Industrial 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. A world-wide network of distributors and sales subsidiaries guarantee that products and services reach you quickly and directly. 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 valves

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 valves

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

Product overview

<table>
<thead>
<tr>
<th>Type</th>
<th>GEMÜ 675</th>
<th>GEMÜ 653</th>
<th>GEMÜ 671</th>
<th>GEMÜ 620</th>
<th>GEMÜ 687</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator</td>
<td>Metal bonnet with metal handwheel, optical position indicator</td>
<td>Stainless steel bonnet with plastic handwheel, optical position indicator</td>
<td>Plastic bonnet with optical position indicator</td>
<td>Plastic/metal actuator with 5G iron distance piece</td>
<td>Plastic actuator with stainless steel distance piece</td>
</tr>
<tr>
<td>Nominal size</td>
<td>DN 15 to 300</td>
<td>DN 15 to 100</td>
<td>DN 15 to 100</td>
<td>DN 15 to 150</td>
<td>DN 15 to 100</td>
</tr>
<tr>
<td>Connection type</td>
<td>Threaded connections, flanges, different standards and designs available</td>
<td>Threaded connections, flanges, different standards and designs available</td>
<td>Threaded connections, flanges, different standards and designs available</td>
<td>Threaded connections, flanges, different standards and designs available</td>
<td>Threaded connections, flanges, different standards and designs available</td>
</tr>
<tr>
<td>Valve body material *</td>
<td>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)</td>
<td>Stainless steel 1.4435, 1.4408, PFA lining available</td>
<td>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</td>
<td>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)</td>
<td>EN-GJS-400-18-LT (GGG 40.3) with PFA, PP or hard rubber lining, stainless steel 1.4435, 1.4408, PFA lining available</td>
</tr>
<tr>
<td>Media temperature *</td>
<td>-10 to 150 °C</td>
<td>-10 to 150 °C</td>
<td>-10 to 80 °C</td>
<td>-10 to 150 °C</td>
<td>-10 to 150 °C</td>
</tr>
<tr>
<td>Operating pressure *</td>
<td>0 to 10 bar</td>
<td>0 to 10 bar</td>
<td>0 to 10 bar</td>
<td>0 to 10 bar</td>
<td>0 to 10 bar</td>
</tr>
<tr>
<td>Diaphragm material</td>
<td>NBR, FPM, CR, EPDM, PTFE</td>
<td>FPM, EPDM, PTFE</td>
<td>FPM, EPDM, PTFE</td>
<td>NBR, FPM, CR, EPDM, PTFE</td>
<td>FPM, EPDM, PTFE</td>
</tr>
<tr>
<td>Voltage</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

* 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 made of cast iron (GG 25)

Valve bodies made of stainless steel
pneumatically operated motorized

<table>
<thead>
<tr>
<th>GEMÜ 695</th>
<th>GEMÜ 698</th>
<th>GEMÜ 648 SideStep</th>
<th>GEMÜ 628</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plastic actuator</td>
<td>Plastic actuator with stainless steel distance piece, on/off</td>
<td>Plastic control actuator with optical position indicator</td>
<td>AUMA linear actuator for on/off and regulating duties</td>
</tr>
<tr>
<td>DN 15 to 50</td>
<td>DN 15 to 50</td>
<td>DN 15 to 100</td>
<td>DN 32 to 150</td>
</tr>
<tr>
<td>Threaded connections, flanges, different standards and designs available</td>
<td>Threaded connections, flanges, different standards and designs available</td>
<td>Threaded connections, flanges, different standards and designs available</td>
<td>Threaded connections, flanges, different standards and designs available</td>
</tr>
<tr>
<td>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</td>
<td>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</td>
<td>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</td>
<td>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</td>
</tr>
<tr>
<td>-10 to 80 °C</td>
<td>-10 to 150 °C</td>
<td>-10 to 150 °C</td>
<td>-10 to 150 °C</td>
</tr>
<tr>
<td>0 to 10 bar</td>
<td>0 to 10 bar</td>
<td>0 to 10 bar</td>
<td>0 to 10 bar</td>
</tr>
<tr>
<td>FPM, EPDM, PTFE</td>
<td>FPM, EPDM, PTFE</td>
<td>NBR, FPM, CR, EPDM, PTFE</td>
<td>NBR, FPM, CR, EPDM, PTFE</td>
</tr>
<tr>
<td>-</td>
<td>24 V DC, 120 V AC, 230 V AC 50/60Hz</td>
<td>24 V DC, 120 V AC, 230 VAC 50/60Hz</td>
<td>According to AUMA product range</td>
</tr>
</tbody>
</table>

