Applications

GAR-SEAL butterfly valves are used in most cases where corrosive, abrasive and toxic media need to be controlled.
GAR-SEAL valves are used, for controlling, throttling and shutting off purposes in the chemical, petrochemical and chlorine industry as well as in electroplating, the paper industry and many other branches.
GAR-SEAL valves convince through their long service life and offer with reduced maintenance requirements an increased amount of operation performance.

GAR-SEAL

Dimensions

DN 50 - 600 (other sizes upon request)

Flange Connections

EN 1092
DIN 2501 PN 10/16
ANSI B 16.5., Class 150

Face-to-face Dimensions

EN 558-1 GR 20 (DIN 3202 T3 K1)
ISO 5752 table 5 short – Line 20

Bodies

Wafer and Lug design with neck for insulation.

Body Strength

DIN / EN 12516 T2 (DIN 3840), tested within the scope of the inspection body designated by Modul H1

Temperature Range

–40 °C to +200 °C

Adapter Flange

EN ISO 5211
NF E 29-402

Operating Pressure

DN 50-300 10, 16 bar
above DN 300 10 bar

Tightness

Gastight for overpressure acc. to EN12666 1 P11 + 12 leakrate A

Vacuum

up to 1 mbar abs.

Liner

- PTFE
- Antistatic PTFE (s. SAFETY-SEAL)
- PVDF
- UHMPE

For additional product information please refer to the valve documentation.

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Material Selection Chart

Valve Material						Design Type					
1 Valve Body		**2 Body Liner**		**3 Disc**		**4 Body Type**		**5 Specific Design Body Liner**		**6 Valve Type**	
Code	Material	Code	Material	Code	Material	Code	Material	Code	Material	Code	Material
1	GGG 40.3 (0.7043)	1	PTFE**	1	PTFE**	W	WAFER Ring Body	A	antistatic (SAFETY-SEAL)	S	STERILE-SEAL
2	GS-C 25 (1.0619)	2	UHMPE***	2	UHMPE***	L	LUG Flange-On-Body	C	abrasive Service		
3	Stainless Steel (1.4581)			3	Staniless Steel (1.4581 and others)			V	For increased Vacuum		
4	Others			4	Hastelloy B/C* (2.4800/2.4602)						
				5	Titan* (3.7035)	**MOBILE-SEAL**					
				6	Monel 400* (2.4360)	Code	With existing pipe flanges				
				7	Uranus B6* (1.4500)	W-T	Drilling in acc. to EN 1092 PN 10				
				8	Tantal*	L-T	Drilling in acc. to DIN 2501 PN 10				
		9	PVDF****	9	PVDF**** others	W-TW	Drilling in acc. to DIN 28459				

Examples	1	2	3	4	5	6	
GAR-SEAL, WAFER Design	1	1	1	W	-	-	MT
SAFETY-SEAL, LUG Design	3	1	1	L	A	-	MT
MOBILE-SEAL, WAFER Design, acc to TW Standard, electrically heated	1	1	3	W-TW	-	-	MT
STERILE-SEAL, LUG Design	3	1	3	L	-	S	
SAFETY-SEAL, WAFER Design, antistatic	2	1	1	W	A	-	MT
GAR-SEAL, WAFER Design Vacuum Lining	1	1	1	W	V	-	MT

Performance Data

DN 50 - 600, 2" - 24"

Nominal Pressure
max. 16 bar (≤ DN 300)

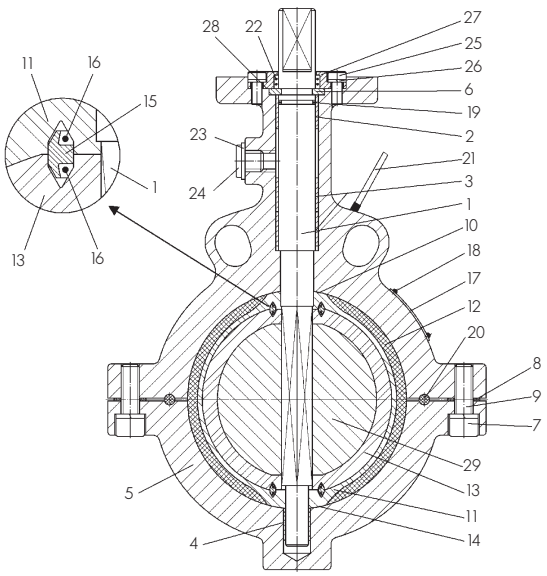
Vacuum
up to 1 mbar abs.
(dep. upon temperature)

Operating temperature
-40 °C to +200 °C (for PTFE**)
-40 °C to +85 °C (for UHMPE***)
-40 °C to +135 °C (for PVDF****)

MT = GAR-SEAL Butterfly valves comply with the TA-Luft regulations.

