

**BUTTERFLY VALVE
WAFER TYPE
of carbon steel
31100 (31000 - 31200) series**





Operation

Edition 21-09-2009

Wafer type butterfly valve 31100 (31000 – 31200) series is used in industrial pipelines for demanding on-off and regulating tasks as well as in district heating, district cooling and power production. It is tight to both directions of flow.

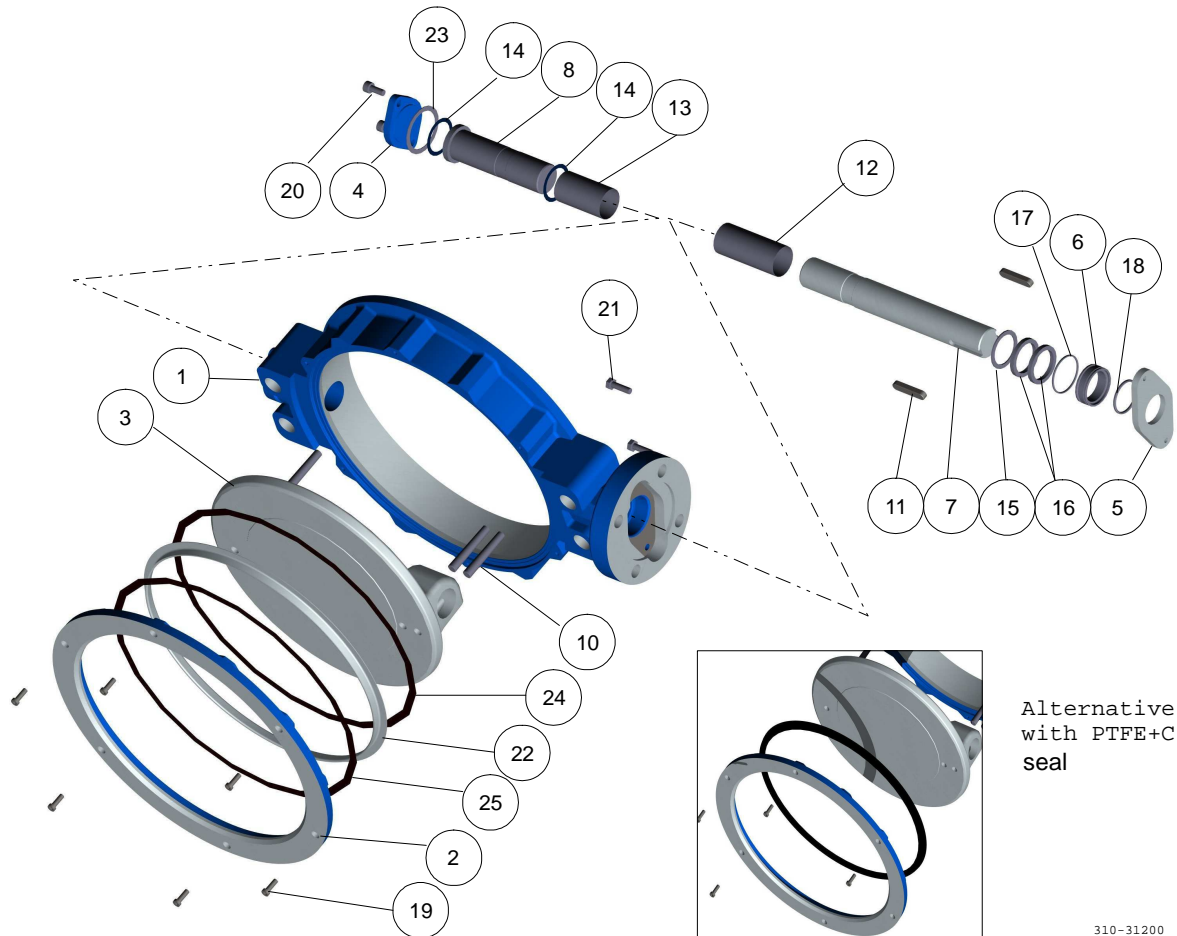
The body material is cast carbon steel. Double eccentric disc and shaft are stainless steel. The shaft packing box is a combination of graphite rings and O-rings which are possible to tighten while in pipeline and are also replaceable.

Nominal dimensions:	DN 80 - 800	
Nominal pressure	PN25bar	
Disk seal alternatives	Stainless steel (CS)	PTFE+C (TS)
Closing pressure (ΔP)	DN 80–350 – 20 bar	DN 80–350 – 25 bar
	DN 400–800 – 16 bar	DN 400–600 – 16 bar
* Tightness class ISO 5208, EN 12266-1	RATE B	RATE A
** Working temperature of liquid media (version for steam also available)	+260°C -40°C	+180°C -40°C
Face-to-face length according to ISO 5752	EN 558-1 Series 20 DIN3202 K1 or EN 558-1 Series 25 DIN3202 K2 or EN 558-1 Series 16 DIN3202 K3	
*** Connection	Between neck-type flanges: EN1092-1 Type 11, Facing Type B, PN25, PN16, PN10, ANSI CLASS 150. Size of assembly gasket in accordance to SFS 4378, DIN 2690.	
Safety	Conform to the requirements of the Council Directive 97/23/EC on Pressure Equipment, marking: Class: gas, group 1.   Explosion-proof design is available as per special order. Marking in accordance to ATEX Directive 94/9/EC: group II 2 GD, protection concept of non-electrical components: c T6.	

*) Option with Rate A for stainless steel seat is available.

**) Wider temperature range is available.

***) For the valves DN400 and higher the design pressure (PN10,PN16,PN25)of flanges on the pipeline must be specified in order. Consult factory for details.