**Diaphragms**

diaphragm sizes 10 - 200
PTFE/EPDM fully laminated, PTFE/EPDM two-layer, loose

**Valve bodies** made of 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.

www.gemu-group.com
Weir-type diaphragm valves

Product overview

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

* dependent on diaphragm material and/or body material

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

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

Valve bodies made of 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
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

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

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
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 150

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

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

Connections thread for positioners 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

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

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

GEMÜ 695, DN 50, with remotely mounted GEMÜ 1436 cPos positioner
GEMÜ 698

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)
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
- Option: Integrated emergency power supply module
- Fieldbus interface
- e.sy-com interface for Bluetooth connection

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

Optical position indicator
Plain text display
Operating keys
Stainless steel distance piece 1.4301 for operating temperatures up to 150 °C
Injection moulded high quality linings
Minimal deadleg internal contour for good flow conditions and high Kv values

Heat resistant coating of the whole body (only SG iron) applied before lining provides good corrosion protection against condensate and atmosphere

Concave or convex diaphragm in different materials to suit various media

GEMÜ 648 SideStep
motorized, DN 15 to 100
<table>
<thead>
<tr>
<th>Features</th>
<th>SideStep economy Open/Close control</th>
<th>SideStep industrial Open/Close control</th>
<th>SideStep industrial control system</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-line display</td>
<td>-</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Automatic initialisation</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>4 fascia keys</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Position indication by LED</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Operating indication by LED</td>
<td>●</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>e.sY-com interface</td>
<td>-</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Axial force (adjustable)</td>
<td>-</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Actuating speed (adjustable)</td>
<td>-</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Option Profinbus</td>
<td>-</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Positioner</td>
<td>-</td>
<td>-</td>
<td>●</td>
</tr>
<tr>
<td>Option process controller</td>
<td>-</td>
<td>-</td>
<td>●</td>
</tr>
<tr>
<td>Option digital inputs</td>
<td>-</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Extended diagnostic facilities</td>
<td>-</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Alarm outputs (adjustable)</td>
<td>-</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Analogue output</td>
<td>-</td>
<td>-</td>
<td>●</td>
</tr>
<tr>
<td>Min / Max position (adjustable)</td>
<td>-</td>
<td>-</td>
<td>●</td>
</tr>
</tbody>
</table>
GEMÜ 628

motorized, DN 32 to 150

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

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.)

Injection moulded high quality linings

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

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

Product overview

<table>
<thead>
<tr>
<th>Type</th>
<th>GEMÜ 655</th>
<th>GEMÜ 656</th>
<th>GEMÜ 638</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator</td>
<td>Metal bonnet with metal handwheel</td>
<td>Metal actuator with SG iron metal distance piece</td>
<td>AUMA linear actuator for on/off and regulating duties</td>
</tr>
<tr>
<td>Nominal size</td>
<td>DN 25 to 300</td>
<td>DN 25 to 250</td>
<td>DN 25 to 150</td>
</tr>
<tr>
<td>Connection type</td>
<td>Various flanges acc. to EN and ANSI, lengths acc. to EN and MSS</td>
<td>Various flanges acc. to EN and ANSI, lengths acc. to EN and MSS</td>
<td>Various flanges acc. to EN and ANSI, lengths acc. to EN and MSS</td>
</tr>
<tr>
<td>Media temperature *</td>
<td>-10 to 100 °C</td>
<td>-10 to 100 °C</td>
<td>-10 to 100 °C</td>
</tr>
<tr>
<td>Operating pressure **</td>
<td>0 to 7 bar</td>
<td>0 to 7 bar</td>
<td>0 to 7 bar</td>
</tr>
<tr>
<td>Diaphragm material</td>
<td>NBR, IIR, CR, NR, EPDM</td>
<td>NBR, IIR, CR, NR, EPDM</td>
<td>NBR, IIR, CR, EPDM</td>
</tr>
<tr>
<td>Voltage</td>
<td>-</td>
<td>-</td>
<td>According to AUMA product range</td>
</tr>
</tbody>
</table>

