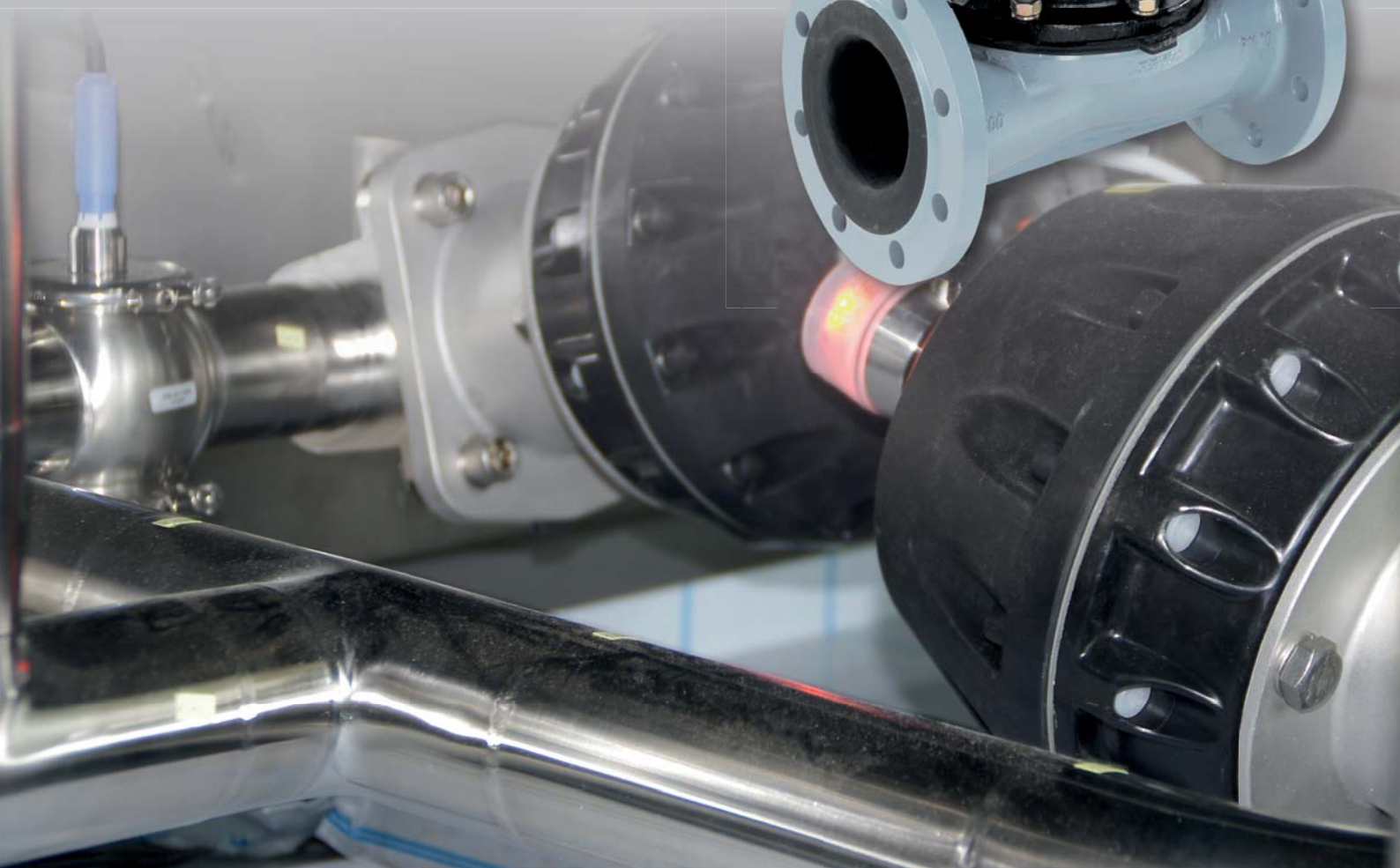


GEMÜ®

VALVES, MEASUREMENT AND
CONTROL SYSTEMS

Industrial Valves Metal Diaphragm Valves





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.

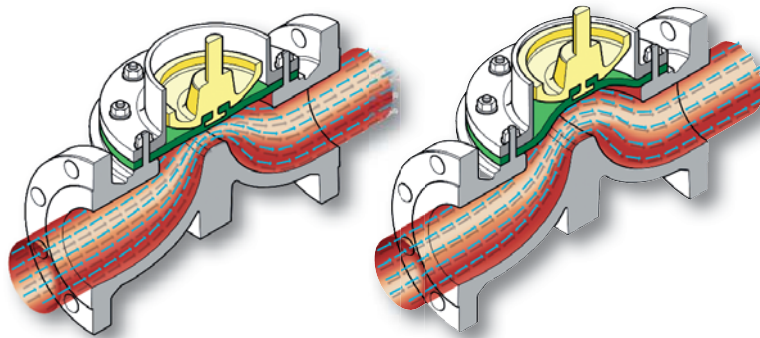
GEMÜ is your valve and instrumentation partner. State-of-the-art factory equipment and machinery plus a motivated team ensure the best service through our world-wide network of distributors and sales subsidiaries. We are constantly making investments in order to optimise our existing products and to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



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The correct valve selection *creates security*



Weir-type diaphragm valve

Features

- Depending on diameter and materials of construction, up to 10 bar operating pressure and 150 °C operating temperature
- Good flow characteristics
- All mechanical components are located outside the media wetted area. The working medium only comes into contact with the inner valve body and diaphragm surfaces
- Suitable for higher cycle duties

Areas of use

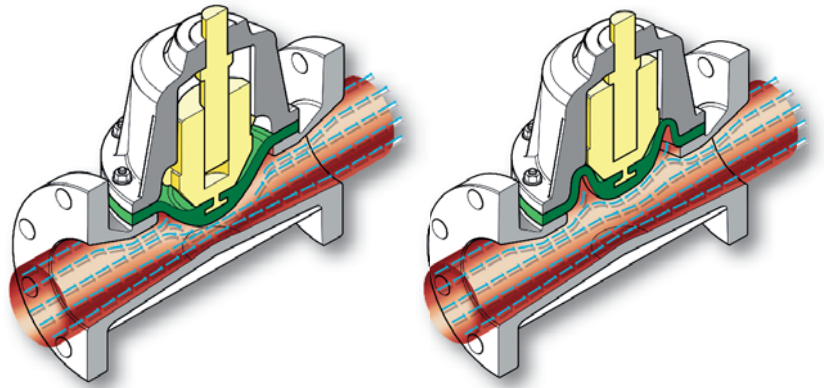
- Suitable for clean to heavily contaminated liquid, gaseous inert and corrosive media
- Slurries, powder and dust
- Abrasive media
- Controlling liquid media

Typical areas of application

- Waste water, sewage, sea water, cooling water, service water and drinking water treatment
- Woodpulp and paper manufacturing/processing
- Dyestuff and paint manufacturing / processing
- Gemstone and metal extraction and processing, mining
- Fertiliser production
- Preparation of / processing plaster, cement, sulphur and lime
- Brine and salt extraction
- Power plants
- Sewage clarification plants
- Dyeing
- Granulate manufacture
- Sugar production

Advantages

- Diaphragm can be exchanged with the valve in-line
- Requires no additional gaskets or gland packing
- Bubble-tight shut-off



Full bore diaphragm valve

Features

- Depending on diameter and materials of construction, up to 7 bar operating pressure and 100 °C operating temperature
- Very good flow characteristics
- All mechanical components are located outside the media wetted area. The working medium only comes into contact with the inner valve body and diaphragm surfaces

Areas of use

- Suitable for heavily and extremely contaminated liquid, inert and corrosive media
- Heavily contaminated waste water and slurries
- Granular materials
- Abrasive media

Typical areas of application



- Woodpulp and paper manufacturing/processing
- Gemstone and metal extraction and processing, mining
- Fertiliser production / phosphate processing
- Preparation of / processing plaster, cement, sulphur and lime
- Sewage clarification plants
- Granulate manufacture

Advantages

- Diaphragm can be exchanged with the valve in-line
- Requires no additional gaskets or gland packing

Weir-type diaphragm valves



	Manually operated			Pneumatically operated	
					
Type	GEMÜ 675	GEMÜ 653	GEMÜ 671	GEMÜ 620	GEMÜ 687
Operator	Metal operator with metal handwheel, optical position indicator	Stainless steel operator with plastic handwheel, optical position indicator	Plastic operator with optical position indicator	Plastic/metal actuator with SG iron distance piece	Plastic actuator with stainless steel distance piece
Nominal size	DN 15 to 300	DN 15 to 100	DN 15 to 100	DN 15 to 150	DN 15 to 100
Connection	Threaded connections, flanges, different standards and designs available	Threaded connections, flanges, different standards and designs available	Threaded connections, flanges, different standards and designs available	Threaded connections, flanges, different standards and designs available	Threaded connections, flanges, different standards and designs available
Valve body material **	EN-GJL-250 (GG 25), EN-GJS-400-18-LT (GGG 40.3) with PFA, PP or hard rubber lining, EN-GJS-500-7 (GGG 50) with PFA or PP lining	Stainless steel 1.4435, 1.4408, PFA lining available	Stainless steel 1.4435, 1.4408, EN-GJL-250 (GG 25), EN-GJS-400-18-LT (GGG 40.3) with PFA, PP or hard rubber lining	EN-GJL-250 (GG 25), EN-GJS-400-18-LT (GGG 40.3) with PFA, PP or hard rubber lining, EN-GJS-500-7 (GGG 50) with PFA or PP lining	EN-GJS-400-18-LT (GGG 40.3) with PFA, PP or hard rubber lining, stainless steel 1.4435, 1.4408, PFA lining available
Media temperature *	-10 to 150 °C	-10 to 150 °C	-10 to 80 °C	-10 to 150 °C	-10 to 150 °C
Operating pressure *	0 to 10 bar	0 to 10 bar	0 to 10 bar	0 to 10 bar	0 to 10 bar
Diaphragm material	NBR, FPM, CR, EPDM, PTFE	FPM, EPDM, PTFE	FPM, EPDM, PTFE	NBR, FPM, CR, EPDM, PTFE	FPM, EPDM, PTFE
Voltage	-	-	-	-	-

* dependent on diaphragm material and/or body material, ** other versions on request

Diaphragms

diaphragm sizes 10 - 300

choice of EPDM, FPM, CR, IIR, NBR






Valve bodies in cast iron (GG 25)

Valve bodies in stainless steel



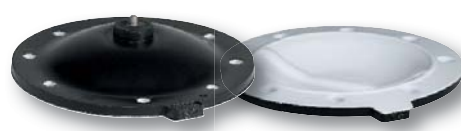


Pneumatically operated		Motorized	
			
			
GEMÜ 695	GEMÜ 698	GEMÜ 648 SideStep®	GEMÜ 628
Plastic actuator	Plastic actuator with stainless steel distance piece, on/off	Plastic control actuator with optical position indicator	AUMA linear actuator for on/off and regulating duties
DN 15 to 50	DN 15 to 50	DN 15 to 100	DN 32 to 150
Threaded connections, flanges, different standards and designs available	Threaded connections, flanges, different standards and designs available	Threaded connections, flanges, different standards and designs available	Threaded connections, flanges, different standards and designs available
EN-GJL-250 (GG 25), EN-GJS-400-18-LT (GGG 40.3) with PFA, PP or hard rubber lining, stainless steel 1.4435, 1.4408, PFA lining available	EN-GJL-250 (GG 25), EN-GJS-400-18-LT (GGG 40.3) with PFA, PP or hard rubber lining, stainless steel 1.4435, 1.4408, PFA lining available	EN-GJL-250 (GG 25), EN-GJS-400-18-LT (GGG 40.3) with PFA, PP or hard rubber lining, EN-GJS-500-7 (GGG 50) with PFA or PP lining	EN-GJL-250 (GG 25), EN-GJS-400-18-LT (GGG 40.3) with PFA, PP or hard rubber lining, EN-GJS-500-7 (GGG 50) with PFA or PP lining
-10 to 80 °C	-10 to 150 °C	-10 to 150 °C	-10 to 150 °C
0 to 10 bar	0 to 10 bar	0 to 10 bar	0 to 10 bar
FPM, EPDM, PTFE	FPM, EPDM, PTFE	NBR, FPM, CR, EPDM, PTFE	NBR, FPM, CR, EPDM, PTFE
-	24 VDC, 120 VAC, 230 VAC 50/60Hz	24 VDC, 120 VAC, 230 VAC 50/60Hz	According to AUMA product range

Diaphragms

diaphragm sizes 10 - 200

PTFE/EPDM fully laminated, PTFE/EPDM two-layer, loose



Valve bodies in SG iron (GGG 40.3) / ductile iron (GGG 50) and stainless steel, with lining



Halar coated



Hard rubber lined



PP lined



PFA lined



Stainless steel
PFA lined

Coated and lined bodies are only available with flange connections.