**Exploded view****Parts list and standard materials**

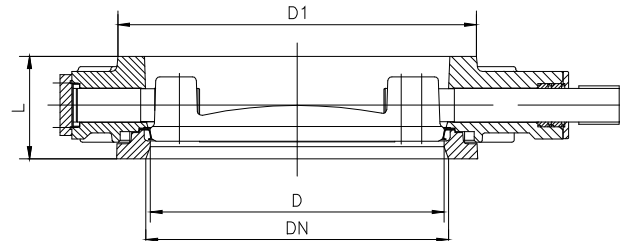
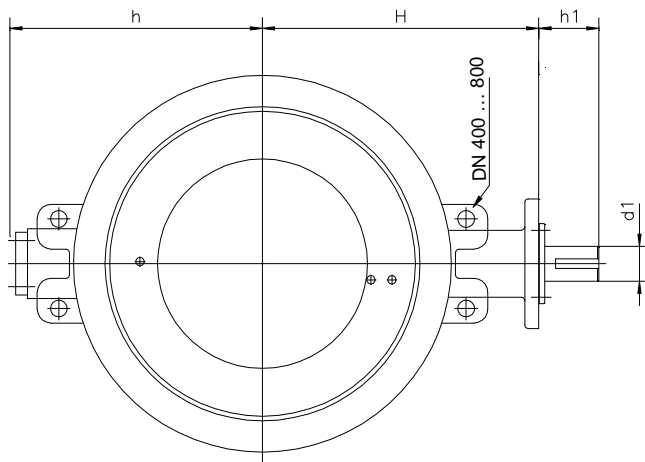
Part	Material		
1	Body	Cast carbon steel GP240GH/ WCB	
2	Counter flange	Carbon steel P265GH	
3	Disk	Stainless steel EN10213-4 1.4408, ASTM A351 CF8M	
4	Subshaft cover	Carbon steel	
5	Gland	Stainless steel 1.4436	
6	Shaft seal bushing	Stainless steel	
7	Main shaft	Stainless steel EN10088-3 1.4460	
8	Subshaft	Stainless steel EN10088-3 1.4460	
10	Conical pins	Stainless steel 1.4462	
11	Key	Carbon steel	
12	Stem bearing	PTFE on stainless steel net	
13	Subshaft bearing	PTFE on stainless steel net	
14	Bearing plate	PTFE on stainless steel net	
15	Back-up-ring	Stainless steel	
16	Box packing	Graphite	
17,18	O-ring	FPM	Absent in version for steam
19	Socket screw	Stainless steel ISO 3506 A4-80	
20	Socket screw	Stainless steel ISO 3506 A4-80	
21	Hexagonal screw	Stainless steel ISO 3506 A4-80	
22	Seat ring	Hard chrome plated stainless steel AISI 316, AISI 904L or PTFE+C	
23	Bottom cover gasket	Carbon Fibre SFS5811	Graphite for steam version
24, 25	Shim	Carbon Fibre SFS5811	Graphite for steam version

**BLUE LINE****BUTTERFLY VALVE**
wafer type

Valves

31100 (31000 – 31200) series

21-09-2009

Dimensions

DN	L			D1	D	h	H	h1	d1	Flange ISO5211	Weight, kg			
	31000	31100	31200								31100 Bare shaft	31000	31100	31200
80	49	46	64	138	72	114	144	45	15	F07	6.5	6.5	6.5	6.5
100	56	52	64	158	89	131	168	52	20	F07	8	7	8	7
125	64	56	70	188	113	143	179	52	20	F07	9.8	8.7	9.8	8.7
150	70	56	76	212	137	160	199	58	25	F10	14.9	13	14.9	13
200	71	60	89	268	187	200	224	58	25	F12	25	29*)	29*)	29*)
250	76	68	114	320	238	232	269	63	30	F12	30	38*)	38*)	38*)
300	83	78	114	370	286	275	308	69	35	F14	40.5	54*)	54*)	54*)
350	92	78	127	430	337	303	335	69	35	F14	52	67*)	67*)	67*)
400	–	102	140	482	386	333	380	86	50	F16	86.5	–	118*)	118*)
450	–	114	–	530	437	358	408	86	50	F16	117	–	149*)	–
500	–	127	152	585	483	388	458	103	60	F16	160	–	198*)	198*)
600	–	154	178	685	582	448	530	119	70	F25	280	–	337*)	337*)
700	–	165	229	785	682	498	602	119	70	F30	318	–	375*)	375*)
800	–	190	241	885	775	566	650	125	90	F30	454	–	511*)	515*)

*) with manual gear

Actuating

According to customer's needs the butterfly valve is delivered with:

- bare shaft (not recommended),
- manual gear,
- electric actuator,
- pneumatic or hydraulic actuator.

Operation torque

		DN	80	100	125	150	200	250	300	350	400	450	500	600	700	800
Torque*, Nm	CS		90	130	180	240	400	700	1'100	1'600	2'200	3'000	4'200	6'800	10'000	13'000
	TS		70	100	140	190	320	550	850	1'300	1'800	2'400	3'400	5'500	–	–

*) the operation torque for steam is the same as for liquid but one size bigger.



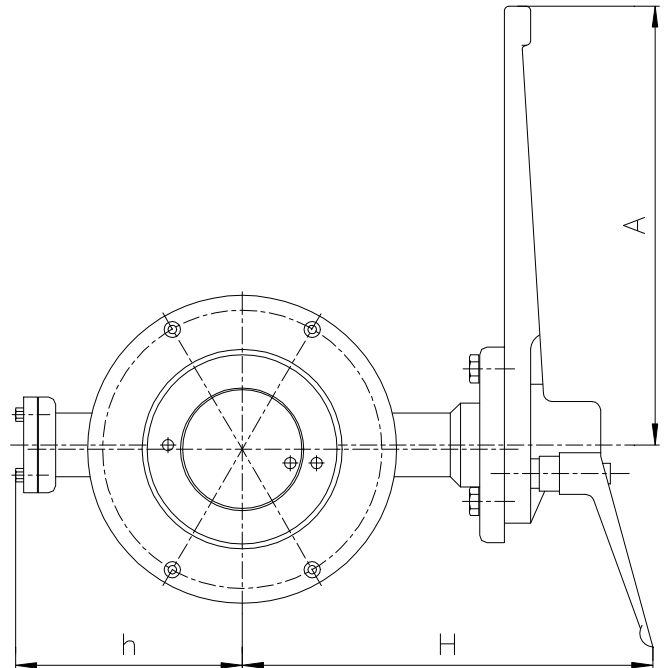
Handlever

The smaller sizes, DN 80 -150 can be operated with handlever.

The opening and closing of valves is stepless.

The valve is open when the handlever is parallel to the pipe.

DN	h	H	A
80	114	223	300
100	131	246	300
125	143	260	300
150	160	289	420

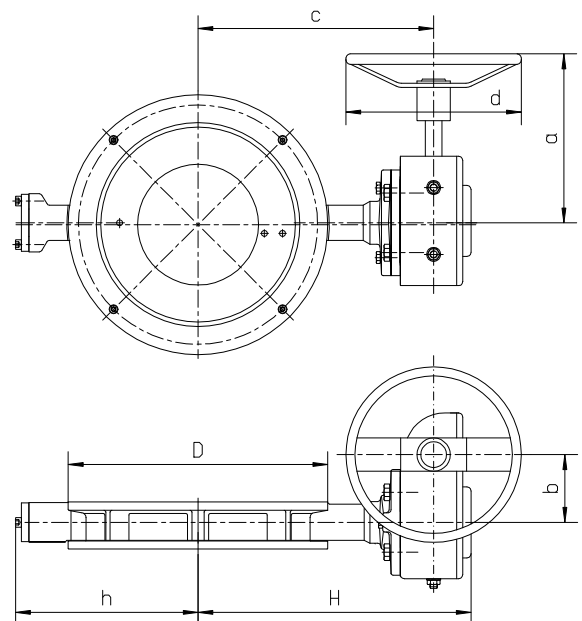


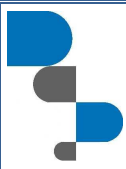
Manual gear

Opening and closing of the valves from the handwheel.