* dependent on diaphragm material

Diaphragm
choice of NBR, IIR, CR, EPDM

Valve body made of cast iron
with DIN or ANSI flanges, length EN 558, series 7

Valve body made of 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

Robust metal housing
Variable spring sets for optimum adaptation to various operating pressures
Long life actuator membrane with optimized support
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.

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

Connection thread for positioners and accessories
Actuator available in 3 control functions:
  - Normally closed (NC)
  - Normally open (NO)
  - Double acting (DA)

Control air connector for control function "Normally closed"
Roller burnished valve spindle
Optimally suited compressor
Threaded diaphragm pin for optimum diaphragm seat and long service life

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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

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

There is no other area in which the demands on valve bodies are as varied as in industrial applications. General experience and application experience over the course of several decades have been applied to our valve designs. 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

<table>
<thead>
<tr>
<th>Valve body material</th>
<th>Areas of use</th>
<th>Temperature range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cast iron</td>
<td>General industrial applications, water, alkaline and inert media, gas and oil</td>
<td>limited by diaphragm material</td>
</tr>
<tr>
<td>Cast iron with Halar lining (ECTFE)</td>
<td>Very suitable for strong mineral acids, oxidative acids and alkalis. Should not be used for particulate and abrasive media.</td>
<td>limited by diaphragm material</td>
</tr>
<tr>
<td>Cast iron and SG iron with IIR lining (Butyl)</td>
<td>Good resistance to diluted inorganic acids, alkalis and saline solutions. Good weather resistance and very suitable for water and ozone. Low gas permeability. Unsuitable for oils and hydrocarbons.</td>
<td>limited by diaphragm material</td>
</tr>
<tr>
<td>Cast iron with CR lining (chloroprene rubber)</td>
<td>Resistant to various chemicals, diluted solutions of inorganic acids, alkalis and salts. Ozone and weather resistant. Very suitable for abrasive media. Not resistant to aromatic hydrocarbons.</td>
<td>-10 to 100 °C</td>
</tr>
<tr>
<td>SG iron</td>
<td>General industrial applications, water, alkaline and inert media, gas and oil</td>
<td>limited by diaphragm material</td>
</tr>
<tr>
<td>Cast iron and SG iron with hard rubber lining</td>
<td>Can be used for weak acids, waste water, brine, water treatment and cleaning, surface finishing, pickling and galvanising, sodium hydroxide, sodium chloride</td>
<td>limited by diaphragm material</td>
</tr>
<tr>
<td>SG iron or ductile iron with PP lining</td>
<td>Can be used for acids, waste water, brine, water treatment and cleaning, surface finishing, pickling and galvanising</td>
<td>-10 to 80 °C</td>
</tr>
<tr>
<td>SG iron or ductile iron with PFA lining</td>
<td>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.</td>
<td>limited by diaphragm material</td>
</tr>
<tr>
<td>Stainless steel 1.4408</td>
<td>Can be used for pure media with limited aggressive chemicals and environments</td>
<td>limited by diaphragm material</td>
</tr>
<tr>
<td>Stainless steel 1.4435</td>
<td>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</td>
<td>limited by diaphragm material</td>
</tr>
<tr>
<td>Stainless steel 1.4408 with PFA lining</td>
<td>See SG iron with PFA lining. An additional advantage is the resistance of the valve body to an aggressive environment</td>
<td>limited by diaphragm material</td>
</tr>
</tbody>
</table>

