

Diaphragm Valve Two Stage Actuator Metal

Construction

The GEMÜ 658/688 2/2-way or multi-port metal diaphragm valve has a two stage actuator.

The actuator has a stainless steel housing and is controlled by two pistons working independently of each other (for function see page 3).

Features

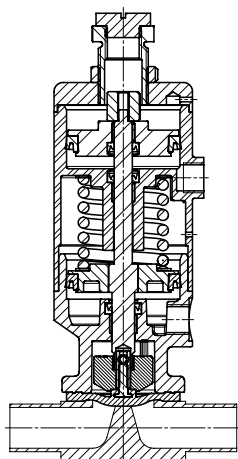
- Suitable for inert and corrosive* liquid and gaseous media
- CIP/SIP cleaning and sterilizing capabilities
- An adjusting screw in the actuator enables the setting of the opening and closing function and also the setting of a part stroke (for reduced flow)
- Fast on/off operation and the possibility for precision dosing of the working medium
- Insensitive to particulate media
- Valve body and diaphragm available in various materials and designs
- Compact design
- Versions according to ATEX on request

Advantages

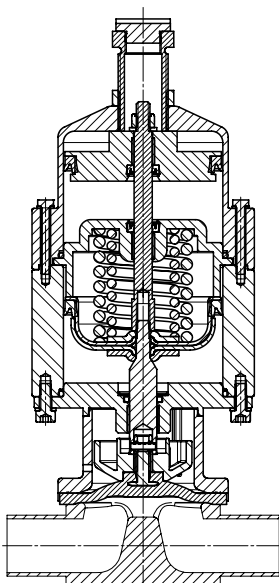
- Optional flow direction
- Installation for an optimized draining is possible
- Can be individually used. Space consuming piping systems and valve wiring are no longer necessary
- Extensive range of accessories, easily retrofitted
- With GEMÜ 688 the Closed and Open positions (full stroke) can be detected via M8x1 proximity switches. The proximity switches must be suitable for flush mounting. For diaphragm size 40 and 50 proximity switches with a minimum thread length of 35 mm are required.

*see information on working medium on page 2

Sectional drawing



GEMÜ 658



GEMÜ 688



GEMÜ 658



GEMÜ 688

Technical data

Working medium

Corrosive, inert, gaseous and liquid media which have no negative impact on the physical and chemical properties of the body and diaphragm material.

The valve will seal in both flow directions up to full operating pressure (gauge pressure).

Temperatures

Medium temperature

FPM (code 4)	-10 ... 90 °C
EPDM (code 13)	-10 ... 100 °C
EPDM (code 17)	-10 ... 100 °C
PTFE/EPDM (code 54)	-10 ... 100 °C
PTFE/EPDM (code 5M)	-10 ... 100 °C

Sterilisation temperature ⁽¹⁾

FPM (code 4)	not applicable
EPDM (code 13)	max. 150 °C ⁽²⁾ , max. 60 min per cycle
EPDM (code 17)	max. 150 °C ⁽²⁾ , max. 180 min per cycle
PTFE/EPDM (code 54)	max. 150 °C ⁽²⁾ , no time limit per cycle
PTFE/EPDM (code 5M)	max. 150 °C ⁽²⁾ , no time limit per cycle

¹ The sterilisation temperature is valid for steam (saturated steam) or superheated water.

² If the sterilisation temperatures listed above are applied to the EPDM diaphragms for longer periods of time, the service life of the diaphragms will be reduced. In these cases, maintenance cycles must be adapted accordingly. This also applies to PTFE diaphragms exposed to high temperature fluctuations.

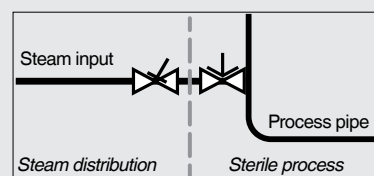
PTFE diaphragms can also be used as moisture barriers; however, this will reduce their service life.

The maintenance cycles must be adapted accordingly.

GEMÜ 555 and 505 globe valves are particularly suitable for use in the area of steam generation and distribution.