The position of disc can be seen on a position indicator on top of the gear.

DN	D	h	H	a	b	c	d
80	138	114	204	218	45	171	200
100	158	131	228	218	45	195	200
125	188	143	239	218	45	206	200
150	212	160	286	220	71	240	200
200	268	200	311	220	71	265	200
250	320	232	356	255	71	310	300
300	370	275	398	291	86	350	400
350	430	303	425	291	86	377	400
400	482	333	501	387	130	435	500
450	530	358	536	387	130	463	500
500	585	388	579	387	130	513	500
600	685	448	689	500	263	589	500
700	785	498	761	500	263	661	500
800	885	565	819	579	431	714	700





BLUE LINE

BUTTERFLY VALVE wafer type

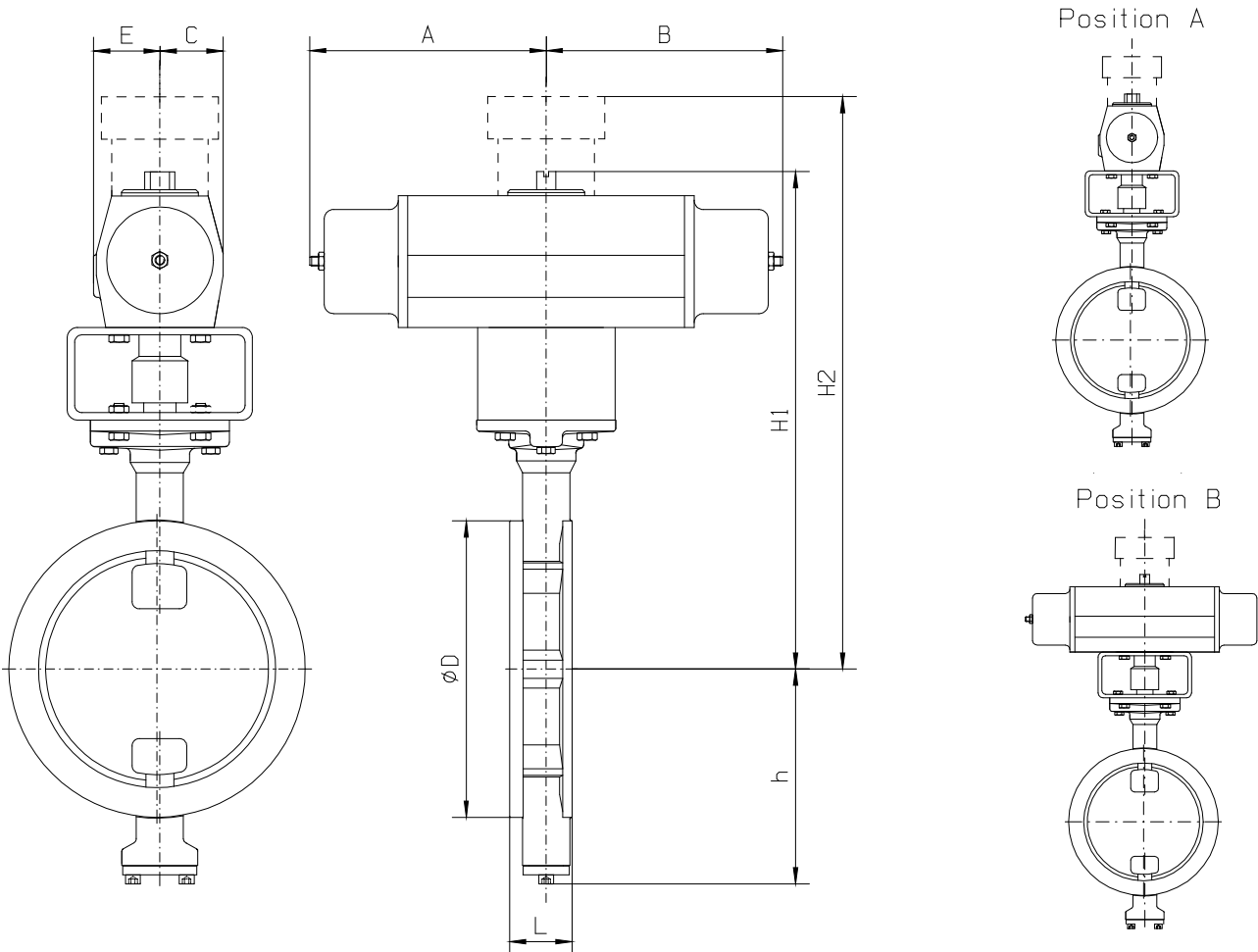
HÖGFORS
Valves

31100 (31000 – 31200) series

21-09-2009

Pneumatic actuator.

Högfors valve can be equipped with pneumatic actuator of any known brand. In the picture below presented the common combination of valve with Remote Control spring return actuator.



DN	RC model*	ØD	L			E	C	h	H1	A	B
			31000	31100	31200						
80	RC250-SR	138	49	46	64	75	69	114	389	90	285
100	RC260-SR	158	56	52	64	75	69	131	413	285	285
125	RC260-SR	188	64	56	70	75	69	143	424	285	285
150	RC260-SR	212	70	56	76	75	69	160	474	285	285
200	RC270-SR	268	71	60	89	110	110	200	612	145	510
250	RC280-SR	320	76	68	114	110	110	232	647	510	510
300	RC88-SR	370	83	78	114	110	110	276	901	510	510
350	RC88-SR	430	92	78	127	110	110	303	975	510	510
400**	RC88-SR	482	–	102	140	110	110	333	1045	510	510
450**	RCG100	530	–	114	–	190	190	358	1038	850	850
500**	RCG100	585	–	127	152	190	190	388	1088	850	850

