

## Diaphragm Valve, Metal

### Construction

The GEMÜ 650 piston actuated 2/2-way diaphragm valve is designed for use in sterile areas of application.

All metallic actuator components are made of stainless steel. Normally closed, Normally open and Double acting control functions are available. The valve is available with two actuator versions: Design D has concealed bolt mounting in the actuator and is only suitable for 2/2-way bodies. Design T is suitable for T valve, Multi-port valve, Tank bottom valve and 2/2-way valve bodies. The valve has an optical position indicator as standard.

### Features

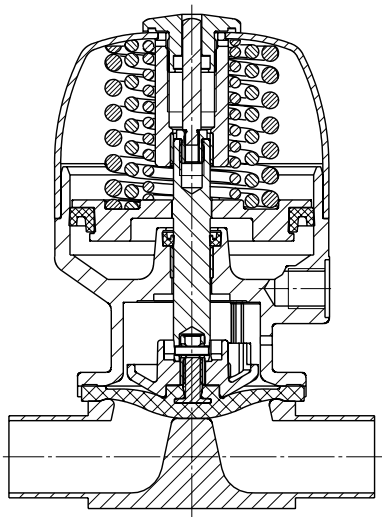
- Suitable for inert and corrosive\* liquid and gaseous media
- Valve body and diaphragm available in various materials and designs
- Compact design (ideal when space is at a premium)
- Various connections available
- CIP/SIP cleaning and sterilizing capabilities
- Autoclave capability, dependent on version
- Surface finishes down to 0.25 µm, electropolished
- Versions according to ATEX on request

### Advantages

- Hermetic separation between medium and actuator
- Optional flow direction
- Optional mounting position
- Design D for the 2/2-way version is mounted by means of female threads in the actuator
- Control air connectors positioned in-line with piping (option: 90° offset)
- Expelled air from spring chamber can optionally be piped to other locations
- Extensive range of accessories, easily retrofitted

\*see information on working medium on page 2

### Sectional drawing



Actuator version "T"



Actuator version "D"

## 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).

Max. operating temperature (dependent on medium wetted materials) 150 °C

### Ambient conditions

Ambient temperature max. 60 °C

### Control medium

Inert gases

Max. perm. temperature of control medium 70 °C

### Filling volume

Actuator size	control function 1	control function 2
OT1	0,01 dm <sup>3</sup>	0,010 dm <sup>3</sup>
OTA	0,02 dm <sup>3</sup>	0,013 dm <sup>3</sup>
1	0,03 dm <sup>3</sup>	0,070 dm <sup>3</sup>
2	0,13 dm <sup>3</sup>	0,220 dm <sup>3</sup>
3	0,23 dm <sup>3</sup>	0,500 dm <sup>3</sup>
4	0,50 dm <sup>3</sup>	1,200 dm <sup>3</sup>

Actuator Code	MG	DN	Operating pressure [bar]		Control pressure [bar]	
			EPDM / FPM	PTFE	C.f. 1	C.f. 2 + 3
OT1	8	4	0 - 8	0 - 6	5.0 - 7	max. 4.5
OT1		6				
OT1		8				
OT1		10				
OT1		15				
OTA	8	4	0 - 10	0 - 6	3.5 - 7	max. 4,5
OTA		6				
OTA		8				
OTA		10				
OTA		15				
1	10	10	0 - 10	0 - 6	4.5 - 7	max. 4.5
1		15				
1		20				
2	25	15	0 - 10	0 - 6	5.0 - 7	max. 4.5
2		20				
2		25				
3	40	32	0 - 10	0 - 6	4.5 - 7	max. 5.5
3		40				
4	50	50	0 - 10	0 - 6	4.5 - 7	max. 4.5

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

Version with PTFE diaphragm up to 10 bar possible with actuator special function „H“ and forged valve body

## Technical data

### Diaphragm temperature range [°C]

Diaphragm	Liquid Media		Steam** (Sterilisation)	Code
	Min.	Max.		
EPDM	-10	90	150 °C, max. 60 min	13/3A
EPDM	-10	90	150 °C, max. 60 min	16/6A
EPDM	-10	90	150 °C, max. 180 min	17
PTFE	-10	90	Constant temperature* 150 °C	52/5A
PTFE	-10	90	Constant temperature* 150 °C	5E
PTFE	-10	90	150 °C, max. 40 min	5F