The following valve arrangement for interfaces between steam pipes and process pipes has proven itself over time:

A globe valve for shutting off steam pipes and a diaphragm valve as an interface to the process pipes.



Ambient temperature

0 ... 60 °C

Control medium

Inert gases

Max. permissible temperature of control medium

60 °C

Filling volume

Diaphragm size	lower piston	upper piston
10	0.04 dm ³	0.03 dm ³
25	0.08 dm ³	0.09 dm ³
40	0.44 dm ³	0.47 dm ³
50	0.44 dm ³	0.47 dm ³

MG	GEMÜ	Operating pressure [bar]		Control pressure
		EPDM / FPM	PTFE	[bar]
10	658	0 - 10	0 - 6	4.5 - 6.0
25	688	0 - 10	0 - 6	5.5 - 7.0
40	688	0 - 10	0 - 6	3.5 - 7.0
50	688	0 - 10	0 - 6	5.5 - 7.0

All pressures are gauge pressures. Operating pressure values were determined with static operating pressure applied on one side of a closed valve. Sealing at the valve seat and atmospheric sealing is ensured for the given values.

Information on operating pressures applied on both sides and for high purity media on request.

MG = diaphragm size

Technical data

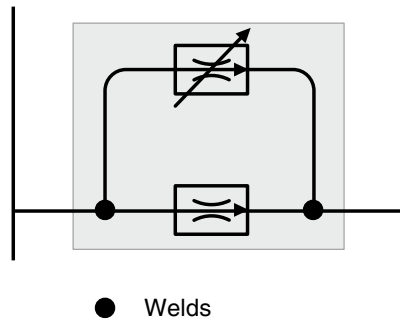
Kv values [m³/h]								
Pipe standard		DIN	EN 10357 series B (formerly DIN 11850 series 1)	EN 10357 series A (formerly DIN 11850 series 2) / DIN 11866 series A	DIN 11850 Series 3	SMS 3008	ASME BPE / DIN 11866 series C	ISO 1127 / EN 10357 series C / DIN 11866 series B
Connection code		0	16	17	18	37	59	60
MG	DN							
10	10	-	2.4	2.4	2.4	-	2.2	3.3
	15	3.3	3.8	3.8	3.8	-	2.2	4.0
	20	-	-	-	-	-	3.8	-
25	15	4.1	4.7	4.7	4.7	-	-	7.4
	20	6.3	7.0	7.0	7.0	-	4.4	13.2
	25	13.9	15.0	15.0	15.0	12.6	12.2	16.2
40	32	25.3	27.0	27.0	27.0	26.2	-	30.0
	40	29.3	30.9	30.9	30.9	30.2	29.5	32.8
50	50	46.5	48.4	48.4	48.4	51.7	50.6	55.2
	65	-	-	-	-	62.2	61.8	-

MG = diaphragm size

Kv values determined acc. to DIN EN 60534, inlet pressure 5 bar, Δp 1 bar, stainless steel valve body (forged body) and soft elastomer diaphragm. The Kv values for other product configurations (e.g. other diaphragm or body materials) may differ. In general, all diaphragms are subject to the influences of pressure, temperature, the process and their tightening torques. Therefore the Kv values may exceed the tolerance limits of the standard.

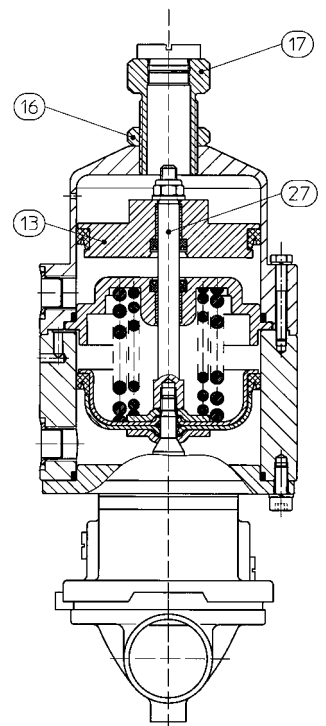
The Kv value curve (Kv value dependent on valve stroke) can vary depending on the diaphragm material and duration of use.