* ΔP = 25 bar, at air pressure 6 bar

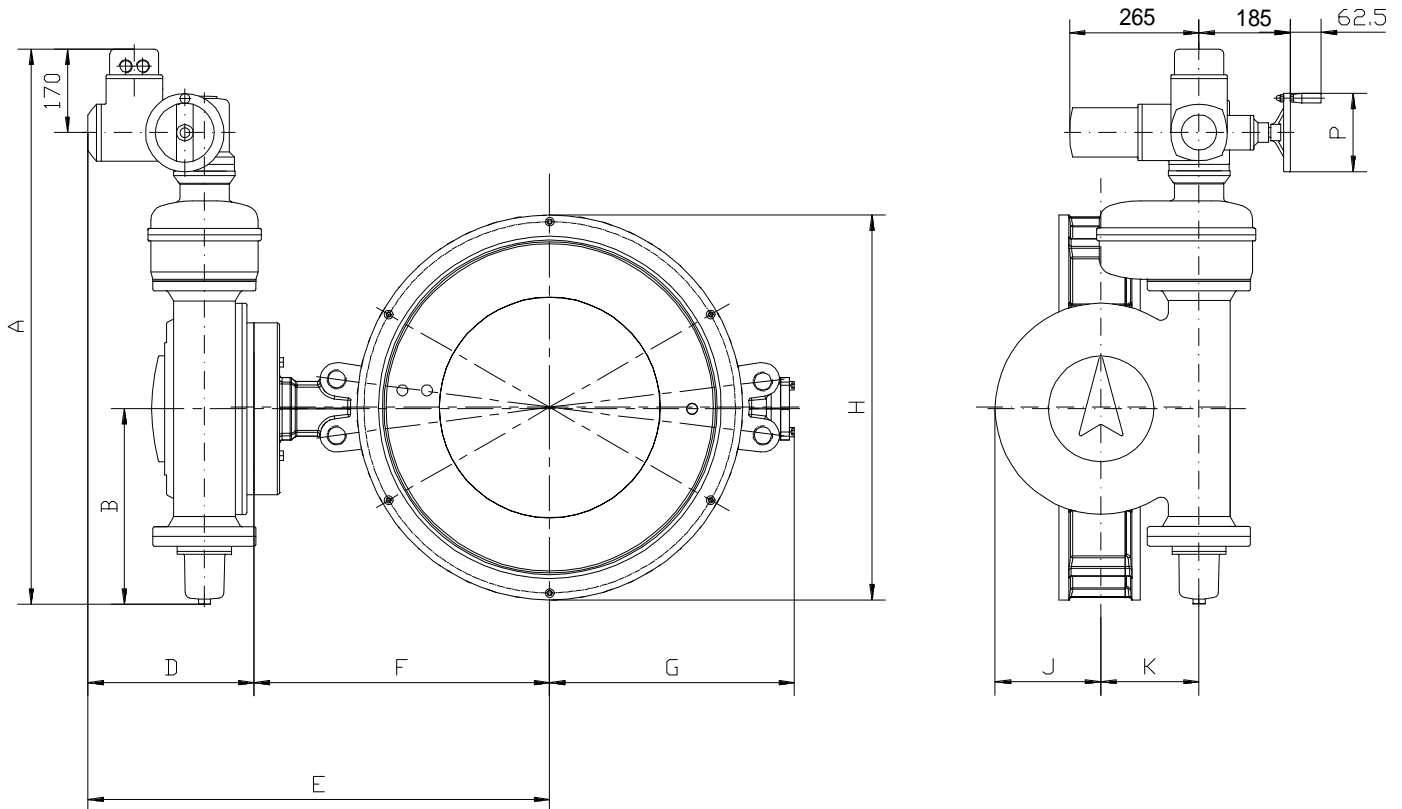
** ΔP max = 16 bar



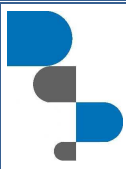
Electrical actuator.

Högfors valve can be equipped with the electrical actuator of any known brand.

The typical solution is 311 series valve with AUMA Norm actuator.



DN	AUMA type	A	B	D	E	F	G	H	J	K	P
80	SA07.1-GS50.3 – F07	444	96	269	413	144	114	138	52	40	140
100	SA07.1-GS50.3 – F07	444	96	269	437	168	131	158	52	40	140
125	SA07.1-GS50.3 – F07	444	96	269	448	179	143	188	52	40	140
150	SA07.1-GS50.3 – F10	444	96	277	476	199	160	212	63	50	140
200	SA07.5-GS63.3 – F12	500	127	282	506	224	200	268	75	63	160
250	SA07.5-GS80.3 – F12	510	132	284	553	269	232	320	88	80	160
300	SA07.5-GS100.3/VZ4.3 – F14	689	182	312	620	308	275	370	105	100	160
350	SA07.5-GS100.3/VZ4.3 – F14	689	182	312	647	335	303	430	105	100	160
400	SA07.5-GS100.3/VZ4.3 – F16	689	182	312	692	380	333	482	105	100	160
450	SA10.1-GS125.3/VZ4.3 – F16	700	187	322	730	408	358	530	125	125	200
500	SA10.1-GS125.3/VZ4.3 – F16	700	187	322	780	458	388	585	125	125	200
600	SA07.5-GS160.3/GZ160.3 – F25	990	337	313	843	530	448	685	173	160	160
700	SA07.5-GS200.3/GZ200.3 – F30	1131	398	338	940	602	498	785	215	200	160
800	SA07.5-GS200.3/GZ200.3 – F30	1131	398	338	988	650	566	885	215	200	160



BLUE LINE

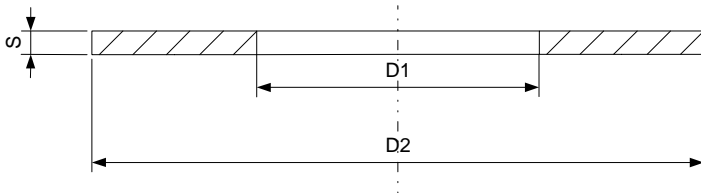
BUTTERFLY VALVE wafer type



31100 (31000 – 31200) series

21-09-2009

Mounting gasket.



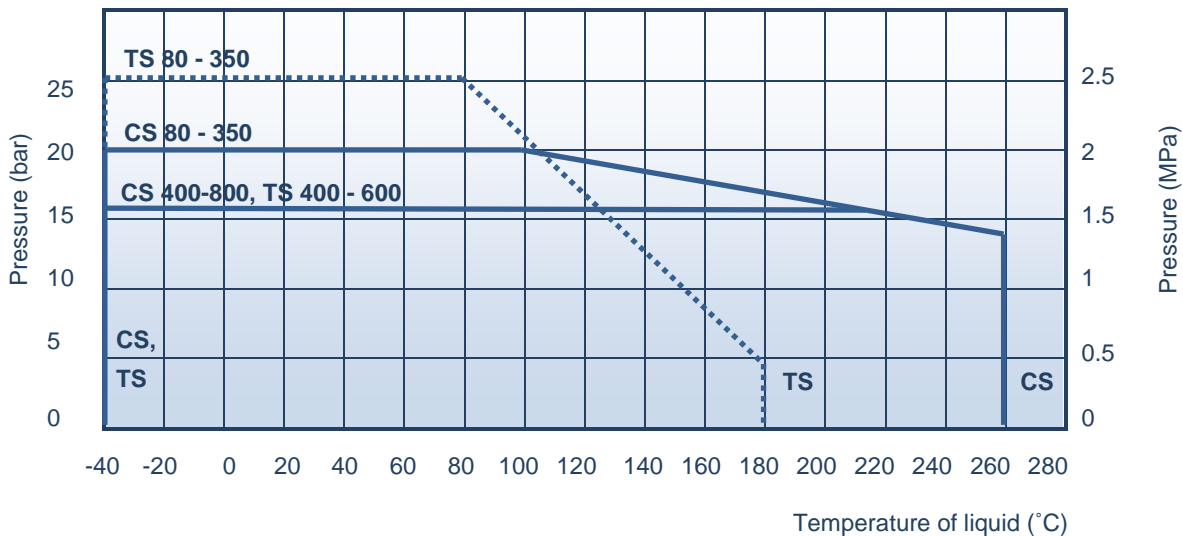
Gasket thickness "S" can be 0.5 – 3.0mm, 2.0mm is recommended.