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

\*\* Sterilization temperature is only valid for steam and superheated water

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

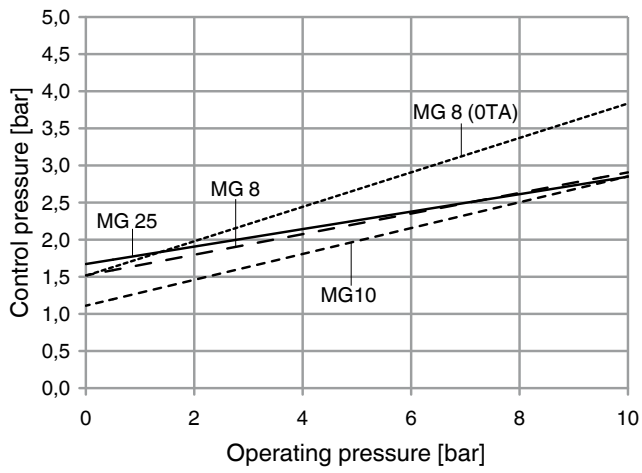
Diaphragm size	DN	DIN Code 0	DIN 11850 Series 1 Code 16	DIN 11850 Series 2 Code 17	DIN 11850 Series 3 Code 18	SMS 3008 Code 37	ASME BPE Code 59	EN ISO 1127 Code 60
8	4	0.5	-	-	-	-	-	-
	6	1.1	-	-	-	-	-	1.2
	8	1.3	-	-	-	-	0.6	2.2
	10	-	2.1	2.1	2.1	-	1.3	-
	15	-	-	-	-	-	2.0	-
10	10	-	2.4	2.4	2.4	-	2.2	3.3
	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.

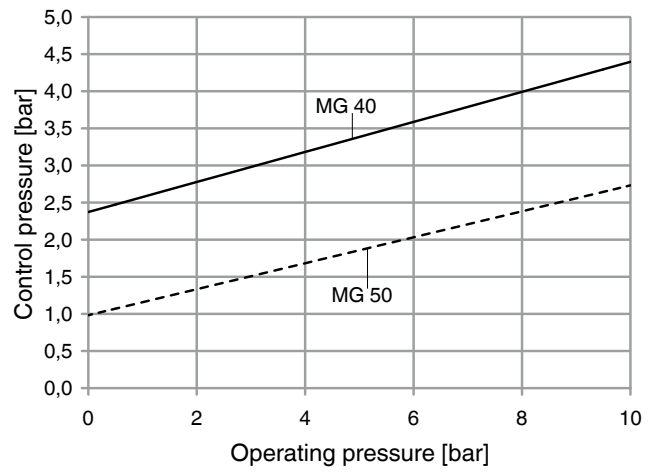
### Autoclave capability

Actuator size 0	Standard version with autoclave capability
Actuator size 1	Standard version with autoclave capability
Actuator size 2	Standard version with autoclave capability
Actuator size 3	with special version
Actuator size 4	with special version

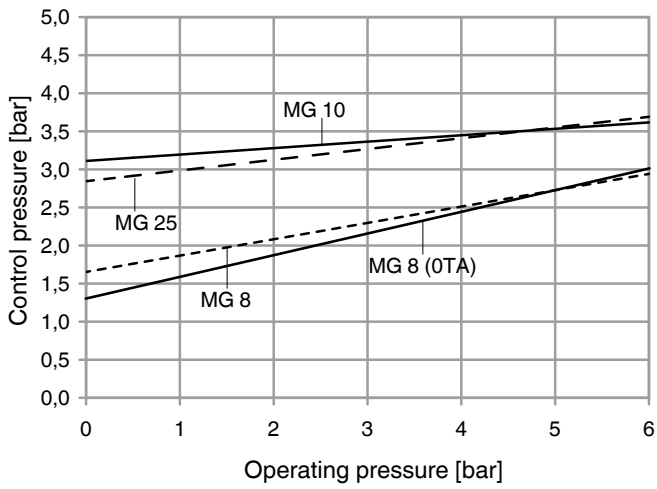
**Control function 2 + 3  
with elastomer diaphragm  
diaphragm size 8 - 25**



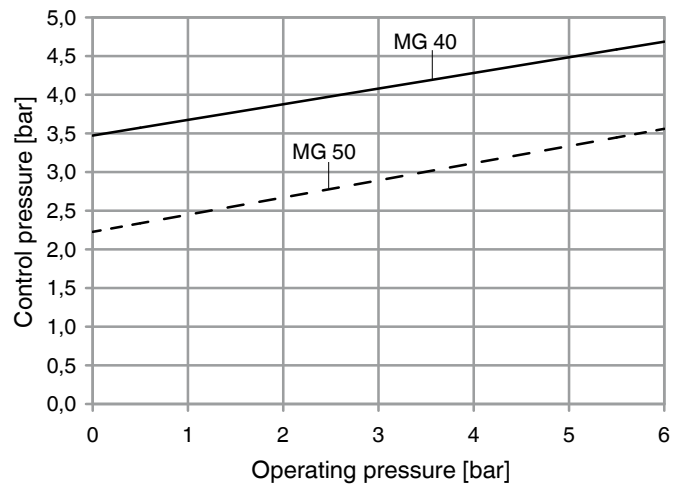
**Control function 2 + 3  
with elastomer diaphragm  
diaphragm size 40 - 50**



