	GEMÜ 693
pneumatic	electric	electric	electric
DN 15 to 50	DN 15 to 25	DN 12 to 15	DN 12 to 15
Spigots for solvent cementing and welding, flanges, threaded spigots for unions with insert. Different standards and designs available	Threaded spigots for unions with insert	Threaded sockets, solvent cement sockets, spigots for IR butt welding, union ends with insert	Threaded sockets, solvent cement sockets, spigots for IR butt welding, union ends with insert
PVC-U grey, ABS, inliner PP-H, grey / outliner PP reinforced, inliner PVDF / outliner PP reinforced	PVC-U grey, ABS, inliner PP-H, grey / outliner PP reinforced, inliner PVDF / outliner PP reinforced	PVC-U grey, PP reinforced, PVDF	PVC-U grey, PP reinforced, PVDF
-10 to 80 °C	-20 to 80 °C	-10 to 80 °C	-10 to 80 °C
0 to 6 bar	0 to 6 bar	0 to 6 bar	0 to 6 bar
NBR, FPM, EPDM	NBR, FPM, EPDM, PTFE	NBR, FPM, EPDM, PTFE	NBR, FPM, EPDM, PTFE
-	24 V DC	24 VDC, 120 VAC, 230 VAC 50/60Hz	24 VDC, 120 VAC, 230 VAC 50/60Hz

### Valve body versions



Backing flanges



Union ends

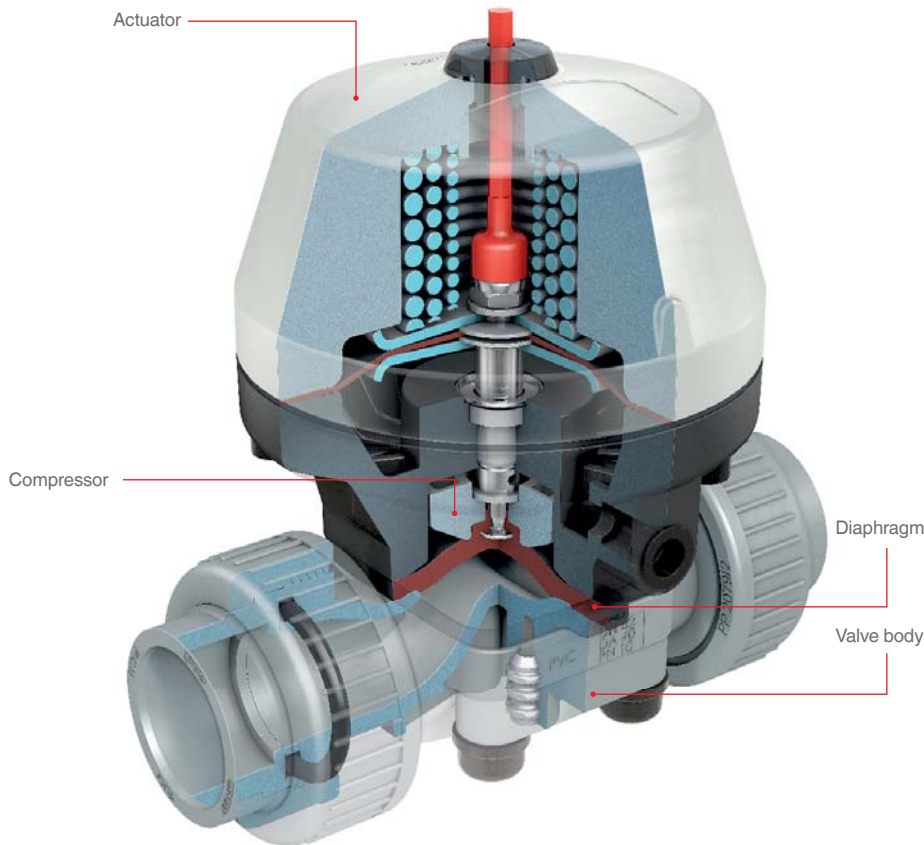


Butt weld spigots



Customised multi-port valve blocks

# The original GEMÜ seal system



As a recognised diaphragm valve specialist, GEMÜ are familiar with almost all industrial sectors and applications. We are the leading supplier of stainless steel valves for sterile applications in the pharmaceutical industry, biotechnology industry, as well as the foodstuff and beverage industries. As well as this, our valves also stand for reliability and a high standard of quality in the chemical and processing industries. The diaphragm, a central sealing element in the piping system is of major importance. Only the diaphragm and the valve body are in contact with the medium. At the same time, they also guarantee external hermetic sealing of the pipeline.

## The system is more than the sum of the individual parts

The outstanding characteristics of the diaphragm valve are the result of the perfect interaction of tuned components. These are the valve body, the shut-off diaphragm, the diaphragm fixing, the compressor as well as the actuator. Our many years of experience and intensive dialogue with plant operators has enabled us to continue optimising the diaphragm valve design and its individual components.

## Diaphragm and valve body are inseparable

GEMÜ valve bodies have a raised circular sealing bead on the inside diameter, in contrast to the valve bodies of other manufacturers. This results in a defined external sealing point. This measure reduces the ring-shaped gap between diaphragm and valve body in the external sealing area. This special feature makes GEMÜ diaphragm valves suitable for sterile applications. We also consider this crucial design and functional characteristic, which was developed by GEMÜ over three decades ago, during the development of our diaphragms. Only this ensures that our customers can rely on the valve as a complete unit.

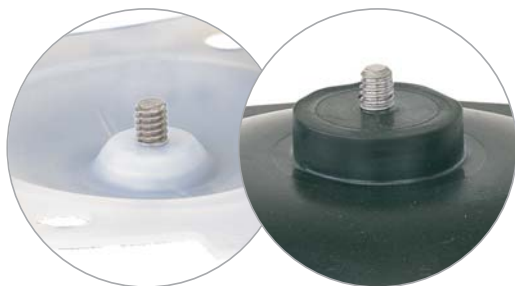
GEMÜ diaphragms have been developed, tested, and approved for applications with GEMÜ valve bodies. GEMÜ do not recommend or guarantee the use of other manufacturers diaphragms with GEMÜ valve bodies due to the unique original GEMÜ design and sealing system. We shall not accept any liability resulting from the use of diaphragms of other manufacturers inside GEMÜ diaphragm valves.

### GEMÜ flexible diaphragm fixing

The diaphragm is uniformly fixed in the compressor by means of a threaded pin. The only exception is the smallest diaphragm size (diaphragm size 8), which is pushed in with a rubber pin. The uniform fixing method applies both to soft elastomer and PTFE diaphragms. The largest advantage of fixing by means of a threaded pin, e.g. in comparison to a bayonet fitting, is that the force transfer is distributed onto the large area of the flanks of the screw thread. This prevents damage to the mechanical connection between compressor and diaphragm especially under vacuum operating conditions. The uniform fixing of elastomer and PTFE diaphragms permits subsequent replacement of the diaphragms at any time without having to exchange the actuator because its mounting is different like other manufacturers.



Diaphragm size 8



Diaphragm sizes 10 - 100

### Diaphragms without paint adhesion interfering substances

We supply valves and diaphragms, which are free from substances that prevent paint adhesion (e.g. silicone) for applications in the surface finishing/painting industry. The diaphragms and valves are cleaned accordingly and packed individually in plastic bags. Furthermore, silicone-free lubricants are used during assembly.



Packed diaphragms, without paint adhesion interfering substances

# **GEMÜ diaphragms**

## *Soft elastomer and PTFE*

### **Soft elastomer diaphragms**

Soft elastomer diaphragms consist of EPDM rubber mixtures, which are peroxidically cross-linked (vulcanised) with each other. The diaphragms are provided with different technical features according to the mixture used, the duration of the cross-linking process, the vulcanisation temperature as well as the vulcanisation pressure. The following statement applies in principle to soft elastomer materials: the higher the temperature load capability, the lower the service life is in relationship to the mechanical stress. Therefore both the temperature load and the deformability of diaphragms must be optimally adjusted to the application. Different constructional designs are available to achieve this. Soft elastomer diaphragms are characterised by a high insensitivity in the case of mechanically contaminated working media, e.g. cellular lumps, solid matter or catalytic solid matter. Slurries usually do not affect the function of the valve or the seal on the valve weir. Different EPDM rubber mixtures can be selected according to the operating/sterilisation temperatures and the chemical characteristics of the working media.



Code 17, diaphragm size 25

### **PTFE diaphragms**

The GEMÜ PTFE diaphragms are made of a chemically modified second-generation PTFE (TFM™ PTFE). They provide maximum chemical resistance. Even under steam conditions, PTFE diaphragms wear much more slowly than soft elastomer diaphragms. In the case of highly permeating media the structure of PTFE materials requires appropriately larger bonding thicknesses, stiffening this diaphragm version compared to pure soft elastomer diaphragms. Due to the higher rigidity the service life of the diaphragm may be reduced on high cycle duties depending on the application.