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.
<table>
<thead>
<tr>
<th>Areas of use</th>
<th>Mediums</th>
<th>Valve body material</th>
<th>Diaphragm material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminium oxide manufacture</td>
<td>Thick slurries* with 50% caustic soda or 10% sulphuric acid</td>
<td>Cast iron/SG iron with soft rubber (Butyl) or hard rubber lining.</td>
<td>Butyl</td>
</tr>
<tr>
<td></td>
<td>Industrial water, light slurries or treated water</td>
<td>Cast iron/SG iron or with soft rubber (Butyl)</td>
<td>Butyl</td>
</tr>
<tr>
<td>Steelworks, metalwork, pickling and surface treatment</td>
<td>Chromic acid (H$_2$CrO$_4$)</td>
<td>Cast iron or SG iron with ECTFE or PFA lining</td>
<td>PTFE</td>
</tr>
<tr>
<td></td>
<td>Caustic soda solution (NaOH)</td>
<td>Cast iron, SG iron or ductile iron with PP or hard rubber lining.</td>
<td>EPDM, PTFE</td>
</tr>
<tr>
<td></td>
<td>Hydrochloric acid solution (HCl), iron chloride (FeCl$_3$), contaminated solution</td>
<td>Cast iron or SG iron with ECTFE or PFA lining</td>
<td>PTFE, FPM/FKM</td>
</tr>
<tr>
<td></td>
<td>Hydrochloric acid (HCl), sulphuric acid (H$_2$SO$_4$)</td>
<td>Cast iron or SG iron or with ECTFE or PFA lining</td>
<td>PTFE</td>
</tr>
<tr>
<td></td>
<td>Hydrochloric acid (HCl) regeneration</td>
<td>Cast iron or SG iron with ECTFE or PFA lining</td>
<td>PTFE</td>
</tr>
<tr>
<td>Fertiliser industry/ phosphate production/ phosphoric acid manufacture</td>
<td>Acidulated gypsum*</td>
<td>Cast iron, SG iron or ductile iron with Butyl or Neoprene lining</td>
<td>Butyl, EPDM, CR</td>
</tr>
<tr>
<td></td>
<td>Phosphoric acid* (H$_3$PO$_4$)</td>
<td>Cast iron/SG iron with hard rubber, Butyl or Neoprene lining</td>
<td>Butyl, EPDM, CR</td>
</tr>
<tr>
<td></td>
<td>Process slurry* (CaSO$_4$)</td>
<td>Cast iron, SG iron or ductile iron with Butyl or Neoprene lining</td>
<td>Butyl, EPDM, CR</td>
</tr>
<tr>
<td></td>
<td>Pure phosphoric acid (H$_3$PO$_4$ 85%)</td>
<td>Cast iron or SG iron with ECTFE or PFA lining</td>
<td>PTFE</td>
</tr>
<tr>
<td></td>
<td>Sulphuric acid (H$_2$SO$_4$)</td>
<td>Cast iron or SG iron or with ECTFE or PFA lining</td>
<td>PTFE</td>
</tr>
<tr>
<td>Mining, ore processing and hydrometallurgy gold/platinum/silver/zinc</td>
<td>Highly abrasive slurries* and slightly corrosive media</td>
<td>Cast iron, SG iron with soft rubber lining</td>
<td>CR, Butyl, EPDM, natural rubber</td>
</tr>
<tr>
<td></td>
<td>Highly corrosive media</td>
<td>Cast iron or SG iron with ECTFE or PFA lining</td>
<td>PTFE</td>
</tr>
<tr>
<td></td>
<td>Industrial water, treated water, slightly abrasive slurries</td>
<td>Cast iron, SG iron with soft rubber lining</td>
<td>EPDM, Butyl, CR, natural rubber</td>
</tr>
<tr>
<td>Copper mining and processing, hydrometallurgy, electrolysis</td>
<td>Abrasive, corrosive media*</td>
<td>Cast iron or SG iron with soft rubber lining or stainless steel</td>
<td>CR, Butyl, EPDM, natural rubber</td>
</tr>
<tr>
<td></td>
<td>Highly corrosive media</td>
<td>Cast iron or SG iron with ECTFE or PFA lining</td>
<td>PTFE</td>
</tr>
<tr>
<td>Nickel ore processing</td>
<td>Nickel slurry*</td>
<td>Stainless steel 1.4408 (AISI 316)</td>
<td>CR</td>
</tr>
<tr>
<td></td>
<td>Nickel-sulphate (NiSO$_4$)</td>
<td>Stainless steel 1.4408, (AISI 316) /1.4435 (AISI 316L)</td>
<td>PTFE</td>
</tr>
<tr>
<td>Soda/chlorine manufacture</td>
<td>Chlorine brine (NaCl mit Cl$_2$)</td>
<td>Cast iron or SG iron with ECTFE, hard rubber or PFA lining</td>
<td>PTFE, FPM/FKM</td>
</tr>
<tr>
<td></td>
<td>Sodium chloride lye (NaCl)</td>
<td>Cast iron, SG iron or ductile iron, with PP, hard rubber or PFA lining</td>
<td>CR, EPDM</td>
</tr>
<tr>
<td></td>
<td>Sodium hypochloride (NaOCl)</td>
<td>Cast iron or SG iron with ECTFE, hard rubber or PFA lining</td>
<td>PTFE, EPDM</td>
</tr>
<tr>
<td></td>
<td>Caustic soda (NaOH)</td>
<td>Cast iron, SG iron or ductile iron with PP or hard rubber lining</td>
<td>CR, EPDM</td>
</tr>
<tr>
<td></td>
<td>Hydrochloric acid (HCl)</td>
<td>Cast iron, SG iron or ductile iron, with PP, hard rubber or PFA lining</td>
<td>PTFE, EPDM</td>
</tr>
<tr>
<td>Titanium ore processing, titanium dioxide manufacture for the paint, paper and plastic industry</td>
<td>Titanium dioxide slurry*</td>
<td>Cast iron, SG iron with hard rubber, Butyl or Hypalon lining</td>
<td>Butyl</td>
</tr>
</tbody>
</table>
### Areas of use

