

Valves for Water Treatment



GEMU® VALVES, MEASUREMENT
AND CONTROL SYSTEMS

Innovative technology

GEMÜ is a leading world-wide manufacturer of high quality valves, measurement and control systems.

Fritz Müller established GEMÜ in 1964, and since then, the company developed internationally with a large number of production centres, subsidiaries and trading companies on every continen.

GEMÜ provides engineered control solutions for a large number of process and engineering plant, such as:

- Industrial plant and machine construction
- Automobile industry
- Water / waste water treatment
- Chemical industry
- Steel works
- Mining and metal extraction
- Power stations
- Petrochemical industry
- Paper industry
- Pharmaceutical and biotechnological industries
- Foodstuff and beverage industries
- Microelectronics and semiconductor industries

State-of-the-art factory equipment and machinery plus a motivated team ensure the best service through our world-wide network of distributors and stockholding 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.

GEMÜ - your valve and instrumentation partner.



Headquarters in Ingelfingen-Criesbach



Research and Development Centre in Niedernhall-Waldzimmern



Water is life

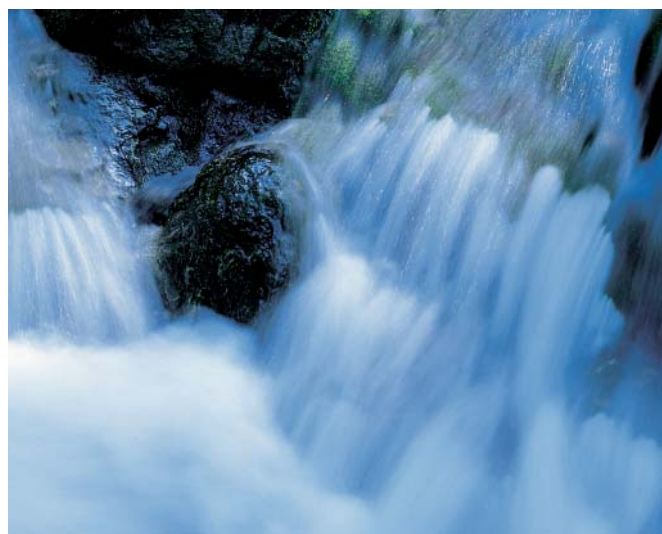
Clean water is a valuable resource which is increasingly in short supply as the human need for water is constantly growing. In order to ensure the provision of drinking water for the population and agriculture, as well as water for energy production processes and industry, an increasing number of water treatment plants are being built.

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

The applications range from isolation, controlling and regulating very dirty sea, river and brackish water up to the production of high purity water for the semiconductor and pharmaceutical industries. Our products are used in small mobile drinking water processing plants just as much as in large stationary sea water desalination plant or water works.

Typical applications are:

- Drinking water treatment
- Sea water desalination
- Process water for energy production
- Cooling water circuits
- Process water for industry
- Water purification for swimming pools
- Treatment of leachate from rubbish dumps
- Municipal and industrial drainage water treatment and sewage treatment plants
- Municipal water supply
- High purity water production for the semiconductor industry
- Water processing for the pharmaceutical industry, up to WFI (water for injection) quality



Applications

Sea water desalination by Reverse Osmosis (RO)

System

Drinking water production in Singapore, capacity: 136,000 m³/day. GEMÜ supplied more than 760 valves in nominal sizes from DN 15 - DN 1400 for this project.

To offer the customer a package solution, valves were also purchased from partner companies and GEMÜ supplied everything as a single source supplier.