Code 5E, diaphragm size 25



# GEMÜ 617 / 610 / 613

## Diaphragm valves



GEMÜ 617  
manually operated

### Features

- DN 12 to 20
- Robust plastic bonnet
- Ergonomic, rising handwheel
- Option: lockable handwheel
- Optical position indicator



GEMÜ 610  
pneumatically  
operated

### Features

- DN 12 to 20
- Robust plastic piston actuator
- Connection thread for electrical position indicator, travel sensor and positioner
- Optical position indicator
- Connections: Threaded sockets, solvent cement sockets, flare connection, spigots and union ends
- Valve bodies in PVC-U grey, PP reinforced, PP-H natural and PVDF



GEMÜ 613  
motorized

### Features

- DN 12 to 15
- Position feedback by means of potential-free limit switches or potentiometer as an option
- Low maintenance motorized actuator with reversible synchronous motor
- Optical position indicator
- Connections: Threaded sockets, solvent cement sockets, spigots and union ends
- Valve bodies in PVC-U grey, PP reinforced, PVDF

# GEMÜ R677 / R690 / R647

## Diaphragm valves



GEMÜ R677  
manually operated

### Features

- DN 15 to 100
- Very compact bonnet design
- Integral optical position indicator
- Smooth surfaces (reduced dirt entrapment)
- Encapsulated threaded inserts
- Lockable handwheel



GEMÜ R690  
pneumatically  
operated

### Features

- DN 15 to 100
- Compact and lightweight construction (reduced control air volume)
- Smooth surfaces (reduced dirt entrapment)
- Integral optical position indicator
- Encapsulated threaded inserts
- Actuators bolted from below



GEMÜ R647  
pneumatically  
operated

### Features

- DN 15 to 50
- Compact design with good flow capability
- Simple diaphragm replacement
- Good flow characteristics due to flow optimised valve body
- Insensitive to particulate media
- Opened by operating pressure, closed by control pressure
- Diaphragm material NBR or EPDM

# **GEMÜ R680 / 693**

## *Diaphragm valves*



GEMÜ R680  
motorized

### **Features**

- DN 15 to 25
- Compact and lightweight construction
- Optional flow direction and installation position
- Insensitive to particulate media
- Integrated limit switches
- Optical position indicator



GEMÜ 693  
motorized

### **Features**

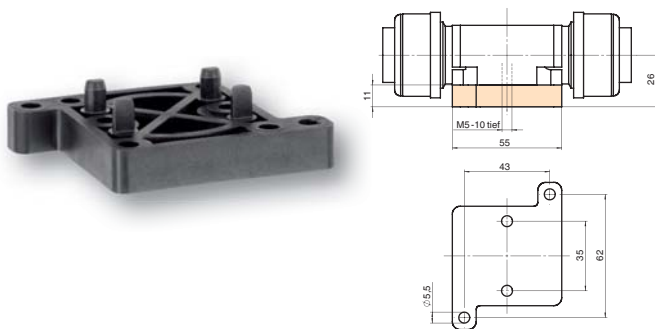
- DN 15 to 50
- Robust plastic actuator housing
- Consistent control system and reliable OPEN/CLOSE function
- Adjustable limit switch for valve stroke limitation
- Option: Electrical position feedback by means of a potentiometer
- Stainless steel distance piece
- Optical position indicator
- Manual override

# GEMÜ 1041 Compensating/mounting plates for GEMÜ plastic diaphragm valves

## GEMÜ 1041 000 Z02 - mounting compensating plate, PP (glass fibre reinforced)

**Function:** • Mounting plate for GEMÜ 610 and 617, DN 12 and 15

**Order code:** 1041 000 Z02

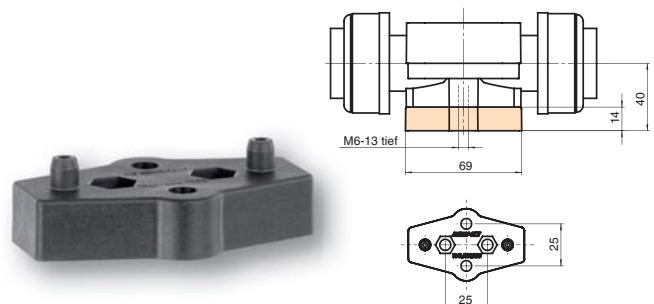


## GEMÜ 1041 000 Z05 - mounting compensating plate, PP (glass fibre reinforced)

**Function:** • A mounting plate to raise the valve body so unions do not foul mounting surfaces  
• Compensating plate for DN 15 - 25 so they align with the pipe centre of the DN 32 - 50 bodies when these are directly mounted without a compensating plate

**For valve type:** GEMÜ 693, R677, R690, R647

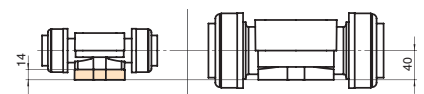
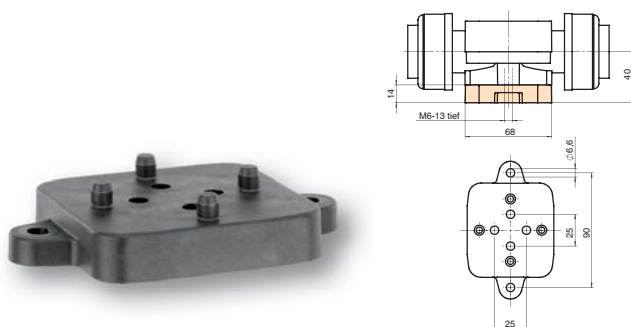
**Order code:** 1041 000 Z05



## GEMÜ 1041 000 Z03 - mounting compensating plate, PP (glass fibre reinforced)

**Function:** • A mounting plate to raise the valve body so unions do not foul mounting surfaces  
• Compensating plate for DN 15 - 25 so they align with the geometries of the DN 32 - 50 bodies when these are directly mounted without a mounting plate

**Order code:** 1041 000 Z03



GEMÜ 693	DN 15 - 25	DN 32 - 50
GEMÜ R647	DN 15 - 32	DN 40 - 50
GEMÜ R677, R690	DN 15 - 32	DN 40 - 65



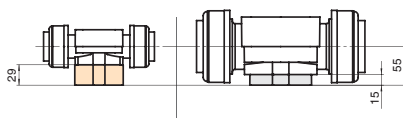
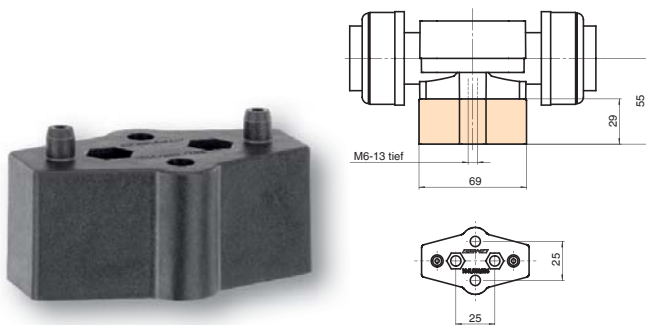
## GEMÜ 1041 000 Z06 - mounting compensating plate, PP

(glass fibre reinforced)

**Function:** • Compensating plate for DN 15 - 32 so they align with the pipe centres of the DN 32 - 65 bodies (when these are equipped with compensating plate GEMÜ 1041 000 Z07)

**For valve type:** GEMÜ 693, R677, R690, R647

**Order code:** 1041 000 Z06



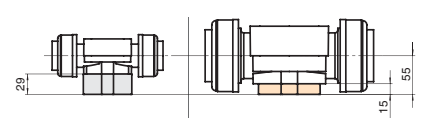
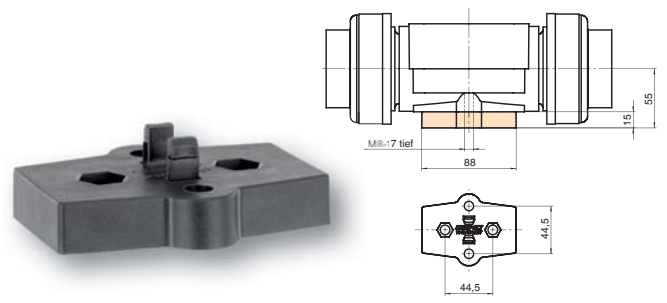
GEMÜ 693	DN 15 - 25	DN 32 - 50
GEMÜ R647	DN 15 - 32	DN 40 - 50
GEMÜ R677, R690	DN 15 - 32	DN 40 - 65

## GEMÜ 1041 000 Z07 - mounting compensating plate, PP

(glass fibre reinforced)

**Function:** • A mounting plate to raise the valve body so unions do not foul mounting surfaces  
• Compensating plate for DN 40 - 65 so they align with the pipe centres of the DN 15 - 32 bodies when these are equipped with compensating plate GEMÜ 1041 000 Z06 and compensating plate for GEMÜ R690 (DN 40 - 65) so they align with the pipe centres of GEMÜ R690 (DN 80) and GEMÜ 690 (DN 65 - 80)

**Order code:** 1041 000 Z07



GEMÜ 693	DN 15 - 25	DN 32 - 50
GEMÜ R647	DN 15 - 32	DN 40 - 50
GEMÜ R677, R690	DN 15 - 32	DN 40 - 65

## Other accessories



**Threaded socket GEMÜ 1031**  
Plastic PVC-U grey or PP,  
DN 15-50



**Union GEMÜ 1035**  
Plastic PVC-U grey, PP or PVDF,  
DN 10-100



**Flange GEMÜ 1034**  
Plastic PVC-U grey  
DN 15-100

# Multi-port valve blocks

Multi-port valves or multi-port valve blocks unite a variety of functions in the smallest of spaces thanks to their individual design, such as:

- *mixing*
- *dividing*
- *diverting*
- *draining*
- *feeding*

They can also fulfil safety functions, double shut-off (double block and bleed), cross connections and control functions. These individual functions serve very specific purposes in individual situations, such as the taking of samples, the distribution of chemicals, the connection of cleaning media (CIP) and ensuring a minimum flow rate. There are also numerous more complex functions in connection with process automation. Pressure or temperature sensors can be integrated for example. Intelligently designed, multi-port valve blocks can be developed into compact system components with a high degree of functionality.