Application example



Functional description

When control pressure is applied, the lower actuator piston strokes 100%. The stroke of the upper part of the actuator, however, can be steplessly limited from 0% to 100% by means of the stroke limiter (item 17) and secured by the lock nut (item 16). When a stroke limiter is used, the piston (item 13) moves against the stroke limiter (item 17) and flow restriction is possible. If the lower part of the actuator is under control pressure, the valve fully opens, pushing the spindle (item 27) upwards through the upper piston.



Order data

Body configuration	Code
Tank valve body	B**
2/2-way body	D
T body	T*
* For dimensions see T Valves brochure	
** Dimensions and versions on request or according to customer requirements	

Valve body material	Code
1.4435, investment casting	C3
1.4408, investment casting	37
1.4435 (316 L), forged body	40
1.4435 (BN 2), forged body $\Delta Fe < 0.5\%$	42
1.4539, forged body	F4

Connection	Code
Butt weld spigots	
Spigots DIN	0
Spigots EN 10357 series B (formerly DIN 11850 series 1)	16
Spigot EN 10357 series A (formerly DIN 11850 series 2) / DIN 11866 series A	17
Spigots DIN 11850 series 3	18
Spigots JIS-G 3447	35
Spigots JIS-G 3459	36
Spigots SMS 3008	37
Spigots BS 4825 Part 1	55
Spigot ASME BPE / DIN 11866 series C	59
Spigot ISO 1127 / EN 10357 series C / DIN 11866 series B	60
Spigots ANSI/ASME B36.19M Schedule 10s	63
Spigots ANSI/ASME B36.19M Schedule 40s	65
Threaded connections	
Threaded sockets DIN ISO 228	1
Threaded spigots DIN 11851	6
One side threaded spigot, other side cone spigot and union nut, DIN 11851	62
Aseptic unions on request	
Flanges	
Flanges EN 1092 / PN16 / form B, length EN 558, series 1, ISO 5752, basic series 1	8
Clamp connections	
Clamps ASME BPE for pipe ASME BPE, length ASME BPE	80
Clamps DIN 32676 series B for pipe EN ISO 1127, length EN 558, series 7	82
Clamps ASME BPE for pipe ASME BPE, length EN 558, series 7	88
Clamps DIN 32676 series A for pipe DIN 11850, length EN 558, series 7	8A
Clamps SMS 3017 for pipe SMS 3008, length EN 558, series 7	8E
Aseptic clamps on request	
For overview of available valve bodies see page 11	

Diaphragm material	Code
FPM	4
EPDM	13
EPDM	17
EPDM	19
EPDM	36
PTFE/EPDM, one-piece	54
PTFE/EPDM, two-piece	5M
Material complies with FDA requirements, except code 4	

Control function	Code
Normally closed (NC)	1

Version	Code
Diaphragm size 10 Control air connector positioned in-line with flow direction	1T1
Diaphragm size 25 Control air connector 90° to flow direction	1V1
Diaphragm size 40 + 50 Control air connector 90° to flow direction	2V1

Order data

Internal surface finishes for forged and block material bodies ¹

Readings for Process Contact Surfaces	Mechanically polished ²		Electropolished	
	Hygienic class DIN 11866	Code	Hygienic class DIN 11866	Code
$Ra \leq 0.80 \mu m$	H3	1502	HE3	1503
$Ra \leq 0.60 \mu m$	-	1507	-	1508
$Ra \leq 0.40 \mu m$	H4	1536	HE4	1537
$Ra \leq 0.25 \mu m$ ³	H5	1527	HE5	1516

Readings for Process Contact Surfaces acc. to ASME BPE 2016 ⁴	Mechanically polished ²		Electropolished	
	ASME BPE Surface Designation	Code	ASME BPE Surface Designation	Code
Ra Max. = $0.76 \mu m$ (30 $\mu inch$)	SF3	SF3	-	-
Ra Max. = $0.64 \mu m$ (25 $\mu inch$)	SF2	SF2	SF6	SF6
Ra Max. = $0.51 \mu m$ (20 $\mu inch$)	SF1	SF1	SF5	SF5
Ra Max. = $0.38 \mu m$ (15 $\mu inch$)	-	-	SF4	SF4