Weir-type diaphragm valves



Motorized



Type	GEMÜ 618
Operator	Compact plastic control actuator with optical position indicator
Nominal size	DN 4 to 20
Connection	Threaded connections, different standards and designs available
Valve body material	Brass, stainless steel 1.4435, 1.4408
Media temperature *	-10 to 150 °C
Operating pressure *	0 to 10 bar
Diaphragm material	FPM, EPDM, PTFE
Voltage	24 VDC, 120 VAC, 230 VAC 50/60Hz

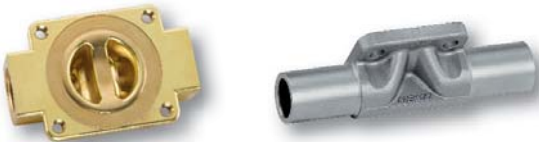
* dependent on diaphragm material and/or body material

Note:
For small nominal sizes types GEMÜ 601, 605, 611 and 615 are available (refer to the respective datasheet for their designs).

Diaphragms
diaphragm sizes 8 - 10
choice of EPDM, FPM, PTFE

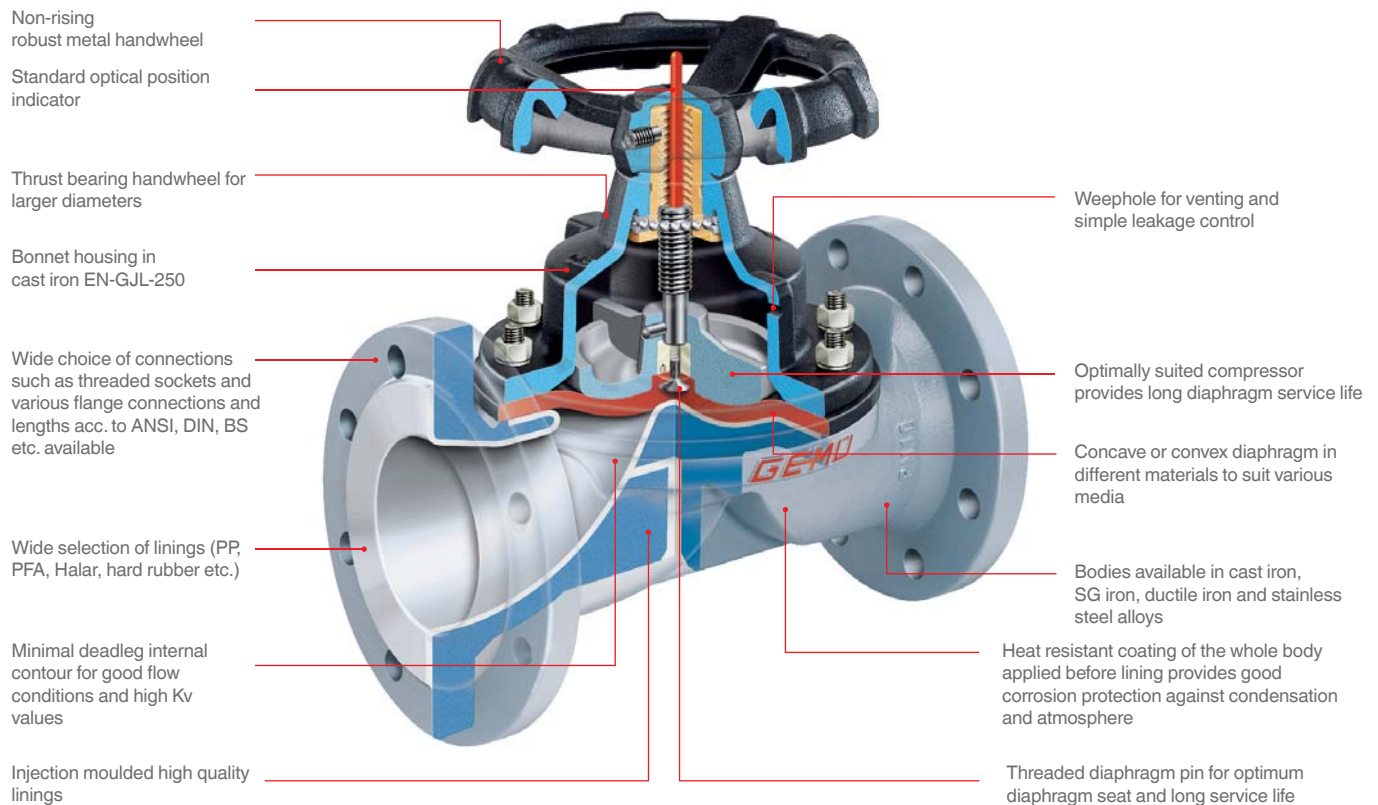


Valve bodies in brass or stainless steel



GEMÜ 675

manually operated, DN 15 to 300



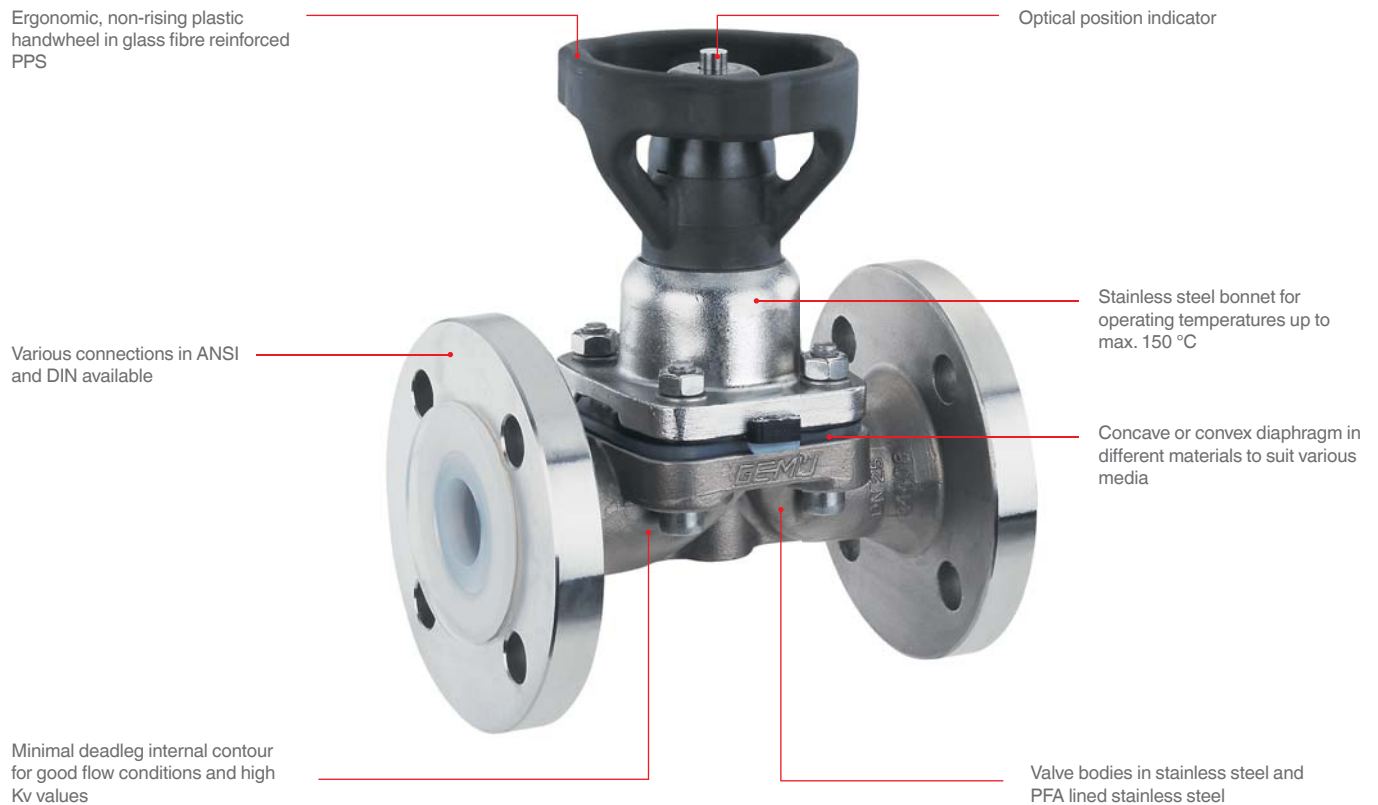
Features

- Suitable for inert, corrosive, liquid and gaseous media
- Insensitive to particulate media
- Valve bodies and diaphragms available in various materials and designs
- Various connections available
- Compact design for tight spaces



GEMÜ 653

manually operated, DN 15 to 100



Features

- Suitable for inert, corrosive, liquid and gaseous media
- Insensitive to particulate media
- Surface finishes down to 0.25 µm, electropolished (for stainless steel version)
- Numerous options available: Seal adjuster, stroke limiter, handwheel clamp, lockable handwheel, mounting facility for proximity switches etc.

GEMÜ 671

manually operated, DN 15 to 100

Option: lockable
handwheel

Optical position indicator

Ergonomic, non-rising
plastic handwheel in PP

Robust plastic bonnet in PP,
high chemical resistance

Wide choice of connections such
as threaded sockets and various
flange connections in ANSI, DIN,
etc. available

Concave or convex diaphragm in
different materials to suit various
media

Minimal deadleg internal contour
for good flow conditions and high
Kv values

Bodies available in cast iron,
SG iron (with various linings) and
stainless steel alloys

Operating temperature: max. 80 °C

Features

- Suitable for inert, corrosive, liquid and gaseous media
- Chemical resistance of bonnet
- Insensitive to particulate media
- Valve bodies and diaphragms available in various materials and designs
- Compact design for tight spaces



GEMÜ 620

pneumatically operated, DN 15 to 150

Connection thread for controllers and accessories

Variable spring sets for optimum adaptation to various operating pressures

Long life actuator membrane with optimized support

SG iron distance piece for operating temperatures up to max. 150 °C

Wide choice of connections such as threaded sockets and various flange connections and lengths in ANSI, DIN, BS etc. available

Wide selection of linings (PP, PFA, Halar, hard rubber etc.)