DN		80	100	125	150	200	250	300	350	400	450	500	600	700	800
D1*(mm)		90	115	141	169	220	274	325	368	420	470	520	620	720	820
D2(mm)	PN10	142	162	192	218	273	328	378	438	490	540	595	695	810	915
	PN16	142	168	195	225	273	330	385	445	497	557	618	735	805	910
	PN25	142	168	195	225	285	342	402	458	515	565	625	730	830	940

D1* - maximum permissible size.

Pressure / Temperature Rating.

The max pressure difference depends on the working temperature of liquid media.



Product codes

	Face-to-face length according to ISO 5752					
	EN 558-1 Series 25 DIN3202 K2 DN 80 – 350		EN 558-1 Series 20 DIN3202 K1		EN 558-1 Series 16 DIN3202 K3	
Seat	PTFE+C	Stainless steel	PTFE+C	Stainless steel	PTFE+C	Stainless steel
handlever up to DN150	31002TS_ _	31000CS_ _	31102TS_ _	31100CS_ _	31202TS_ _	31200CS_ _
bare shaft	31002TS_ _ Z	31000CS_ _ Z	31102TS_ _ Z	31100CS_ _ Z	31202TS_ _ Z	31200CS_ _ Z
manual gear	31002TS_ _ M	31000CS_ _ M	31102TS_ _ M	31100CS_ _ M	31202TS_ _ M	31200CS_ _ M
For steam on special order. Code number: 31101CS_ _						



BLUE LINE

BUTTERFLY VALVE wafer type

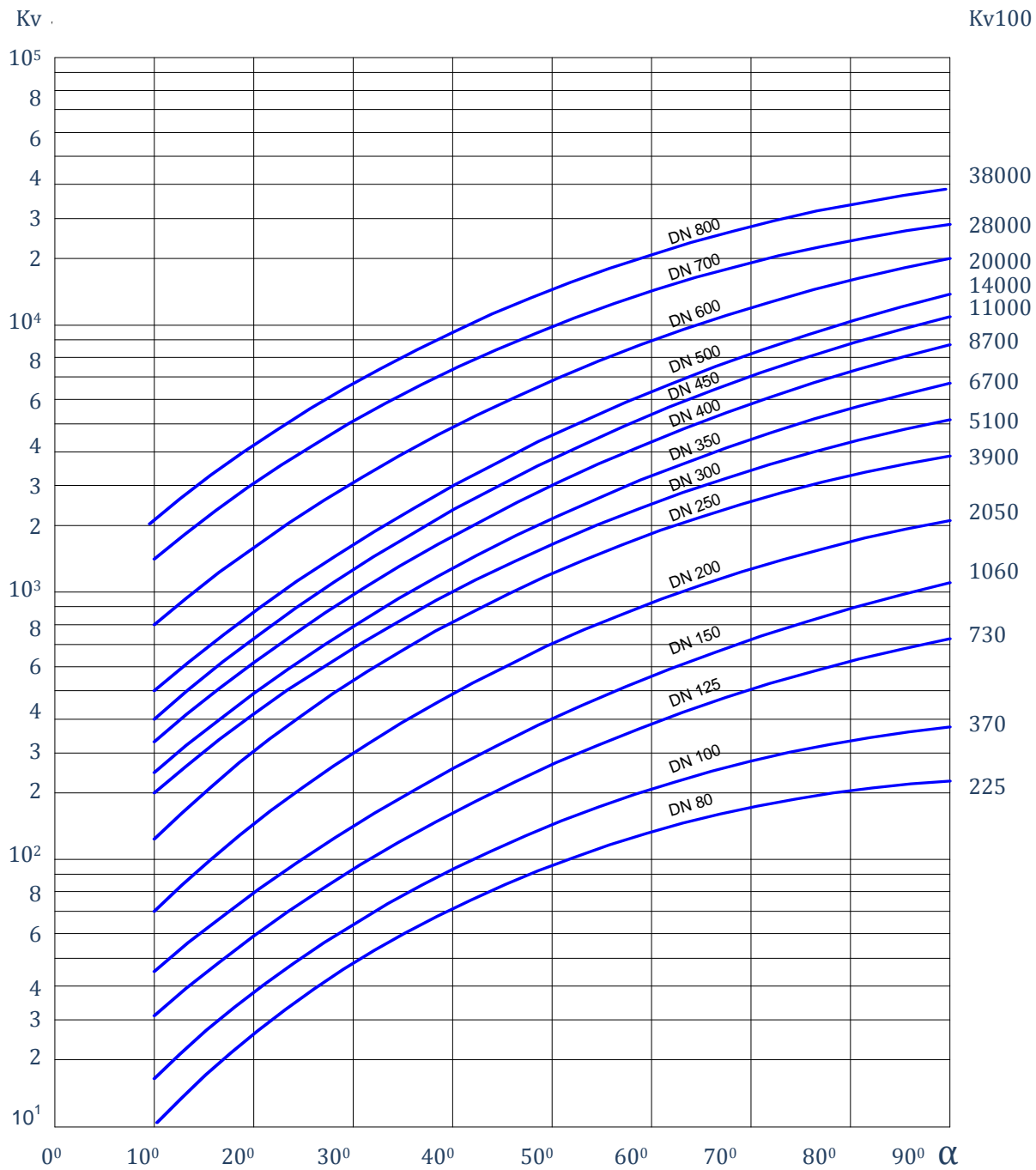


31100 (31000 – 31200) series

21-09-2009

The control curves

The curves indicate the regulating values of the valve at different opening angles.



