

## 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 (e.g. pilot valves, limit switches, field bus connections)
- 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

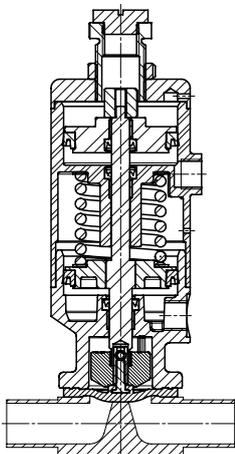


GEMÜ 658

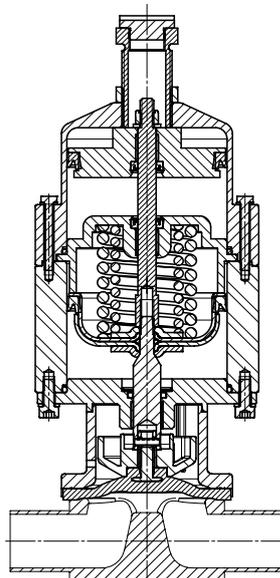


GEMÜ 688

### Sectional drawing



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 (code 52)	-10 ... 100 °C
PTFE (code 5E)	-10 ... 100 °C

#### Sterilisation temperature

FPM (code 4)	not applicable
EPDM (code 13)	150 °C, max. 60 min
EPDM (code 17)	150 °C, max. 180 min
PTFE (code 52)	Constant temperature* 150 °C
PTFE (code 5E)	Constant temperature 150 °C

The sterilisation temperature is valid for steam or superheated water.

\* The valves concerned must be serviced regularly if steam is applied continuously.

**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 <sup>3</sup>	0.03 dm <sup>3</sup>
25	0.08 dm <sup>3</sup>	0.09 dm <sup>3</sup>
40	0.44 dm <sup>3</sup>	0.47 dm <sup>3</sup>
50	0.44 dm <sup>3</sup>	0.47 dm <sup>3</sup>

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

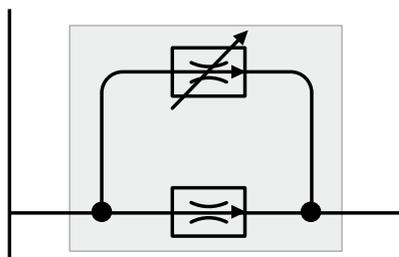
## Technical data

### Kv values [m<sup>3</sup>/h]

MG	DN	DIN Code 0	DIN 11850 Series 1 Code 16	DIN 11850 Series 2 Code 17	DIN 11850 Series 3 Code 18	SMS 3008 Code 37	ASME BPE Code 59	EN ISO 1127 Code 60
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

Kv values determined acc. to IEC 534 standard, inlet pressure 6 bar,  $\Delta p$  1 bar, stainless steel valve body and soft elastomer diaphragm.

## Application example



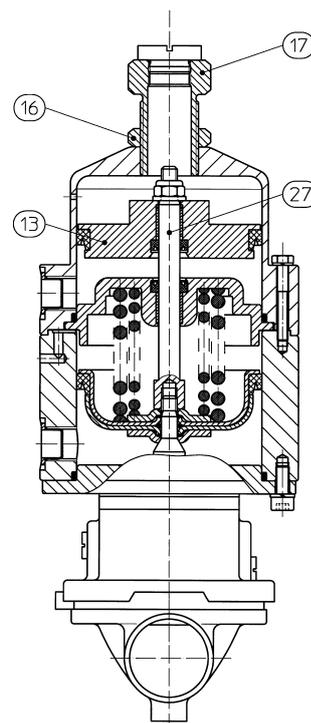
● Welds

## 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
Multi-port design	M**
T body	T*
* For dimensions see T Valves brochure	
** Dimensions and versions on request or according to customer requirements	

Connection	Code
<b>Butt weld spigots</b>	
Spigots DIN	0
Spigots DIN 11850, series 1	16
Spigots DIN 11850, series 2	17
Spigots DIN 11850, series 3	18
Spigots DIN 11866, series A	1A
Spigots DIN 11866, series B	1B
Spigots JIS-G 3447	35
Spigots JIS-G 3459	36
Spigots SMS 3008	37
Spigots BS 4825, part 1	55
Spigots ASME BPE	59
Spigots EN ISO 1127	60
Spigots ANSI/ASME B36.19M, Schedule 10s	63
Spigots ANSI/ASME B36.19M, Schedule 40s	65
<b>Threaded connections</b>	
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	
<b>Flanges</b>	
Flanges EN 1092 / PN16 / form B, length EN 558, series 1, ISO 5752, basic series 1	8
<b>Clamp connections</b>	
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
Overview of available valve bodies see page 8	