Minimal deadleg internal contour for good flow conditions and high Kv values

Robust plastic or metal housing

Actuator available in 3 control functions:
- Normally closed (NC)
- Normally open (NO)
- Double acting (DA)

Roller burnished valve spindle

Control air connector G1/4

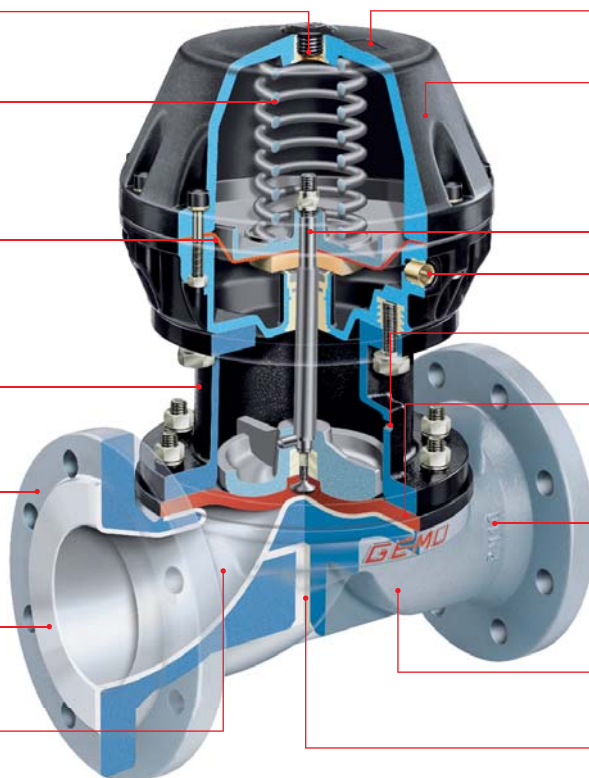
Weephole for venting and simple leakage control

Concave or convex diaphragm in different materials to suit various media

Heat resistant coating of the whole body applied before lining provides good corrosion protection against condensation and atmosphere

Bodies available in cast iron, SG iron and ductile iron

Injection moulded high quality linings



Features

- Suitable for inert, corrosive, liquid and gaseous media
- Insensitive to particulate media
- Valve bodies and diaphragms available in various materials and designs
- Versions according to ATEX on request



GEMÜ 620, DN 100, with directly mounted GEMÜ 1435 ePos® positioner

GEMÜ 687

pneumatically operated, DN 15 to 100



Features

- Suitable for inert, corrosive, liquid and gaseous media
- Chemical resistance of actuator
- Insensitive to particulate media
- Valve bodies and diaphragms available in various materials and designs
- Various connections available
- Surface finishes down to 0.25 μm , electropolished (for stainless steel version)
- Versions according to ATEX on request



GEMÜ 695

pneumatically operated, DN 15 to 50

Connection thread for
controllers and accessories

Variable spring sets for
optimum adaptation to
various operating pressures

Long life actuator membrane
with optimized support

Wide choice of connections
such as threaded sockets and
various flange connections in
ANSI, DIN, etc. available

Minimal deadleg internal contour
for good flow conditions and high
Kv values

Operating temperature: max. 80° C

Robust plastic housing

Actuator available
in 3 control functions:
- Normally closed (NC)
- Normally open (NO)
- Double acting (DA)

Control air connector for control
function "Normally closed" (NC)

Concave or convex diaphragm in
different materials to suit various
media

Bodies available in cast iron, SG iron
and stainless steel alloys, optionally
with plastic lining, for SG iron bodies
further linings are available



Features

- Suitable for inert, corrosive, liquid and gaseous media
- Insensitive to particulate media
- Valve bodies and diaphragms available in various materials and designs
- Surface finishes down to 0.25 µm, electropolished (for stainless steel version)
- Versions according to ATEX on request



GEMÜ 695, DN 50,
with remotely mounted
GEMÜ 1436 cPos®
positioner

GEMÜ 698

motorized, DN 15 to 50



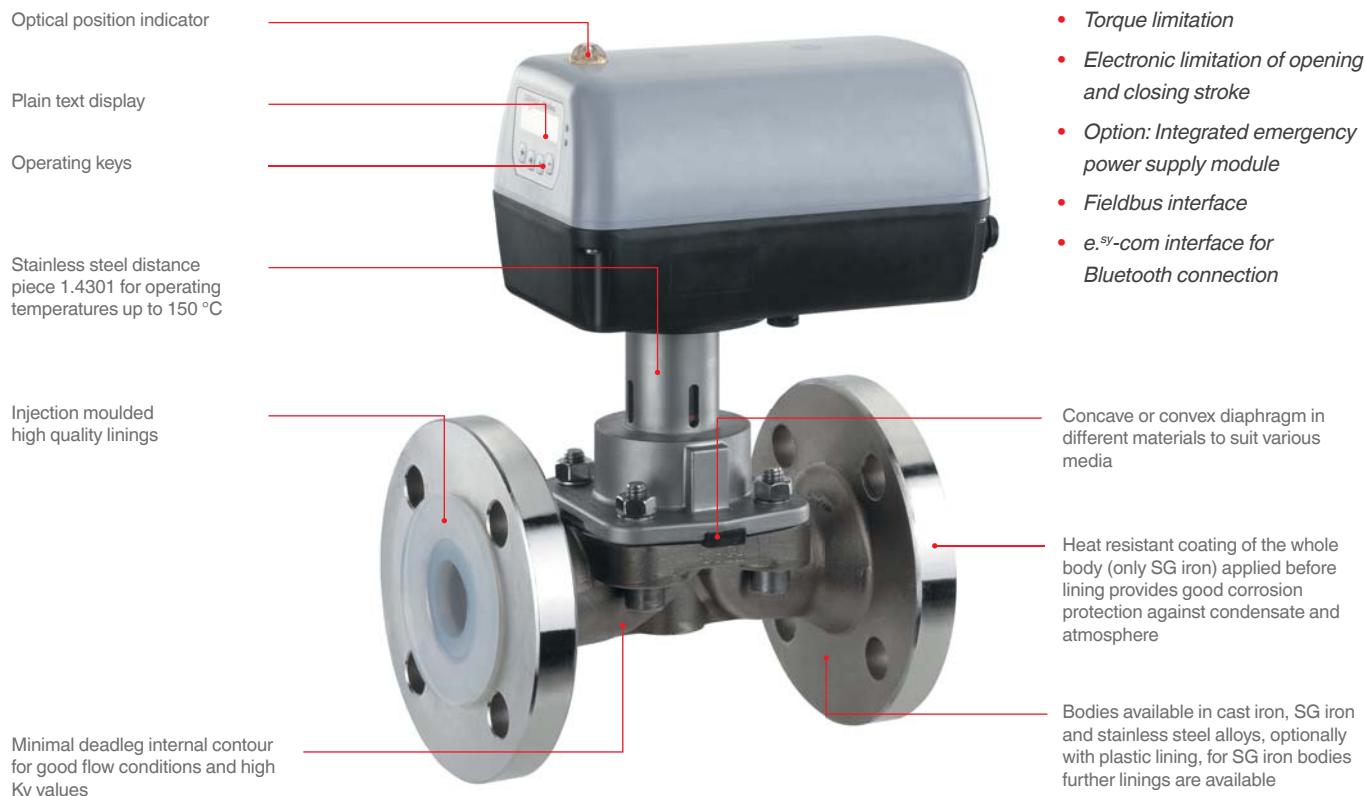
Features

- Suitable for inert, corrosive, liquid and gaseous media
- Chemical resistance of actuator
- Insensitive to particulate media
- Valve bodies and diaphragms available in various materials and designs
- The valve stroke can be limited by adjustable limit switches
- Suitable for use as a control valve (with GEMÜ 1283)



GEMÜ 648 SideStep®

motorized, DN 15 to 100



Features

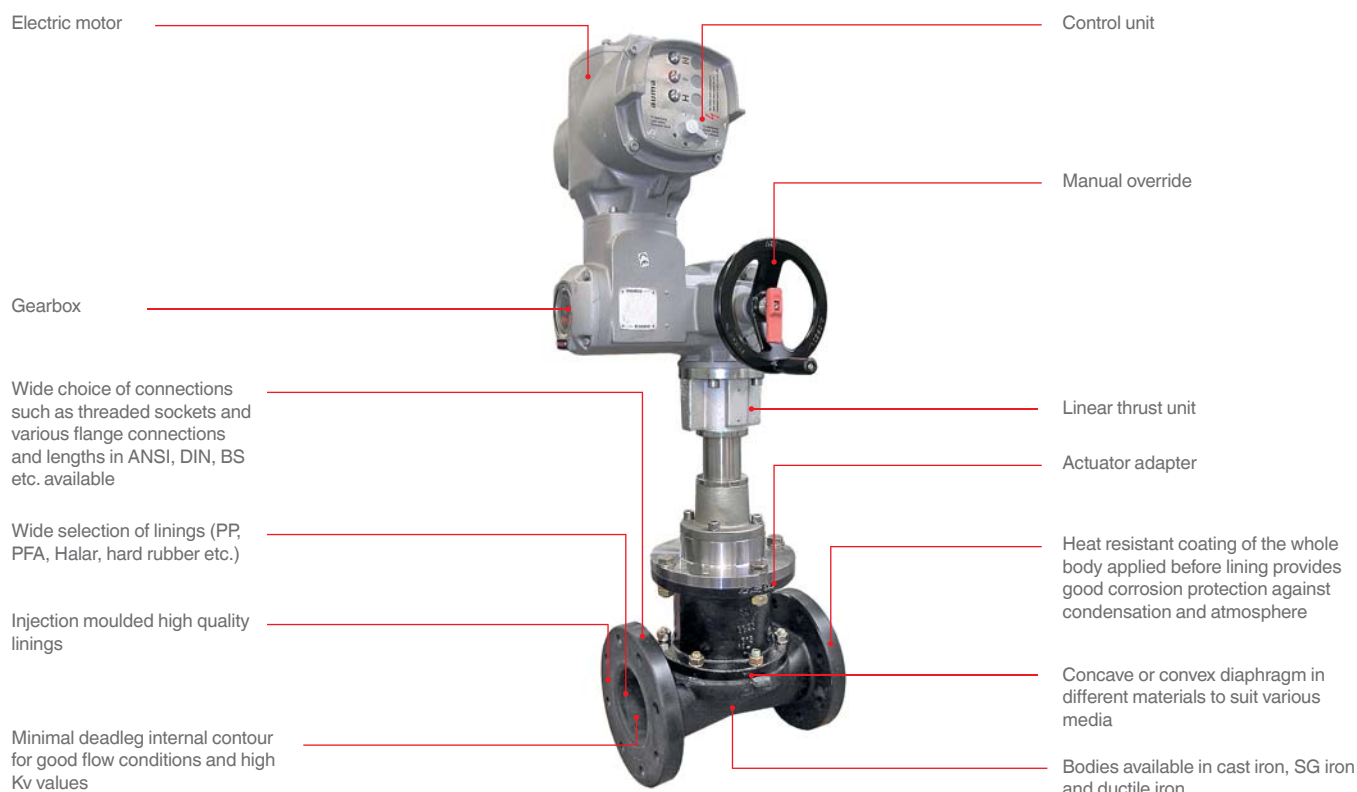
- Suitable for inert, corrosive, liquid and gaseous media
- OPEN/CLOSE function or control version
- Actuating speed and control parameters easily adjustable
- Optimised initialisation and valve control
- Parameterisation during operation
- Torque limitation
- Electronic limitation of opening and closing stroke
- Positioner and process controller are synchronised with each other
- Optional integrated emergency power supply module with selectable fail-safe condition
- Setting of functions via display

Features of the different actuator versions			
Features	SideStep® economy OPEN / CLOSE control	SideStep® industrial OPEN / CLOSE control	SideStep® industrial control system
	Code A	Code C, D	Code S, T, P, R
2-line display	-	●	●
Automatic initialisation	●	●	●
4 fascia keys	●	●	●
Position indication by LED	●	●	●
Operating indication by LED	●	-	-
e.SY-com interface	-	●	●
Axial force (adjustable)	-	●	●
Actuating speed (adjustable)	-	●	●
Option Profibus	-	●	●
Positioner	-	-	●
Option process controller	-	-	●
Option digital inputs	-	●	●
Extended diagnostic facilities	-	●	●
Alarm outputs (adjustable)	-	●	●
Analogue output	-	-	●
Min / Max position (adjustable)	-	-	●



GEMÜ 628

motorized, DN 32 to 150






All versions of the AUMA actuators (SA 07.2/SA 07.6), as well as associated control systems are available. Other types on request.