## Advantages

- *Individual, customised and flexible design*
- *Very compact*
- *Fewer fittings, welds or solvent cemented joints*  
→ fewer potential leakage points
- *Lower assembly and installation costs*
- *Low hold-up volume, smaller wetted area*
- *Operators and diaphragms/seals from the proven GEMÜ modular system*
- *Produced from a single block of material (standard materials PVC-U, PP, PP natural, PVDF and PEEK); further materials on request*
- *Standard connections: threaded sockets, solvent cement spigots, butt weld spigots, union ends and flanges*



Multi-port valve block with integrated sensor system and filter unit



Multi-port valve block GEMÜ iComLine®

# **GEMÜ 563**

## *Globe valve*



GEMÜ 563  
motorized

### **Features**

- *DN 3 to 15*
- *Motorized dosing and control valve*
- *Kv values: 0.06 - 3.3 l/min*
- *Low maintenance motorized actuator with reversible synchronous motor*
- *Position feedback by means of potential-free limit switches or potentiometer as an option*
- *Optical position indicator*
- *Option with integrated positioner for position control or control of process variables, consistent control system*

## **Plastic diaphragm valves** for ultra pure media



GEMÜ CleanStar® valves

**CleanStar®** PFA or PP valves

**PurePlus®** PVDF-HP and PP-HP valves

**iComLine®** Valves with innovative globe diaphragm valve design, all media wetted parts made of PTFE



Water treatment with GEMÜ PurePlus® valves



Plant in the semiconductor industry with GEMÜ iComLine® valves

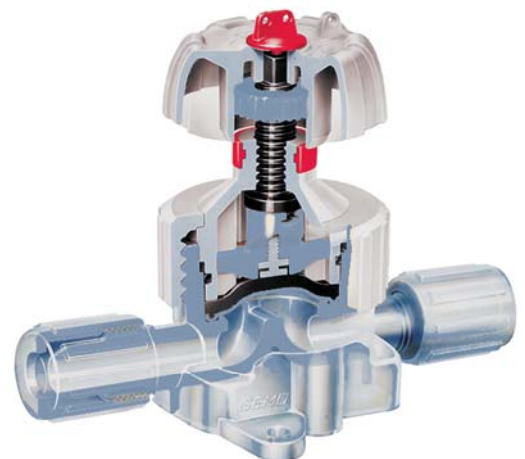
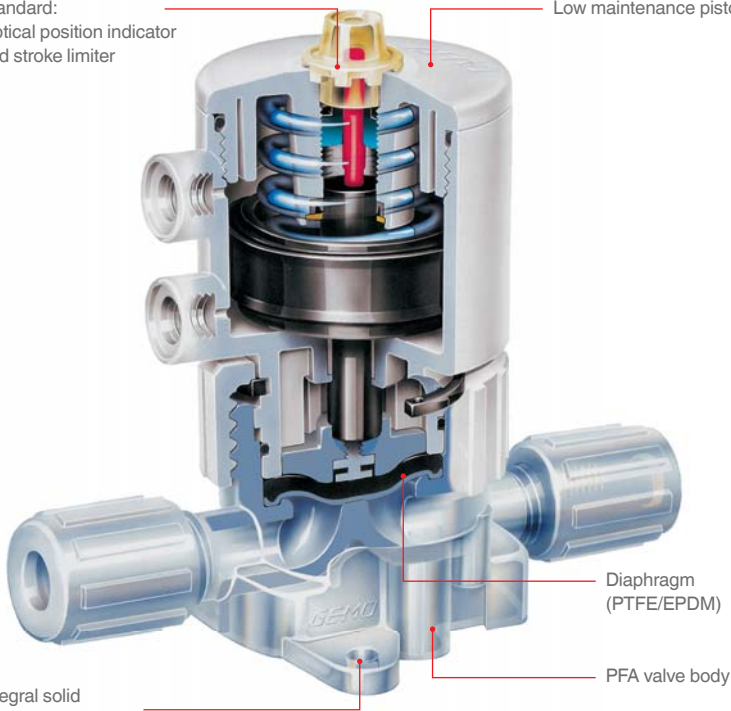


# GEMÜ CleanStar®

## Ultra pure PFA and PP diaphragm valves

Standard:  
Optical position indicator  
and stroke limiter

Low maintenance piston actuator



Type	GEMÜ C67 CleanStar®	GEMÜ C60 CleanStar®	GEMÜ C67, C60 CleanStar® SmartLine
Operator	manual	pneumatic	manual / pneumatic
Nominal size	DN 4 – 25 (1/4" - 1 1/4")	DN 4 – 25 (1/4" - 1 1/4")	DN 10 - 32 (1/2" - 1 1/4")
Connection	Flare connection, butt weld spigots	Flare connection, butt weld spigots	Flare connection, butt weld spigots
Valve body material	PFA, PVDF	PFA, PVDF	PP-H grey, PP-R natural
Media temperature *	-10 to 80 °C	-10 to 80 °C	-10 to 90 °C
Operating pressure *	0 to 6 bar	0 to 6 bar	0 to 6 bar
Diaphragm material	PTFE/EPDM	PTFE/EPDM	PTFE/EPDM

\* dependent on diaphragm material

# GEMÜ C60, C67 CleanStar®



GEMÜ C67 CleanStar®  
manually operated

## Features

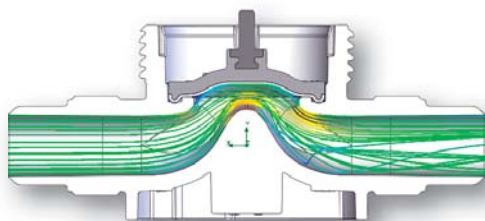
- Ergonomic handwheel
- Metal-free
- External operator parts in PVDF
- Standard stroke limiter and position indicator
- Union nut optionally in ECTFE
- HighFlow version available



GEMÜ C60 CleanStar®  
pneumatically operated

## Features

- 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



GEMÜ C60 CleanStar®  
High-Flow valve body

## Features

- 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



GEMÜ C60 CleanStar®  
SmartLine  
pneumatically operated

#### Features

- Design 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



GEMÜ C67 CleanStar®  
3-way valve with dual  
operator concept

#### Features

- Ergonomic handwheel
- Metal-free
- External operator parts in PVDF
- Standard stroke limiter and position indicator
- Union nut optionally in ECTFE
- HighFlow version available



GEMÜ C60 CleanStar®  
T valve

#### Features

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

# GEMÜ PurePlus®

## Ultra pure PVDF/PP diaphragm valves



Type	GEMÜ 617 HP	GEMÜ 677 HP	GEMÜ 610 HP	GEMÜ 690 HP
Operator	manual	manual	pneumatic	pneumatic
Nominal size	DN 12 to 15	DN 15 to 100	DN 12 to 15	DN 15 to 100
Connection	Threaded sockets, union ends, butt weld spigots	Butt weld spigots	Butt weld spigots	Union ends, butt weld spigots
Valve body material	PVDF	PFA inliner/ PVDF outliner	PFA inliner/ PVDF outliner	PFA inliner/ PVDF outliner
Media temperature *	-10 to 80 °C	-10 to 90 °C	-10 to 80 °C	-10 to 90 °C
Operating pressure *	0 to 6 bar	0 to 6 bar	0 to 6 bar	0 to 8 bar
Diaphragm material	PTFE/EPDM	PTFE/EPDM	PTFE/EPDM	PTFE/EPDM

\* dependent on diaphragm material



# GEMÜ 617 HP, 677 HP, 610 HP, 690 HP PurePlus®



GEMÜ 617 HP  
manually operated

## Features

- DN 12 to 15
- Any flow direction and installation position
- Suitable for high purity media
- Media wetted parts in PP or PVDF and PTFE
- Minimal contamination
- Minimal deadleg



GEMÜ 677 HP  
manually operated

## Features

- DN 15 to 100
- PTFE/EPDM diaphragm
- 2/2-way valve body
- Butt weld spigots
- Valve body material PP-HP



GEMÜ 610 HP  
pneumatically operated

## Features

- DN 12 to 15
- PTFE/EPDM diaphragm
- 2/2-way or T valve body
- Butt weld spigots and union ends
- Valve body material PVDF-HP