Internal surface finishes for investment cast bodies

Readings for Process Contact Surfaces	Mechanically polished ²	
	Hygienic class DIN 11866	Code
$Ra \leq 6.30 \mu m$	-	1500
$Ra \leq 0.80 \mu m$	H3	1502
$Ra \leq 0.60 \mu m$ ⁵	-	1507

¹ Surface finishes of customized valve bodies may be limited in special cases.

² Or any other finishing method that meets the Ra value (acc. to ASME BPE).

³ The smallest possible Ra finish for pipe connections with an internal pipe diameter < 6 mm is 0.38 μm .

⁴ When using these surfaces, the bodies are marked according to the specifications of ASME BPE.

The surfaces are only available for valve bodies which are made of materials (e.g. GEMÜ material codes 40, 41, F4, 44) and use connections (e.g. GEMÜ connection codes 59, 80, 88) according to ASME BPE.

⁵ Not possible for GEMÜ connection code 59, DN 8 and GEMÜ connection code 0, DN 4.

Ra acc. to DIN EN ISO 4288 and ASME B46.1

Order data

Special function	Code
3-A compliant design (only GEMÜ 658)	M

Order example	688	25	D	60	40	5M	1	1V1	1503
Type	688								
Nominal size		25							
Body configuration (code)			D						
Connection (code)				60					
Valve body material (code)					40				
Diaphragm material (code)						5M			
Control function (code)							1		
Version (code)								1V1	
Surface finish (code)									1503
Special function only GEMÜ 658 (code)									

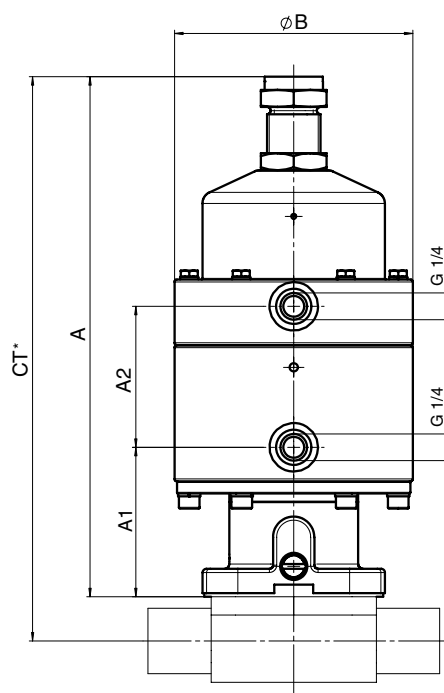
Actuator dimensions [mm]

MG	GEMÜ	Version	øB	A	A1	A2	Weight [kg]
10	658	1T1	61	169	35	63	1.75
25	688	1V1	98	216	64	50	4.80
40	688	2V1	168	320	76	95	18.90
50	688	2V1	168	328	84	95	19.10

MG = Diaphragm size

Actuator material for GEMÜ 658 DN 10 - 20: 1.4404 / 1.4408.

Actuator material for GEMÜ 688 DN 15 - 50: 1.4305 (also available in 1.4404 on request).



* CT = A + H1 (see body dimensions)

Body dimensions [mm]

Butt weld spigots, connection code 0, 16, 17, 18 Valve body material: Investment casting (code C3), forged body (code 40, F4)