Valve body material	Code
1.4435 BN 2 (CF3M), investment casting, Fe < 0.5%	32
1.4435 (ASTM A 351 CF3M $\cong$ 316 L), investment casting	34
1.4408, investment casting	37
1.4435 (316 L), forged body	40
1.4435 (BN 2), forged body, Fe < 0.5%	42

Diaphragm material	Code
FPM	4
EPDM	max. 150 C 13
EPDM	max. 150 C 17
PTFE/EPDM convex, PTFE loose	max. 150 C 5E*
PTFE/EPDM, PTFE lamin.	max. 150 C 52**
* for diaphragm size 25 - 50      ** for diaphragm size 10	
Material complies with FDA requirements, except code 4	

Control function	Code
Normally closed (NC)	1

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

For further order data see page 5

## Order data

### Valve body surface finish, internal contour

	Forged body Code 40, 42	Investment casting Code 32, 34	Code
Ra ≤ 6.3 µm    blasted internal/external	-	X	1500
Ra ≤ 6.3 µm    optical electropolishing	-	X	1509
Ra ≤ 0.8 µm    mechanically polished internal, blasted external	X	X	1502
Ra ≤ 0.8 µm    electropolished internal/external	X	-	1503
Ra ≤ 0.6 µm    mechanically polished internal, blasted external	X	X	1507
Ra ≤ 0.6 µm    electropolished internal/external	X	-	1508
Ra ≤ 0.4 µm    mechanically polished internal, blasted external	X	-	1536
Ra ≤ 0.4 µm    electropolished internal/external	X	-	1537
Ra ≤ 0.25 µm    mechanically polished internal, blasted external	X	-	1527
Ra ≤ 0.25 µm    electropolished internal/external	X	-	1516

Ra acc. to DIN 4768; at defined reference points  
Surface finish data refer to medium wetted surfaces

### Special function

### Code

3-A compliant design

M

Order example	688	25	D	60	40	13	1	1V1	1503	M
Type	688									
Nominal size		25								
Body configuration (code)			D							
Connection (code)				60						
Valve body material (code)					40					
Diaphragm material (code)						13				
Control function (code)							1			
Version (code)								1V1		
Surface finish (code)									1503	
Special function (code)										M

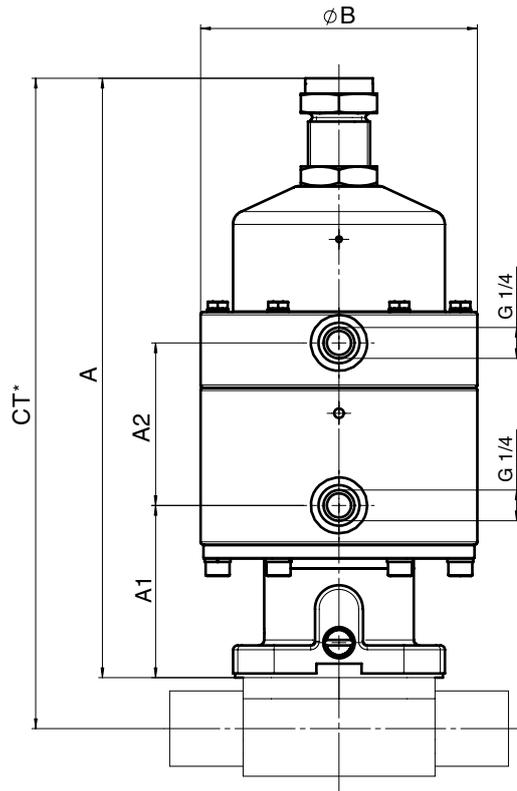
## Actuator dimensions [mm]

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)

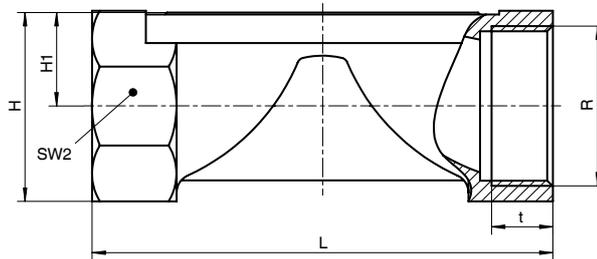
## Body dimensions [mm]