**for valve body materials and diaphragms**

<table>
<thead>
<tr>
<th>Areas of use</th>
<th>Medium*</th>
<th>Valve body material</th>
<th>Diaphragm material</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Water treatment</strong></td>
<td>Aluminium sulphate (Al₂(SO₄)₃)</td>
<td>Cast iron, SG iron or ductile iron with PP or hard rubber lining</td>
<td>EPDM, Butyl</td>
</tr>
<tr>
<td></td>
<td>Ferric trichloride (FeCl₃)</td>
<td>Cast iron, SG iron or ductile iron, with PP, hard rubber or PFA lining</td>
<td>Butyl, EPDM</td>
</tr>
<tr>
<td></td>
<td>Caustic soda (NaOH) diluted or concentrate</td>
<td>SG iron or ductile iron with PP or PFA lining</td>
<td>EPDM, CR</td>
</tr>
<tr>
<td></td>
<td>Hydrochloric acid (HCl) 10% and 30% concentration</td>
<td>Cast iron or SG iron with PP, ECTFE or PFA lining</td>
<td>FPM, PTFE</td>
</tr>
<tr>
<td></td>
<td>Fully desalinated water</td>
<td>Cast iron, SG iron or ductile iron, with PP, hard rubber or PFA lining</td>
<td>EPDM, CR</td>
</tr>
<tr>
<td></td>
<td>Water in general (H₂O)</td>
<td>Cast iron, SG iron with hard rubber lining</td>
<td>EPDM, CR</td>
</tr>
<tr>
<td><strong>Cellulose, paper</strong></td>
<td>Chlorine oxides and sodium chlorates (Cl)</td>
<td>Cast iron or SG iron with ECTFE or PFA lining</td>
<td>PTFE</td>
</tr>
<tr>
<td></td>
<td>Dyes</td>
<td>Cast iron or SG iron with ECTFE or PFA lining</td>
<td>CR, EPDM</td>
</tr>
<tr>
<td></td>
<td>Hydrogen peroxide (H₂O₂)</td>
<td>Stainless steel</td>
<td>EPDM</td>
</tr>
<tr>
<td></td>
<td>Kaolin slurry</td>
<td>Cast iron, SG iron with Neoprene or Butyl lining</td>
<td>CR, EPDM</td>
</tr>
<tr>
<td></td>
<td>Sodium hypochloride (NaOCl)</td>
<td>Cast iron or SG iron with ECTFE or hard rubber lining</td>
<td>EPDM</td>
</tr>
<tr>
<td></td>
<td>Caustic soda (NaOH)</td>
<td>Cast iron, SG iron or ductile iron with PP or hard rubber lining</td>
<td>CR, EPDM, PTFE</td>
</tr>
<tr>
<td><strong>Cement industry</strong></td>
<td>Industrial water, treated water with cement residue</td>
<td>Cast iron, SG iron with hard rubber lining</td>
<td>CR, Butyl, EPDM</td>
</tr>
<tr>
<td></td>
<td>Cement slurry*</td>
<td>Cast iron, SG iron with natural rubber lining</td>
<td>Natural rubber</td>
</tr>
<tr>
<td><strong>Sugar and alcohol industry</strong></td>
<td>Filtering, cleaning and demineralisation</td>
<td>SG iron or ductile iron with PFA lining (to avoid fluoride contamination and corrosion)</td>
<td>PTFE</td>
</tr>
<tr>
<td></td>
<td>Sugar slurry, sugar solution, syrup</td>
<td>Hard rubber lining</td>
<td>CR</td>
</tr>
</tbody>
</table>