Pipe standard							DIN		EN 10357 series B (formerly DIN 11850 series 1)		EN 10357 series A (formerly DIN 11850 series 2) / DIN 11866 series A		DIN 11850 Series 3		Weight [kg]
Connection code							0		16		17		18		
MG	DN	NPS	L	c	H1*	H1**	ød	s	ød	s	ød	s	ød	s	
10	10	3/8"	108	25	12.5		-	-	12	1.0	13	1.5	14	2.0	0.30
	15	1/2"	108	25	12.5		18	1.5	18	1.0	19	1.5	20	2.0	0.30
25	15	1/2"	120	25	13.0	19.0	18	1.5	18	1.0	19	1.5	20	2.0	0.62
	20	3/4"	120	25	16.0	19.0	22	1.5	22	1.0	23	1.5	24	2.0	0.58
	25	1"	120	25	19.0	19.0	28	1.5	28	1.0	29	1.5	30	2.0	0.55
40	32	1 1/4"	153	25	24.0	26.0	34	1.5	34	1.0	35	1.5	36	2.0	1.45
	40	1 1/2"	153	25	26.0	26.0	40	1.5	40	1.0	41	1.5	42	2.0	1.32
50	50	2"	173	30	32.0	32.0	52	1.5	52	1.0	53	1.5	54	2.0	2.25

* only for investment cast design

** only for forged design

MG = diaphragm size

For materials see overview on page 11

Butt weld spigots, connection code 60 Valve body material: Investment casting (code C3), forged body (code 40, F4)

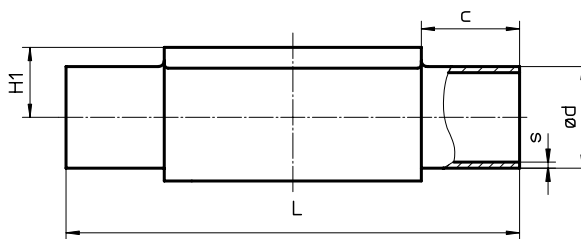
Pipe standard							ISO 1127 / EN 10357 series C / DIN 11866 series B		Weight [kg]
Connection code							60		
MG	DN	NPS	L	c	H1*	H1**	ød	s	
10	10	3/8"	108	25	12.5	12.5	17.2	1.6	0.30
	15	1/2"	108	25	12.5	12.5	21.3	1.6	0.30
25	15	1/2"	120	25	13.0	19.0	21.3	1.6	0.62
	20	3/4"	120	25	16.0	19.0	26.9	1.6	0.58
	25	1"	120	25	19.0	19.0	33.7	2.0	0.55
40	32	1 1/4"	153	25	24.0	26.0	42.4	2.0	1.45
	40	1 1/2"	153	25	26.0	26.0	48.3	2.0	1.32
50	50	2"	173	30	32.0	32.0	60.3	2.0	2.25

* only for investment cast design

** only for forged design

MG = diaphragm size

For materials see overview on page 11



Body dimensions [mm]

Butt weld spigots, connection code 35, 36, 37 Valve body material: Investment casting (code C3), forged body (code 40, F4)

Pipe standard							JIS-G 3447		JIS-G 3459		SMS 3008		Weight [kg]
Connection code							35		36		37		
MG	DN	NPS	L	c	H1*	H1**	ød	s	ød	s	ød	s	
10	10	3/8"	108	25	-	12.5	-	-	17.3	1.65	-	-	0.30
	15	1/2"	108	25	-	12.5	-	-	21.7	2.10	-	-	0.30
25	15	1/2"	120	25	-	19.0	-	-	21.7	2.10	-	-	0.62
	20	3/4"	120	25	-	19.0	-	-	27.2	2.10	-	-	0.58
	25	1"	120	25	19.0	19.0	25.4	1.2	34.0	2.80	25.0	1.2	0.55
40	32	1 1/4"	153	25	-	26.0	31.8	1.2	42.7	2.80	33.7	1.2	1.45
	40	1 1/2"	153	25	26.0	26.0	38.1	1.2	48.6	2.80	38.0	1.2	1.32
50	50	2"	173	30	32.0	32.0	50.8	1.5	60.5	2.80	51.0	1.2	2.25
	65	2 1/2"	173	30	-	34.0	63.5	2.0	-	-	63.5	1.6	2.20

* only for investment cast design

** only for forged design

MG = diaphragm size

For materials see overview on page 11

Butt weld spigots, connection code 55, 59, 63, 65 Valve body material: Investment casting (code C3), forged body (code 40, F4)