Features

- *Suitable for inert, corrosive, liquid and gaseous media*
- *Valve bodies and diaphragms available in various materials and designs*
- *Motorized actuators for on/off and regulating duties, including various control units can be supplied*
- *Various actuator versions are available according to the AUMA product range*

Full bore diaphragm valves



	manually operated	pneumatically operated	motorized
			
Type	GEMÜ 655	GEMÜ 656	GEMÜ 638
Operator	Metal bonnet with metal handwheel	Metal actuator with SG iron metal distance piece	AUMA linear actuator for on/off and regulating duties
Nominal size	DN 25 to 300	DN 25 to 250	DN 25 to 150
Connection	Various flanges acc. to EN and ANSI, lengths acc. to EN and MSS	Various flanges acc. to EN and ANSI, lengths acc. to EN and MSS	Various flanges acc. to EN and ANSI, lengths acc. to EN and MSS
Valve body material	EN-GJL-250 (GG 25), EN-GJL-250 (GG 25) with hard and soft rubber lining	EN-GJL-250 (GG 25), EN-GJL-250 (GG 25) with hard and soft rubber lining	EN-GJL-250 (GG 25), EN-GJL-250 (GG 25) with hard and soft rubber lining
Media temperature *	-10 to 100 °C	-10 to 100 °C	-10 to 100 °C
Operating pressure **	0 to 7 bar	0 to 7 bar	0 to 7 bar
Diaphragm material	NBR, IIR, CR, NR, EPDM	NBR, IIR, CR, NR, EPDM	NBR, IIR, CR, EPDM
Voltage	-	-	According to AUMA product range

* dependent on diaphragm material

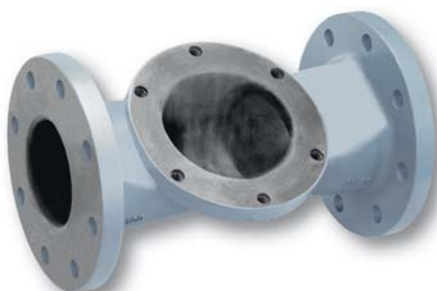
Diaphragm

choice of NBR, IIR, CR, EPDM



Valve body in cast iron

with DIN or ANSI flanges, length EN 558, series 7



Valve body in cast iron

with hard rubber lining, with DIN or ANSI flanges, length EN 558, series 7



GEMÜ 655

manually operated, DN 25 to 300

Non-rising
robust metal handwheel

Thrust bearing handwheel for
larger diameters

Body available with
hard or soft rubber lining

Minimal deadleg internal contour for
good flow conditions and high Kv
values. Particularly suitable for media
with a high solid matter content.

Optimally suited compressor

Threaded diaphragm pin for
optimum diaphragm seat and
long service life

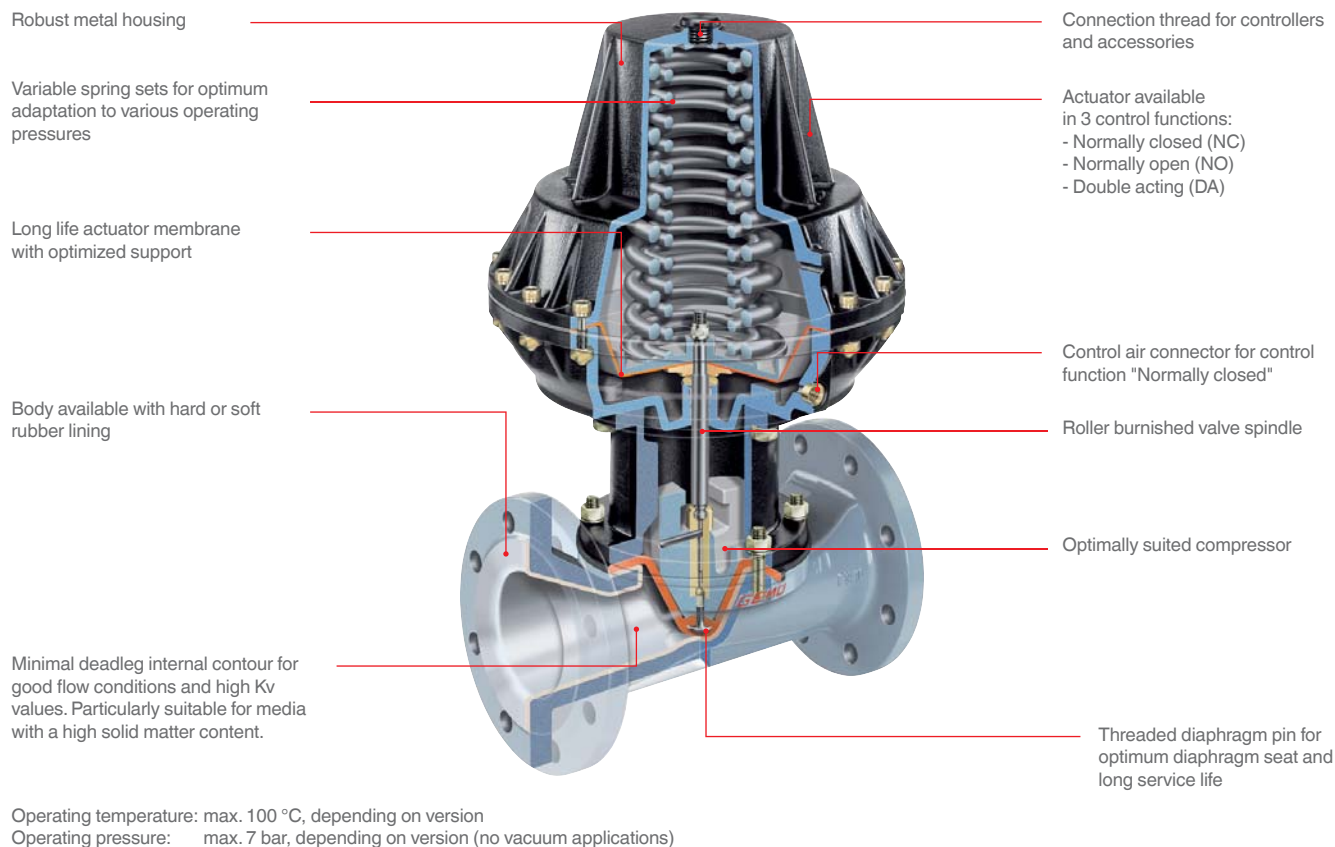
Operating temperature: max. 100 °C, depending on version
Operating pressure: max. 7 bar, depending on version (no vacuum applications)

Features

- *With rubber lining, suitable for applications with particulate media, e.g.:*
 - Mining
 - Paper and woodpulp industry
 - Water treatment
 - Ceramics industry
 - Chemical industry and dyestuff industry
- *Valve bodies and diaphragms available in various materials and designs*

GEMÜ 656

pneumatically operated, DN 25 to 250



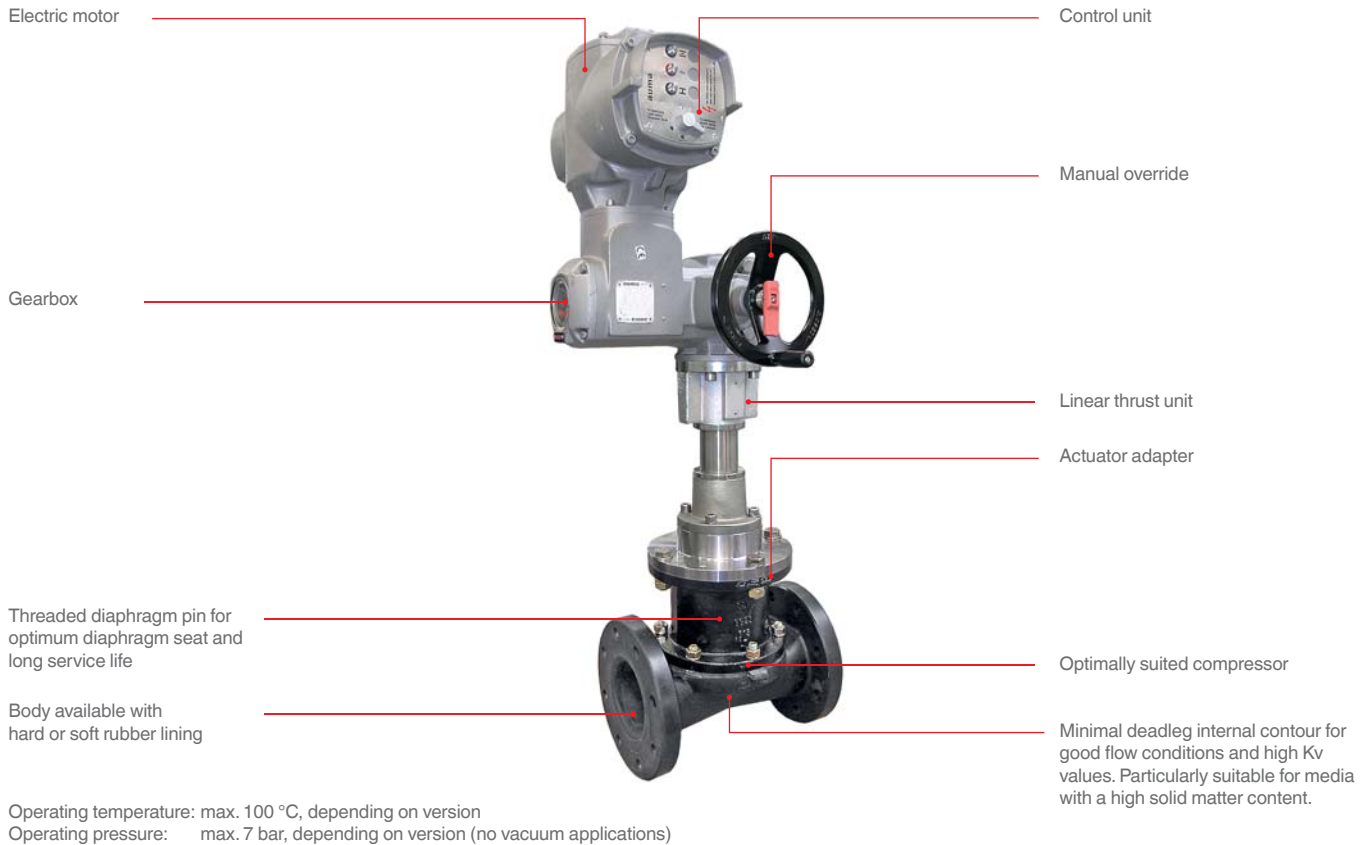
Features

- With rubber lining, particularly suitable for applications with particulate media, e.g.:
 - Mining
 - Paper and woodpulp industry
 - Water treatment
 - Ceramics industry
 - Chemical industry and dyestuff industry
- Valve bodies and diaphragms available in various materials and designs



GEMÜ 638

motorized, DN 25 to 150



Features

- *With rubber lining, particularly suitable for applications with particulate media, e.g.:*
 - Mining
 - Desulphurisation plants
 - Paper and woodpulp industry
 - Water treatment
 - Ceramics industry
 - Chemical industry and dyestuff industry
- *Valve bodies and diaphragms available in various materials and designs*
- *Motorized actuators for on/off and regulating duties, including various control units can be supplied*
- *No auxiliary air pressure supply required*

Lined GEMÜ valve bodies



There is no other field requiring as many varied valve bodies as industrial applications in which we have several decades of experience in practical applications. This experience is the design and material selection benchmark. Our special manufacturing processes and sophisticated coordination of production materials make GEMÜ valve bodies a lasting, high-quality application solution.