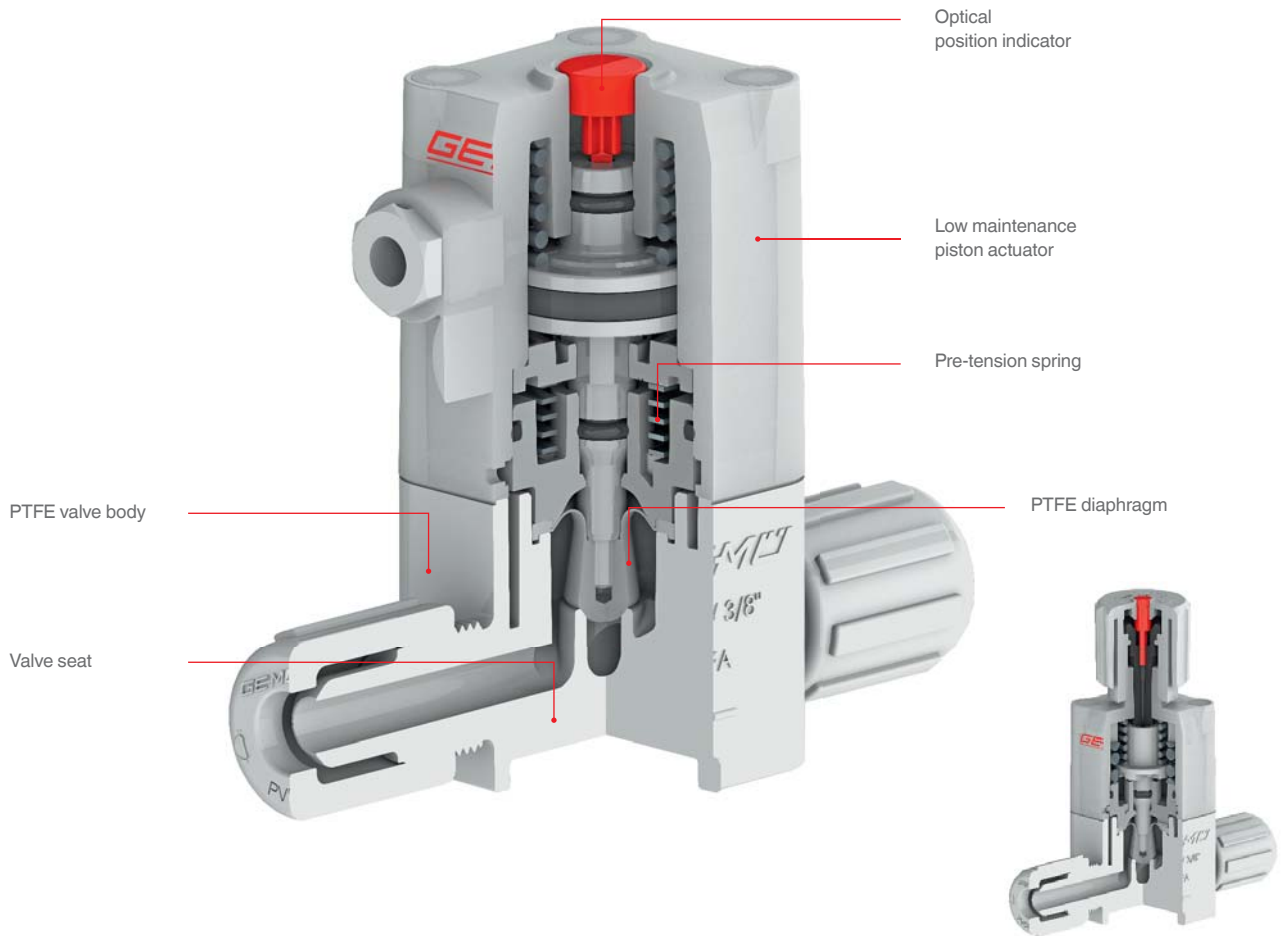
GEMÜ 690 HP  
pneumatically operated

## Features

- DN 15 to 100
- PTFE/EPDM diaphragm
- 2/2-way or T valve body
- Butt weld spigots and union ends
- Valve body material PVDF-HP

# GEMÜ iComLine®

## Ultra pure PTFE diaphragm globe valves



Type	GEMÜ C50 iComLine®	GEMÜ C51 iComLine®	GEMÜ C57 iComLine®
Operator	pneumatic	pneumatic	manual
Nominal size	DN 4 to 25 (1/4" to 1 1/4")	DN 4 to 25 (1/4" to 1 1/4")	DN 4 to 25 (1/4" to 1 1/4")
Connection	Flare and Pillar™ connection	Flare and Pillar™ connection	Flare and Pillar™ connection
Valve body material	PTFE	PTFE	PTFE
Media temperature *	-10 to 80 °C	-10 to 90 °C	-10 to 90 °C
Operating pressure *	0 to 6 bar	0 to 6 bar	0 to 8 bar
Diaphragm material	PTFE	PTFE	PTFE

\* dependent on diaphragm material

# GEMÜ C50, C51, C57 iComLine®



GEMÜ C50 iComLine®  
pneumatically operated

## Features

- DN 4 to 25 (1/4" to 1 1/4")
- 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®  
manually operated  
(quarter turn)

## Features

- DN 4 to 25 (1/4" to 1 1/4")
- 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



GEMÜ C57 iComLine®  
manually operated

## Features

- DN 4 to 25 (1/4" to 1 1/4")
- Ergonomic handwheel
- All external operator parts in PVDF
- All media wetted parts in PTFE
- Optical position indicator
- Integral mounting lugs

# Butterfly valves

- DN 15 to 300
- GEMÜ RSK check valves
- Operators: manual, pneumatic and motorized
- Extensive range of accessories:
  - Pilot valves
  - Electrical position indicators
  - Optical position indicators
  - Electro-pneumatic positioners and process controllers



Type	GEMÜ 417	GEMÜ 410	GEMÜ 423	GEMÜ D457	GEMÜ D451	GEMÜ D458
<b>Operator</b>	manual	pneumatic	electric	manual	pneumatic	electric
<b>Nominal size</b>	DN 15 to 100	DN 15 to 100	DN 15 to 100	DN 50 to 300	DN 50 to 300	DN 50 to 300
<b>Connection</b>	Union ends with DIN insert (socket), union ends with inch insert (socket)	Union ends with DIN insert (socket), union ends with inch insert (socket)	Union ends with DIN insert (socket), union ends with inch insert (socket)	EN 1092 PN 10 / ANSI B16.5, Class 150 / JIS 10K	EN 1092 PN 10 / ANSI B16.5, Class 150 / JIS 10K	EN 1092 PN 10 / ANSI B16.5, Class 150 / JIS 10K
<b>Valve body material</b>	PVC-U grey	PVC-U grey	PVC-U grey	PP (GF)	PP (GF)	PP (GF)
<b>Media temperature *</b>	-10 to 60 °C	-10 to 60 °C	-10 to 60 °C	0 to 90 °C	0 to 90 °C	0 to 90 °C
<b>Operating pressure *</b>	0 to 6 bar	0 to 6 bar	0 to 6 bar	0 to 10 bar	0 to 10 bar	0 to 10 bar
<b>Disc material</b>	PVDF, PP	PVDF, PP	PVDF, PP	PVC-U, PVC-C, PP-H	PVC-U, PVC-C, PP-H	PVC-U, PVC-C, PP-H
<b>Seal material</b>	FPM, EPDM	FPM, EPDM	FPM, EPDM	FPM, EPDM	FPM, EPDM	FPM, EPDM
<b>Voltage</b>	-	-	24 VDC, 120 VAC, 230 VAC 50/60Hz	-	-	24 VDC, 120 VAC, 230 VAC 50/60Hz

\* dependent on nominal size and design





# GEMÜ 417, 410, 423



GEMÜ 417  
manually operated



## Features

- DN 15 to 100
- Integrated locking device
- Ergonomic operator
- One-piece butterfly disc and shaft



GEMÜ 410  
pneumatically operated

## Features

- DN 15 to 100
- Low maintenance, corrosion resistant pneumatic actuator
- Connection thread for electrical position indicator and accessories
- Control air connector
- One-piece butterfly disc and shaft
- Optional electrical position indication via two potential-free limit switches
- Optional stroke limiter



GEMÜ 423  
motorized

## Features

- DN 15 to 100
- Powerful, reversible DC motor
- Low maintenance electric actuator
- Option with electrical position feedback by potential-free limit switches
- Integral position indicator
- Option with emergency power supply
- Integrated manual override
- One-piece butterfly disc and shaft

# GEMÜ D457, D451, D458



GEMÜ D457  
manually operated

## Features

- DN 50 to 300
- Lockable hand lever
- Pneumatic or motorized actuators can be retrofitted
- Low weight
- Wafer body for flange connection acc. to EN 1092, ANSI, JIS
- Variety of materials: Disc material made of PVC-U, PVC-C, PP-H



GEMÜ D451  
pneumatically operated

## Features

- DN 50 to 300
- Pneumatic plastic piston actuator
- Connection thread for electrical position indicator, positioner and accessories
- Low weight



GEMÜ D458  
motorized

## Features

- DN 50 to 300
- Low maintenance electric actuator
- Optical position indicator
- Option with integrated positioner
- Integrated manual override
- Low weight

# Ball valves

- Good flow capability
- All media wetted parts and actuator housing are made of plastic
- Suitable for clean, non-particulate media (inert or corrosive and gaseous or liquid), which have no negative impact on the physical and chemical properties of the body and seal material
- Maximum permissible operating temperature 120 °C, dependent on operating pressure and body material



Type	GEMÜ 717	GEMÜ S717	GEMÜ 710	GEMÜ 723
Operator	manual	manual	pneumatic	electric
Nominal size	DN 10 to 100	DN 10 to 100	DN 10 to 100	DN 10 to 100
Body configuration	Straight through: (2/2-way): DN 10 - DN 100 Multi-port: (3/2-way): DN 10 - DN 50	Straight through: (2/2-way)	Straight through: (2/2-way): DN 10 - DN 100 Multi-port: (3/2-way): DN 10 - DN 50	Straight through: (2/2-way): DN 10 - DN 100 Multi-port: (3/2-way): DN 10 - DN 50
Connection	Solvent cement/welded sockets DIN and BS, flanges DIN and ANSI, union ends with insert PE, PP, PVDF in DIN for IR/butt welding, RP threaded sockets	Solvent cement/welded sockets DIN, Union ends with inch insert (socket), RP threaded sockets	Solvent cement/welded sockets DIN and BS, flanges DIN and ANSI, union ends with insert PE, PP, PVDF in DIN for IR/butt welding, RP threaded sockets	Solvent cement/welded sockets DIN and BS, flanges DIN and ANSI, union ends with insert PE, PP, PVDF in DIN for IR/butt welding, RP threaded sockets
Valve body material	PVC-U, PVC-C, ABS, PP-H, PVDF	PVC-U, PP-H	PVC-U, PVC-C, ABS, PP-H, PVDF	PVC-U, PVC-C, ABS, PP-H, PVDF
Media temperature *	-40 to 120 °C	0 to 60 °C	-40 to 120 °C	-40 to 120 °C
Operating pressure **	0 to 16 bar	0 to 16 bar	0 to 10 bar	0 to 10 bar
PN	PVC-U, PVC-C and PVDF: PN16 ABS, PP, PVC-C (from DN 65): PN10	PVC-U (DN 10 to 50): PN 16 PVC-U (DN 65 to 100), PP-H (DN 10 to 100): PN 10	PVC-U, PVC-C and PVDF: PN16 ABS, PP, PVC-C (from DN 65): PN10	PVC-U, PVC-C and PVDF: PN16 ABS, PP, PVC-C (from DN 65): PN10
Voltage	-	-	-	12 V - 24 V DC 12 V - 24 V AC 100 V - 250 AC

\* dependent on nominal size and operating pressure; \*\* dependent on nominal size and operating temperature

# GEMÜ 717, S717, 710, 723



GEMÜ 717  
manually operated

## Features

- DN 10 to 100
- Ergonomic hand lever
- High quality design for the chemical industry
- Robust 2/2-way and 3/2-way body
- Locking mechanism to secure union nuts



GEMÜ S717  
manually operated

## Features

- DN 10 to 100
- Robust 2/2-way body
- Ergonomic hand lever with non-slip rubber coating
- Various connections available



GEMÜ 710  
pneumatically operated

## Features

- DN 10 to 100
- Pneumatic plastic piston actuator
- Connection thread for accessories
- Control air connector (DA), vent hole (NC)
- High quality design for the chemical industry
- Robust 2/2-way and 3/2-way body
- Locking mechanism to secure union nuts



GEMÜ 723  
motorized

## Features

- DN 10 to 100
- Low maintenance electric actuator
- Powerful, reversible DC motor
- Option with electrical position feedback by potential-free limit switches
- Option with emergency power supply
- Integrated manual override and position indicator
- High quality design for the chemical industry
- Robust 2/2-way and 3/2-way body
- Locking mechanism to secure union nuts

# Angle seat valves

## Angle seat globe valve with handwheel GEMÜ N507

The GEMÜ N507 manually operated valve consists entirely of plastic. All components (except for sealing elements) are made from PVC-U.