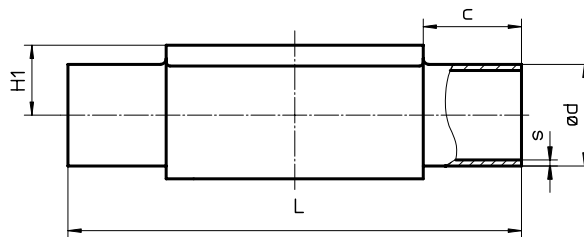
Pipe standard							BS 4825 Part 1		ASME BPE / DIN 11866 series C		ANSI/ASME B36.19M Schedule 10s		ANSI/ASME B36.19M Schedule 40s		Weight [kg]
Connection code							55		59		63		65		
MG	DN	NPS	L	c	H1*	H1**	ød	s	ød	s	ød	s	ød	s	
10	10	3/8"	108	25	-	12.5	9.53	1.2	9.53	0.89	17.1	1.65	17.1	2.31	0.30
	15	1/2"	108	25	-	12.5	12.70	1.2	12.70	1.65	21.3	2.11	21.3	2.77	0.30
	20	3/4"	108	25	12.5	12.5	19.05	1.2	19.05	1.65	-	-	-	-	0.30
25	15	1/2"	120	25	-	19.0	-	-	-	-	21.3	2.11	21.3	2.77	0.62
	20	3/4"	120	25	16.0	19.0	19.05	1.2	19.05	1.65	26.7	2.11	26.7	2.87	0.58
	25	1"	120	25	19.0	19.0	-	-	25.40	1.65	33.4	2.77	33.4	3.38	0.55
40	32	1 1/4"	153	25	-	26.0	-	-	-	-	42.2	2.77	42.2	3.56	1.45
	40	1 1/2"	153	25	26.0	26.0	-	-	38.10	1.65	48.3	2.77	48.3	3.68	1.32
50	50	2"	173	30	32.0	32.0	-	-	50.80	1.65	60.3	2.77	60.3	3.91	2.25
	65	2 1/2"	173	30	-	34.0	-	-	63.50	1.65	-	-	-	-	2.10

* only for investment cast design

** only for forged design

MG = diaphragm size

For materials see overview on page 11

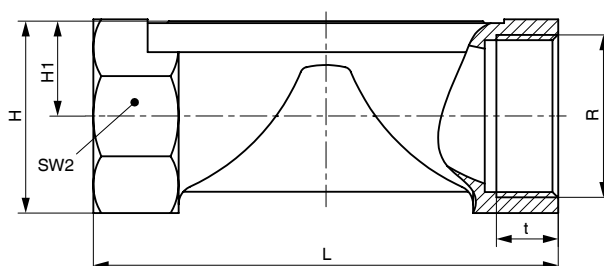


Body dimensions [mm]

Threaded sockets, connection code 1 Valve body material: investment casting (code 37)

MG	DN	R	H	H1	t	L	SW2	Number of flats	Weight [kg]
10	12	G 3/8	25	13	12	55	22	2	0.17
	15	G 1/2	30	15	15	68	27	2	0.26
25	15	G 1/2	29	16	15	85	27	6	0.32
	20	G 3/4	32	16	16	85	32	6	0.34
	25	G 1	37	16	13	110	41	6	0.39
40	32	G 1 1/4	49	24	20	120	50	8	0.88
	40	G 1 1/2	52	24	18	140	55	8	0.93
50	50	G 2	68	33	26	165	70	8	1.56

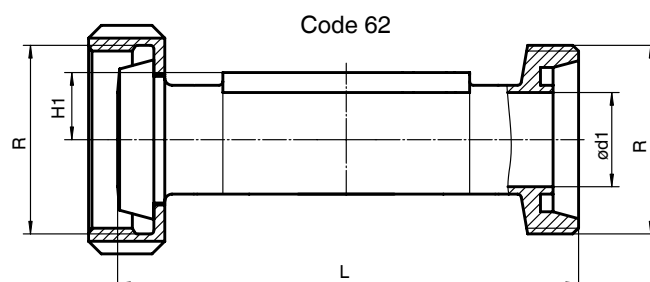
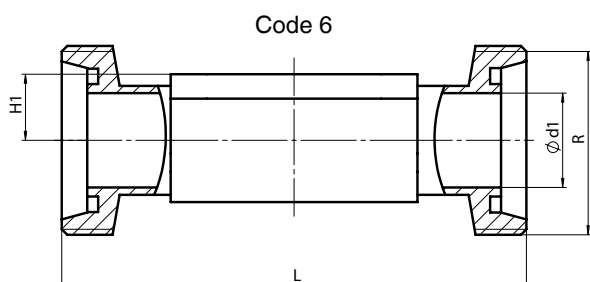
MG = Diaphragm size