- GEMÜ valve bodies are only manufactured from high-quality materials
- Individual inspection ensures a high degree of user safety
- Only selected, certified foundries supply our metal bodies
- GEMÜ itself manufactures the injection moulding tools for the plastic material linings
- GEMÜ injects the valve body linings subject to strict quality controls, e.g. spark testing
- Injection moulding is made at a central point below the valve weir, preventing the plastic layer from detaching in vacuum operation
- At the pipe connections, the metal/plastic material transition is designed so that the liner is fixed axially and no stress damage can occur as a result of heat expansion
- A temperature resistant coating on the metal bodies provides corrosion protection even underneath the lining

Coating:

- Metal, paint or synthetic powder coating
- Coating applied by galvanisation, painting or immersion/enamelling
- Thin coating, less material coating
- Coating materials e.g. zinc, chrome, epoxy-phenol resin, nylon, fluoroplastics
- Preferred application:
Simple corrosion protection for slightly corrosive media

Lining/Injection moulding:

- Fluid thermoplastics and elastomers are injected with an extruder into the metal body and metal injection tools. The lining thickness can be defined exactly, thus maintaining consistent high quality.
- The injection moulding materials are most often polypropylene (PP) and fluoroplastics (PVDF and PFA) as well as hard rubber
- Preferred application:
Corrosive and highly corrosive media such as those in the chemical industry

Areas of use for valve body materials and diaphragms

Valve body material	Areas of use	Temperature range
Cast iron	General industrial applications, water, alkaline and inert media, gas and oil	limited by diaphragm material
Cast iron with Halar lining (ECTFE)	Very suitable for strong mineral acids, oxidative acids and alkalis. Should not be used for particulate and abrasive media.	limited by diaphragm material
Cast iron and SG iron with IIR lining (Butyl)	Good resistance to dilute inorganic acids, alkalis and saline solutions. Good weather resistance and very suitable for water and ozone. Low gas permeability. Unsuitable for oils and hydrocarbons.	limited by diaphragm material
Cast iron with CR lining (chloroprene rubber)	Resistant to various chemicals, dilute solutions of inorganic acids, alkalis and salts. Ozone and weather resistant. Very suitable for abrasive media. Not resistant to aromatic hydrocarbons.	-10 to 100 °C
SG iron	General industrial applications, water, alkaline and inert media, gas and oil	limited by diaphragm material
Cast iron and SG iron with hard rubber lining	Can be used for weak acids, waste water, brine, water treatment and cleaning, surface finishing, pickling and galvanising, sodium hydroxide, sodium chloride	limited by diaphragm material
SG iron or ductile iron with PP lining	Can be used for acids, waste water, brine, water treatment and cleaning, surface finishing, pickling and galvanising	-10 to 80 °C
SG iron or ductile iron with PFA lining	Very suitable for strong mineral, oxidative and inorganic acids. Resistant to bases, halogens, metal salts, organic acids, hydrocarbons, alcohols and aldehydes, ketones, ester and ammonia. PFA also has a higher resistance than other lining materials at higher temperatures.	limited by diaphragm material
Stainless steel 1.4408	Can be used for pure media with limited aggressive chemicals and environments	limited by diaphragm material
Stainless steel 1.4435	Can be used for pure media, meets the requirements of the pharmaceutical and food industry as well as biotechnology, resistance to aggressive fluids for the external cleaning of the valves	limited by diaphragm material
Stainless steel 1.4408 with PFA lining	See SG iron with PFA lining. An additional advantage is the resistance of the valve body to an aggressive environment	limited by diaphragm material

The temperature data are recommendations for the material and refer to water above freezing point. The actual application temperatures of the valves depend on the working medium, the operating pressure, the nominal size, the diaphragms and the actuator. The plant operator is responsible for careful selection of valves and materials for their processes.



Areas of use	Medium*	Valve body material	Diaphragm material
Aluminium oxide manufacture	Thick slurries* with 50% caustic soda or 10% sulphuric acid	Cast iron/SG iron with soft rubber (Butyl) or hard rubber lining.	Butyl
	Industrial water, light slurries or treated water	Cast iron/SG iron or with soft rubber (Butyl)	Butyl
Steelworks, metalwork, pickling and surface treatment	Chromic acid (H_2CrO_4)	Cast iron or SG iron with ECTFE or PFA lining	PTFE
	Caustic soda rinse (NaOH)	Cast iron, SG iron or ductile iron with PP or hard rubber lining	EPDM, PTFE
	Hydrochloric acid solution (HCl), iron chloride ($FeCl_3$), contaminated solution	Cast iron or SG iron with ECTFE or PFA lining	PTFE, FPM/FKM
	Hydrochloric acid (HCl), sulphuric acid (H_2SO_4)	Cast iron or SG iron with ECTFE or PFA lining	PTFE
	Hydrochloric acid (HCl) regeneration	Cast iron or SG iron with ECTFE or PFA lining	PTFE
Fertiliser industry/ phosphate production/ phosphoric acid manufacture	Acidulated gypsum*	Cast iron, SG iron or ductile iron with Butyl or Neoprene lining	Butyl, EPDM, CR
	Phosphoric acid* (H_3PO_4)	Cast iron/SG iron with hard rubber, Butyl or Neoprene lining	Butyl, EPDM, CR
	Process slurry* ($CaSO_4$)	Cast iron, SG iron or ductile iron with Butyl or Neoprene lining	Butyl, EPDM, CR
	Pure phosphoric acid (H_3PO_4 85%)	Cast iron or SG iron with ECTFE or PFA lining	PTFE
	Sulphuric acid (H_2SO_4)	Cast iron or SG iron with ECTFE or PFA lining	PTFE
Mining, ore processing and hydrometallurgy gold/platinum/silver/zinc	Highly abrasive slurries* and slightly corrosive media	Cast iron/SG iron with soft rubber lining	CR, Butyl, EPDM, natural rubber
	Highly corrosive media	Cast iron or SG iron with ECTFE or PFA lining	PTFE
	Industrial water, treated water, slightly abrasive slurries	Cast iron/SG iron with soft rubber lining	EPDM, Butyl, CR, natural rubber
Copper mining and processing, hydrometallurgy, electrolysis	Abrasive, corrosive media*	Cast iron or SG iron with soft rubber lining or stainless steel	CR, Butyl, EPDM, natural rubber
	Highly corrosive media	Cast iron or SG iron with ECTFE or PFA lining	PTFE
Nickel ore processing	Nickel slurry*	Stainless steel 1.4408 (AISI 316)	CR
	Nickel-sulphate ($NiSO_4$)	Stainless steel 1.4408, (AISI 316) / 1.4435 (AISI 316L)	PTFE
Soda/chlorine manufacture	Chlorine brine ($NaCl$ mit Cl_2)	Cast iron or SG iron with ECTFE, hard rubber or PFA lining	PTFE, FPM/FKM
	Sodium chloride lye ($NaCl$)	Cast iron, SG iron or ductile iron, with PP, hard rubber or PFA lining	CR, EPDM
	Sodium hypochloride ($NaOCl$)	Cast iron or SG iron with ECTFE, hard rubber or PFA lining	PTFE, EPDM
	Caustic soda (NaOH)	Cast iron, SG iron or ductile iron with PP or hard rubber lining	CR, EPDM
	Hydrochloric acid (HCl)	Cast iron, SG iron or ductile iron, with PP, hard rubber or PFA lining	PTFE, EPDM
Titanium ore processing, titanium dioxide manufacture for the paint, paper and plastic industry	Titanium dioxide slurry*	Cast iron, SG iron with hard rubber, Butyl or Hypalon lining	Butyl

Continued on the next page

Areas of use

for valve body materials and diaphragms

Areas of use	Medium*	Valve body material	Diaphragm material
Water treatment	Aluminium sulphate ($Al_2(SO_4)_3$)	Cast iron, SG iron or ductile iron with PP or hard rubber lining	EPDM, Butyl
	Ferric trichloride ($FeCl_3$)	Cast iron, SG iron or ductile iron, with PP, hard rubber or PFA lining	Butyl, EPDM
	Caustic soda (NaOH) diluted or concentrate	SG iron or ductile iron with PP or PFA lining	EPDM, CR
	Hydrochloric acid (HCl) 10% and 30% concentration	Cast iron or SG iron with PP, ECTFE or PFA lining	FPM, PTFE
	Fully desalinated water	Cast iron, SG iron or ductile iron, with PP, hard rubber or PFA lining	EPDM, CR
	Water in general (H_2O)	Cast iron, SG iron with hard rubber lining	EPDM, CR
Cellulose, paper	Chlorine oxides and sodium chlorates (Cl)	Cast iron or SG iron with ECTFE or PFA lining	PTFE
	Dyes	Cast iron or SG iron with ECTFE or PFA lining	CR, EPDM
	Hydrogen peroxide (H_2O_2)	Stainless steel	EPDM
	Kaolin slurry	Cast iron, SG iron with Neoprene or Butyl lining	CR, EPDM
	Sodium hypochloride (NaOCl)	Cast iron or SG iron with ECTFE or hard rubber lining	EPDM
	Caustic soda (NaOH)	Cast iron, SG iron or ductile iron with PP or hard rubber lining	CR, EPDM, PTFE
Cement industry	Industrial water, treated water with cement residue	Cast iron, SG iron with hard rubber lining	CR, Butyl, EPDM
	Cement slurry*	Cast iron, SG iron with natural rubber lining	Natural rubber
Sugar and alcohol industry	Filtering, cleaning and demineralisation	SG iron or ductile iron with PFA lining (to avoid fluoride contamination and corrosion)	PTFE
	Sugar slurry, sugar solution, syrup	Hard rubber lining	CR

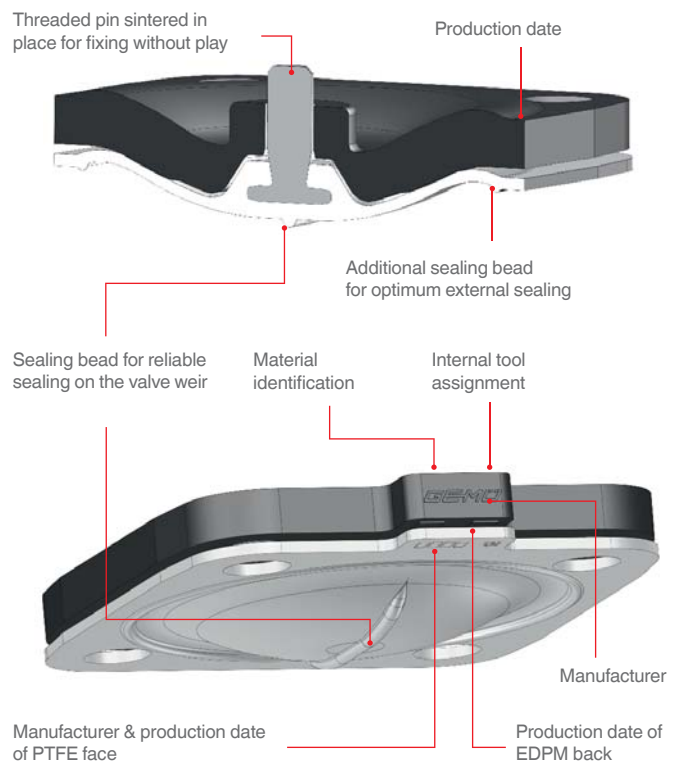
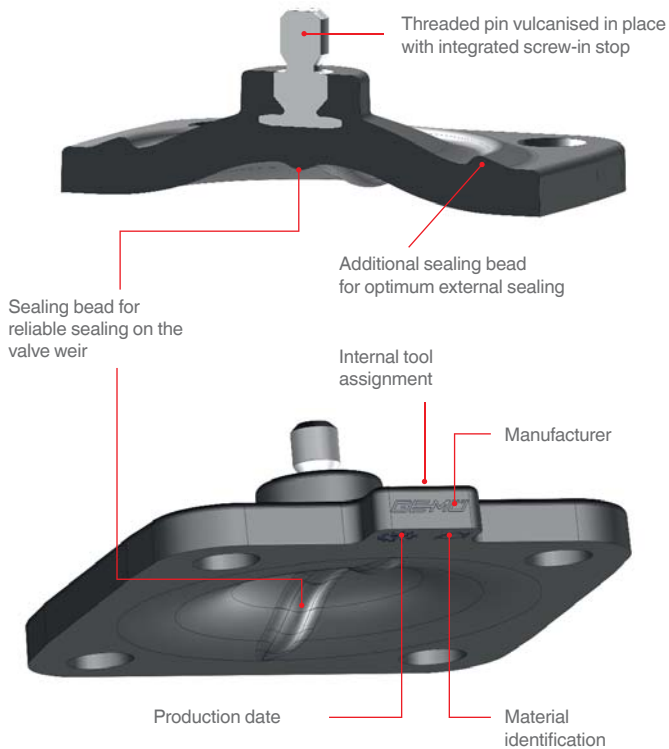
The applications listed above refer to experience of our customers who have had positive experience with them in their plant.

The suitability of the materials depends primarily on the process parameters and the manufacturing method used.

* Full bore diaphragm valves can be used with a high percentage of solids and low cycle duties.

The plant operator is responsible for careful selection of valves and materials for their processes.

Selection of diaphragms



The marking of the diaphragm may vary depending on the manufacturer.

Each application must be analysed before the selection of the diaphragm material. Since the most varied operating conditions often prevail within a plant at different locations, it can be necessary to use different valves and materials. In particular, the chemical characteristics and the temperature of the working media often lead to different interactions. The suitability of the materials used must therefore always be examined individually with regard to the current resistance list or checked by an authorised specialist. Only this procedure guarantees that the application will operate safely and economically for a longer period.

Diaphragms are wearing parts. They need to be regularly inspected and replaced otherwise malfunctions can occur, possibly resulting in hazardous situations. Please note: The maintenance intervals for inspecting and replacing diaphragms are application-dependent. In order to determine a suitable maintenance interval, the maintenance history and the stresses placed on the parts due to frequent sterilisation or frequent cycle duties must be taken into account.