**Control function 2 + 3  
with PTFE diaphragm  
diaphragm size 8 - 25**



**Control function 2 + 3  
with PTFE diaphragm  
diaphragm size 40 - 50**



## Order data (2/2-way valves)

Body configuration	Code
Tank valve body (actuator version T)	B**
2/2-way body (actuator version D and T)	D
Multi-port design (actuator version T)	M**
T body (actuator version T)	T*
* For dimensions see T Valves brochure	
** Dimensions and versions on request	

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>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
Aseptic clamps on request	
For overview of available valve bodies see page 12	

Valve body material	Code
1.4435 - BN2 (CF3M), investment casting Fe<0.5%	32
1.4435 (ASTM A 351 CF3M $\cong$ 316L), investment casting	34
1.4408, investment casting	37
1.4435 (316L), forged body	40
1.4435 (BN2), forged body Fe<0.5%	42

Diaphragm material	Code
EPDM	13 3A*
EPDM	16 6A*
EPDM	17
PTFE/EPDM convex	PTFE loose 5E
PTFE/FPM convex	PTFE loose 5F
PTFE/EPDM	PTFE lamin. 52** 5A*
* for diaphragm size 8      ** for diaphragm size 10	
Material complies with FDA requirements	

Control function	Code
Normally closed (NC)	1
Normally open (NO)	2
Double acting (DA) (with opening spring)	3

Actuator size	Code
Actuator size 0 (diaphragm size 8)	0
Actuator size 1 (diaphragm size 10)	1
Actuator size 2 (diaphragm size 25)	2
Actuator size 3 (diaphragm size 40)	3
Actuator size 4 (diaphragm size 50)	4

Actuator version	Code
Only for body configuration D (diaphragm size 10 - 50)	D
For body config. B, D, M and T (diaphragm size 8 - 50)	T
For body config. B, D, M and T (diaphragm size 8 - 50) Control air connector 90° offset to flow direction	R

Spring set	Code
Standard	1
For higher operating pressure (diaphragm size 8 and 40)	A

For further order data see page 6

## Order data (2/2-way valves)

### 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
--	electropolished	-	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

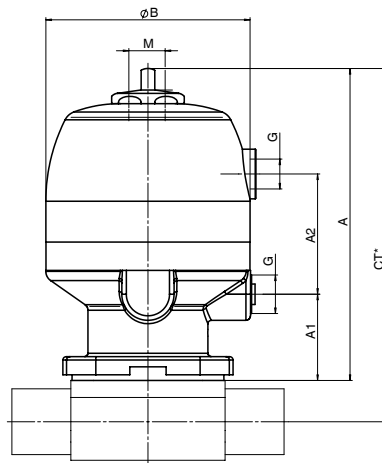
Ra acc. to DIN 4768; at defined reference points  
Surface finish data refer to medium wetted surfaces

Order example	650	50	D	60	40	17	1	4	D	1	1503
Type	650										
Nominal size		50									
Body configuration (code)			D								
Connection (code)				60							
Valve body material (code)					40						
Diaphragm material (code)						17					
Control function (code)							1				
Actuator size (code)								4			
Actuator version (code)									D		
Spring set (code)										1	
Surface finish (code)											1503

## Dimensions [mm]

### Actuator dimensions

Actuator size	Diaphragm size	A	A1	A2	ø B	G	M	Weight [kg]	
								Design D	Design T
0T1	8	80.5	28	37.8	42	G 1/8	M12x1	-	0.5
0TA	8	89.5	28	39.1	47	G 1/8	M12x1	-	0.5
1T1	10	116.0	37	42.5	61	G 1/4	M16x1	1.1	0.9
2T1	25	137.5	38	53.0	90	G 1/4	M16x1	2.5	1.9
3T1	40	173.0	53	56.5	114	G 1/4	M16x1	5.0	3.0
3TA	40	223.0	52	-	144	G 1/4	M16x1	-	7.3
4T1	50	223.0	52	70.5	144	G 1/4	M16x1	9.5	7.7



\* CT = A + H1 (see body dimensions)