Valves used in the system

Sea water inlet, filtration/flotation, supply (tanks and pump stations)

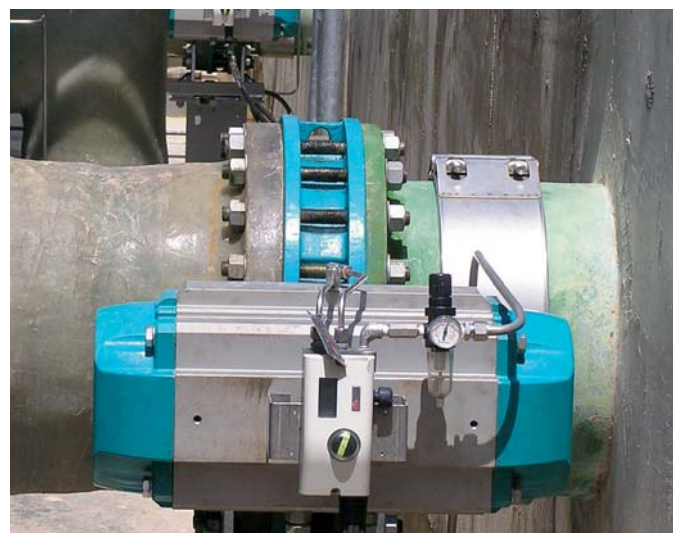
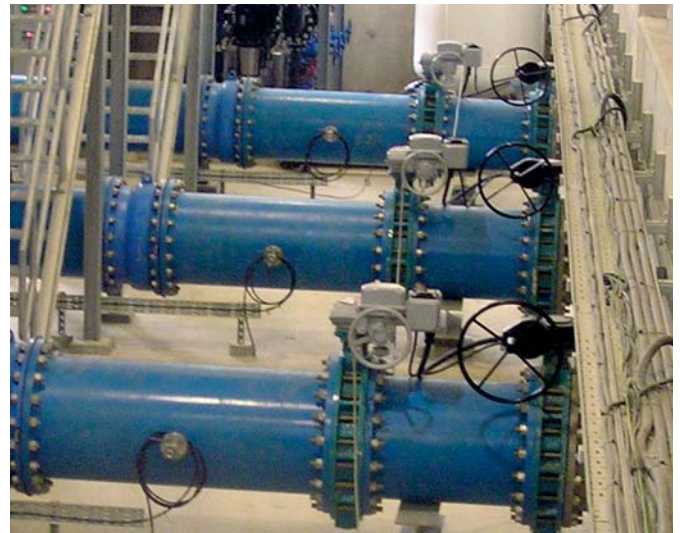
- Butterfly valves DN 65 - DN 1400
- Disc materials 1.4408, bronze or ECTFE coated
- Operating pressure depending on process area 2.5 - 18 bar
- Pneumatic and motorized operators as well as manual operators with hand levers and gears

Water pre-treatment and post-treatment, dosing of FeCl₃, H₂SO₄, HCl, NaOH

- Diaphragm valves DN 15 - DN 40
- Valve bodies PVC-U, PVDF
- Operating pressure approx. 3 - 5 bar
- All valves with pneumatic operators, fully automated. Variable area flowmeters DN 20 - DN 40 were also installed

Pump stations in front of the osmosis modules

- High pressure valves and non-return valves in DN 300
- Valves made of special materials e.g Super Duplex A890
- Operating pressure 5 - 84 bar
- Differential pressure up to 59 bar
- All valves are pneumatically operated and equipped with intelligent positioners