Note

Since plastics and elastomers are subject to natural aging, we recommend observing the GEMÜ storage conditions for shut-off diaphragms. You thereby guarantee maximum storage and service life of the diaphragms.

The specified temperatures (see page 30) are merely the permissible temperature ranges for the respective diaphragm. The permissible temperature ranges of the valve must always be taken into account for the overall valve design. These can be found in the respective datasheets.

The temperature values are indicated irrespective of operating pressure and diaphragm size and apply to water and/or inert gases. The permissible operating pressure decreases with rising temperature and nominal size. Only specially designated diaphragms should be used for steam. The permissible operating pressure results from the general steam pressure diagram. We will be pleased to provide you with the GEMÜ steam pressure diagram on request.

GEMÜ diaphragms

Soft elastomer



Diaphragm sizes
10 - 300

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.

GEMÜ diaphragms

PTFE



Diaphragm sizes 10 - 150

The GEMÜ PTFE/EPDM diaphragms comprise a PTFE face and an EPDM back. These two components are either firmly (Code 5A/52) or flexibly (Code 5E) connected with each other. The flexible PTFE diaphragm unites all the advantages of PTFE with the flexibility of elastomer diaphragms in one product. In order to optimise the entire system again, both the PTFE face as well as the diaphragm back are compounded for GEMÜ and produced by GEMÜ in house.

Features

- *Special compounding and production by the GEMÜ Group*
- *High chemical resistance due to PTFE face*
- *Defined assembly due to sintered (Code 5E) or vulcanised (Code 5A/52) threaded pin with integrated screw-in stop*

Technical data and features

- *-10 to 100 °C continuous operation with liquid media*
- *Max. 150 °C in continuous operation with steam*
- *Available in diaphragm sizes 8 to 150*

Diaphragms

Selection

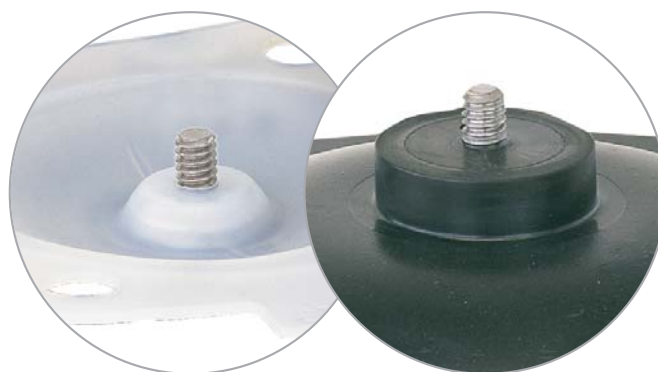
Diaphragm material	Code	Temperature range liquid media [° C]		Typical areas of application
		Min.	Max.	
NBR (nitrile rubber, Perbunan)	2	-10	100	Good resistance to mineral oils, greases and petrol. Unsuitable for oxidative media.
FPM /FKM (fluorinated rubber)	4	-10	90	Resistant to hydrocarbons and strong acids, aromatic solvents, ozone, chlorine in gas form and chlorinated solvents. Performs well at high temperatures. Not resistant to ketones and strong alkalis.
IIR (Butyl)	6	-5	100	Good resistance to dilute inorganic acids, alkalis and saline solutions. Good weather resistance and very suitable for water and ozone. Low gas permeability. Unsuitable for oils and hydrocarbons.
CR (chloroprene rubber)	8	-10	100	Resistant to various chemicals, dilute solutions of inorganic acids, alkalis and salts. Ozone and weather resistant. Very suitable for abrasive media. Not resistant to aromatic hydrocarbons.
EPDM (Ethylene-propylene-diene rubber)	14	-10	90	Very suitable for aggressive media, dilute acids, alkalis and saline solutions. Ozone and weather resistant. Very suitable for demineralised and deionised cold/hot water. Unsuitable for oils and greases.
PTFE */ EPDM (fully laminated PTFE diaphragm with EPDM back)	52	-10	100	Resistant to almost all chemicals such as strong acids, alkalis and salts also at high temperatures. Good resistance to solvents, chlorine and aromatic hydrocarbons.
PTFE */ EPDM (convex two-piece PTFE diaphragm with loose EPDM back)	5E	-10	100	Resistant to almost all chemicals such as strong acids, alkalis and salts also at high temperatures. Good resistance to solvents, chlorine and aromatic hydrocarbons. Low gas permeability.
NR (natural rubber)	15	-10	60	Resistant to dilute inorganic acids, alkalis and saline solutions. High abrasion resistance. Unfavourable in oxidising media and oils.

The temperature values are maximum values. With increasing operating pressure the temperature application limit drops.

* Chemically modified PTFE of the second generation (TFMTM); for code 52 only up to and including diaphragm size 100.

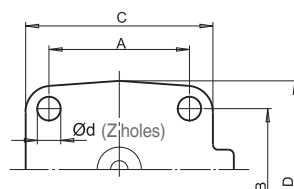
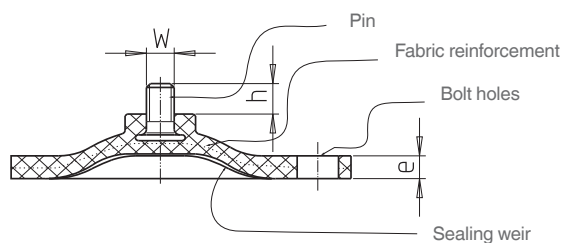
GEMÜ flexible diaphragm fixing

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.

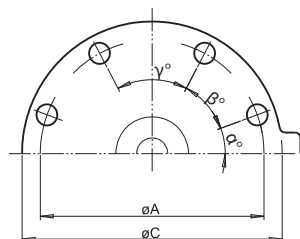
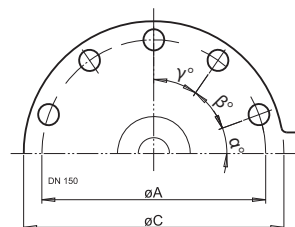


Diaphragms for weir-type diaphragm valves

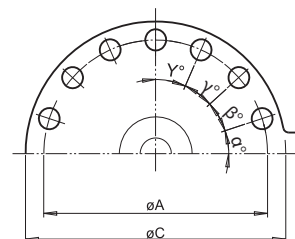
Dimensions



DN 15 to DN 80



DN 100 to DN 125



DN 200 to DN 300



DN	NPS	MG*	A	B	C	D	ϕd	e	h	W	α	β	γ	γ	Number of bolt holes
15 - 25	1/2" - 1"	25	54	46	71,7	66,7	9	6	8	1/4"	-	-	-	-	4
32 - 40	1 1/4" - 1 1/2"	40	70	65	100	90	11,5	7	8	1/4"	-	-	-	-	4
50	2"	50	82	78	124	106	13	7	7	1/4"	-	-	-	-	4
65	2 1/2"	65 ¹	102	95	145	133	14	8	7,5	5/16"	-	-	-	-	4
80	3"	80	127	114	186	156	18	9	8	5/16"	-	-	-	-	4
100	4"	100	194	-	228	-	13	10	9	5/16"	28°	42°	40°	-	8
125	5"	125	222	-	260	-	17	10	10,7	3/8"	25°	43.5°	43.5°	-	8
150	6"	150	273	-	305	-	17	11,3	11	3/8"	20°	35°	35°	-	10
200	8"	200	381	-	410	-	19	12	22	7/8"	18°	27°	22.5°	22.5°	14
250	10"	250	-	-	-	-	24	12	25	7/8"	22.5°	22.5°	22.5°	22.5°	14
300	12"	300	507	-	563	-	24	14	25	7/8"	18°	24°	24°	24°	14

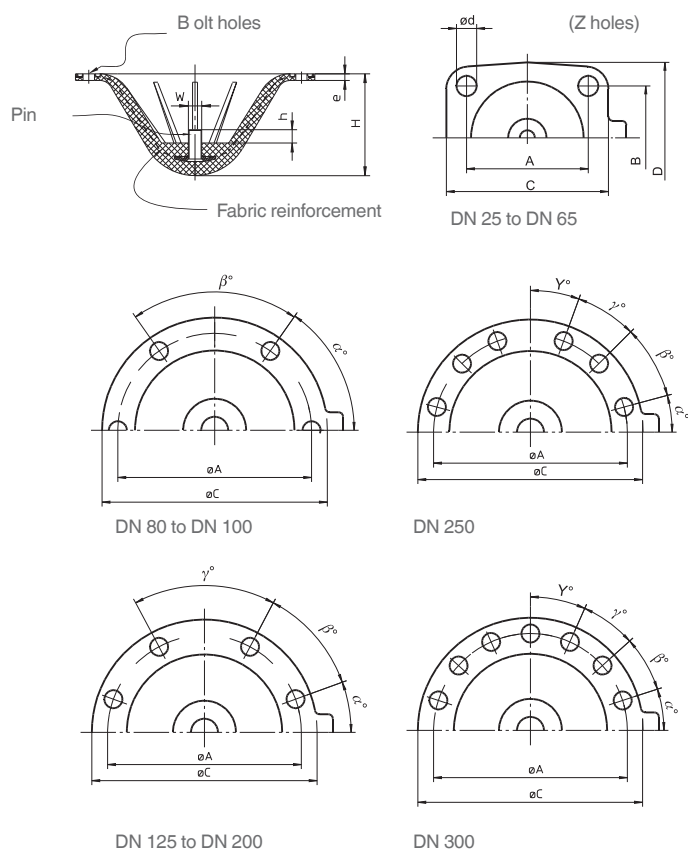
* Diaphragm size

The thread of the diaphragm pin "W" corresponds to Whitworth standard.

¹ Only GEMÜ 620 and 675.

Diaphragms for full bore diaphragm valves

Dimensions



DN	NPS	A	B	C	D	d	e	h	W	H	α	β	γ	Y	Number of bolt holes
15	½"	54	30	69	54	7	3.5	6	⅜"	22	-	-	-	-	4
20	¾"	54	30	69	54	7	3.5	6	⅜"	22	-	-	-	-	4
25	1"	64	51	90	70	9	5	8	¼"	36	-	-	-	-	4
40	1½"	64	51	90	70	9	5	8	¼"	36	-	-	-	-	4
50	2"	101	82	159	128	13.5	6	10	⅝"	64	-	-	-	-	4
65	2½"	101	82	159	128	13.5	6	10	⅝"	64	-	-	-	-	4
80	3"	175	-	223	-	13.5	6	12	⅝"	80	56°	34°	-	-	6
100	4"	175	-	223	-	13.5	6	12	⅝"	80	56°	34°	-	-	6
125	5"	255	-	287	-	13.5	8	16	⅝"	115	20°	40°	60°	-	8
150	6"	255	-	287	-	13.5	8	16	⅝"	115	20°	40°	60°	-	8
200	8"	305	-	341	-	18.5	8	20	⅝"	145	30°	40°	40°	-	8
250	10"	381	-	410	-	17	10	20	⅝"	178	15°	30°	25°	20°	12
300	12"	528	-	576	-	22	12	25	1"	280	18°	24°	24°	24°	14

The thread of the diaphragm pin "W" corresponds to Whitworth standard.

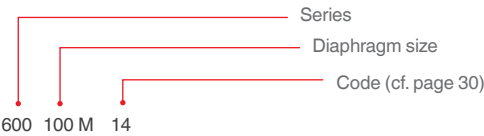
Replacement diaphragms

Replacement diaphragms can be ordered as loose items using the following article numbers. The table below is just an example of diaphragm size 100.

The composition of the article description is identical for all other diaphragm sizes and series.

Diaphragm size	Article designation Series 600-698	Article designation Series 655, 656, 638
100	600 100 M 2	655 100 M 2
	600 100 M 4	655 100 M 6
	600 100 M 8	655 100 M 8
	600 100 M 14	655 100 M 14
	600 100 M 52	655 100 M 15
	600 100 M 5E	

Example:



Storage and service life of elastomer components

Correct storage, such as that described in DIN 7716, is essential for a product to achieve its specified service life. Please use the relevant standards.