## Check valve GEMÜ N560

The GEMÜ N560 check valve comprises an angle seat globe valve body made of plastic (either PVC-U or PP-H). The sealing elements are manufactured from EPDM and FPM.

## Strainer GEMÜ N570

The GEMÜ N570 strainer has a plastic body (PVC-U or PP-H). The sealing elements are manufactured from EPDM or FPM. The integrated filter insert filters suspended matters in the medium.



Type	GEMÜ N507	GEMÜ N560	GEMÜ N570
Operator	manual	Check valve	Strainer
Nominal size	DN 10 to 100	PVC-U: DN 10 to 100, PP-H: DN 15 to 80	PVC-U: DN 10 to 100 PP-H: DN 15 to 100
Body configuration	Straight through: (2/2-way)	Straight through: (2/2-way)	Straight through: (2/2-way)
Connection	Spigots DIN, Threaded sockets DIN ISO 228, Solvent cement/welded sockets DIN, Flanges EN 1092 / PN 10 / form B	Spigots DIN, Threaded sockets DIN ISO 228, Solvent cement/welded sockets DIN, Flanges EN 1092 / PN 10 / form B, Flanges ANSI Class 150 FF	Spigots DIN, Threaded sockets DIN ISO 228, Solvent cement/welded sockets DIN, Flanges EN 1092 / PN 10 / form B, Flanges ANSI Class 150 FF
Valve body material	PVC-U, grey	PVC-U, grey; PP-H, grey	PVC-U, grey; PVC-U, transparent; PP-H, grey
Media temperature *	10 to 60 °C	PVC-U: 10 to 60 °C, PP-H: 5 to 80 °C	PVC-U: 10 to 60 °C, PP-H: 5 to 80 °C
Operating pressure **	0 to 16 bar	PVC-U: 0 to 16 bar PP-H: 0 to 10 bar	PVC-U: 0 to 16 bar PP-H: 0 to 10 bar
Seal material	FPM, EPDM	FPM, EPDM	FPM, EPDM

\* dependent on nominal size and operating pressure; \*\* dependent on nominal size and operating temperature



# GEMÜ N507, N560, N570



GEMÜ N507  
manually operated

## Features

- DN 10 to 100
- Not suitable for gases as not soft seated
- Made from corrosion resistant materials
- Good flow capability
- For isolation and control of liquids in pipings



GEMÜ N560  
Check valve

## Features

- DN 10 to 100
- Made from corrosion resistant materials
- Good flow capability
- To protect the pipelines against emptying of liquids



GEMÜ N570  
Strainer

## Features

- DN 10 to 100
- Made from corrosion resistant materials
- Filters available in various materials and mesh sizes
- Strainer for holding back impurities in flowing liquids

# Positioners and process controllers

## Overview

GEMÜ pneumatic actuators can usually be paired with our electro-pneumatic positioners and process controllers. In addition to the process parameters and the control system for which a positioner must be suitable, other technical functions and properties also play an important part in the selection of the right positioner.

To make your choice easier, we have placed the four GEMÜ positioners in a comparison based on important features.



Function / Features		GEMÜ 1434 µPos®	GEMÜ 1435 ePos®	GEMÜ 1436 cPos®	GEMÜ 1436 cPos® eco
<b>Controller type</b>	Positioner	●	●	●	●
	Process controller			●	
<b>Operation</b>	Local display / keypad		●	●	
	Status display	●	●	●	●
	Web browser user			●	
	Fieldbus option (Profibus DP, Device Net)			●	
<b>Housing</b>	Plastic	●		●	●
	Aluminium		●		
<b>Functions</b>	Automatic initialisation ( <b>speed<sup>AP</sup></b> )	●	●	●	●
	Alarm / error outputs		●	●	
	Min/max positions adjustable		●	●	
<b>Mounting</b>	Direct mounting to linear actuators	●	●	●	●
	Remote mounting to linear actuators	●	●	●	●
	Direct mounting to quarter turn actuators		●	●	●
	Remote mounting to quarter turn actuators	●	●	●	●
<b>Control function of valve actuator</b>	Control function 1, normally closed (NC)	●	●	●	●
	Control function 2, normally open (NO)	●	●	●	●
	Control function 3, double acting (DA)		●	●	
<b>Air output</b>	15 NI/min.	50 NI/min. 90 NI/min.	150 NI/min. 200 NI/min. 300 NI/min.	15 NI/min.	

# Combi switchboxes and electrical position indicators

## Combi switchboxes and electrical position indicators are integrated components of an intelligent process automation system

Intelligent process automation follows a comprehensive approach which comprises the upper control levels as well as also innovative components and valves at the field level. GEMÜ has been offering valves and precisely tuned valve instrumentation, controllers, sensor systems, valve actuators, and system solutions for process automation for some years now: It could be said that you take care of your process, we take care of the component interfaces. Moreover, we believe that the

most reliable and safest monitoring of valves always take place directly at the valve itself.

Linear type valves and quarter turn valves are frequently used with electrical position indicators. GEMÜ provides the most varied designs to suit any automation concept. The product range not only comprises simple switches but also intelligent designs equipped with timesaving automated initialisation. Explosion proof versions are also available. Advanced combi switchboxes may be used in fieldbus networks such as AS-interface and DeviceNet.



GEMÜ 1235  
with GEMÜ R690 diaphragm valve



GEMÜ 4221  
with GEMÜ D451 plastic butterfly valve



GEMÜ 1234  
with GEMÜ 610 diaphragm valve

# Combi switchboxes and electrical position indicators for pneumatically operated linear valves

Our devices detect the valve stroke in any installation position without play and are tension-free. The sensor base of the GEMÜ 1234, 1235, 4222 and 4242 series is positively connected to the valve spindle by means of a preloaded spring so that possible tangential forces of the valve actuator do not negatively affect the position indicator. The position indicators can be quickly and easily assembled and are safe and uncomplicated to handle.

They can be adapted to pneumatic actuators of GEMÜ globe and diaphragm valves. Due to its special design, the GEMÜ 9415 quarter turn actuator may likewise be combined with this type of position indicator.



	Combi switchboxes					Electrical position indicators									
Device type	4242 <sup>1</sup>	4212 <sup>1</sup>	4222 (end-of-series article)	4226	4216	1234	1235/ 1236	1242	1201	1211	1231	1214	1215	1230	1232
Valve stroke (in mm)	2 - 30	5 - 75	3 - 30 6 - 50 9 - 75	up to 30	up to 50	1 - 10	2 - 30 4 - 50 5 - 75	2 - 46	2 - 70	2 - 70	2 - 20	2 - 70		2 - 20	2 - 20
Electrical connection	M12			Cable gland		M12			Cable gland			Cable gland, M12 (optional)			
Programmable	●	●	●			●	●	●							
With integrated pilot valve	●	●	●	●	●										
Ex design	*	*		●	●			*		●	●		● <sup>2</sup>		
Fieldbus interface	●	●	●			●		●							
Mechanically adjustable (proximity switches)				●	●					●	●	●			●
Mechanically adjustable (microswitches)									●					●	
IO-Link interface	●	●					●	●							
Optical position indicator (LEDs)	●	●	●			●	●	●				●		●	●
Optical position indicator (mechanical)		●											●		
Feedback (OPEN and CLOSED)	●	●	●	●	●	●	●	●	●	●	●	●		●	●
Feedback (OPEN)													●		

<sup>1</sup> alternative product for end-of-series article GEMÜ 4222

<sup>2</sup> not with optional M12 plug

\* under development (expected end of 2016)

# Electrical position indicators for pneumatically operated quarter turn valves

Various electrical position indicators are available for ball valves and butterfly valves. These devices detect the valve position in any installation position without play and are tension-free. The position indicators can be quickly and easily assembled and are safe and uncomplicated to handle.

The special design of the GEMÜ 9415 quarter turn actuator enables its combination with electrical position indicators for linear actuators.



GEMÜ 4221  
with DR/SC actuator

Device type	4221* (end-of-series article)	LSR 2xx	LST 2xx	LSF 2xx	LSR 3xx	LST 3xx	LSF 3xx	LSR 1xx	LST 1xx	PCR	1226	1225
Travel range	0 – 90°	0 – 90°	0 – 90°	0° / 90°	0 – 90°	0 – 90°	0° / 90°	0 – 90°	0 – 90°	0 – 90°	0° / 90°	0 – 90°
Connection	M12 x 1 5-pin	M20 x 1.5	M20 x 1.5	M12 x 1 4-pin	M20 x 1.5	M20 x 1.5	M12 x 1 4-pin	M20 x 1.5	M20 x 1.5	M20	PG 13.5	PG 13.5
Programmable	●											
With integrated pilot valve	●											
Ex design		●	●	●								
Fieldbus interface	●											
Mechanically adjustable (proximity switches)		●	●		●	●						
Mechanically adjustable (microswitches)								●	●	●		●
Optical position indicator (LEDs)	●			●			●					●
Optical position indicator (mechanical)		●	●	●	●	●	●	●	●	●	●	●
Feedback (OPEN and CLOSED)	●	●	●	●	●	●	●	●	●	●	●	●

\* Combi switchbox



# Pilot valves and valve manifolds

GEMÜ provides a wide range of pilot valves and valve manifolds. The range includes pilot valves for direct mounting to pneumatic valve actuators as well as single valves, valve batteries and complete valve manifolds for assembly in a control cabinet. In addition to the standard connection methods, pilot valves are also available for fieldbus connections (AS-interface, LON, Profibus, etc.).