Particle filtration – Pre-stage water treatment

System

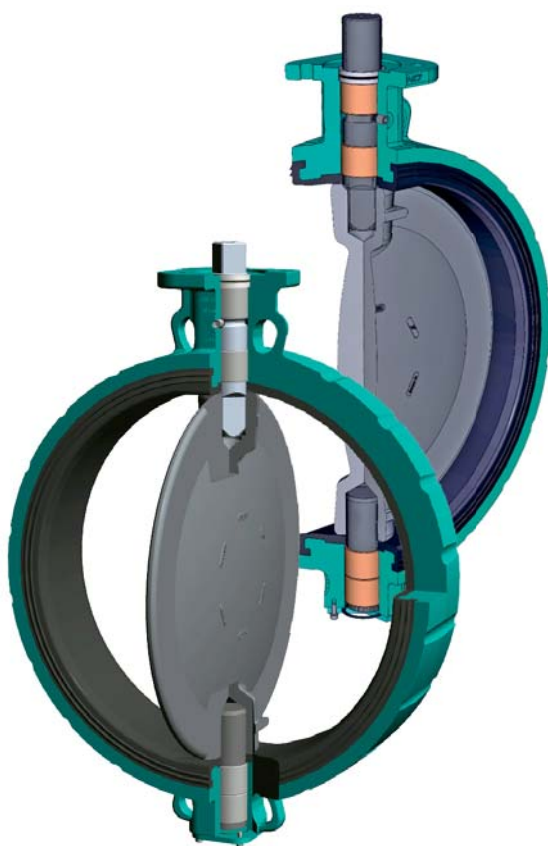
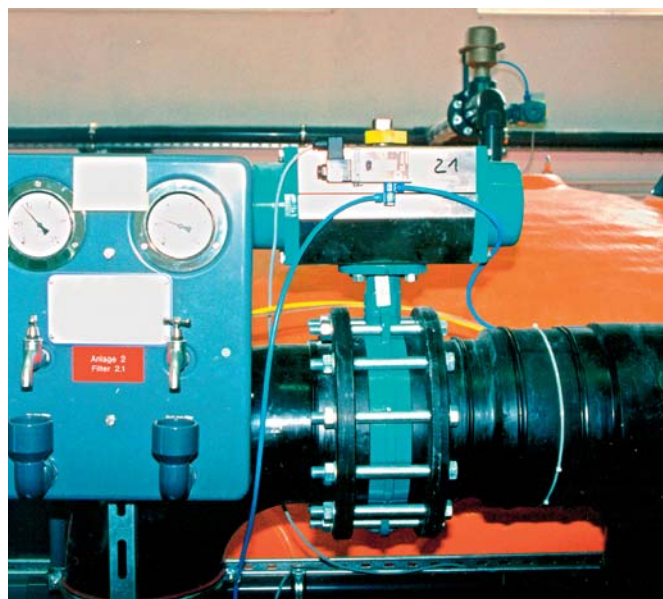
Particle filtration for separating water from solid matter such as sand, mud, precipitation, iron, manganese, plant residues and very small living things or other suspended matter and particles. For water taken from rivers, lakes, wells or contaminated systems as well as for mechanical cleaning of waste water.

Valves used in the system

- Diaphragm valves DN 15 - DN 300 for highly contaminated water
- Butterfly valves DN 65 - DN 600 for water with a low degree of contamination and large nominal sizes
- Valve material: PVC-U, PP, PA, steel, occasionally stainless steel
- Manual, pneumatic or motorized operators

Filter monitoring

- Pressure or differential pressure measurement devices GEMÜ 3120 for operating pressures 0-10 bar



Applications

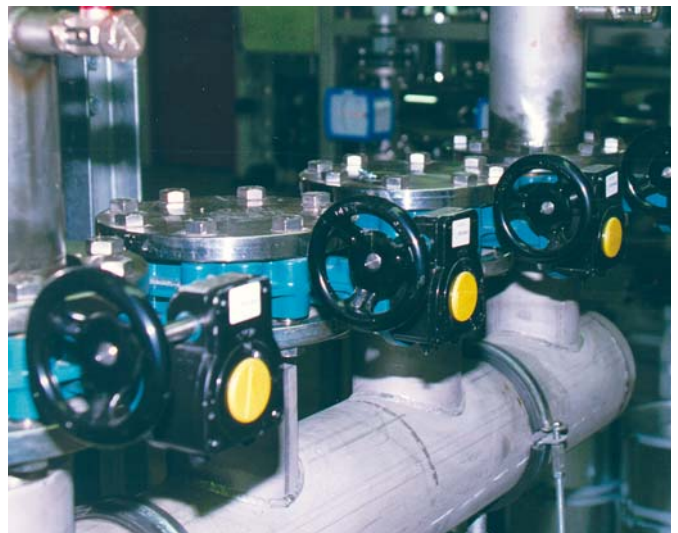
Cooling circuit for industrial water

System

Production system for special microchips and test wafers for the electronics industry. All the facilities are hermetically separated from the outside world in order to prevent contamination in semiconductor production. The cooling water must not cause contamination of the cooling installation and the cleanrooms. DI water is used as the heat transfer medium /coolant.