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

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.

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

---

### Selection

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

[^°C]: The temperature values are maximum values. With increasing operating pressure the temperature application limit drops.

* Chemically modified second generation PTFE (TFMTM); for code 52 only up to and including diaphragm size 100.
Diaphragms
for weir-type valves

Dimensions

<table>
<thead>
<tr>
<th>DN</th>
<th>NPS</th>
<th>MG*</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>ød</th>
<th>e</th>
<th>h</th>
<th>W</th>
<th>α</th>
<th>β</th>
<th>γ</th>
<th>Y</th>
<th>Number of bolt holes</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 - 25</td>
<td>½&quot; - 1&quot;</td>
<td>25</td>
<td>54</td>
<td>46</td>
<td>71.7</td>
<td>66.7</td>
<td>9</td>
<td>6</td>
<td>8</td>
<td>¼&quot;</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>4</td>
</tr>
<tr>
<td>32 - 40</td>
<td>1¼&quot; - 1½&quot;</td>
<td>40</td>
<td>70</td>
<td>65</td>
<td>100</td>
<td>90</td>
<td>11.5</td>
<td>7</td>
<td>8</td>
<td>¾&quot;</td>
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<td>50</td>
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<td>106</td>
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<td>7</td>
<td>7</td>
<td>¼&quot;</td>
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<td>-</td>
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<td>4</td>
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<td>95</td>
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<td>8</td>
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<td>5/16&quot;</td>
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<td>80</td>
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<td>114</td>
<td>186</td>
<td>156</td>
<td>18</td>
<td>9</td>
<td>8</td>
<td>5/16&quot;</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<td>10.7</td>
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<td>12</td>
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<td>18°</td>
<td>27°</td>
<td>22.5°</td>
<td>22.5°</td>
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<td>24</td>
<td>12</td>
<td>25</td>
<td>¼&quot;</td>
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<td>22.5°</td>
<td>22.5°</td>
<td>22.5°</td>
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<td>18°</td>
<td>24°</td>
<td>24°</td>
<td>24°</td>
<td>14</td>
</tr>
</tbody>
</table>