### 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

For materials see overview on page 11



### Threaded connections, connection code 6, 62 Valve body material: investment casting (code 34), forged body (code 40)

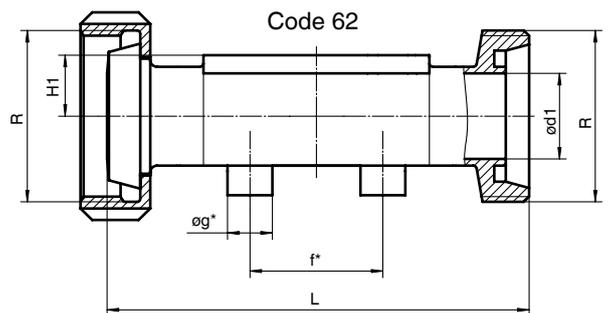
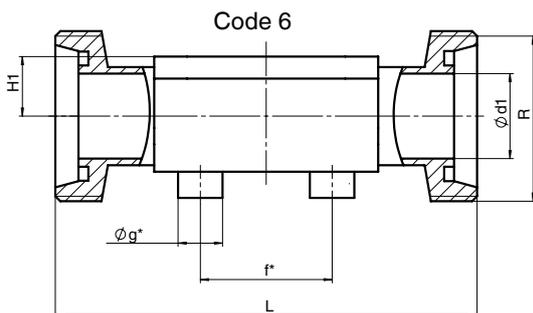
MG	DN	H1*	H1**	f*	øg*	ød1	Thread to DIN 405 R	Code 6 L	Code 62 L	Weight [kg]
10	10	12.5	-	30.0	13.5	10.0	RD 28 x 1/8	118	116	0.33
	15	12.5	-	30.0	13.5	16.0	RD 34 x 1/8	118	116	0.35
25	15	13.0	19	40.0	13.5	16.0	RD 34 x 1/8	118	116	0.71
	20	16.0	19	40.0	13.5	20.0	RD 44 x 1/6	118	114	0.78
	25	19.0	19	40.0	13.5	26.0	RD 52 x 1/6	128	127	0.79
40	32	24.0	26	68.0	13.5	32.0	RD 58 x 1/6	147	147	1.66
	40	26.0	26	75.0	13.5	38.0	RD 65 x 1/6	160	160	1.62
50	50	32.0	32	90.0	13.5	50.0	RD 78 x 1/6	191	191	2.70

\* 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 0, 16, 17, 18 Valve body material: Investment casting (code 34), forged body (code 40)

MG	DN	NPS	f*	øg*	L	c	H1*	H1**	DIN Series 0 Code 0		DIN 11850 Series 1 Code 16		DIN 11850 Series 2 Code 17		DIN 11850 Series 3 Code 18		Weight [kg]
									ød	s	ød	s	ød	s	ød	s	
10	10	3/8"	30	13.5	108	25	12.5		-	-	12	1.0	13	1.5	14	2.0	0.30
	15	1/2"	30	13.5	108	25	12.5		18	1.5	18	1.0	19	1.5	20	2.0	0.30
	20	3/4"	30	13.5	108	25	12.5		-	-	-	-	-	-	-	-	0.30
25	15	1/2"	40	13.5	120	25	13.0	19.0	18	1.5	18	1.0	19	1.5	20	2.0	0.62
	20	3/4"	40	13.5	120	25	16.0	19.0	22	1.5	22	1.0	23	1.5	24	2.0	0.58
	25	1"	40	13.5	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"	68	13.5	153	25	24.0	26.0	34	1.5	34	1.0	35	1.5	36	2.0	1.45
	40	1 1/2"	75	13.5	153	25	26.0	26.0	40	1.5	40	1.0	41	1.5	42	2.0	1.32
50	50	2"	90	13.5	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 1A, 1B, 60 Valve body material: Investment casting (code 34), forged body (code 40)