* upon request
** Polytetrafluorethylene
*** Ultrahighmoleculare Polyethylene
**** Polyvinylidenfluoride

Materials



Pos.	Qty.	Material	Designation	Pos.	Qty.	Material	Designation
1	1	1.4313 to DN 300 1.4021 to DN 350	Shaft	15	2	PTFE	Sealring
				16	4	VITON	O-Ring (Sealring)
2	1	Steel/PTFE	slide bearing (top)	17	1	Stainless steel	Nameplate
3	2	Steel/PTFE	slide bearing (center)	18	4	Stainless steel	Rivet
4	1	Steel/PTFE	slide bearing (bottom)	19	1	VITON	O-Ring
5	1	s. table	Body	20	2	PTFE	Security element
6	1[1]	PTFE, carbon reinf.	retaining ring (split)	21	1[3]	Steel electroplated	Earthing Cable
7	2[2]	Stainless Steel	Circlip	22	2	VITON	O-Ring (Adapter Flange)
8	2[2]	GYLON	Washer	23	1[3]	Stainless steel/VITON	Sealring
9	2[2]	Stainless Steel	Body screw	24	1[3]	Stainless steel	Locking screw
10	1	GYLON	Top gasket	25	4	Stainless steel	Screw
11	1	s. table	Lining	26	4	Stainless steel	Circlip
12	2	Silicone	Elastomer Backup-Element	27	1	Stainless steel	Adapter Flange
13	1	s. table	Disc	28	1	GYLON	Seal (Adapter Flange)
14	1	GYLON	Bottom gasket	29	1	0.7040 (GGG 40)	Valve disc

[1] does not apply above DN 250

[2] > DN 350 – 4 Pc. each

[3] Special design

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Dimensions

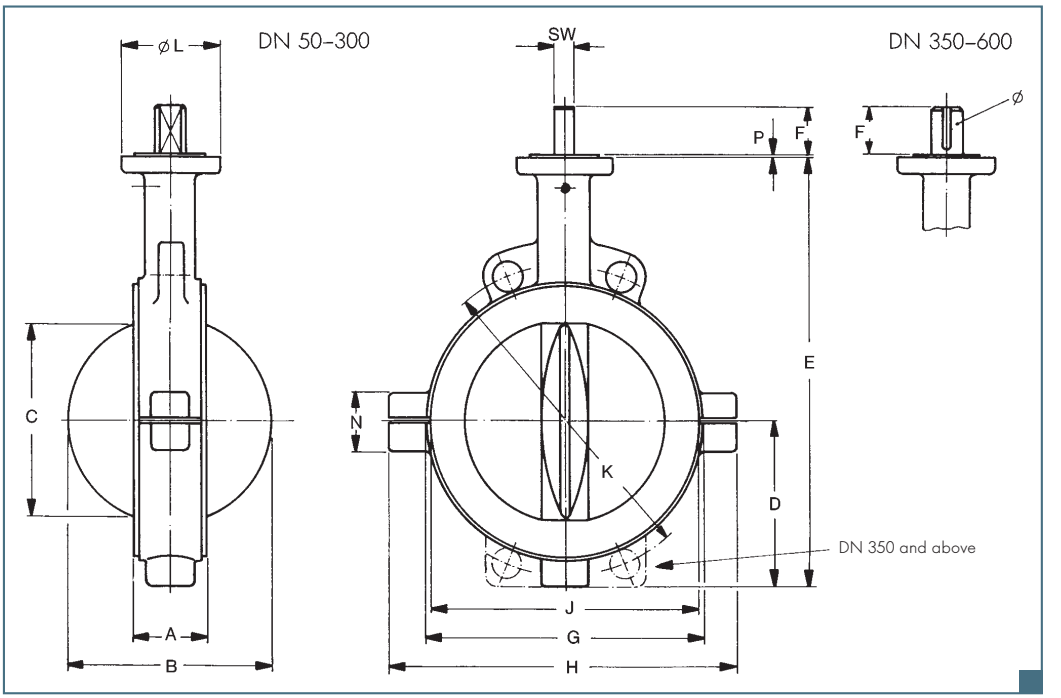
Garlock Butterfly Valve – Wafer Design

Flange Connection: EN 1092 (DIN 2501), PN 10 • PN 16 (DN 50 - DN 300) • ANSI B 16.5, 150 LBS