* Diaphragm size

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

¹ Only GEMÜ 620 and 675.
Diaphragms for full bore valves

Dimensions

<table>
<thead>
<tr>
<th>DN</th>
<th>NPS</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>d</th>
<th>e</th>
<th>h</th>
<th>W</th>
<th>H</th>
<th>α</th>
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<th>Y</th>
<th>Number of bolt holes</th>
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<td>54</td>
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<td>-</td>
<td>4</td>
</tr>
<tr>
<td>20</td>
<td>¾&quot;</td>
<td>54</td>
<td>30</td>
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<td>-</td>
<td>-</td>
<td>4</td>
</tr>
<tr>
<td>25</td>
<td>1&quot;</td>
<td>64</td>
<td>51</td>
<td>90</td>
<td>70</td>
<td>9</td>
<td>5</td>
<td>8</td>
<td>¼&quot;</td>
<td>36</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>4</td>
</tr>
<tr>
<td>40</td>
<td>1½&quot;</td>
<td>64</td>
<td>51</td>
<td>90</td>
<td>70</td>
<td>9</td>
<td>5</td>
<td>8</td>
<td>¼&quot;</td>
<td>36</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>4</td>
</tr>
<tr>
<td>50</td>
<td>2&quot;</td>
<td>101</td>
<td>82</td>
<td>159</td>
<td>128</td>
<td>13.5</td>
<td>6</td>
<td>10</td>
<td>5/16&quot;</td>
<td>64</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>4</td>
</tr>
<tr>
<td>65</td>
<td>2¼&quot;</td>
<td>101</td>
<td>82</td>
<td>159</td>
<td>128</td>
<td>13.5</td>
<td>6</td>
<td>10</td>
<td>5/16&quot;</td>
<td>64</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>4</td>
</tr>
<tr>
<td>80</td>
<td>3&quot;</td>
<td>175</td>
<td>-</td>
<td>223</td>
<td>-</td>
<td>13.5</td>
<td>6</td>
<td>12</td>
<td>5/16&quot;</td>
<td>80</td>
<td>56°</td>
<td>34°</td>
<td>-</td>
<td>-</td>
<td>6</td>
</tr>
<tr>
<td>100</td>
<td>4&quot;</td>
<td>175</td>
<td>-</td>
<td>223</td>
<td>-</td>
<td>13.5</td>
<td>6</td>
<td>12</td>
<td>5/16&quot;</td>
<td>80</td>
<td>56°</td>
<td>34°</td>
<td>-</td>
<td>-</td>
<td>6</td>
</tr>
<tr>
<td>125</td>
<td>5&quot;</td>
<td>255</td>
<td>-</td>
<td>287</td>
<td>-</td>
<td>13.5</td>
<td>8</td>
<td>16</td>
<td>%&quot;</td>
<td>115</td>
<td>20°</td>
<td>40°</td>
<td>60°</td>
<td>-</td>
<td>8</td>
</tr>
<tr>
<td>150</td>
<td>6&quot;</td>
<td>255</td>
<td>-</td>
<td>287</td>
<td>-</td>
<td>13.5</td>
<td>8</td>
<td>16</td>
<td>%&quot;</td>
<td>115</td>
<td>20°</td>
<td>40°</td>
<td>60°</td>
<td>-</td>
<td>8</td>
</tr>
<tr>
<td>200</td>
<td>8&quot;</td>
<td>305</td>
<td>-</td>
<td>341</td>
<td>-</td>
<td>18.5</td>
<td>8</td>
<td>20</td>
<td>%&quot;</td>
<td>145</td>
<td>30°</td>
<td>40°</td>
<td>40°</td>
<td>-</td>
<td>8</td>
</tr>
<tr>
<td>250</td>
<td>10&quot;</td>
<td>381</td>
<td>-</td>
<td>410</td>
<td>-</td>
<td>17</td>
<td>10</td>
<td>20</td>
<td>%&quot;</td>
<td>178</td>
<td>15°</td>
<td>30°</td>
<td>25°</td>
<td>20°</td>
<td>12</td>
</tr>
<tr>
<td>300</td>
<td>12&quot;</td>
<td>528</td>
<td>-</td>
<td>576</td>
<td>-</td>
<td>22</td>
<td>12</td>
<td>25</td>
<td>1&quot;</td>
<td>280</td>
<td>18°</td>
<td>24°</td>
<td>24°</td>
<td>24°</td>
<td>14</td>
</tr>
</tbody>
</table>

The thread of the diaphragm pin “W” corresponds to Whitworth standard.
Replacement diaphragms

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

The composition of the item designation is identical for all other diaphragm sizes and series.