Our customers can continue to make full use of the elastomer products manufactured by us and our qualified suppliers as long as the elapsed time since production does not exceed the period given in the table (MAX. STORAGE TIME IN YEARS). The date of manufacture is stamped on the diaphragm (see below).

Diaphragm material	Code	Max. storage time in years	Max. recommended operating time in years*
NBR	2	5	3
EPDM	3A / 12 / 13 / 14 / 16 / 17	5	3
FPM	4 / 4A	5	4
PTFE/EPDM	5A / 5E / 52	5	4
Butyl	6	5	3
CR (chloroprene)	8	6	3
NR (natural rubber)	15	2	1
PTFE/FPM	56	5	4

* In addition it is recommended that diaphragms that are in service are replaced at the latest after the operating times listed above.

These values are to be understood as guidelines and there can be strong deviations from these according to the actual operating conditions (temperature, pressure, media, switching frequency etc.).

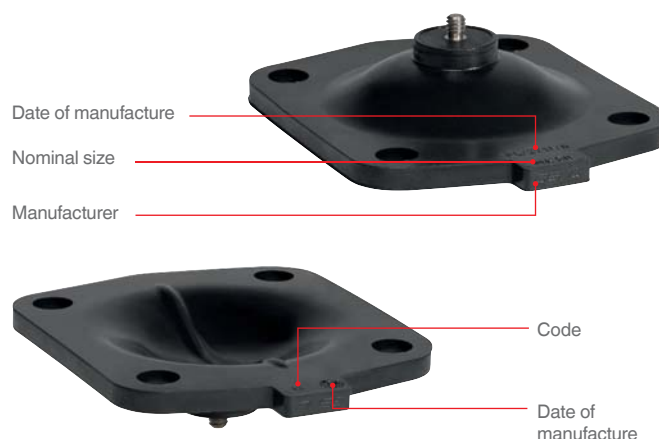
For diaphragms made of a combination of materials, the shorter storage time should be applied.

Specific measures must be implemented in order to store the diaphragms.

- Temperature below 25 °C, preferably 15 °C, but not below -10 °C
- Protection from light, in particular from light with a high UV component (e.g. sunlight)
- Relative humidity below 65 %
- The storage space must not contain any ozone-producing equipment (e.g. electric motors), or solvents, fuels, chemicals, etc.
- Do not use films containing plasticizers for packaging
- The diaphragms must be stored stress-free, i.e. without tension, pressure or other deformation; for example, they must not be suspended from any part of the edge of their circumference

Elastomers are organic materials; they can be damaged by external influences such as oxygen, ozone, heat, etc. The measures listed above are necessary for achieving the maximum storage time.

At GEMÜ, diaphragms are stored under optimum conditions and never for longer than six months.



Valve instrumentation options



GEMÜ 620
with directly mounted
GEMÜ 1435 ePos®
positioner



GEMÜ 620
with directly mounted
GEMÜ 1436 cPos®
positioner and process controller



GEMÜ 687
with directly mounted
GEMÜ 1434 µPos®
positioner



GEMÜ 695
with remotely mounted
GEMÜ 1435 ePos®
positioner



GEMÜ 695
with remotely mounted
GEMÜ 1436 cPos®
positioner and process controller

Positioners and process controllers



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

Accessories

for pneumatic actuators GEMÜ 620, 687, 695



GEMÜ 0322 - 0324, 8303

Pilot valves



GEMÜ 1201 - 1235

Electrical position indicators



GEMÜ 1434, 1435, 1436

Electro-pneumatic positioners and process controllers



GEMÜ 1106 - 1161

Optical position indicator,
stroke limiter,
seal adjuster,
manual override



GEMÜ 1450 - 1460

NAMUR mounting bracket with/without
handwheel

Accessories

for pneumatic actuators GEMÜ 620, 687, 695

			GEMÜ 620	GEMÜ 656	GEMÜ 687	GEMÜ 695
Optical position indicators	Optical position indicator with stroke limiter and manual override, control function "Normally closed"	GEMÜ 1114	●	●	●	●
	Optical position indicator with stroke limiter for control function "Normally open"	GEMÜ 1151-1161	●	●	●	●
	Optical position indicator variants for all control functions available	GEMÜ 1300	●	●	●	●
	Optical position indicator for mounting of proximity switches, control function "Normally closed"	GEMÜ 1310	●	●	●	●
Stroke limiters, seal adjuster	Stroke limiter with seal adjuster for control function "Normally open"	GEMÜ 1106	●	●	●	●
	Stroke limiter for control function "Normally closed"	GEMÜ 1151	●	●	●	●
	Stroke limiter for control function "Normally open"	GEMÜ 1110-1161	●	●	●	●
	Proximity switches mounted and adjustable	GEMÜ 1216	●	●	●	●
Electrical position indicators	Electrical position indicator (indication: valve open and/or closed)	GEMÜ 1201-1214	●	●	●	●
	Electrical position indicator ATEX	GEMÜ 1205, 1211	●	●	●	●
	Electrical position indicator (indication: valve open)	GEMÜ 1215	●	●	●	●
	Electrical position indicator (indication: valve open and/or closed)	GEMÜ 1230, 1232	●	●	●	●
	Electrical position indicator ATEX	GEMÜ 1231	●	●	●	●
	Electrical position indicator (programmable)	GEMÜ 1235	●	●	●	●
	Combi switchbox with integrated 3/2-way pilot valve For direct automation connection	GEMÜ 4222	●	●	●	●
	Combi switchbox with integrated pilot valve	GEMÜ 4242			●	●
Positioners	Electro-pneumatic positioner For direct mounting to pneumatically operated valves (\leq DN 25)	GEMÜ 1434 μ Pos®			●	●
	Electro-pneumatic positioner For direct or remote mounting to pneumatically operated valves	GEMÜ 1435 ePos®	●	●	●	●
	Electro-pneumatic positioner with integrated process controller For direct or remote mounting to pneumatically operated valves	GEMÜ 1436 cPos®	●	●	●	●
Manual override, Pilot valves	Pilot valves for direct mounting to pneumatically operated valves	GEMÜ 0324, 334	●	●	●	●
	Manual override with optical position indicator	GEMÜ 1002	●	●	●	●
	NAMUR mounting bracket with/without handwheel	GEMÜ 1450, 1460	●	●	●	●

● optional

— on request

Other options and combinations of several accessories are possible, please enquire.

Accessories

for pneumatic full bore diaphragm valve GEMÜ 656



GEMÜ 0322 - 0324, 8303, 8506

Pilot valves



GEMÜ 1201 - 1235

Electrical position indicators



GEMÜ 1435, 1436

Electro-pneumatic positioners and
process controllers



GEMÜ 1300

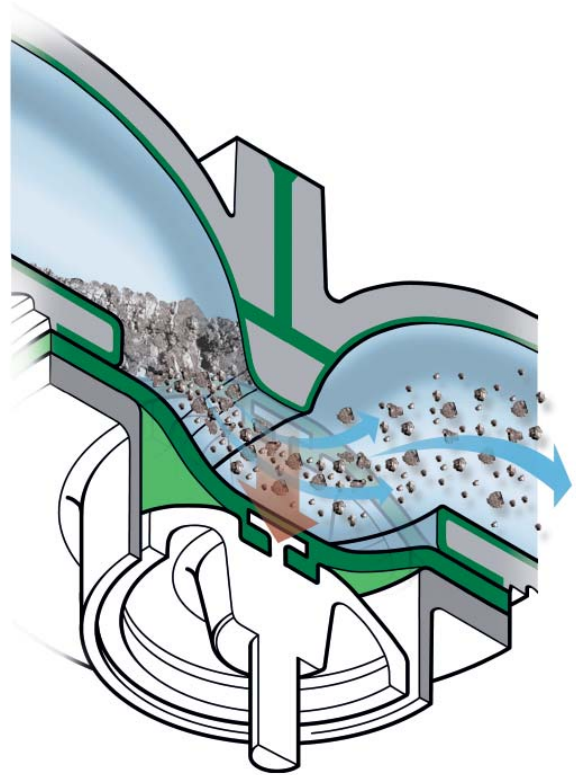
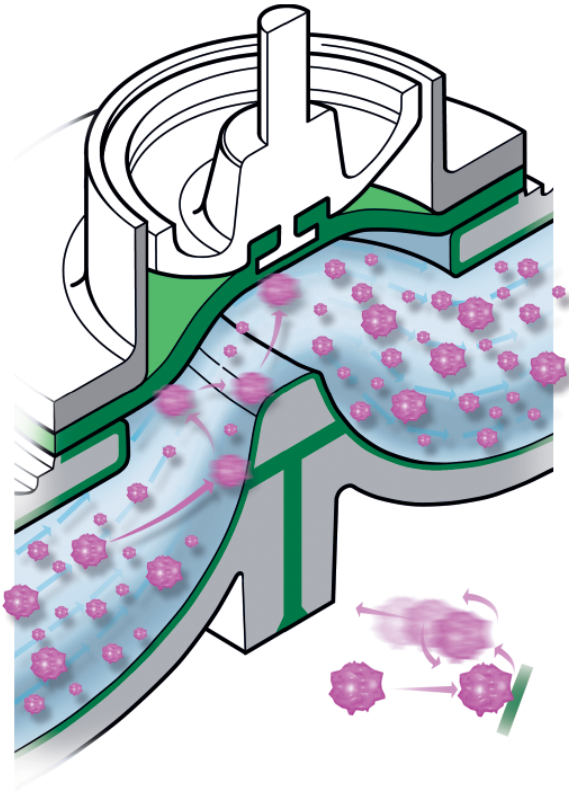
Optical
position indicator



GEMÜ 1450 - 1460

NAMUR mounting bracket with/without
handwheel

Terms and installation hints



Abrasive

A working medium is abrasive if it removes material from the components / devices (e.g. the valve) it flows through. Example: Sulphur crystals (powder) are transported by compressed air in a piping system. The more abrasive a medium is, the lower the flow velocity ought to be.

Measure / installation hint:

Appropriate countermeasures include reducing flow velocity and protecting the components, either with an extremely hard surface or a soft surface.

Plugging caused by in-line solids:

If the medium consists of gas or liquid with a high content of relatively heavy particles, the heavy components sink to the bottom when pipeline sections or valves are closed or when there are only very low flow velocities. This condition may cause plugs which can only be removed with difficulty or not at all. The cross-section of the pipe diminishes - valves are clogged.

Measure / installation hint:

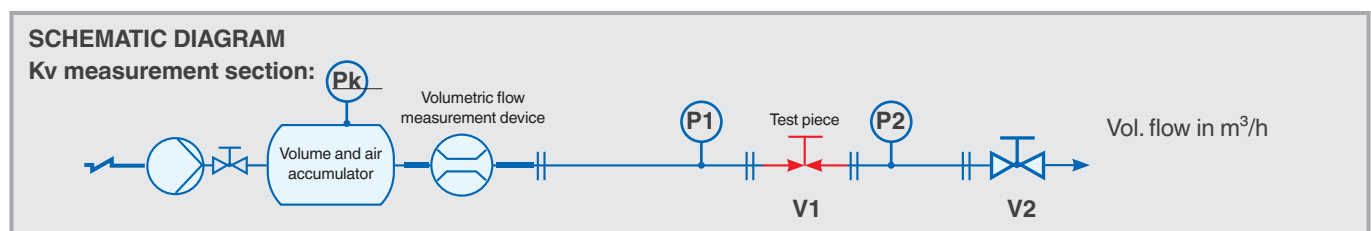
Install the diaphragm valve upside-down. The particles are deposited at the closed diaphragm. When the valve is opened, it is unclogged by the diaphragm movement and washed out by the flowing medium.

Kv value

Test method for Kv value determination based on DIN EN 60534

Medium: Water

Testing order according to the schematic diagram below:



Kv value calculation:

$$Kv = \text{Volume flow} \times \sqrt{1 / \Delta p}$$

Δp = pressure differential $p_1 - p_2$ (upstream pressure minus downstream pressure)

Kv value definition:

The Kv value is the flow coefficient of valves based on water, in m³/h, with a pressure differential of 1 bar at the valve.

Cv value definition:

The Cv value is the flow coefficient of valves based on water, in gallons per minute, with a pressure differential of 1 psi at the valve.