Overall Length: EN 558-1 GR20 (DIN 3202 T3 K1)

Adapter Flange: EN ISO 5211

2" to 24" • DN 50 to DN 600



DN Inch	DN mm	Adapter Flange	A	B	C	D	E	F	G	H	J	K DIN PN 10	K ANSI	L	SW ø	P	N	Z DIN PN 10	Z ANSI UNC	Weight kg
2	50	F05	43	60	43	62	202	35	102	152	98	125	121	65	10,0	3	40	4xM16	4x⅝"-11	2,60
2 ½	65	F05	46	70	53	70	220	35	121	171	120	145	140	65	10,0	3	40	4xM16	4x⅝"-11	3,60
3	80	F05	46	82	67	79	244	35	133	183	127	160	152	65	10,0	3	40	8xM16	4x⅝"-11	4,00
4	100	F07	52	106	93	95	275	35	162	214	159	180	190	90	13,0	3	50	8xM16	8x⅝"-11	6,10
5	125	F07	56	128	115	108	303	35	192	248	187	210	216	90	13,0	3	50	8xM16	8x¾"-10	8,60
6	150	F10	56	157	147	121	336	40	218	290	216	240	241	125	17,0	3	56	8xM20	8x¾"-10	11,20
8	200	F10	60	197	188	150	395	40	273	350	270	295	298	125	17,0	3	56	8xM20	8x¾"-10	16,40
10	250	F12	68	246	236	179	459	50	328	405	324	350	362	150	22,0	3	60	12xM20	12x⅞"-9	27,20
12	300	F12	78	295	284	216	536	50	378	455	375	400	432	150	22,0	3	70	12xM20	12x⅞"-9	36,10
14	350	F14	92	335	322	265	640	60	438	550	413	460	476	175	44,4	4	70	16xM20	12x 1"- 8	71,50
16	400	F14	102	387	374	305	725	60	489	570	470	515	540	175	44,4	4	70	16xM24	16x 1"- 8	89,20
18	450	F16	114	430	415	320	780	80	539	670	533	565	578	210	44,4	4	70	20xM24	16x1⅛"- 7	125,40
20	500	F16	127	484	467	355	865	80	594	690	584	620	635	210	44,4	4	70	20xM24	20x1⅛"- 7	157,30
24	600	F25	154	578	558	415	990	90	695	820	692	725	749	300	63,5	5	76	20xM27	20x1¼"- 7	256,20

8	200	**for PN 16 > DN 150**	295			12xM20		
10	250		355			12xM24		
12	300		410			12xM24		

Dimensions

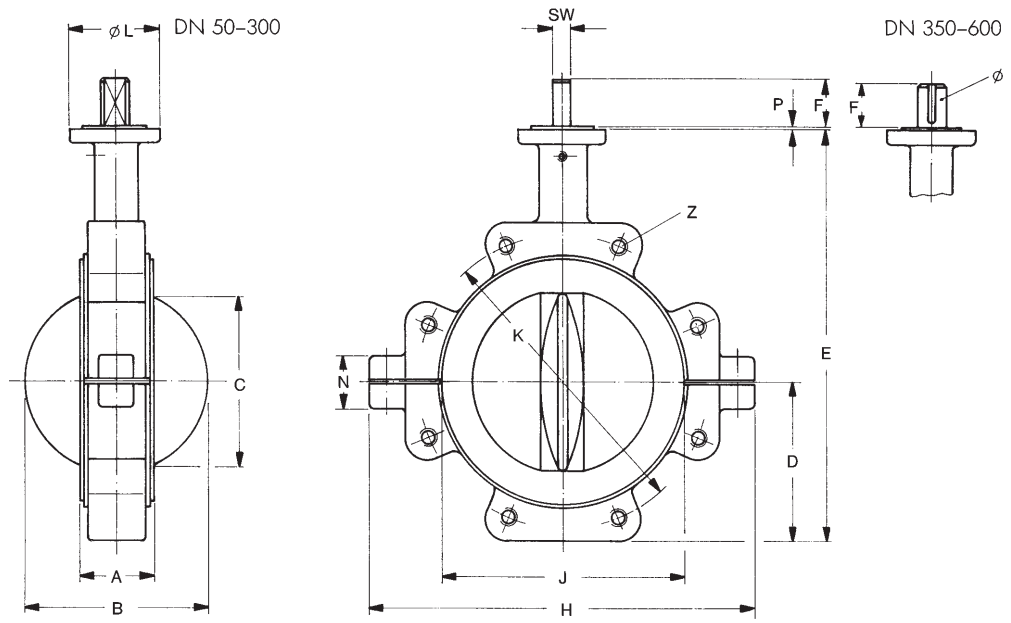
Garlock Butterfly Valve – Lug Design

Flange Connection: EN 1092 (DIN 2501), PN 10 • PN 16 (DN 50 - DN 300) • ANSI B 16.5, 150 LBS