## GEMÜ 0322, 0324, 0326

3/2-way valves in plastic  
Nominal size: DN 2  
Air output approx. 1.2 l/min



## GEMÜ 8458

5/2-way piston valve with aluminium body  
Nominal size: DN 6  
Air output approx. 1,200 l/min



## GEMÜ 332 - 336

3/2-way valves in plastic  
Nominal size: DN 1  
Air output approx. 0.8 l/min



## GEMÜ 8505

4/2-way piston valve with aluminium body  
Nominal size: DN 4 / DN 7  
Air output approx. 700 / 1,400 l/min



## GEMÜ 8357

3/2-way piston valve with aluminium body  
Nominal size: DN 6  
Air output approx. 1,200 l/min



## GEMÜ 8506

3/2 and 5/2-way piston valve with aluminium body  
Nominal size: DN 6  
Air output approx. 1,200 l/min



	GEMÜ 0322, 0324	GEMÜ 332 - 336	GEMÜ 8357	GEMÜ 8458	GEMÜ 8505	GEMÜ 8506
3/2-way valve, plastic body	●	●				●
3/2-way valve, aluminium body			●			
4/2-way valve, aluminium body				●		
5/2-way valve, aluminium body					●	●
Nominal size	DN 2	DN 1	DN 6	DN 6	DN 4 / DN 7	DN 6
Air output in l/min	1.2	0.8	1,200	1,200	700 / 1,400	1,200
Single mounting	●	●	●	●	●	●
Direct mounting to pneumatic actuator	●	●	●	●	●	●
Battery mounting	●	●				
Valve manifold						
Manual operation	●	●	●	●	●	●
Explosion-proof rating	●	●				

# Solenoid valves

The GEMÜ solenoid valves are suitable for inert and corrosive liquid and gaseous media. They are corrosion-resistant and therefore particularly suitable for:

- *Water treatment plant, washing and cleaning installations*
- *Plant for food and foodstuff industries, the chemical industry and electroplating*
- *Equipment for the photographic industry, laboratory, analytical and medical apparatus*



Type	GEMÜ 52	GEMÜ 102	GEMÜ 202	GEMÜ 205	GEMÜ 225
<b>Actuator</b>	Directly controlled	Directly controlled	Directly controlled	Directly controlled	Servo assisted
<b>Nominal size</b>	DN 2 - 6	DN 6 - 10	DN 10 - 15	DN 10 - 50	DN 15 - 50
<b>Connection</b>	Threaded sockets DIN ISO 228, solvent cement sockets - DIN	Threaded sockets DIN ISO 228, solvent cement sockets - DIN	Threaded sockets DIN ISO 228, solvent cement sockets - DIN	Spigots DIN, threaded sockets DIN ISO 228, threaded sockets NPT, solvent cement sockets DIN, solvent cement spigots, inch, union ends with DIN insert (socket)	Spigots DIN, solvent cement spigots, inch, union ends with DIN insert (socket)
<b>Valve body material</b>	PVC-U grey, PVDF	PVC-U grey, PVDF	PVC-U grey, PVDF	PVC-U grey, PVDF	PVC-U grey, PVDF
<b>Media temperature *</b>	-20 to 100 °C	-20 to 100 °C	-20 to 100 °C	-20 to 60 °C	-20 to 60 °C
<b>Operating pressure *</b>	0 to 6 bar	0 to 4 bar	0 to 2 bar	0 to 6 bar	0 to 6 bar
<b>Seal material</b>	FPM, PTFE, EPDM	FPM, PTFE, EPDM	FPM, PTFE, EPDM	FPM, PTFE, EPDM	FPM, EPDM
<b>Voltage</b>	12 VDC, 24, 120, 230 VDC or VAC, 50/60Hz	12, 24, 120, 230 VDC or VAC, 50/60Hz	12, 24, 120, 230 VDC or VAC, 50/60Hz	24 VDC, 24, 120, 230 VAC 50/60Hz	24 VDC, 24, 120, 230 VAC 50/60Hz

\* dependent on nominal size and design

# GEMÜ 52, 102, 202



GEMÜ 52  
directly controlled  
DN 2 - 6



GEMÜ 102  
directly controlled  
DN 6 - 10



GEMÜ 202  
directly controlled  
DN 10 - 15

## Features

- 2/2-way solenoid valves
- Completely plastic encapsulated DC coil
- The solenoid can be replaced without removing the valve body from the pipeline
- Connector plug to DIN EN 175301-803 form A. The connector plug has a rectifier for use with an AC supply
- The solenoid can be replaced without removing the valve body from the pipeline
- Hermetic separation between medium and actuator by PTFE bellows
- Good cleanability (the valves can be dismantled without tools by unscrewing the union nut)
- ROHS compliant



# GEMÜ 205, 225



GEMÜ 205  
directly controlled

## Features

- DN 10 to 50
- High performance DC coil
- Connector plug to DIN EN 175301-803 form A.
- The connector plug has a rectifier for use with an AC supply
- Optical position indicator
- Manual override
- Hermetic separation between medium and actuator



GEMÜ 225  
directly controlled

## Features

- DN 15 to 50
- High performance DC coil
- Connector plug to DIN EN 175301-803 form A.
- The connector plug has a rectifier for use with an AC supply
- Piston mechanism, designed as servo control, assists the coil
- Optical position indicator
- Manual override
- Hermetic separation between medium and actuator

# GEMÜ pressure control valves

## Pressure retaining valves GEMÜ N086, N186 and N786

The GEMÜ N086 and N186 pressure retaining valves are used to provide a constant back pressure in process plant. They can also be used as pressure relief valves to reduce pressure peaks. Due to their minimal deadleg design, types N086 and N186 are particularly well suited to ultra pure water applications. The product range has been expanded to include the pressure retaining valve GEMÜ N786.

## Pressure relief valves GEMÜ N085 and N185

Plant and piping systems are protected against gauge pressure and pressure peaks using pressure relief valves from the GEMÜ N085 and N185 series.

A third pipe spigot facilitates installation in the main pipe through which any overpressure is relieved. Due to the minimal deadleg and flow-efficient design of the valve body, there is only a minimal pressure loss through the valve.

## Pressure reducers GEMÜ N082, N182 and N782

GEMÜ pressure reducers are used to reduce the pressure to a specified value, which can be conveniently set using a set screw. The inlet pressure is reduced to the required outlet pressure utilizing the pressure differential.



Type	GEMÜ N086, N186, N786	GEMÜ N082, N182, N782	GEMÜ N085, N185
Nominal size	DN 10 to 100 *	DN 10 to 100 *	DN 10 to 100 *
Connection	Spigots, flanges, union ends with insert	Spigots, flanges, union ends with insert	Spigots, flanges, union ends with insert
Valve body material	PVC-U, PP, PVDF	PVC-U, PP, PVDF	PVC-U, PP, PVDF
Media temperature *	-20 to 100 °C	-20 to 100 °C	-20 to 100 °C
Setting range *	0.5 to 10 bar	0.5 to 9 bar	0.5 to 10 bar
Seal material *	EPDM, PTFE	EPDM, PTFE, FPM	EPDM, PTFE

\*depending on version and/or operating parameters

# GEMÜ N186, N782, N185



GEMÜ N186  
Pressure retaining valve

## Features

- Adjustment of working pressure via set screw
- Actuator separated from the medium by the actuator membrane
- Can be installed regardless of position
- Low maintenance
- No auxiliary power required for operating the actuator



GEMÜ N782  
Pressure reducer

## Features

- Adjustment mechanism hermetically separated from the medium
- No auxiliary power required for operating the actuator
- Can be installed irrespective of location
- Low maintenance
- Diaphragm-protected pressure gauge to read off the outlet pressure
- No auxiliary power required for operating the actuator



GEMÜ N185  
Pressure relief valve

## Features

- Adjustment of working pressure via set screw
- Actuator separated from the medium by the actuator membrane
- Can be installed regardless of position
- Low maintenance
- No auxiliary power required for operating the actuator



# Flowmeters

GEMÜ offers flowmeters operating according to the most varied physical measurement principles.