Valves used in the system

- Butterfly valves DN 65 - DN 200
- Rilsan coated cast iron bodies (Lug)
- EPDM liner and stainless steel disc
- Manually gear operated; in the process control system the butterfly valves are equipped with a motorized operator



Treatment of leachate from rubbish dumps

System

Treatment /detoxification of leachate from rubbish dumps. The pre-treated raw water is treated in a three-stage reverse osmosis process to keep the filtration residues as low as possible. The system is PLC controlled and operates fully automatically under constant monitoring. If the limiting values are exceeded by scaling or fouling, the system is automatically turned off and cleaned by CIP equipment to reduce biofouling.

Valves used in the system

- Diaphragm valves GEMÜ SilverLine® S660, DN 15 - DN 50
- Valve body: PVC-U
- Operating pressure 1-6 bar
- Pneumatically operated



Applications

Brackish water treatment and boron decontamination

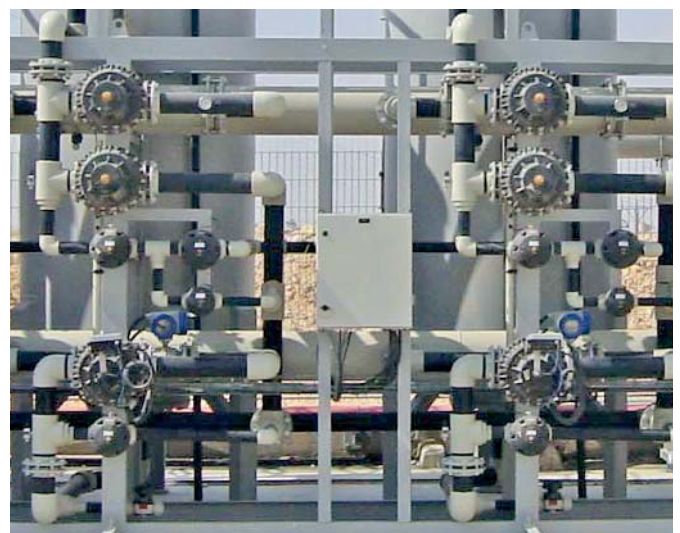
System

Sea water conversion plant in a region of the Eastern Mediterranean. The amount of drinking water to be treated daily is 6,500 cubic metres. The boron content in the raw water is available as boric acid at an amount of 1.0 - 2.5 mg/ per litre. The boron content is reduced to less than 0.25 mg/per litre. The system includes various filtration stages, several ion exchangers with an additional stage for boron as well as a final reverse osmosis process..

Valves used in the system

- Diaphragm valves in polypropylene (PP), DN 25 - DN 100
- Diaphragm valves with PP-lined SG iron bodies, DN 25 - DN 100
- Pneumatic operators, fully automated
- GEMÜ 1435 ePos® positioners for control circuits mounted to diaphragm valves

In the water inlet and outlet manually operated butterfly valves are used which are only rarely operated.



Sewage clarification plant, water activating basin

System

Domestic sewage cleaning with presettling basin, activating basin and final sedimentation basin. The compressed air for activation is generated in a compressor house and fed to the settling basin at 4 to 6 bar. At the border of the basin the collecting main opens into a manifold from where it discharges into the sewage along the basin. Under the surface the compressed air is distributed in the whole basin by nozzles.