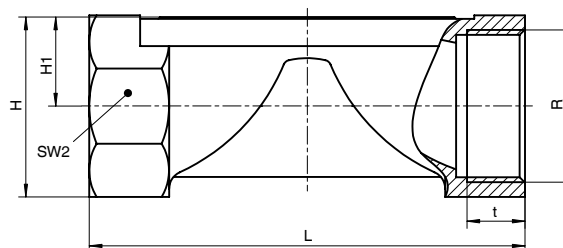
## Body dimensions [mm]

### Threaded sockets, connection code 1 Valve body material: Investment casting (code 34, 37)

MG	DN	R	H	H1	t	L	SW2	Number of flats	Weight [kg]
8	8	G 1/4	19	8.5	12	72	17	2	0.09
10	12	G 3/8	23	10.5	13	55	22	2	0.17
	15	G 1/2	29	13.5	15	68	24	2	0.26
25	15	G 1/2	30	16.0	9	85	27	6	0.32
	20	G 3/4	33	17.0	10	85	32	6	0.34
	25	G 1	37	17.0	13	110	41	6	0.39
40	32	G 1 1/4	50	25.0	16	120	50	8	0.88
	40	G 1 1/2	52	25.0	18	140	55	8	0.93
50	50	G 2	69	34.0	18	165	70	8	1.56

MG = diaphragm size

For materials see overview on last page



## Body dimensions [mm]

### Butt weld spigots, connection code 0, 16, 17, 18 Valve body material: Investment casting (code 34), forged body (code 40)

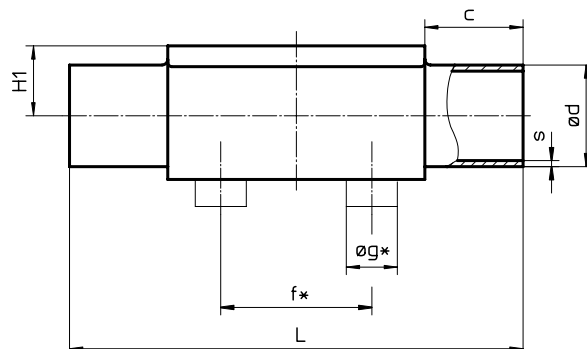
MG	DN	NPS	f*	øg*	L	c	H1*	H1**	DIN Series 0 Code 0		DIN 11850 Series 1 Code 16		DIN 11850 Series 2 Code 17		DIN 11850 Series 3 Code 18		Weight [kg]
									ød	s	ød	s	ød	s	ød	s	
8	4	-	-	-	72	20	8.5		6	1.0	-	-	-	-	-	-	0.09
	6	-	-	-	72	20	8.5		8	1.0	-	-	-	-	-	-	0.09
	8	1/4"	-	-	72	20	8.5		10	1.0	-	-	-	-	-	-	0.09
	10	3/8"	-	-	72	20	8.5		-	-	12	1.0	13	1.5	14	2.0	0.09
	15	1/2"	-	-	72	20	8.5		-	-	-	-	-	-	-	-	0.09
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 last page

### 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	
8	4	-	-	-	72	20	8.5		-	-	-	-	-	-	0.09
	6	-	-	-	72	20	8.5		8	1.0	10.2	1.6	10.2	1.6	0.09
	8	1/4"	-	-	72	20	8.5		10	1.0	13.5	1.6	13.5	1.6	0.09
	10	3/8"	-	-	72	20	8.5		13	1.5	-	-	-	-	0.09
	15	1/2"	-	-	72	20	8.5		-	-	-	-	-	-	0.09
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 last page





## Body dimensions [mm]

### Butt weld spigots, connection code 35, 36, 37 Valve body material: Investment casting (code 34), forged body (code 40)

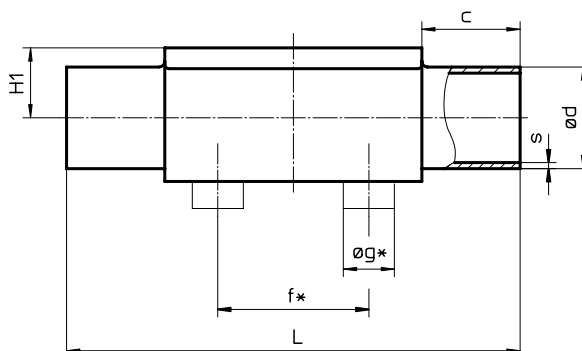
									JIS-G 3447 Code 35		JIS-G 3459 Code 36		SMS 3008 Code 37		Weight [kg]
MG	DN	NPS	f*	øg*	L	c	H1*	H1**	ød	s	ød	s	ød	s	
8	4	-	-	-	72	20	8.5		-	-	-	-	-	-	0.09
	6	-	-	-	72	20	8.5		-	-	10.5	1.20	-	-	0.09
	8	1/4"	-	-	72	20	8.5		-	-	13.8	1.65	-	-	0.09
	10	3/8"	-	-	72	20	8.5		-	-	-	-	-	-	0.09
	15	1/2"	-	-	72	20	8.5		-	-	-	-	-	-	0.09
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 last page