WATER:

$$\text{Volume flow: } Q = K_V \sqrt{\frac{\Delta p}{\rho}}$$

$$\text{Flow velocity: } V = 354 \frac{Q}{DN^2}$$

K_V = KVvalue – Capacity factor

DN = nominal valve size (mm)

α – disc opening angle

Δp = pressure difference, bar

ρ – density of liquid kg/dm^3

V – flow velocity m/s

Q – volume flow m^3/h



BLUE LINE

BUTTERFLY VALVE wafer type



31100 (31000 – 31200) series

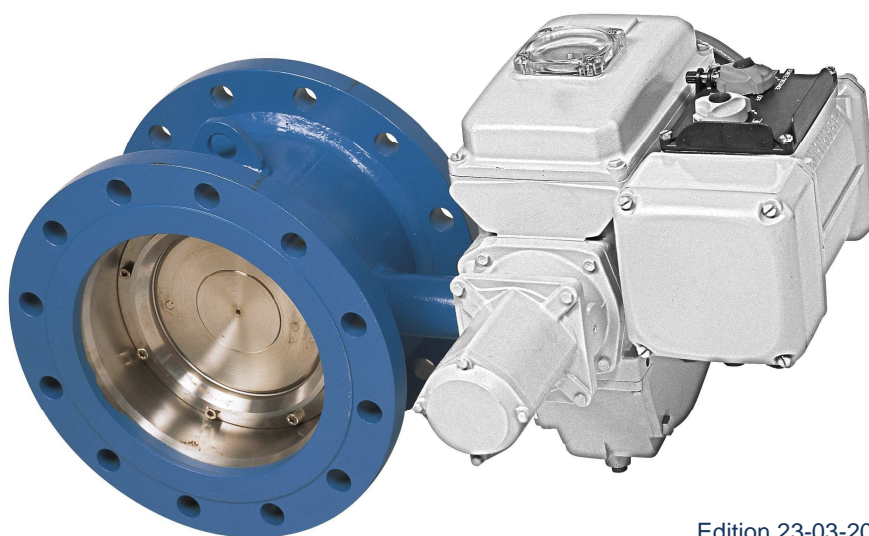
21-09-2009

How to order

		3	1	1	00	CS	800	M
Body material:	3 – Carbon steel, 4 – Stainless steel							
Valve type:	1 - butterfly valve,							
Connection:	0, 1, 2 - wafer type, 3 - welded end, 5 – flanged,							
Special options:	00 – standard, 01 - For steam, 02 - PTFE+C seat							
Main seal	(CS) - Stainless steel, (TS) - PTFE+C							
Size DN								
Actuator:	(_) - handlever, (Z) - bare shaft, (M) - manual gear							

BUTTERFLY VALVE of carbon steel with flanges **31500 series**

CONTROL




Edition 23-03-2010

Operation

The welded butterfly valve 31500 with flanges is used for example in district heating, district cooling and industry. It can be used as an on-off or control valve. Högfors butterfly valve is tight in both flow directions.

The body of the butterfly valve is of carbon steel. The double eccentric disc and shafts are made of stainless steel. Replaceable seat ring is hard chrome plated stainless steel. The shaft packing box is a combination of graphite rings and O-rings which are possible to tighten while in pipeline and are also replaceable.

Nominal dimensions:	DN 200 - 1200
Nominal pressure	PN 25bar
Disk seal	Stainless steel (CS)
Closing pressure (ΔP)	ΔP 16bar or 25bar
* Tightness class ISO 5208, EN 12266-1	RATE B
** Working temperature of liquid media (version for steam also available)	DN 200 – 1000 max+260°C/ min -40°C DN1200 max + 260°C/ min -20°C
Face-to-face length according to EN 558-1	series 14
Connection	between flanges: EN1092-1 Type B, PN 25, PN 16 and PN 10 ANSI CLASS 150
Safety	Conform to the requirements of the Council Directive 97/23/EC on Pressure Equipment, marking: Class: gas, group 1.  0575

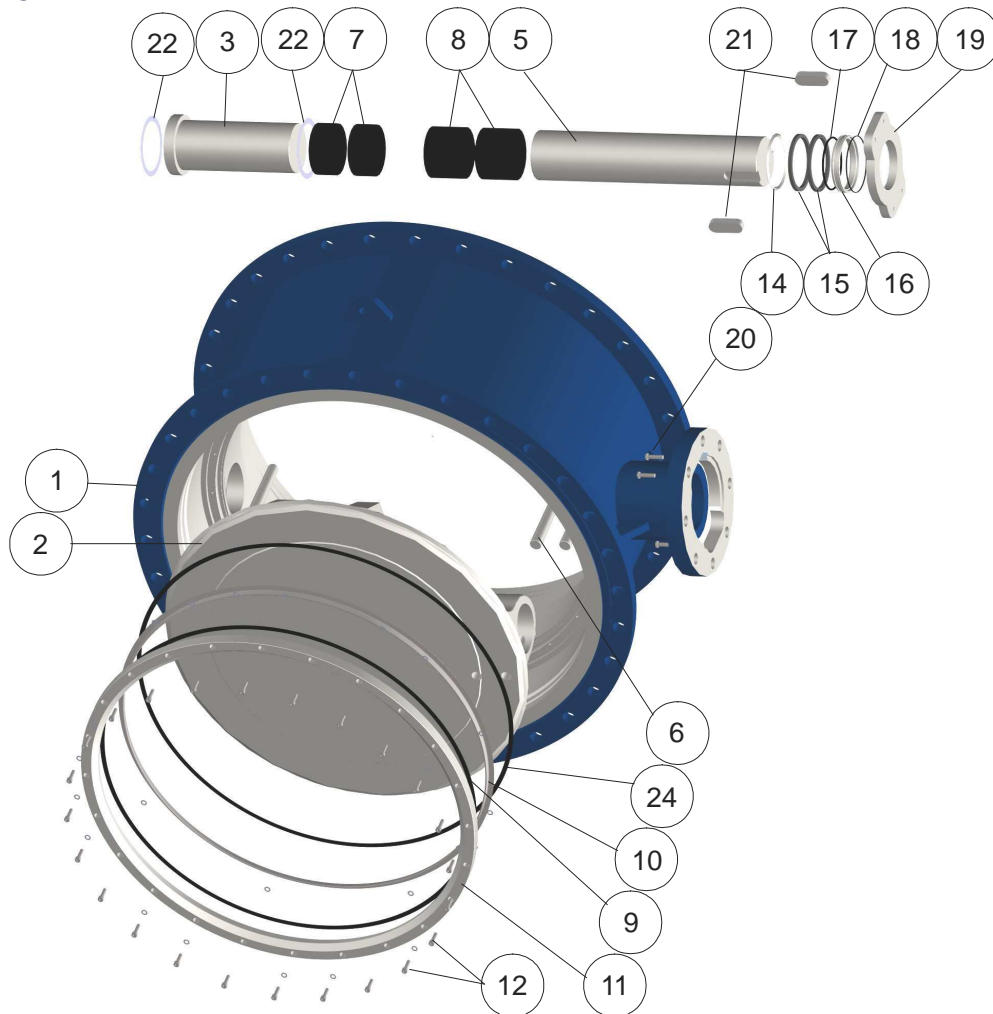
*) Option with Rate A is available also.