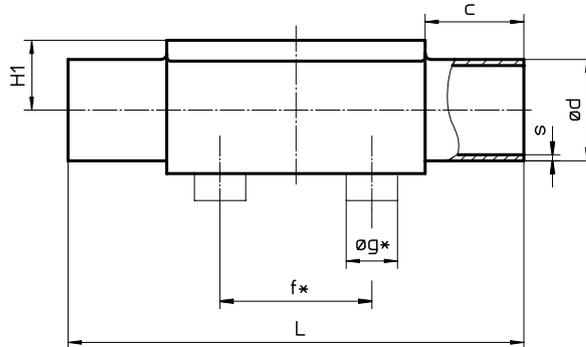
MG	DN	NPS	f*	øg*	L	c	H1*	H1**	DIN 11866 Series A Code 1A		DIN 11866 Series B Code 1B		EN ISO 1127 Code 60		Weight [kg]
									ød	s	ød	s	ød	s	
10	10	3/8"	30	13.5	108	25	12.5		13	1.5	17.2	1.6	17.2	1.6	0.30
	15	1/2"	30	13.5	108	25	12.5		19	1.5	21.3	1.6	21.3	1.6	0.30
	20	3/4"	30	13.5	108	25	12.5		-	-	-	-	-	-	0.30
25	15	1/2"	40	13.5	120	25	13.0	19.0	19	1.5	21.3	1.6	21.3	1.6	0.62
	20	3/4"	40	13.5	120	25	16.0	19.0	23	1.5	26.9	1.6	26.9	1.6	0.58
	25	1"	40	13.5	120	25	19.0	19.0	29	1.5	33.7	2.0	33.7	2.0	0.55
40	32	1 1/4"	68	13.5	153	25	24.0	26.0	35	1.5	42.4	2.0	42.4	2.0	1.45
	40	1 1/2"	75	13.5	153	25	26.0	26.0	41	1.5	48.3	2.0	48.3	2.0	1.32
50	50	2"	90	13.5	173	30	32.0	32.0	53	1.5	60.3	2.0	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 34), forged body (code 40)

MG	DN	NPS	f*	øg*	L	c	H1*	H1**	JIS-G 3447 Code 35		JIS-G 3459 Code 36		SMS 3008 Code 37		Weight [kg]
									ød	s	ød	s	ød	s	
10	10	3/8"	30	13.5	108	25	12.5		-	-	17.3	1.65	-	-	0.30
	15	1/2"	30	13.5	108	25	12.5		-	-	21.7	2.10	-	-	0.30
	20	3/4"	30	13.5	108	25	12.5		-	-	-	-	-	-	0.30
25	15	1/2"	40	13.5	120	25	13.0	19.0	-	-	21.7	2.10	-	-	0.62
	20	3/4"	40	13.5	120	25	16.0	19.0	-	-	27.2	2.10	-	-	0.58
	25	1"	40	13.5	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"	68	13.5	153	25	24.0	26.0	31.8	1.2	42.7	2.80	33.7	1.2	1.45
	40	1 1/2"	75	13.5	153	25	26.0	26.0	38.1	1.2	48.6	2.80	38.0	1.2	1.32
50	50	2"	90	13.5	173	30	32.0	32.0	50.8	1.5	60.5	2.80	51.0	1.2	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 55, 59, 63, 65 Valve body material: Investment casting (code 34), forged body (code 40)

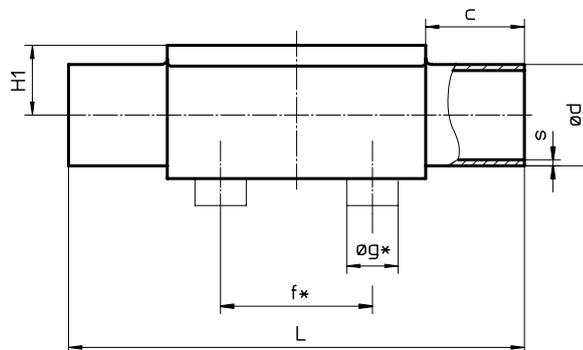
MG	DN	NPS	f*	øg*	L	c	H1*	H1**	BS 4825 Code 55		ASME BPE Code 59		ANSI/ASME B36.19M 10s Code 63		ANSI/ASME B36.19M 40s Code 65		Weight [kg]
									ød	s	ød	s	ød	s	ød	s	
10	10	3/8"	30	13.5	108	25	12.5		9.53	1.2	9.53	0.89	17.1	1.65	17.1	2.31	0.30
	15	1/2"	30	13.5	108	25	12.5		12.70	1.2	12.70	1.65	21.3	2.11	21.3	2.77	0.30
	20	3/4"	30	13.5	108	25	12.5		19.05	1.2	19.05	1.65	-	-	-	-	0.30
25	15	1/2"	40	13.5	120	25	13.0	19.0	-	-	-	-	21.3	2.11	21.3	2.77	0.62
	20	3/4"	40	13.5	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"	40	13.5	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"	68	13.5	153	25	24.0	26.0	-	-	-	-	42.2	2.77	42.2	3.56	1.45
	40	1 1/2"	75	13.5	153	25	26.0	26.0	-	-	38.10	1.65	48.3	2.77	48.3	3.68	1.32
50	50	2"	90	13.5	173	30	32.0	32.0	-	-	50.80	1.65	60.3	2.77	60.3	3.91	2.25