Overall Lenght: EN 558-1 GR20 (DIN 3202 T3 K1)

Adapter Flange: EN ISO 5211

2" to 24" • DN 50 to DN 600



DN Inch	DN mm	Adapter Flange	A	B	C	D	E	F	H	J	K DIN PN 10	K ANSI	L	SW ø	P	N	Z DIN PN 10	Z ANSI UNC	Weight kg
2	50	F05	43	60	43	62	202	35	170	98	125	121	65	10,0	3	45	4xM16	4x⅝"-11	3,40
2 ½	65	F05	46	70	53	70	220	35	193	120	145	140	65	10,0	3	45	4xM16	4x⅝"-11	4,30
3	80	F05	46	82	67	79	244	35	252	127	160	152	65	10,0	3	56	8xM16	4x⅝"-11	6,50
4	100	F07	52	106	93	95	275	35	290	159	180	190	90	13,0	3	56	8xM16	8x⅝"-11	10,20
5	125	F07	56	128	115	108	303	35	312	187	210	216	90	13,0	3	60	8xM16	8x¾"-10	12,60
6	150	F10	56	157	147	121	336	40	362	216	240	241	125	17,0	3	66	8xM20	8x¾"-10	16,10
8	200	F10	60	197	188	150	395	40	416	270	295	298	125	17,0	3	76	8xM20	8x¾"-10	22,40
10	250	F12	68	246	236	179	459	50	508	324	350	362	150	22,0	3	90	12xM20	12x⅞"- 9	36,90
12	300	F12	78	295	284	216	536	50	575	375	400	432	150	22,0	3	110	12xM20	12x⅞"- 9	52,50
14	350	F14	92	335	322	265	640	60	640	413	460	476	175	44,4	4	70	16xM20	12x 1"- 8	102,50
16	400	F14	102	387	374	305	725	60	720	470	515	540	175	44,4	4	70	16xM24	16x 1"- 8	131,70
18	450	F16	114	430	415	320	780	80	750	533	565	578	210	44,4	4	70	20xM24	16x1⅛"- 7	153,90
20	500	F16	127	484	467	355	865	80	830	584	620	635	210	44,4	4	70	20xM24	20x1⅛"- 7	247,80
24	600	F25	154	578	558	415	990	90	960	692	725	749	300	63,5	5	76	20xM27	20x1¼"- 7	385,70

8	200	**for PN 16 > DN 150**	295			12xM20		
10	250		355			12xM24		
12	300		410			12xM24		

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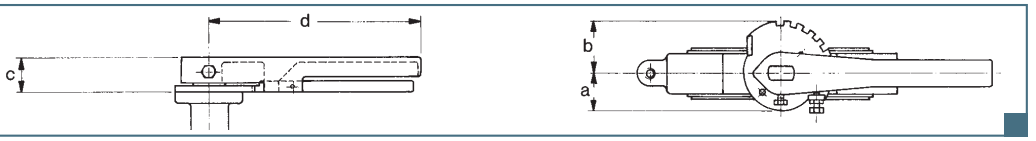
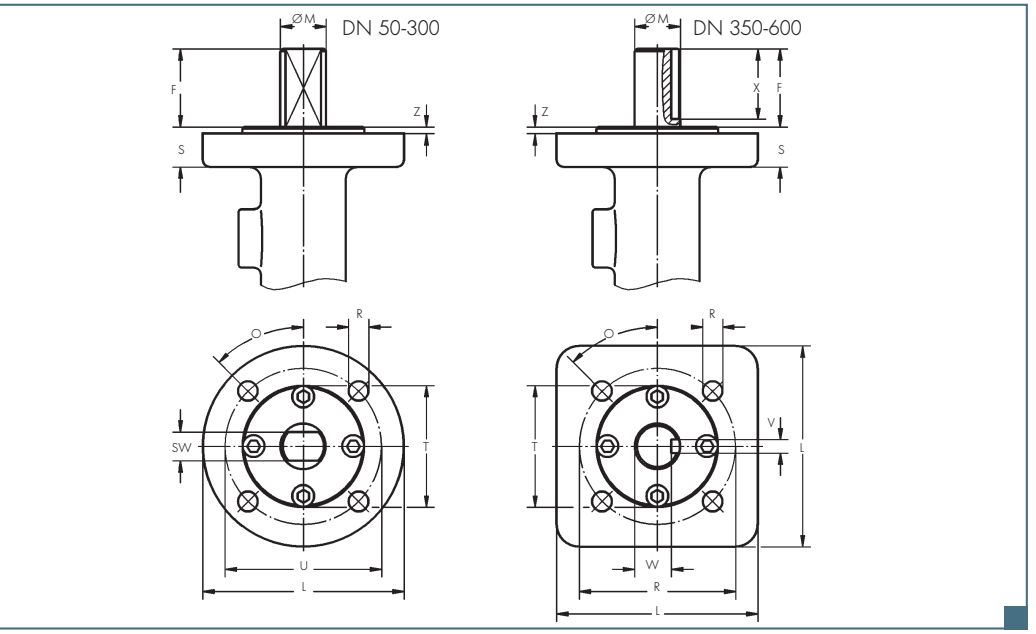
Mounting Dimensions – Hand lever