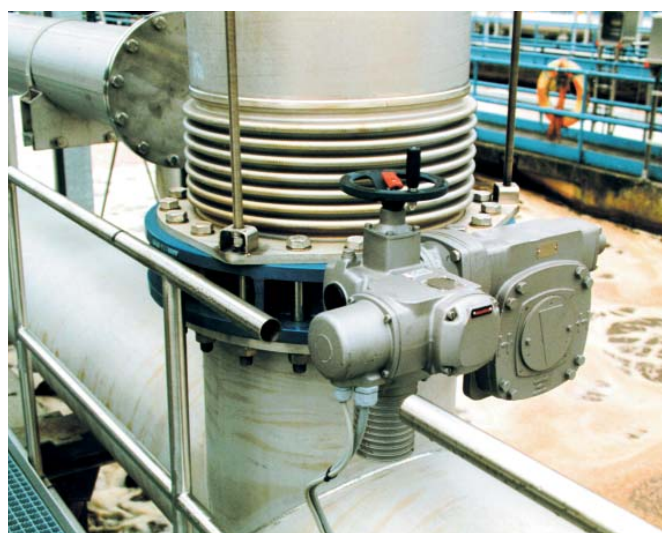
Valves used in the system

- GEMÜ wafer type butterfly valves, DN 80 -DN 1000
- Valve body: Cast iron, Epoxy (400 µm) coated, with stainless steel discs and Lug design
DN 60 - DN 400, in larger sizes than DN 400 in double flange design, nitrile liner (NBR / Perbunan)
- Butterfly valves up to DN 125 are manually operated, the larger sizes are motorized

GEMÜ plastic solenoid valves are used for dosing ferric trichloride.

Special features

The sewage inlet and outlet is controlled by butterfly valves installed under water. Their gear is flooded and the motorized operator is mounted outside the basin.











Product group		Butterfly valves				Check valves
Typ	GEMÜ 480 Victoria	D480	GEMÜ 490	GEMÜ 417, 410, 423, 457, 450, 451, 463, 411, 415, 418, 428	RSK	
Selection criteria						
Pressure range (bar)	0 - 16	0 - 16	0 - 10	0 - 10	0 - 16	
Nominal size (DN)	50 - 600	25 - 1400	32 - 900	15 - 250	32 - 600	
Design	wafer type one-piece body	wafer type one-piece body	wafer type split body	wafer type split body	wafer type with flange integrated seal	
Body material	Plastic			●	●	
	Cast iron	●	●	●		
	Steel / Cast steel	●	●	●		
	Stainless steel	●	●	●	●	
	Cast bronze / Brass				●	
	Special materials	●	●	●		
Connection	Flange / Wafer type / Lug type	●	●	●	●	
	Butt weld spigots				●	
	Threaded sockets / female thread				●	
	Other				●	
Operator	Manual	●	●	●		
	Pneumatic	●	●	●	●	
	Motorized	●	●	●	●	
	Electromagnetic					
Market segments / Applications	Municipal drinking water treatment (e.g. filtration and chlorination systems)	●	●	●	●	
	Pumping stations and reservoirs	●	●			
	Waste water treatment	●	●	●	●	
	Waste water recycling	●	●	●	●	
	Industrial cooling water and service water systems	●	●	●	●	
	Process water	●	●	●	●	
	Sea water desalination plant MED,MSF, (RO)	●	●	●	●	
	Fire protection	●	●		●	
	District cooling / Air conditioning	●	●		●	
	Power station cooling systems	●	●	●	●	
	Heating systems (hot water / steam)	●	●		●	
	Flue gas desulphurization	●	●	●	●	
	Water treatment	●	●	●	●	
	Chemical dosing			●	●	
	Mining (underground / above ground)	●	●	●	●	
	Shipbuilding / Offshore	●	●	●	●	

All pneumatic operators can be equipped with electrical position indicators, positioners and process controllers. Field bus connections for AS-Interface Profibus and DeviceNet are available.

When combined with flowmeters, pressure and differential pressure measurement systems as well as level sensors, complete systems and control loops can be supplied from a single source.