For US gallons: (Kv) 1 m³/h = 1.1576 gal/min as a Cv value

For UK gallons: (Kv) 1 m³/h = 0.9639 gal/min as a Cv value

Definition of valve stroke:

100 % stroke means: Valve in "OPEN" position

Calculation of resistance correction value z (zeta)

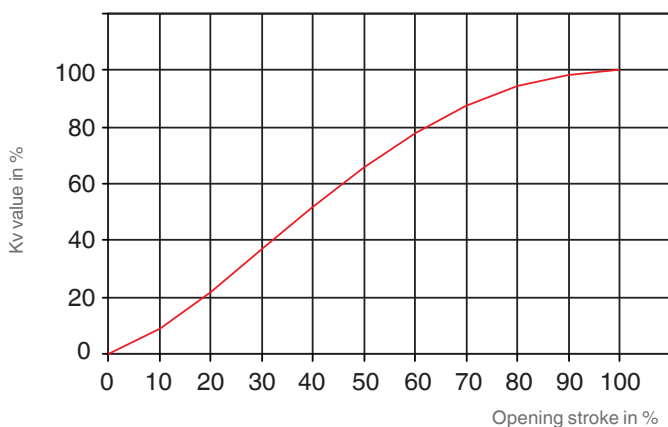
The resistance correction value z (zeta) can be calculated using the connection diameter or inner pipe diameter

$$z = 0.0016 \times D^4 / Kv^2$$

Kv value in m³/h

pipe diameter D in mm

Example Kv value diagram



The diagram shown is an approximation of the course of the Kv value curves. Dependent on the valve body, nominal size, diaphragm, valve stroke and operating pressure, the curves may differ.

Certificates

The following certificates are available for many of our products. Please contact us for detailed information.

"TA Luft" (German Clean Air Act)

We are the first manufacturer world-wide whose diaphragm valves comply with the "TA-Luft" (leakage check) according to VDI 2440, edition November 2000.

RoHS

GEMÜ diaphragms comply with the RoHS Directive 2002/95 EC and the WEEE Directive 2002/96 EC.

Pressure Equipment Directive

As all diaphragm valves are pressure bearing components and as the diaphragm is the central sealing element in addition to the valve body, all diaphragms also comply with the European Pressure Equipment Directive 97/23EC Art. 3 § 3.

BAM certificate for use in oxygen applications

Materials and valves are suitable for oxygen service and comply with the bulletin M934 (BGI 617) with regard to burn-out safety when used with gaseous oxygen.

Quality Management System

GEMÜ is certified to DIN EN ISO 9001:2000.

GOST certificate

GEMÜ diaphragm valves are certified to the Russian GOST and meet the hygienic requirements of the foodstuff industry in Russia.

As some of the approvals/certificates only relate to specific product and material versions, please ask your GEMÜ consultant for further details.

Explosion protection

You will receive information on the ATEX classification of valves on request.



GEMÜ manufacturing sites and sales locations worldwide

AFRICA

GEMÜ Valves Africa Pty. Ltd
Phone: +27(0)11 462 7795
Fax: +27(0)11 462 4226
office@gemu.co.za

AUSTRALIA

GEMÜ Australia Pty. Ltd
Phone: +61-2-43 23 44 93
Fax: +61-2-43 23 44 96
mail@gemu.com.au

AUSTRIA

GEMÜ GmbH
Phone: +43 22-36 30 43 45-0
Fax: +43 22-36 30 43 45-31
info@gemu.at

BELGIUM

GEMÜ Valves bvba/sprl
Phone: +32 2 702 09 00
Fax: +32 2 705 55 03
info@gemu.be

BOSNIA/HERCEGOVINA

ALTERA d.o.o.
Phone: +387 51 434 311
Fax: +387 51 434 311
altera@blic.net

BRAZIL / SOUTH AMERICA

GEMÜ Indústria de Produtos
Plásticos e Metalúrgicos Ltda.
Phone: +55-41-33 82 24 25
Fax: +55-41-33 82 35 31
gemu@gemu.com.br

BULGARIA

GEMÜ GmbH
Phone: +43-22-36 30 43 45-0
Fax: +43-22-36 30 43 45-31
info@gemu.at

CANADA

GEMÜ Valves Canada Inc.
Phone: +1-450-902-2690
Fax: +1-404-3 44 4003
info@gemu.com

CHINA

GEMÜ Valves (China) Co., Ltd
Phone: +86-21-2409 9878
info@gemu.com.cn

CROATIA

STRIX d.o.o.
Phone: +38 51 23 70 381
Fax: +38 51 23 70 675
strix@zg.t-com.hr

CZECH REPUBLIC

Fluidtechnik Bohemia s.r.o.
Phone: +420 548 213 233-5
Fax: +420 548 213 238
brno@fluidbohemia.cz

DENMARK

GEMÜ ApS
Phone: +45 70 222 516
Fax: +45 70 222 518
info@gemu.dk

EGYPT

Noaman Engineering Co.
Phone: +20-2-33 47 21 57
Fax: +20-2-33 03 18 79

ESTONIA/LATVIA

UAB Biotecha
Phone: +370 5 270 90 55
Fax: +370 5 270 90 56
info@biotecha.lt

FINLAND

Gemü Oy
Phone: +35-89-82-54-14-0
Fax: +35-89-82-54-14-13
orders@gemu.fi

FRANCE

GEMÜ S.A.S
Phone: +33-3 88 48 21 00
Fax: +33-3 88 49 12 49
info@gemu.fr

INTERCARAT

Phone: +33-3 88 48 21 20
Fax: +33-3 88 49 14 82
sales@intercarat.com

GERMANY

GEMÜ Gebr. Müller
GmbH & Co. KG
Phone: +49-79 40-12 30
Fax: +49-79 40-12 31 92 (Domestic)
Fax: +49-79 40-12 32 24 (Export)
info@gemu.de

GREAT BRITAIN / UK

GEMÜ Valves Ltd
Phone: +44-19 25-82 40 44
Fax: +44-19 25-82 80 02
info@gemu.co.uk

GREECE

A. Stamopoulos Industrial Products
Phone: +30-210-7798 663
Fax: +30-210-7473 359
astamop@otenet.gr

GUATEMALA

Proyect, Guatemala S.A.
Phone: +502 2429-0202
Fax: +502 2476-7439
guatemala@grupoproyect.com

HONG KONG

GEMÜ Valves (Shanghai) Co., Ltd
Phone: +86-21-64 42 65 52
Fax: +86-21-64 89 18 85
info@gemu.com.cn

HUNGARY

MULTIVALVE Kft.
Phone: +36 1306 4491
Fax: +36 1306 4491
iroda@multivalve.hu

INDIA

GEMÜ India
Representative Office
Phone: +91-79-25450438
+91-79-25450440
Fax: +91-79-25450439
sales@gemu.in

INDONESIA

Gemu Valves Pte Ltd
(Indonesia Representative Office)
Phone: +62 (21) - 6231 0035
Fax: +62 (21) - 2907 4643
info@gemu.co.id

IRAN

SINARAD Kala Co., Ltd
Phone: +98-21- 22096277,
+98-21-22095187
Fax: +98-21-22096811
GEMU@sinarad.com

IRELAND

GEMÜ Ireland Ltd
Phone: +353 (0)21 4232023
Fax: +353 (0)21 4232024
info@gemu.ie

ISRAEL

Treitel
Chemical Engineering Ltd
Phone: +972-3-9 78 77 77
Fax: +972-3-9 23 29 28
gemu@treitel.co.il

ITALY

GEMÜ S.r.l.
Phone: +39-02-40044080
Fax: +39-02-40044081
info@gemu.it

JAPAN

GEMÜ Japan Co., Ltd.
Phone: +81-52-936-2311
Fax: +81-52-936-2312
info@gemu.jp

LITHUANIA

UAB Biotecha
Phone: +370 5 270 90 55
Fax: +370 5 270 90 56
info@biotecha.lt

MACEDONIA

Eurocons Group d.o.o.
Phone: +381 13 801 460
Fax: +381 63 394 790
borko@eurocons.co.yu

MALAYSIA

GEMU VALVES PTE LTD
(Malaysia Representative Office)
Phone: +(603)- 7832 7640
Fax: +(603)- 7832 7649
info@gemu.com.sg

MEXICO

GEMÜ Válvulas S.A. de C.V.
German Centre
01210 Mexico, D.F., Mexico
Phone: +52 55 7090 4161
+52 55 7090 4179

NETHERLANDS

Startflow B.V.
Phone: +31-8 80 04 46 00
info@startflow.nl

NEW ZEALAND

GEMÜ Australia Pty.
Phone: +61-2-43-23 44 93
Fax: +61-2-43-23 44 96
mail@gemu.com.au

PHILIPPINES

GEMÜ Valves PTE. Ltd
Phone: +65-65 62 76 40
Fax: +65-65 62 76 49
info@gemu.com.sg

POLAND

AFT Sp. Z. o.o.
Phone: +48-61-8 20 51 45
Fax: +48-61-8 20 69 59
aft.poznan@aft.pl

PORTUGAL

Contimetra-Instrumentos
Industriais, Lda
Phone: +351-21-4 20 39 00
Fax: +351-21-4 20 39 01
industria@contimetra.com

ROMANIA

String S.R.L. Romania
Phone: +40 238 72 62 80
Fax: +40 238 71 58 00
info@string.ro

RUSSIA

OOO „GEMÜ GmbH“
Phone: +7(495) 662-58-35
Fax: +7(495) 662-58-35
info@gemu.ru

SERBIA

Eurocons Group d.o.o.
Phone: +381 13 801 460
Fax: +381 13 837 250
info@eurocons.rs

SINGAPORE

GEMÜ Valves PTE. Ltd
Phone: +65-65 62 76 40
Fax: +65-65 62 76 49
info@gemu.com.sg

SLOVAKIA

EURO-VALVE s.r.o.
Phone: +421 31 705 5007
Fax: +421 31 705 5007
euro-valve@euro-valve.com

SLOVENIA

*General Industry,
Water Treatment,
Plastic Piping Systems*
Strix Inziniring d.o.o.
Phone: +386 1 54 66 050
Fax: +386 1 54 66 058
info@strix-inz.si

Pharma, Biotech, Food

Ipros d.o.o.
Phone: +386 1 200 26 20
Fax: +386 1 423 18 24
ipros@ipros.si

SOUTH KOREA

JID Corporation Co. Ltd
Phone: +82-2-326-5545
Fax: +82-2-326-5549
master@jidcorp.com

SPAIN

ELION, S.A.
Phone: +34-9-32 982 000
Fax: +34-9-34 311 800
elion@elion.es

SWEDEN

GEMÜ Armatur AB
Phone: +46-31-99 65 00
Fax: +46-31-99 65 20
order@gemu.se

SWITZERLAND

GEMÜ Vertriebs AG
Tel.: +41-41 799 05 55
Fax: +41-41 799 05 85
vertriebsag@gemu.ch

GEMÜ GmbH
Phone: +41-41-7 99 05 05
Fax: +41-41-7 99 05 85
info@gemu.ch

TAIWAN

GEMUE Taiwan
Representative Office
Phone: +886-3-3 56 68 50
Fax: +886-3-3 56 68 45
office@gemu.tw

THAILAND

GEMÜ Valves PTE. Ltd
Phone: +65-65 62 76 40
Fax: +65-65 62 76 49
info@gemu.com.sg

TURKEY

Durko Çevre Enerji
Phone: +90 216 402 20 00
Fax: +90 216 402 20 10
info@durkocevre.com.tr

UAE + MIDDLE EAST

GEMU Middle East FZCO
Phone: +971-4-88 60 125
Fax: +971-4-88 60 124
info@gemu.ae

UKRAINE

CSC Automation
Phone: +380 (44) 494 33 55
Fax: +380 (44) 494 33 66
kck@kck.ua

UNITED STATES

GEMÜ Valves Inc.
Phone: +1-678-5 53 34 00
Fax: +1-404-3 44 93 50
info@gemu.com

 GEMÜ manufacturing site

 GEMÜ subsidiary



GEMÜ Gebr. Müller Apparatebau GmbH & Co. KG
Fritz-Müller-Straße 6-8 · D-74653 Ingelfingen-Criesbach
Phone +49 (0)7940 123-0 · info@gemu.de

www.gemu-group.com