Garlock Butterfly Valve L & W Design



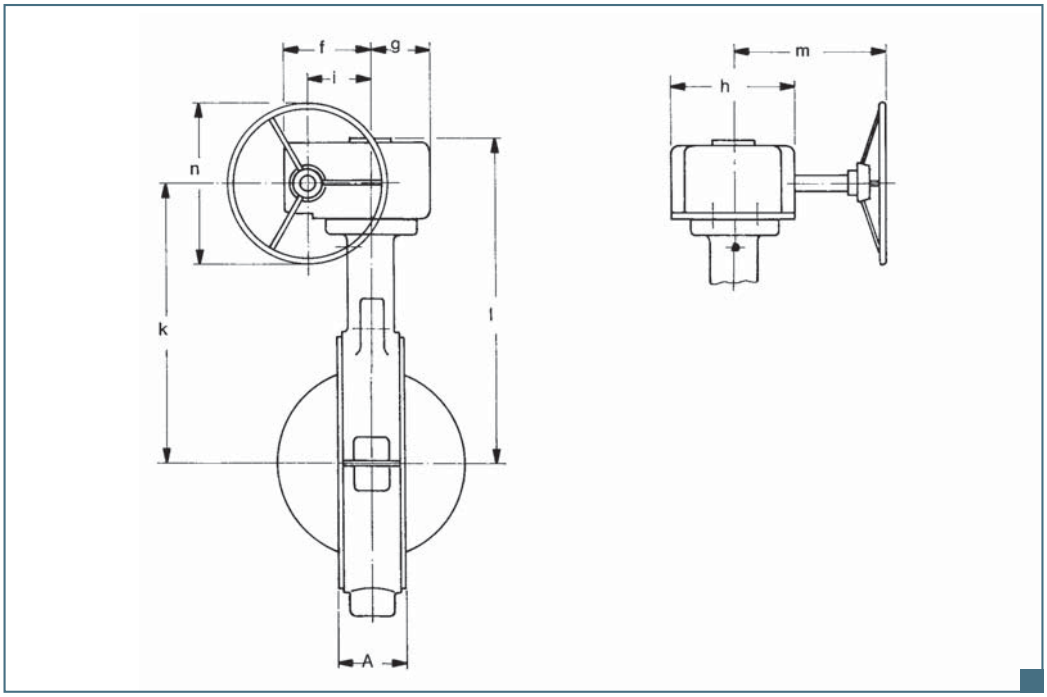
DN						Weigth
Inch	mm	a	b	c	d	kg
2 / 2 1/2 / 3	50 / 65 / 80	32,5	45	38	210	1
4 / 5	100 / 125	45	57	38	300	1,5
6 / 8	150 / 200	80	80	43	500	3,5



DN		Adapter Flange	F	SW	L	Ø M	O	n x R	S	U	T	Z	V	W	X
Inch	mm	EN ISO 5211													
2 / 2 1/2 / 3	50 / 65 / 80	F05	35	10	65	14,2	45°	4 x 7	15	50	35	3			
4 / 5	100 / 125	F07	35	13	90	20,5	45°	4 x 9	18	70	55	3			
6 / 8	150 / 200	F10	40	17	125	25,3	45°	4 x 11	18	102	70	3			
10 / 12	250 / 300	F12	50	22	150	32,4	45°	4 x 13	21	125	85	3			
14 / 16	350 / 400	F14	60		175	44,4	45°	4 x 17	34	140	100	4	9,5	39	55
18 / 20	450 / 500	F16	80		210	44,4	45°	4 x 22	44	165	130	4	9,5	39	55
24	200	F25	90		300	63,5	22,5°	8 x 17	60	254	200	5	16,0	54	70