<table>
<thead>
<tr>
<th>Diaphragm size</th>
<th>Item designation Series 600-698</th>
<th>Item designation Series 655, 656, 638</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>600 100 M 2</td>
<td>655 100 M 2</td>
</tr>
<tr>
<td></td>
<td>600 100 M 4</td>
<td>655 100 M 6</td>
</tr>
<tr>
<td></td>
<td>600 100 M 8</td>
<td>655 100 M 8</td>
</tr>
<tr>
<td></td>
<td>600 100 M 14</td>
<td>655 100 M 14</td>
</tr>
<tr>
<td></td>
<td>600 100 M 52</td>
<td>655 100 M 15</td>
</tr>
<tr>
<td></td>
<td>600 100 M 5E</td>
<td></td>
</tr>
</tbody>
</table>

Example:

600 100 M 14
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 elastomer products manufactured by us and our qualified suppliers as long as the elapsed time since production has not exceeded the period stated in the table (max. storage time in years). The date of manufacture is stamped on the diaphragm (see below).

<table>
<thead>
<tr>
<th>Diaphragm material</th>
<th>Code</th>
<th>Max. storage time in years</th>
<th>Max. recommended operating time in years*</th>
</tr>
</thead>
<tbody>
<tr>
<td>NBR</td>
<td>2</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>EPDM</td>
<td>3A / 12 / 13 / 14 / 16A / 16 / 17 / 36</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>FPM</td>
<td>4A / 4</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>PTFE/EPDM</td>
<td>5A / 5E / 52</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Butyl</td>
<td>6</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>CR (chloroprene)</td>
<td>8</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>NR (natural rubber)</td>
<td>15</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>PTFE/FPM</td>
<td>56 / 5F</td>
<td>5</td>
<td>4</td>
</tr>
</tbody>
</table>

* 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 695 with remotely mounted GEMÜ 1435 ePos positioner

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

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 620 with directly mounted GEMÜ 1435 ePos positioner

GEMÜ 695 with remotely mounted GEMÜ 1435 ePos positioner
## Positioners and process controllers

### Positioners and process controllers - Overview

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

Accessories for pneumatic actuators GEMÜ 620, 687, 695

GEMÜ 0322 - 0324, 8303
Pilot valves

GEMÜ 1434, 1435, 1436
Electro-pneumatic positioners and process controllers

GEMÜ 1201 - 1235
Electrical position indicators

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, 656, 687, 695

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

● optional

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

Accessories for pneumatic full bore diaphragm valve GEMÜ 656

GEMÜ 0322 - 0324
Pilot valves

GEMÜ 1300
Optical position indicator

GEMÜ 1435, 1436
Electro-pneumatic positioners and process controllers

GEMÜ 1201 - 1235
Electrical position indicators

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:

SCHEMATIC DIAGRAM
Kv measurement section:

Kv value calculation: \[ Kv = \text{Volume flow} \times \sqrt{1 / \Delta p} \]
\( \Delta p = \text{pressure differential} \ p_1 - p_2 \) (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:

Calculation of resistance correction value z (zeta)

100 % stroke means: Valve in "OPEN" position

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

\[ z = 0.0016 \times D_4 / \text{Kv}^2 \]
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.
Conformities and approvals

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 2011/65 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 2014/68/EU Art. 3 § 3. If no original GEMÜ shut-off diaphragms are installed, GEMÜ cannot accept any responsibility.

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.

EAC
Certificate of conformity with the applicable standards, quality and safety regulations of the Customs Union between Russia, Kazakhstan, Belarus, Armenia and Kyrgyzstan.
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.
Worldwide presence

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