Threaded connections, connection code 6, 62 Valve body material: Forged body (code 40)

MG	DN	H1	ød1	Thread to DIN 405 R	Code 6 L	Code 62 L	Weight [kg]
10	10	12.5	10.0	RD 28 x 1/8	118	116	0.33
	15	12.5	16.0	RD 34 x 1/8	118	116	0.35
25	15	19.0	16.0	RD 34 x 1/8	118	116	0.71
	20	19.0	20.0	RD 44 x 1/6	118	114	0.78
	25	19.0	26.0	RD 52 x 1/6	128	127	0.79
40	32	26.0	32.0	RD 58 x 1/6	147	147	1.66
	40	26.0	38.0	RD 65 x 1/6	160	160	1.62
50	50	32.0	50.0	RD 78 x 1/6	191	191	2.70

MG = diaphragm size



Body dimensions [mm]

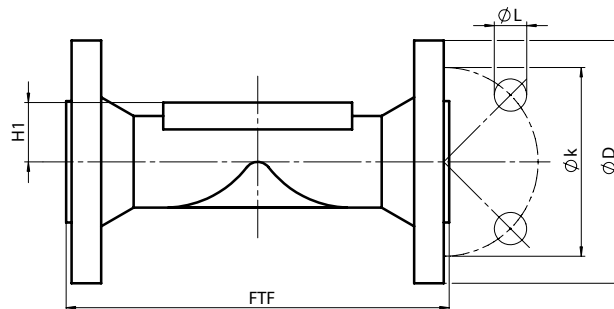
Flanges - DIN EN 1092, connection code 8 Valve body material investment casting (code C3), forged body (code 40)

MG	DN	øD	øk	øL	Number of bolts	H1		FTF	Weight [kg]
						Material code C3	Material code 40		
25	15	95	65	14	4	13.0	19.0	130*	1.85
	20	105	75	14	4	16.0	19.0	150	2.35
	25	115	85	14	4	19.0	19.0	160	2.85
40	32	140	100	19	4	24.0	26.0	180	4.90
	40	150	110	19	4	26.0	26.0	200	5.65
50	50	165	125	19	4	32.0	32.0	230	7.45

* Material code C3, 40 FTF = 150 (no DIN length)

MG = diaphragm size

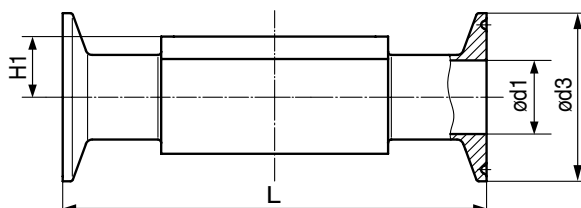
For materials see overview on page 11



Clamp connections, connection code 80, 82, 88, 8A, 8E Valve body material: Forged body (code 40, F4)