Mounting Dimensions – Worm gear

Garlock Butterfly Valve L & W Design



DN										Gross weight (kg)	
Inch	mm	f	g	h	i	k	l	m	n	Type W	Type L
2	50	79	41	127	49,6	169,0	206	136	125	6,60	7,40
2 ½	65	79	41	127	49,6	179,0	216	136	125	7,60	8,30
3	80	79	41	127	49,6	194,0	231	136	125	8,00	10,50
4	100	79	41	127	49,6	209,0	246	136	125	10,10	14,20
5	125	79	41	127	49,6	224,0	261	136	125	12,60	16,60
6	150	92	47	130	60,0	247,0	287	170	250	18,00	22,90
8	200	92	47	130	60,0	277,0	317	170	250	23,20	29,20
10	250	111	76	155	66,7	321,0	369	207	300	38,20	47,90
12	300	111	76	155	66,7	361,0	409	207	300	47,10	63,50
14	350	136	73	178	85,7	419,5	469	260	460	89,00	120,00
16	400	136	73	178	85,7	464,5	514	260	460	106,70	149,20
18	450	168	89	229	111,0	507,0	562	260	460	152,40	180,90
20	500	168	89	229	111,0	557,0	612	260	460	184,30	274,80
24	600	195	111	286	138,0	629,0	691	368	610	289,20	427,70

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Technical Data

Torques, Flow Rate

Torques

For selecting the the correct the valve actuation the enclosed values represent the maximum torques for the opening and closing action.

Flow Rate

For liquids following references apply:
Constant Control: 4,5 m/s
Open/Close Control: 7,5 m/s

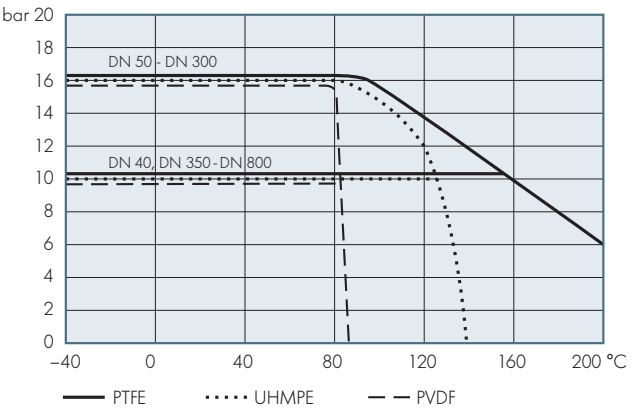
Für GAR-SEAL Butterfly Valves with UHMPE*1-Lining the maximum flow rate is limited to 3,5 m/s.

Lining		PTFE	UHMPE*1	PTFE Vacuum*2	PVDF
DN		Torque	Torque	Torque	Torque
Inch	mm	Nm	Nm	Nm	Nm
2	50	35	42	35	42
2 1/2	65	45	54	45	54
3	80	48	58	48	58
4	100	69	83	83	83
5	125	92	111	111	111
6	150	138	166	166	166
8	200	190	228	230	228
10	250	320	284	390	284
12	300	450	540	540	540
14	350	690	830	900	830
16	400	1040	1250	1360	1250
18	450	1390	1390	1810	1390
20	500	1620	1945	2110	1945
24	600	3460	4150	4500	4150

*1 Ultrahighmolecular Polyethylene
*2 Standard-Vacuum:
5 mm Vacuumlining up to DN 300
7 mm Vacuumlining from DN 350 to DN 600

All stated values reflect "net" torques.
For the actuator design a safety factor of 10 - 15 % should be taken into consideration.