- Variable area flowmeter
- Flow transmitter
- Magnetically inductive flowmeter
- Ultrasonic flowmeter

All these types have their particular features and advantages and are therefore suitable for the most varied applications. The selection of the right measurement principle and its particular design depends on the working medium, the type of measurement required and the conditions prevailing in the plant or machine. The following factors must be considered in detail:

## Medium:

- Temperature
- Conductivity
- Density
- Pressure
- Corrosiveness
- Abrasivity
- Viscosity
- Homogeneity
- Aggregate state

## Pipeline:

- Quantity / nominal size
- Inlet and outlet distances
- Flow
- Disturbances
- Pressure loss

## Measurement:

- Measuring range / dynamics
- Mass or volume
- Accuracy



Flowmeter in an industrial application



UHP water treatment in the semiconductor industry

# Flowmeters



Type	GEMÜ 800	GEMÜ 850	GEMÜ 840	GEMÜ 800 HP	GEMÜ 850 HP
Measuring range liquids <sup>1</sup>	0.5 – 20,000 L/h	0.5 – 20,000 L/h	0.5 – 20,000 L/h	100 - 10,000 L/h	20 - 1000 L/h
Measuring range gas/air <sup>1</sup>	0.2 - 450 Nm <sup>3</sup> /h	0.2 - 450 Nm <sup>3</sup> /h	0.2 - 450 Nm <sup>3</sup> /h	-	-
Nominal size	DN 20 to 65	DN 10 to 25	DN 20 to 65	DN 15 to 50	DN 15 to 25
Operating temperature <sup>2</sup>	-20 to 120 °C	-20 to 120 °C	-20 to 120 °C	-20 to 120 °C	-20 to 120 °C
Operating pressure <sup>2</sup>	Max. 10/15 bar	Max. 10/15 bar	Max. 10/15 bar	Max. 10 bar	Max. 10 bar
Metering tube material	PA, Polysulphone (PSU), PVC-U, PVDF	PA, Polysulphone (PSU), PVC-U, PVDF	Main flow unit: PVC-U, PP Part flow unit: Polysulphone	PVDF	PVDF
Float material	PP, PVC-U, PVDF, stainless steel	PP, PVC-U, PVDF, stainless steel	PP, PVC-U	PVDF	PVDF
Union/ connection	PP, PVC, PVDF, stainless steel, malleable iron	PP, PVC, PVDF, stainless steel, malleable iron	PP, PVC, stainless steel	PVDF	PVDF

<sup>1</sup> dependent on medium, <sup>2</sup> dependent on the materials and the pressure-temperature curve of the materials



Water treatment plant



PVDF

PA 6-3-T

PSU

## Variable area flowmeters

GEMÜ 800, 840, 850

### Technical specifications:

**Working medium:** Liquids and gas/air

**Measuring range:** 2 to 50,000 L/h for liquids  
0.2 to 450 Nm<sup>3</sup>/h for air

**Accuracy:** ± 1% of end value and  
± 3% of measured value

**Operating pressure:** max. 15 bar, dependent on the design

**Media temperature:** -20 to 100 °C  
(depending on metering tube material)

**Available materials:** Metering tubes in PSU, Trogamid,  
PVDF, PVC

**Nominal sizes:** DN 15 to 65

**Automation capability:** Mounting of electrical limit switches or  
instrument sensors with reed contacts  
possible

**Particulars:** Over 13,000 special scales available,  
further scales on request.  
GEMÜ 840 operates according to the  
part flow principle



GEMÜ 800/850

GEMÜ 840



# Flowmeters

## Limit switches

GEMÜ 1250 - 1257

### Features

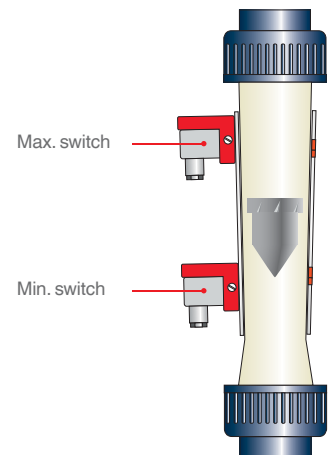
- Change-over contact GEMÜ 1250
- Limit switch max. contact GEMÜ 1251, 1256
- Limit switch min. contact GEMÜ 1252, 1257
- Can be combined with magnetic floats
- IP 65



GEMÜ 1251/1256  
for  
GEMÜ 800: DN 25 to 65  
GEMÜ 850: DN 25



GEMÜ 1252/1257  
for  
GEMÜ 850: DN 10 to 20

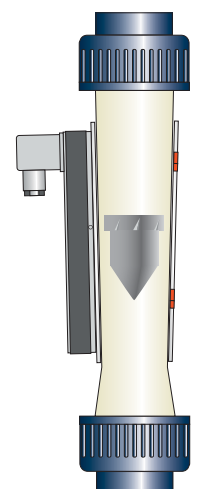


## Instrument sensors

GEMÜ 1270 - 1273

### Features

- Electrical instrument sensors with reed contacts for electrical signal transmission
- Can be combined with magnetic floats
- Output signal 1270/1271: 0 – 10 k $\Omega$
- Output signal 1272/1273: 4 – 20 mA
- IP 65
- Raster of reed contacts dependent on version 2.3 – 4.25 mm





## Flow transmitter

GEMÜ 3020, 3021

### Technical specifications:

- Working medium:** Liquids
- Viscosity:**  $\leq 120 \text{ mm}^2/\text{s}$
- Measuring range:** 120 to 25.000 L/h
- Accuracy:**  $\pm 1\%$  FS (of end value of measuring range)
- Reproducibility**  $\pm 0.5\%$  FS (end value of measuring range)
- Operating pressure:** max. 10 bar at 20 °C
- Media temperature:** 0 to 80 °C
- Available materials:** Turbine PVDF, turbine body PVC and PVDF
- Nominal sizes:** DN 25, DN 50
- Automation capability:** Frequency output 0/4 to 20 mA, current output 0 to 10 V, relay signal inputs via PLC or remote operation
- Particulars:** Freely scalable measuring range  
Designed as transmitter and measurement device, GEMÜ 3021 available as batch controller or totalizer



GEMÜ 3020



GEMÜ 3021

## Magnetically inductive flowmeter

GEMÜ 3030

### Technical specifications:

- Working medium:** Liquids
- Conductivity of medium:**  $\geq 20 \text{ } \mu\text{S}/\text{cm}$
- Measuring range:** 0 to 4 m/s, 0 to 10 m/s
- Accuracy:**  $\leq 1\%$  (of end value of measuring range), dependent on installation situation
- Operating pressure:** max. 10 bar
- Media temperature:** 0 to 135 °C
- Material of sensor rod:** 1.4435/TFM, 1.4435/PEEK
- Nominal sizes:** DN 25 to 300
- Automation capability:** Frequency output 0/4 – 20 mA, pulse, relay, interface RS-232, Profibus-DP
- Particulars:** Choice of measuring ranges, adjustable to changing operating conditions on site



# Overview of Plastics

Raw materials for plastics comprise homogeneous basic elements, so-called monomers, these being joined to one another in a chemical reaction. At the same time, the C-C double bond is broken with the polymer being formed through linking of the individual molecules.

These chemical reactions are termed polymerisation (subdivided into homopolymers, unipolymers, copolymers and block polymers), polycondensation and polyaddition. The degree of polymerisation is important for thermoplastics and, as a result, the tensile strength, hardness, elongation at fracture and impact strength increase as the degree of polymerisation rises with simultaneous increase in the tendency towards crystallisation, swelling behaviour as well as stress crack formation.

## Advantages

- *Low weight due to low density*
- *Suitability for mass production*
- *Complex shapes can be produced economically in only a few work steps*
- *Variable colouration, good dye penetration ability*
- *Simple improvement of the mechanical properties (tensile strength, elongation at fracture etc.) by filling and strengthening materials*
- *Plastics have a good internal elasticity and deformation behaviour*
- *Favourable antifrictional properties*
- *High chemical resistance*



Plastic pellets

## Acrylonitrile butadiene styrene polymer – ABS

Acrylonitrile butadiene styrene polymer is an amorphous thermoplastic with many options for variation in its structure. The monomers styrene, butadiene and acrylonitrile form the polymer, which can be reinforced with glass fibres or glass beads. Blends, polyblends, transparent plastics (ABS with corresponding rubber components), copolymers (graft or terpolymers) and special materials are available. ABS is distinguished by high viscosity, also at low temperatures down to -40 °C. This is complemented by high hardness with good scratch resistance. ABS is used in precision and electrical engineering, vehicle construction and the furniture industry, applications including high-quality household appliances as well as pipes and fittings.

## Features

- *High impact resistance and notch impact strength also at very low temperatures*
- *Smooth surfaces for low pipe friction losses*
- *High rigidity*
- *Physiologically harmless*
- *No microbial growth on the surface*
- *Corrosion resistant*
- *Processing: Injection moulding, extrusion, hot forming, cementing, welding, bolting together (with thread-forming screws), machining*
- *Scratch-proof surface, very high surface gloss for Prof polymer*
- *Galvanising suitability*
- *Metal inserts can be embedded effectively owing to the high viscosity*

## Resistance to chemicals

- *Resistant against:*  
*[Deviations result depending on the portion of the three components styrene, acrylonitrile and butadiene]*  
*Water, aqueous saline solutions, most dilute acids and alkalis, aliphatic hydrocarbons, mineral oils, animal and vegetable fats*
- *Not resistant against:*  
*Concentrated mineral acids, organic acids, aromatic and chlorinated hydrocarbons, solvents (esters, ethers and ketones)*



### Thermal properties

- ABS exhibits good thermal stability and can be used in applications from around -45 °C to 60 °C, sometimes to 80 °C.
- ABS is a good thermal insulator; Owing to the high thermal coefficient of linear expansion, this is to be taken into account in the design of pipe systems

### Electrical properties

- ABS exhibits a high surface and volume resistivity at only very low electrostatic build-up and also has good electric insulating performance. This must be considered for applications where there is a risk of ignition or explosion.

### Fire behaviour

- Burns with a sooting flame without dripping. In accordance with UL94, ABS is classified into the flammability classification HB (horizontal burning). Types with flame-retardant standardisation are available

### Disadvantages

- Not very weatherproof

## Polyamides PA

Polyamides are construction plastics for many technical applications, in particular for machine elements. Apart from copolyamides and polyamide 6-3-T, all others are semi-crystalline. Amorphous polyamides such as PA 6-3-T are almost transparent and are used at GEMÜ for flowmeters amongst other applications.

Polyamides absorb the moisture reversibly and release it again, their properties changing in the process.

Areas of application include mechanical engineering, precision engineering, vehicle construction, electrical engineering, sanitation technology, as well as the construction and furniture industry.