Pipe connection for clamp				ASME BPE						ISO 1127 / EN 10357 series C / DIN 11866 series B			EN 10357 series A (formerly DIN 11850 series 2) / DIN 11866 series A			SMS 3008			Weight [kg]
Clamp connection				ASME BPE						DIN 32676 series B			DIN 32676 series A			ISO 2852 / SMS 3017			
Clamp connection code				80			88			82			8A			8E			
MG	DN	NPS	H1	ød1	ød3	L	ød1	ød3	L	ød1	ød3	L	ød1	ød3	L	ød1	ød3	L	
10	10	3/8"	12.5	-	-	-	-	-	-	14.0	25.0	108.0	10	34.0	108.0	-	-	-	0.30
	15	1/2"	12.5	9.40	25.0	88.9	9.40	25.0	108	18.1	50.5	108.0	16	34.0	108.0	-	-	-	0.43
	20	3/4"	12.5	15.75	25.0	101.6	15.75	25.0	117	-	-	-	-	-	-	-	-	-	0.43
25	15	1/2"	19.0	-	-	-	-	-	-	18.1	50.5	108.0	16	34.0	108.0	-	-	-	0.75
	20	3/4"	19.0	15.75	25.0	101.6	15.75	25.0	117	23.7	50.5	117.0	20	34.0	117.0	-	-	-	0.71
	25	1"	19.0	22.10	50.5	114.3	22.10	50.5	127	29.7	50.5	127.0	26	50.5	127.0	22.6	50.5	127	0.63
40	32	1 1/4"	26.0	-	-	-	-	-	-	38.4	64.0	146.0	32	50.5	146.0	31.3	50.5	146	1.62
	40	1 1/2"	26.0	34.80	50.5	139.7	34.80	50.5	159	44.3	64.0	159.0	38	50.5	159.0	35.6	50.5	159	1.50
50	50	2"	32.0	47.50	64.0	158.8	47.50	64.0	190	56.3	77.5	190.0	50	64.0	190.0	48.6	64.0	190	2.50
	65	2 1/2"	34.0	60.20	77.5	193.8	60.20	77.5	216	-	-	-	-	-	-	60.3	77.5	216	2.30

MG = diaphragm size



Overview of valve bodies for GEMÜ 658/688

		Spigots															
Connection code		0	16	17		18	35	36	37		55	59		60		63	65
Material code		40	40	C3	40	40	40	40	C3	40	40	C3	40	C3	40	40	40
MG	DN																
10	10	-	X	X	X	X	-	X	-	-	X	-	X	X	X	X	X
	15	X	X	X	X	X	-	X	-	-	X	-	X	X	X	X	X
	20	-	-	-	-	-	-	-	-	-	X	X	X	-	-	-	-
25	15	X	X	X	X	X	-	X	-	-	-	-	-	X	X	X	X
	20	X	X	X	X	X	-	X	-	-	X	X	X	X	X	X	X
	25	X	X	X	X	X	X	X	X	X	-	X	X	X	X	X	X
40	32	X	X	X	X	X	X	X	-	X	-	-	-	X	X	X	X
	40	X	X	X	X	X	X	X	X	X	-	X	X	X	X	X	X
50	50	X	X	X	X	X	X	X	X	X	-	X	X	X	X	X	X
	65	-	-	-	-	-	X	-	-	X	-	-	X	-	-	-	-

Availability of material code 42, F4: same as code 40

MG = diaphragm size

		Threaded connections			Clamps					Flanges	
Connection code		1	6	62	80	82	88	8A	8E	8	
Material code		37	40	40	40	40	40	40	40	C3	40
MG	DN										
10	10	-	W	W	-	K	-	K	-	-	-
	12	X	-	-	-	-	-	-	-	-	-
	15	X	W	W	K	W	K	K	-	-	-
	20	-	-	-	K	-	K	-	-	-	-
25	15	X	W	W	-	W	-	K	-	W	W
	20	X	W	W	K	K	K	K	-	W	W
	25	X	W	W	K	K	K	K	K	W	W
40	32	X	W	W	-	W	-	K	K	W	W
	40	X	W	W	K	W	K	K	K	W	W
50	50	X	W	W	K	W	K	K	K	W	W
	65	-	-	-	W	-	W	-	W	-	-

X = Standard

K = Anschlüsse komplett angledreht (nicht geschweißt)

W = Schweißkonstruktion

Verfügbarkeit Material Material Code 42, F4 gleich wie Code 40

MG = Membrangröße

For further metal diaphragm valves, accessories and other products, please see our Product Range catalogue and Price List.
Contact GEMÜ.

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AND CONTROL SYSTEMS