P x T Diagram GAR-SEAL Butterfly Valve

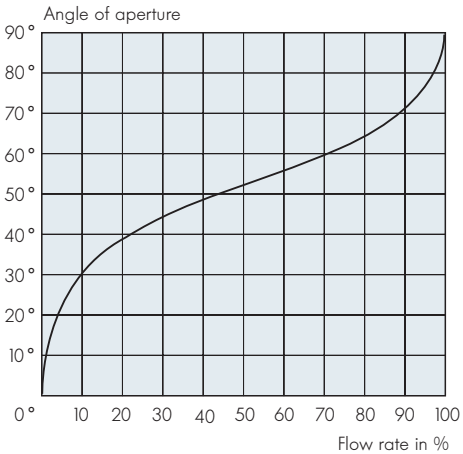


Technical Data

Control Characteristics
k_V-Values

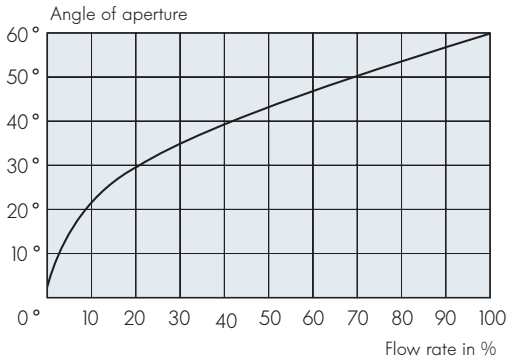
Open/Close Control – Characteristic Curve

The graph shows the percentage flow rate, depending upon the disc-aperture. The curve reflects a throttle valve of any size with slight mods depending upon thickness and profile of the disc itself.
Throttle valves with apertures above 60 ° should be used for on/off control only.



Continuous Control / Characteristic Curve

For continuous control of a throttle valve the flow rate for a 60 ° aperture is defined with 100 % to provide a flow reserve. The graph has a characteristic of similar percentage for disc opening from 0 ° to 60 °.



Nominal bore		k_V-factor against the angle of aperture							
Inch	**mm**	**20°**	**30°**	**40°**	**50°**	**60°**	**70°**	**80°**	**90°**
2	50	1	13	25	37	54	69	81	84
2 ½	65	2	16	34	52	82	112	130	132
3	80	2	16	38	80	133	191	243	244
4	100	9	43	87	144	228	316	399	420
5	125	16	61	122	210	262	497	670	710
6	150	22	113	215	364	547	822	972	997
8	200	35	165	332	555	874	1215	1534	1613
10	250	65	301	608	1015	1599	2221	2805	2950
12	300	96	446	900	1504	2369	3291	4157	4371
14	350	136	632	1277	2133	3360	4669	5896	6200
16	400	194	898	1813	3027	4770	6626	8369	8800
18	450	237	1097	2215	3698	5827	8095	10223	10750
20	500	297	1377	2781	4644	7317	10166	12839	13500
24	600	420	1948	3935	6570	10352	14382	18164	19100

k_V-values against the angle of aperture

The k_V-factor reflects the flow of water (density ∂ 1000 kg/m³) in m/h for a pressure gradient of $\Delta p = 1$ bar.
The resistance characteristic of the butterfly valve is subject to the k_V-factor. It replaces all earlier definitions, s.a. cross-section, flow and friction coefficient.
A detailed butterfly valve dimensioning for maximum flow and/or for throttle use is performed by CONVAL software programming.
Please consult Garlock direct.