**) Wider temperature range is available.

Consult factory for details.

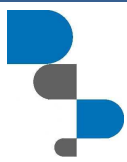


Exploded view

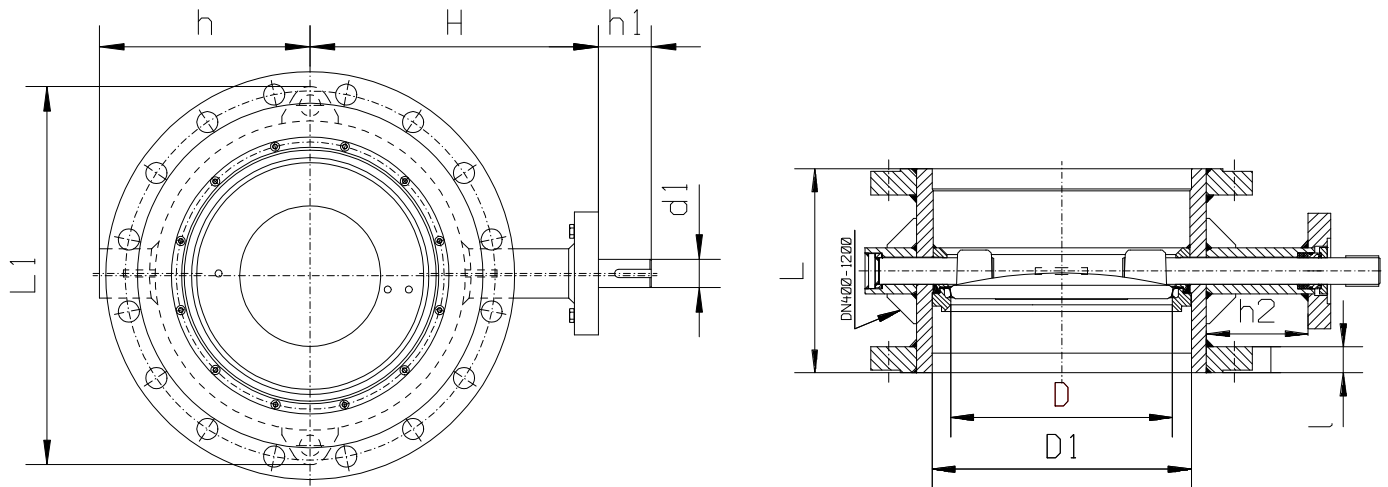


Parts list and standard materials

Part	Material
1 Body	Carbon steel EN 10028-2 P265GH
2 Disk	Stainless steel EN10213-4 1.4408, ASTM A351 CF8M
3 Subshaft	Stainless steel EN 10088-3 1.4460
5 Main shaft	Stainless steel EN 10088-3 1.4460
6 Conical pin	Stainless steel EN10088-3 1.4462
7 Subshaft bearing	PTFE on stainless steel net
8 Stem bearing	PTFE on stainless steel net
9,24 Shim	Carbon Fiber SFS5811 Graphite for steam version
10 Seat ring	Stainless steel AISI 316, AISI 904L hard chrome plated
11 Retaining ring	Carbon steel P265GH
12 Socket screw	Stainless steel ISO 3506 A4-80
13 Washer	Stainless steel
14 Back-up-ring	Stainless steel 1.4404
15 Box packing	Graphite
16 Shaft seal bushing	Stainless steel 1.4404
17,18 O-ring	EPDM Absent in version for steam
19 Gland	Stainless steel 1.4436
20 Hexagonal screw	Stainless steel ISO 3506 A4-80
21 Key	Carbon steel
22 Bearing plate	PTFE on stainless steel net



Dimensions



DN	L	D	D1	l	h	H	h1	d1	h2	L1	Flange ISO5211	Weight, kg
200	230	137.5	210.1	30	154	259	58	25	115	233	F10	67
250	250	187	263.0	32	193	298	63	30	125	385	F12	83
300	270	238	312.7	34	229	323	69	35	125	435	F12	101
350	290	286	344.4	38	255	352	75	40	125	465	F14	145
400	310	337	393.8	40	300	409	75	40	155	540	F14	179
450	330	386	444.4	42	326	445	86	50	163	590	F16	237
500	350	437	495.4	44	351	470	86	50	163	660	F16	295
600	390	483	593.6	46	376	548	103	60	186	760	F16	468
700	430	582	693.6	46	440	601	119	70	186	860	F25	571
800	470	682	795.2	47	490	651	119	70	187	955	F30	701
900	510	775	894.4	58	575	718	125	90	200	1070	F30	1'189
1000	550	855	994.0	62	636	764	130	100	183	1200	F30	1'584
1200	630	1054	1195	70	755	873	160	140	183	1440	F35	2'321

Actuating

According to customer's needs the butterfly valve is delivered with:

- bare shaft (not recommended),
- manual gear,
- electric actuator,
- pneumatic or hydraulic actuator.

Operation torque.

DN	200	250	300	350	400	450	500	600	700	800	900	1000	1200	1400
Torque*, Nm	240	400	700	1'100	1'600	2'200	3'000	4'200	6'800	10'000	13'000	16'000	24'000	34'000

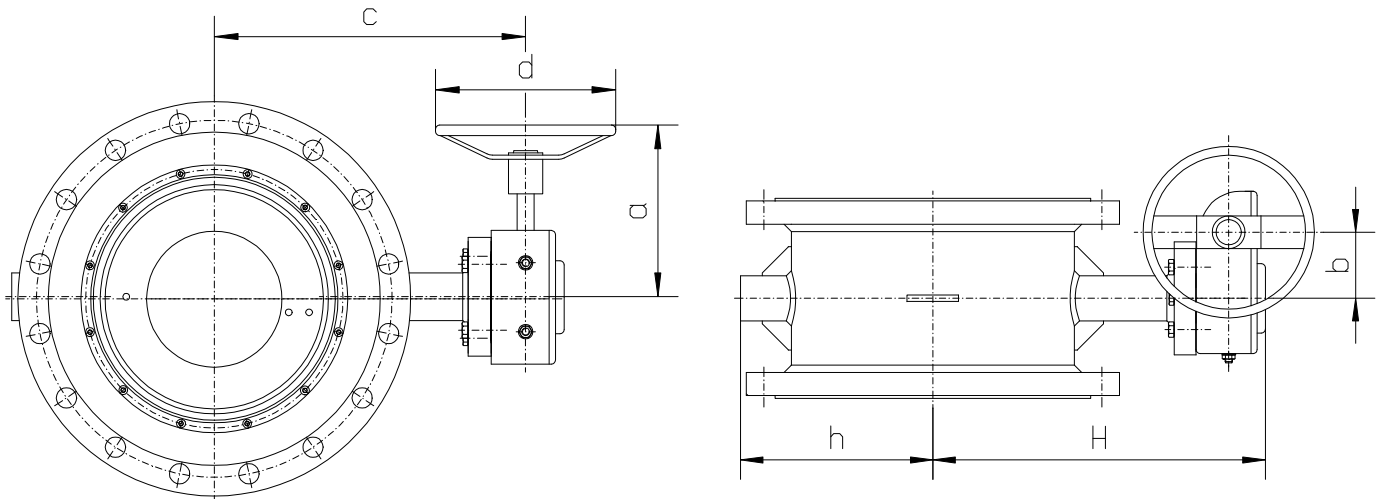
*) the operation torque for steam is the same as for liquid but one size bigger.