					
Diaphragm valves stainless steel	Diaphragm valves metal	Diaphragm valves plastic	Globe and control valves	Ball valves	Solenoid valves
GEMÜ 601, 605, 611, 615, 618, 650, 653, 654, 671, 687, 695, 698, 612, 640, 643, 673, 625, 658/688	GEMÜ 620, 655, 656, 671, 674, 675, 687, 695, 698	GEMÜ 600, 610, 613, 617, 630, 667, 677, 690, 693, S660, S670	GEMÜ 312, 314, 507, 512, 514, 517, 520, 550, 554, 552, 542, S560	GEMÜ 707, 711, 712, 728, 738, 751, 761, 762, 710, 717, 723, 758, 768	GEMÜ 52, 102, 105, 202, 205, 225, 8251, 8253, 8255, 8257, 8258
0 - 10	0 - 10	0 - 10	0 - 35	0 - 63	0 - 16
4 - 100	8 - 300	12 - 100	8 - 100	8 - 100	2 - 50
weir type, PFA and PP lining	weir type and full bore, PFA, ECTFE, PP and rubber lining	weir type	angle seat globe valves and globe valves, 2/2-way, 3/2-way	full bore, 2/2 and 3/2-way, 2 and 3-piece design	directly controlled or servo assisted design
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All from a single source



Wafer pattern butterfly valve GEMÜ 480 Victoria

Nominal sizes:	DN 25 – DN 1400
Max. operating pressure:	up to 16 bar (dependent on version)
Max. operating temperature:	200° C (dependent on version)
Body material :	Cast iron GG25 (Epoxy coated), SG iron GGG40, SG iron GGG40 (Epoxy coated), Cast steel GS-C25 (DN 50-600), Stainless steel 1.4408 (DN 50-600)
Disc material:	SG iron GGG40 (DN 25-700), SG iron GGG40 (Epoxy coated - DN 800-1400), SG iron GGG40 (chromium coated), Stainless steel 1.4408, Stainless steel 1.4408 (polished), Stainless steel 1.4408 (Halar coated), Uranus, Aluminium bronze, Hastelloy
Seal material:	EPDM HT, EPDM white, Nitrile white, Natural rubber, Nitrile, Nitrile Carboxylite, Butyl, Hypalon®, Silicone, Silicone for steam, Silicone for foodstuff, FPM
Body configuration:	Wafer and Lug, PN 6, PN 10, PN 16, PN 25
ATEX:	available
Operator:	manual, GEMÜ 487 Victoria, pneumatic, GEMÜ 481 Victoria, motorized, GEMÜ 488 Victoria

Wafer pattern butterfly valve D480

Nominal sizes:	DN 32 - DN 1400
Max. operating pressure:	16 bar (dependent on version)
Max. operating temperature:	210° C (dependent on version)
Body material:	EN-GJL-250 (GG 25), cast iron, from DN 700, EN-GJS-400-15 (GGG 40) SG iron, Epoxy coated; ASTM A351, CF8M, cast stainless steel; ASTM A216 WCB, cast steel; DIN 1705 (Rg 10), cast bronze; Steel S355J2+N, S 275 JR + Epox laminated carbon steel, EN-AC-47100, cast aluminium
Disc material:	CF8M / 1.4408, CF8M / 1.4408 polished, CF8M / 1.4408 Halar coated, 1.4469 Super Duplex, EN-GJS-400-15 / GGG40 Resicoat coated, EN-GJS-400-15 / GGG40 rubber lined EPDM, DIN 1705 (Rg 10), cast bronze
Seal material:	HNBR, Butyl, Epichlorhydrine, Viton GF, EPDM, Flucast AB/P, Hypalon, EPDM (FDA), EPDM (FDA) White, EPDM (high temperature), EPDM (ACS, KTW, WRAS, W270), NBR, NBR (FDA) White, Neoprene, Silicone, Silicone (steam), Viton
Operator:	manual, pneumatic, electric