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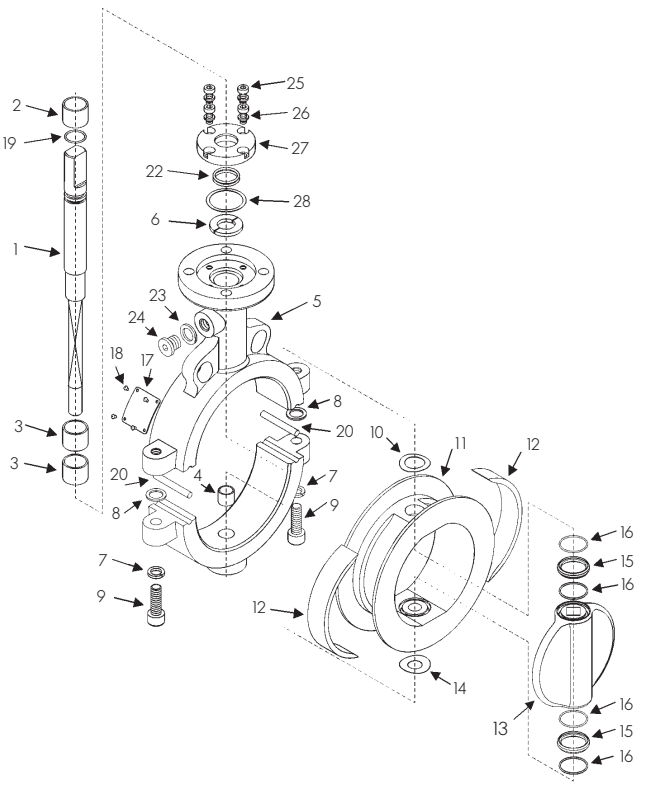
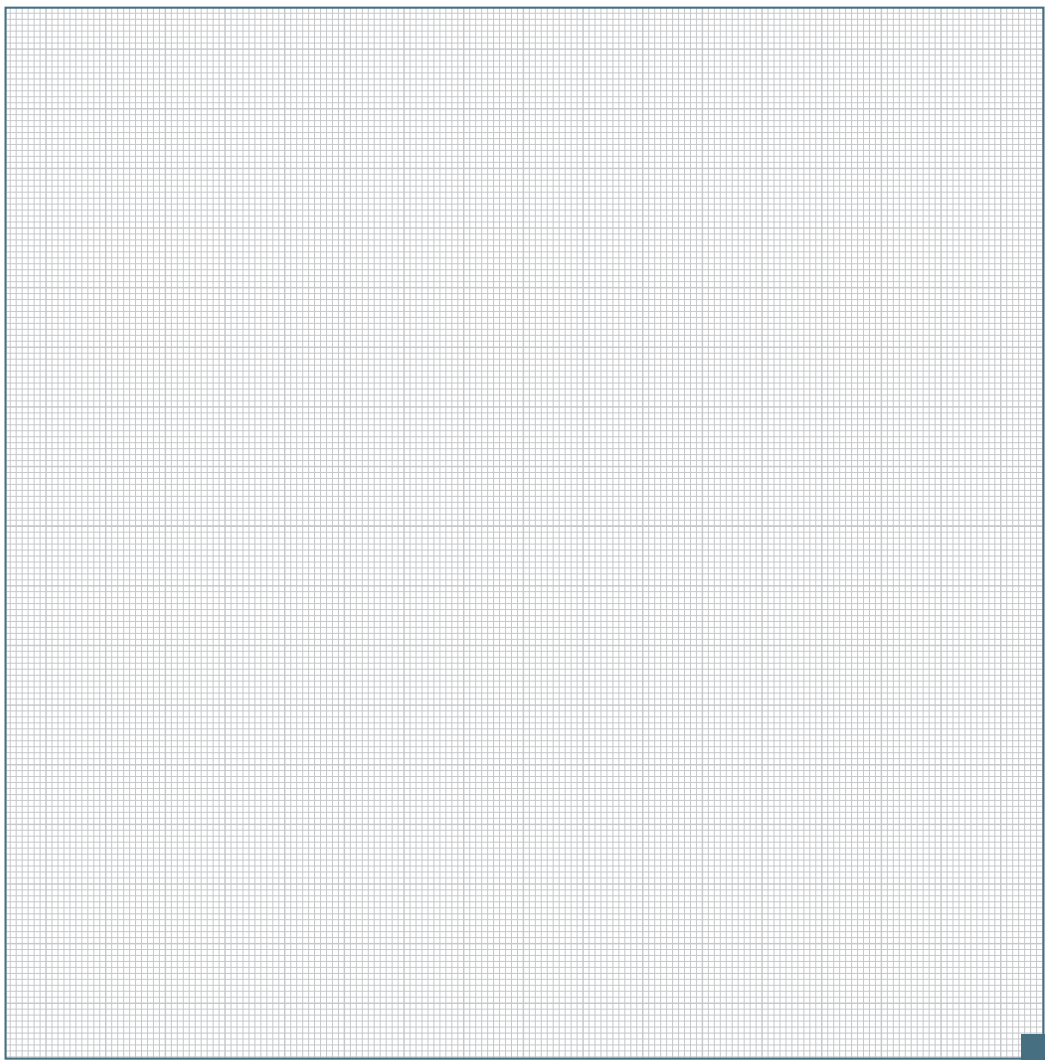
Explosion View GAR-SEAL Butterfly Valve



Pos.	Designation	Pos.	Designation	Pos.	Designation	Pos.	Designation
1	Shaft	8	Washer	15	Sealring	22	O-Ring
2	Top Bush Bearing	9	Bolt	16	O-Ring	23	Gasket*
3	Intermediate Bush Bearings	10	Gasket	17	Nameplate	24	Plug
4	Bottom Bush Bearing	11	Liner	18	Groove pin	25	Bolt
5	Body (split)	12	Back-up Elastomer	19	O-Ring	26	Spring Washer
6	Retaining Ring	13	Disc	20	Sealing Element	27	Support Ring
7	Spring Washer	14	Gasket			28	Sealing Element

* Special design

Notes



Product Range

Hydraulic Components

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Gasketing Products

Metallic Gasketing

Resiliant Metal Seals

Assemblies

Compression Packings

Graphite Seals

Inflatable Seals

Mechanical Seals

Valves

Service

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