### Features

- (at high crystallinity) rigid and hard
- Very viscous after absorbing water
- High fatigue strength
- Good impact resistance and notch impact strength, increased with modified types
- Good abrasion and wear resistance

- Good hydrolysis resistance
- Good antifrictional and antiseizure properties
- Good tracking resistance and dielectric strength
- With injection moulding: Good flow velocity, tremendous demoulding capacity
- Processing: Injection moulding, extrusion, cementing (better with low crystallinity), welding, bolting together, machining, printing, painting, metallising in high vacuum, fluidised bed sintering, flame spraying or electrostatic coating

### Resistance to chemicals

- Resistant against:  
Very many organic media, e.g. esters, ethers, many chlorinated hydrocarbons, aliphatic and aromatic hydrocarbons, numerous mineral oils, greases, petrol, saline solutions, some alcohols, halogenated aliphatics and aromatics, petrol, oils, greases, weak alkalis and (mineral) acids, diluted alkalis
- Not resistant against:  
Mineral acids, strong alkalis, solutions of oxidants, low aliphatic alcohols, acetone, ketones and aldehydes (only to a limited extent)

### Thermal properties

- The application temperature is between approx. -40 to 80 °C, depending on the type. Heat-stabilised types are available, which can withstand a longer influence above 120 °C without harmful effects

### Electrical properties

- The electrical properties depend on the water content. The favourable surface resistance prevents extensive static build-up. Good tracking resistance, good insulation capacity (also with the effects of moisture), low electrolytic corrosion and high dielectric strength distinguish this material

### Fire behaviour

- PA burns bluish with a yellow edge, drips with crackling
- Most types of PA achieve fire class HB to V2 according to UL94, and up to V0 with flame retardant

### Disadvantages

- Water absorption affects material properties. For permanent use with outside weathering; UV-stabilised types should be used above all with exposure to sunlight

# Overview of plastics

## Polypropylene

### PP-H / PP natural / PP reinforced

Polypropylene has been manufactured on an industrial scale since 1957 through the polymerisation of propylene using Ziegler-Natta catalysts. It belongs to the group of olefins which also include polyethylene (PE). A distinction is made between the PP moulding compounds in homopolymers (PP-H), block-copolymer (PP-B) and random-block-copolymers (PP-R). PP-H is used in pipe construction and equipment, as it exhibits many favourable properties such as resistance to chemicals and corrosion, stress crack resistance and, above all, an excellent weldability.

PP is a semi-crystalline, extensively non-polar thermoplastic, exhibiting a higher rigidity, hardness and strength in comparison to PE. As a thermoplastic with the lowest density at around 0.9 g/cm<sup>3</sup>, it occurs with a crystallinity between 60 to 70%. The addition of nucleating agents results in a fine-grain structure, exhibiting an increased (cold) impact strength. A reinforcement comprising glass fibres or minerals is recommended for construction components subject to high stress.

### Features

- Good chemical resistance
- Excellent weldability
- High thermal aging and heat distortion temperature
- Application temperature: 5 to 90 °C, depending on the pressure and medium
- High impact strength, which decreases slightly at temperatures below 0 °C
- Fire behaviour: Burns; in UL94 as HB (horizontal burning) according to DIN 4102 T1
- Low tendency to form stress cracks
- Processing by: Injection moulding, extrusion, extrusion blow moulding, hot forming, no effective bonding strength owing to high chemicals resistance and non-polar structure (after pre-treatment cementing with adhesive and contact bonding material), machining, printing, painting, metallising
- Requires stabilisation

### Resistance to chemicals

- Resistant against:  
*Aqueous solutions of inorganic salts, weak inorganic acids and alkalis, alcohol, some oils, solutions of standard washing liquors to 100 °C*

- Not resistant against:  
*Strong oxidants, halogenated hydrocarbons, ketones, chlorinated hydrocarbons, petrol and benzene. Swelling in aliphatic and aromatic hydrocarbons (especially at increased temperatures). Partially non-resistant upon contact with copper! Inserts made from copper, manganese, cobalt and their alloys are to be avoided!*

### Thermal properties

- PP is a good thermal insulator. Pure PP tends towards oxidation at high temperatures. Stabilised types are therefore used.

### Electrical properties

- Favourable dielectric properties irrespective of temperature and frequency (hence no HF warming). The high electrical insulating properties lead to electrostatic build-up and dust attraction. On account of this electrostatic build-up, care must be taken in applications where there is a risk of ignition or explosion, or corresponding countermeasures are to be implemented.

### UV resistance

- The short-wave UV spectra of sunlight damage the PP together with the atmospheric oxygen. A covering in the form of an insulation or by a coat of paint absorbing UV light should be attached or applied.

## Polyvinylchloride, unplasticised – PVC-U

Polyvinyl chloride is a bulk plastic which has been produced on an industrial scale since the beginning of the 20th century, its use coming in third place behind polyethylene and polypropylene. It is now indispensable in many applications in industry as well as for products in everyday life. PVC exhibits a very good overall ecological balance on account of its high component of chlorine of around 56 % by weight.

Different manufacturing methods give rise to the various PVC polymers PVC-U, PVC-P, PVC-C, PVC-E, PVC-S or PVC-M with special properties. These are determined by the average degree of polymerisation (K value). An increase in the K value therefore increases the viscosity, dimensional stability in heat and fatigue strength at simultaneous decrease in the processability. PVC-U is primarily used in pipe construction, also PVC-C and transparent PVC-S in lower quantities.

PVC-U is an amorphous, polar thermoplastic. The cementing of pipes and valve bodies made from PVC-U is generally carried out with highly-solvent, gap-filling solvent adhesives.

## Features

- *Very good chemical resistance*
- *Good resistance to light and weathering, if sufficiently stabilised*
- *Physiologically indifferent*
- *High mechanical strength, rigidity and hardness*
- *Application temperature: 0 to 60 °C, depending on the pressure and medium*
- *Fire behaviour: Highly sooting with yellow flame, self-extinguishing flammability class V0 according to UL94, building material class B1 (hardly flammable) according to DIN 4102*
- *Low stress crack formation*
- *Processing by: Injection moulding, extrusion, hot forming, cementing, welding, machinable*

## Resistance to chemicals

- *Resistant against:*  
*Saline solutions, sea water, diluted and partially concentrated acid, diluted and concentrated alkalis, non-polar solvents, petrol, mineral oils, greases, alcohol, aliphatic hydrocarbons, elemental chlorine, relatively good against high-energy radiation. UV radiation reduces the impact resistance slightly*
- *Not resistant against:*  
*Polar, aromatic and chlorinated solvents, esters, chlorinated hydrocarbons, aromatic hydrocarbons, petrol, liquid halogens, sulphuric acid containing oleum, concentrated nitric acid. An application with gas is not recommended, as PVC-U valve bodies tend towards chip fracture*

## Thermal properties

- *PVC-U is a good thermal insulator on account of the very low thermal conductivity. Despite the lower linear coefficient of thermal expansion, this must be taken into account in the design of pipes*

## Energy balance

- *PVC-U is average in this respect. The energy balance is low during manufacturing, which has a positive effect in relation to the durability of the products*

## Polyvinylidene fluoride – PVDF

Polyvinylidene fluoride is a semi-crystalline thermoplastic, which can be processed using the injection moulding process in contrast to PTFE. The combination of extreme thermal stability with the best chemical resistance of all plastics allows PVDF to be used in industrial line construction, in the foodstuff industry for packaging films and for coating measuring probes and loudspeakers thanks to its piezoelectric effects. PVDF has a fluorine content of 59 % and can be processed well into moulded parts in contrast to PTFE, which cannot be processed thermoplastically.

## Features

- *High strength and rigidity at high temperatures*
- *High fatigue strength*
- *High UV resistance*
- *High resistance to chemicals*
- *High impact strength even in the cold*
- *Very low water absorption*
- *Self-extinguishing*
- *Physiologically harmless*
- *No microbial growth*
- *No electrolytic corrosion*
- *Application temperature: -20 to 120 °C, depending on the pressure and medium*

## Resistance to chemicals

- *Resistant against:*  
*Most organic and inorganic acids, aliphatic and aromatic hydrocarbons, alcohols and halogenated solvents, dry and moist halogens*
- *Not resistant against:*  
*Alkalis, alkali metals, highly alkaline amines, elemental fluorine. Slight swelling due to highly polar solvents*

# Overview of plastics

## Thermal properties

PVDF is a good thermal insulator; Owing to the high thermal coefficient of linear expansion, this is to be taken into account in the design of pipe systems.

## Electrical properties

- PVDF is a good electrical insulator. The high electrical insulating properties can lead to electrostatic build-up and dust attraction. On account of this electrostatic build-up, care must be taken in applications where there is a risk of ignition or explosion, or corresponding countermeasures are to be implemented

## Fire behaviour

- Does not burn and is classified into flammability class V0 according to UL94. A material decomposition begins at 380 °C, elemental fluorine being released, which reacts exothermally to form hydrogen fluoride in the presence of water

## Polysulphones – PES and PSU

Amorphous, polar thermoplastics exhibiting a high heat deflection temperature and resistance to chemicals. The transparent, partially crystal-clear material PSU is used for flowmeters at GEMÜ. Both materials are also used for mechanical, thermal and electrical construction parts which are subject to high stress and for which transparency is required. Polysulphones have a broad field of application in precision and electrical engineering, vehicle and aircraft construction as well as household appliances.

## Features

- Good strength and rigidity at higher temperatures
- Low creep tendency at higher temperatures
- Good viscosity also at higher temperatures
- Water absorption affects mechanical strength similar to polyamide
- PES has a higher permanent application temperature than PSU
- Colour transparent, almost crystal-clear, can be dyed covered in various colours
- Physiologically harmless

## Resistance to chemicals

- Resistant against:  
*Diluted acids and alkalis, petrol, oils, greases, alcohols, hot water and steam (PSU), high-energy radiation and infrared radiation*
- Not resistant against:  
*PES without stabilisation not weatherproof and UV-resistant, polar organic solvents, esters, ketones, aromatic hydrocarbons and hydrocarbons containing chlorine, petrol*

## Thermal properties

- PSU has high permanent application temperatures, which are even higher for PES. Application temperatures range from -80 °C at good viscosity to 180 °C at low creep tendency

## Electrical properties

- For polar plastics good electrical insulating properties and low dielectric losses also at higher temperatures and humidity

## Fire behaviour

- Hardly flammable, pungent odour of incendiary fumes

## Disadvantages

- Stress crack formation possible with some media;  
*Notch impact sensitivity*

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