Wafer pattern butterfly valve GEMÜ 490



Nominal sizes:	DN 40 – DN 900
Max. operating pressure:	10 bar
Operating temperature:	-20 to +200°C
Body material :	Stainless steel 316L, GGG40 Epoxy coated, steel S355J2G3, Duroplast (VE-CF)
Disc material:	Stainless steel 316L, PFA encapsulated, Titanium Grade 2, Hastelloy C22
Seal material:	TFM™ / Silicone, TFM™ / EPDM, TFM™ / VITON
Body configuration:	Wafer, lug
ATEX:	with conductive materials for disc and liner
Operator:	manual, GEMÜ 497, pneumatic, GEMÜ 491, motorized, GEMÜ 498

Wafer type butterfly valves

Nominal sizes:	DN 65 - DN 250 (GEMÜ 450 up to DN 150)
Max. operating pressure:	6 bar
Max. operating temperature:	90° C
Control pressure:	4 - 8 bar (depending on type and version)
Body material :	PES
Disc material:	PP, stainless steel 1.4408
Seal material:	NBR, FPM, EPDM
Body configuration:	Wafer, PN 10
Operator:	manual, pneumatic (normally closed (NC), normally open (NO), double acting (DA), electric (on/off or control version)



All from a single source

Check valve GEMÜ RSK, plastic

Nominal sizes:	DN 40 – DN 300
Max. operating pressure:	10 bar
Body material :	PVC-U, PP, PVDF
Disc material:	PVC-U, PP, PVDF
Seal material:	Nitrile, EPDM, FPM, PTFE
Body configuration:	Wafer
Return spring:	Stainless steel 1.4571, Hastelloy



Check valve GEMÜ ZRSK, metal

Nominal sizes:	DN 40 – DN 600
Max. operating pressure:	16 bar
Body material :	Stainless steel 1.4305, stainless steel 1.4571, brass, aluminium, cast bronze
Disc material:	Stainless steel 1.4305, stainless steel 1.4571, brass
Seal material:	Nitrile, EPDM, FPM, PTFE
Body configuration:	Wafer
Return spring:	Stainless steel 1.4571, Hastelloy





Weir / Full bore diaphragm valves, metal

Nominal sizes:	DN 4 – DN 300
Operating pressure:	0 - 10 bar (up to PN 16)
Operating temperature:	-10 to 160°C
Body material:	Cast iron, SG iron, cast steel, brass, stainless steel, lined with hard or soft rubber, PP, PFA, PVDF, ECTFE etc.
Seal material:	EPDM, FPM, PTFE
Body configuration:	Straight through body (2/2-way valve), T valve (3/2-way valve), multi-port valves (individual)
Operator:	manual, pneumatic, motorized

Diaphragm valves, plastic

Nominal sizes:	DN 10 – DN 100
Operating pressure:	0 - 10 bar (up to PN 10)
Operating temperature:	-10 to 90°C
Body material:	PVC-U, ABS, PP, PVDF, PFA, Inliner PP-H/outliner PP reinforced
Seal material:	EPDM, FPM, PTFE
Body configuration:	Straight through body (2/2-way valve), T valve (3/2-way valve), multi-port valves in PVC-U, PP and PVDF on request
Operator:	manual, pneumatic, motorized



All from a single source



Ball valves, metal

Nominal sizes:	DN 8 – DN 100
Operating pressure:	0 - 63 bar (up to PN 63)
Operating temperature:	-28 to 180°C
Body material:	Stainless steel
Seal material:	PTFE
Body configuration:	Straight through body (2/2-way valve), T valve body (3/2-way valve)
Operator:	manual, pneumatic, motorized

Ball valves, plastic

Nominal sizes:	DN 15 – DN 100
Operating pressure:	0 - 16 bar (up to PN 16)
Operating temperature:	0 to 120°C
Body material:	PVC-U, PP, PVDF
Seal material:	PTFE
Body configuration:	Straight through body (2/2-way valve), T valve (3/2-way valve) with T- and L-ball
Operator:	manual, pneumatic, motorized