### Butt weld spigots, connection code 55, 59, 63, 65 Valve body material: Investment casting (code 34), forged body (code 40)

									BS 4825 Code 55		ASME BPE Code 59		ANSI/ASME B36.19M 10s Code 63		ANSI/ASME B36.19M 40s Code 65		Weight [kg]
MG	DN	NPS	f*	øg*	L	c	H1*	H1**	ød	s	ød	s	ød	s	ød	s	
8	4	-	-	-	72	20	8.5		-	-	-	-	-	-	-	-	0.09
	6	-	-	-	72	20	8.5		-	-	-	-	10.3	1.24	10.3	1.73	0.09
	8	1/4"	-	-	72	20	8.5		6.35	1.2	6.35	0.89	13.7	1.65	13.7	2.24	0.09
	10	3/8"	-	-	72	20	8.5		9.53	1.2	9.53	0.89	-	-	-	-	0.09
	15	1/2"	-	-	72	20	8.5		12.70	1.2	12.70	1.65	-	-	-	-	0.09
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 last page



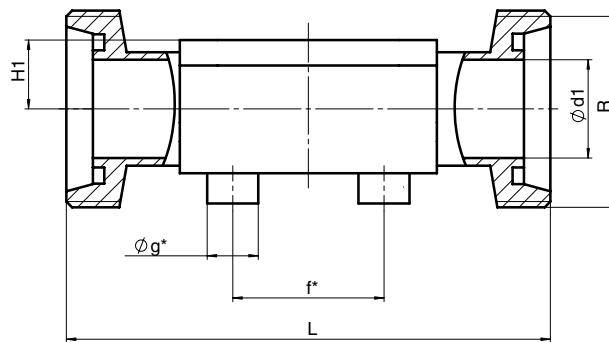
## Body dimensions [mm]

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

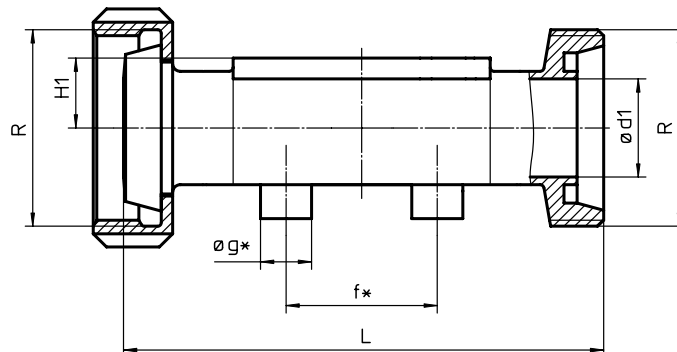
MG	DN	H1*	H1**	f*	øg*	ød1	Thread to DIN 405 R	Code 6 L	Code 62 L	Weight [kg]
8	10	8.5	-	-	-	10.0	RD 28 x 1/8	92	90	0.21
10	10	12.5	-	30.0	13.5	10.0	RD 28 x 1/8	118	116	0.33
	15	12.5	-	30.0	13.5	16.0	RD 34 x 1/8	118	116	0.35
25	15	13.0	19	40.0	13.5	16.0	RD 34 x 1/8	118	116	0.71
	20	16.0	19	40.0	13.5	20.0	RD 44 x 1/6	118	114	0.78
40	25	19.0	19	40.0	13.5	26.0	RD 52 x 1/6	128	127	0.79
	32	24.0	26	68.0	13.5	32.0	RD 58 x 1/6	147	147	1.66
50	40	26.0	26	75.0	13.5	38.0	RD 65 x 1/6	160	160	1.62
	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 last page

Code 6



Code 62



## Body dimensions [mm]

### 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	
8	6	1/8"	8.5	-	-	-	7.0	25.0	63.5	-	-	-	6	25.0	63.5	-	-	-	-
	8	1/4"	8.5	4.57	25.0	63.5	10.3	25.0	63.5	-	-	-	8	25.0	63.5	-	-	-	0.15
	10	3/8"	8.5	7.75	25.0	63.5	-	-	-	-	-	-	10	34.0	88.9	-	-	-	0.18
	15	1/2"	8.5	9.40	25.0	63.5	-	-	-	9.40	25.0	108	-	-	-	-	-	-	0.18
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