\* only for investment cast design

\*\* only for forged design

MG = diaphragm size

For materials see overview on page 11



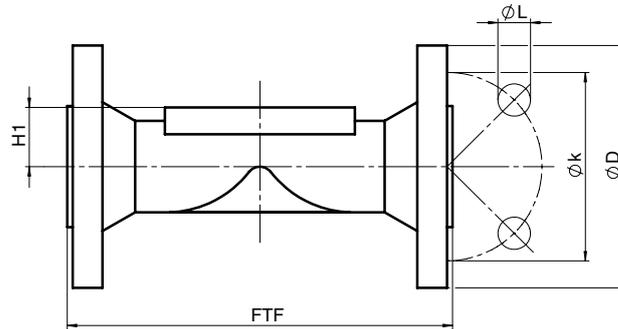
## Body dimensions [mm]

### Flanges - DIN EN 1092, connection code 8 Valve body material: investment casting (code 34)

MG	DN	øD	øk	øL	Number of bolts	H1	FTF	Weight [kg]
25	15	95	65	14	4	13	130*	1.85
	20	105	75	14	4	16	150	2.35
	25	115	85	14	4	19	160	2.85
40	32	140	100	18	4	24	180	4.90
	40	150	110	18	4	26	200	5.65
50	50	165	125	18	4	32	230	7.45

\* no EN length

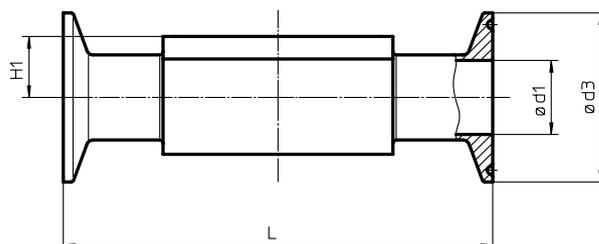
MG = diaphragm size



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

MG	DN	NPS	H1	for pipe ASME BPE Code 80			for pipe EN ISO 1127 Code 82			for pipe ASME BPE Code 88			for pipe DIN 11850 Code 8A			for pipe SMS 3008 Code 8E			Weight [kg]
				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	18.1	50.5	108.0	9.40	25.0	108	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	23.7	50.5	117.0	15.75	25.0	117	20	34.0	117.0	-	-	-	0.71
	25	1"	19.0	22.10	50.5	114.3	29.7	50.5	127.0	22.10	50.5	127	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	44.3	64.0	159.0	34.80	50.5	159	38	50.5	159.0	35.6	50.5	159	1.50
50	50	2"	32.0	47.50	64.0	158.8	56.3	77.5	190.0	47.50	64.0	190	50	64.0	190.0	48.6	64.0	190	2.50

MG = diaphragm size



## Overview of valve bodies for GEMÜ 658/688

		Spigots																						
Connection code		0		16		17		18		1A	1B	35		36	37		55		59		60		63	65
Material code		34	40	34	40	34	40	34	40	40	40	34	40	40	34	40	34	40	34	40	34	40	40	40
MG	DN																							
10	10	-	-	X	X	X	X	X	X	X	X	-	-	X	-	-	-	X	-	X	X	X	X	X
	15	X	X	X	X	X	X	X	X	X	X	-	-	X	-	-	X	X	-	X	X	X	X	X
	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	X	X	X	-	-	-	-
25	15	X	X	X	X	X	X	-	X	X	X	-	-	X	-	-	-	-	-	-	X	X	X	X
	20	X	X	X	X	X	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	X	X	X	X	X	X
40	32	X	X	X	X	X	X	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	X	X	X	X	X	
50	50	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-	-	X	X	X	X	X	X	

MG = diaphragm size

		Threaded connections					Flanges	Clamps				
Connection code		1	6		62		8	80	82	88	8A	8E
Material code		37	34	40	34	40	34	40	40	40	40	40
MG	DN											
10	10	-	W	W	W	W	-	-	K	-	K	-
	12	X	-	-	-	-	-	-	-	-	-	-
	15	X	W	W	W	W	-	K	W	K	K	-
	20	-	-	-	-	-	-	K	-	K	-	-
25	15	X	W	W	W	W	W	-	W	-	K	-
	20	X	W	W	W	W	W	K	K	K	K	-
	25	X	W	W	W	W	W	K	K	K	K	K
40	32	X	W	W	W	W	W	-	W	-	K	K
	40	X	W	W	W	W	W	K	W	K	K	K
50	50	X	W	W	W	W	W	K	W	K	K	K

X = Standard

K = Connections completely machined (not welded)

W = Welded construction

MG = diaphragm size

Availability of material code 32: same as code 34, availability of material code 42: same as code 40

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

**GEMÜ**® VALVES, MEASUREMENT  
AND CONTROL SYSTEMS