Globe and control valves, plastic and metal

Nominal sizes:	DN 8 – DN 150
Operating pressure:	0 - 25 bar (option: up to 40 bar; up to PN 40)
Operating temperature:	-10 - 180°C (option: up to 300°C)
Body material:	PVC-U, PVDF, cast iron, cast steel, cast bronze, stainless steel
Seal material:	PTFE, PEEK, steel
Body configuration:	Straight through body (2/2-way valve, 3/2-way valve), multi-port valves (also in battery design)
Operator:	manual, pneumatic, motorized



Process solenoid valves, metal

Nominal sizes:	DN 8 – DN 50
Operating pressure:	0 - 16 bar (up to PN 16)
Operating temperature:	-10 to 90°C
Body material:	Brass, stainless steel
Body configuration:	Straight through body (2/2-way valve)
Operator:	Electromagnetically servo assisted

Process solenoid valves, plastic

Nominal sizes:	DN 2 – DN 50
Operating pressure:	0 - 6 bar (up to PN 6)
Operating temperature:	0 to 60°C
Body material:	PVC-U, PVDF
Body configuration:	Straight through body (2/2-way valve)
Operator:	Electromagnetically directly controlled or servo assisted

All from a single source



Positioners and process controllers

- 3-point controller for position control of motorized valves
- Electro-pneumatic positioner for pneumatically operated valves with quarter turn or linear actuators
- Electro-pneumatic process controllers for pneumatically operated valves for precise temperature, pressure, flow and level control
- Direct and remote mounting
- Field bus capable (Profibus, DeviceNet)



Operators for quarter turn and linear valves

For use with butterfly, ball, diaphragm, globe and gate valves

- Operator:** Pneumatic piston quarter turn actuator (GEMÜ 9415), Pneumatic double piston actuator (DR/SC), Electro-mechanical quarter turn actuator (GEMÜ 9428, GEMÜ 9468), Electro-mechanical linear actuator (GEMÜ 9ASS)
- Version:** On/off actuators, control actuators
- Torque:** 6 – 14,000 Nm (dependent on version and design)
- Connection standard:** Flange acc. to EN ISO 5211
- Housing material:** Plastic or aluminium (dependent on version and design)
- Explosion protection:** dependent on version and design
- Options:** Stroke limiters/limit switches, electrical position indicators, positioners, process controllers, emergency power supply modules etc.





Electrical position indicators

- For monitoring linear and quarter turn valves
- Mechanical switches and proximity switches
- Monitoring of set limiting values and/or continuous valve position feedback
- New "self-learning" generation, i.e. manual or automatic programming of switch points during initialisation
- Combi switchboxes with integrated pilot valve
- ATEX versions
- Versions with field bus capability



Field bus products and accessories

- AS-Interface master controller
- AS-Interface master with integrated Profibus-DP/ControlNet gateway
- AS-Interface power supply unit
- AS-Interface connectors and extension plug
- Combi switchboxes for AS-Interface, DeviceNet
- AS-Interface flat and programming cable
- Further products and versions on request



Measurement systems and display units

Display units for limiting values and measured values	
Pressure measurement systems	Pressure transducer, pressure measurement device, differential pressure transducer, differential pressure measurement device
Flow measurement systems for volumetric flow and flow rates	Variable area flowmeter, magnetically inductive flowmeter, flow transmitter (turbine measurement principle)
Level measurement systems	Float, ultrasonic, vibration, capacitance, optical
Temperature measurement systems	Temperature transmitter, temperature measurement device PT100, Field bus capable devices available



Pilot valves / Valve manifolds

Nominal sizes:	DN 1 – DN 7
Operating pressure:	0 - 10 bar
Operating temperature:	-15 to 50°C
Body material:	PA, Aluminium
Body configuration:	3/2-way, 4/2-way, 5/2-way, 5/3-way
Operator:	Electromagnetically directly controlled or servo assisted



Subject to alteration · 05/2011 · 86288832

GEMÜ® VALVES, MEASUREMENT AND CONTROL SYSTEMS

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