Manual gear.

Opening and closing of the valves from the handwheel.

The position of disc can be seen on a position indicator on top of the gear.



DN	H	h	a	b	c	d	Weight*, kg
200	349	154	202	67	301	203	71
250	379	193	247	67	340	305	87
300	417	229	264	90	373	305	109
350	446	255	264	90	402	305	158
400	503	300	264	90	459	305	194
450	573	326	405	138	500	500	268
500	576	351	362	123	520	457	326
600	675	376	387	154	598	457	505
700	761	440	505	181	687	457	628
800	811	490	505	181	737	457	758
900	887	575	592	237	792	457	1251
1000	942	636	615	431	807	500	1'646
1200	1051	755	615	431	962	600	2'513

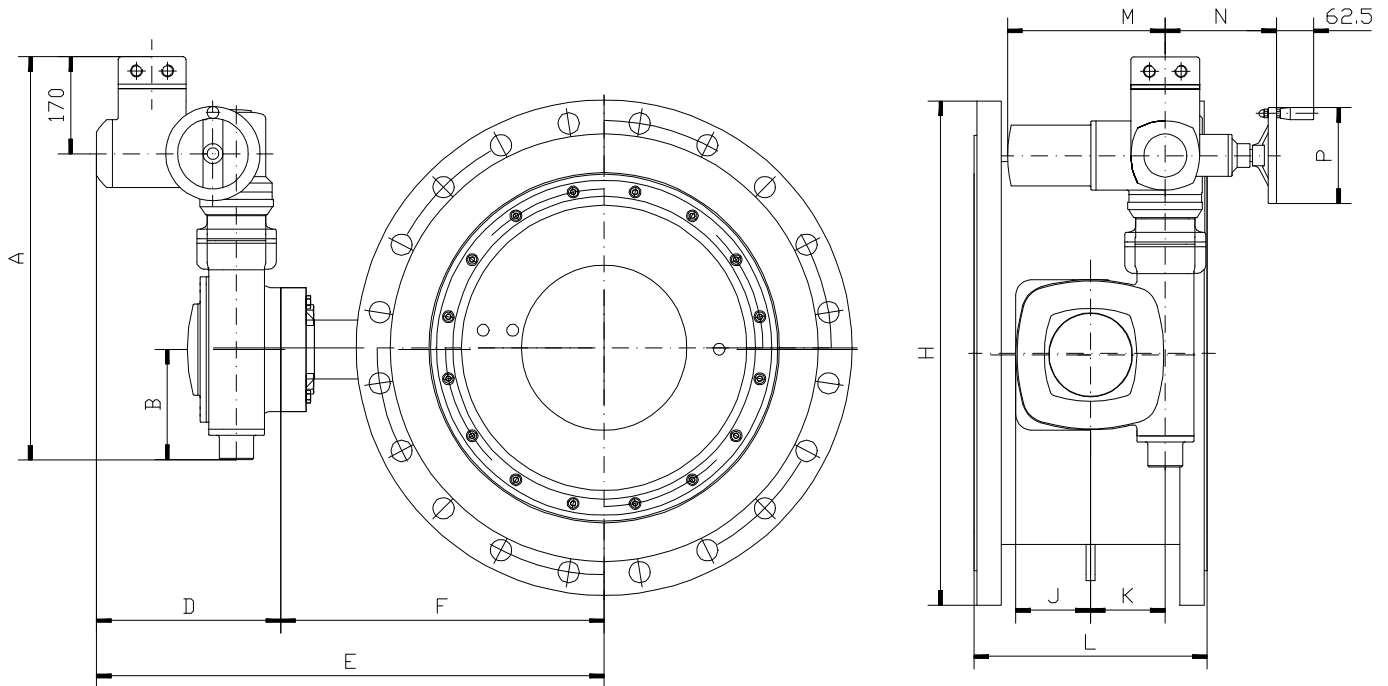
* weight of hand wheel is not included



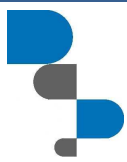
Electrical actuator.

Högfors valve can be equipped with the electrical actuator of any known brand.

The typical solution is with AUMA Norm actuator.



DN	AUMA type	A	B	D	E	F	G	H	J	K	L	M	N	P
200	SA07.1-GS50.3 – F10	444	96	277	536	259	154	233	63	50	233	265	186	140
250	SA07.5-GS63.3 – F12	500	127	282	580	298	193	284	75	63	385	265	186	160
300	SA07.5-GS80.3 – F12	510	132	284	607	323	229	334	88	80	435	265	186	160
350	SA07.5-GS100.3/VZ4.3 – F14	689	182	312	665	353	255	389	105	100	465	265	186	160
400	SA07.5-GS100.3/VZ4.3 – F14	689	182	312	721	409	299	440	105	100	540	265	186	160
450	SA07.5-GS100.3/VZ4.3 – F16	689	182	312	757	445	326	490	105	100	590	265	186	160
500	SA10.1-GS125.3/VZ4.3 – F16	700	187	322	792	470	351	540	125	125	660	282	193	200
600	SA10.1-GS125.3/VZ4.3 – F16	700	187	322	870	548	376	638	125	125	760	282	193	200
700	SA07.5-GS160.3/GZ160.3 – F25	990	337	313	914	601	440	738	173	160	860	265	186	160
800	SA07.5-GS200.3/GZ200.3 – F30	1131	398	338	989	651	490	835	215	200	955	265	186	160
900	SA07.5-GS200.3/GZ200.3 – F30	1131	398	338	1056	718	575	946	215	200	1070	265	186	160
1000	SA07.5-GS200.3/GZ200.3 – F30	1131	398	338	1145	764	636	1060	268	250	1200	265	186	160
1200	SA10.1-GS250.3/GZ250.3 - F35	1303	486	381	1254	873	755	1279	268	250	1440	282	193	200



BLUE LINE

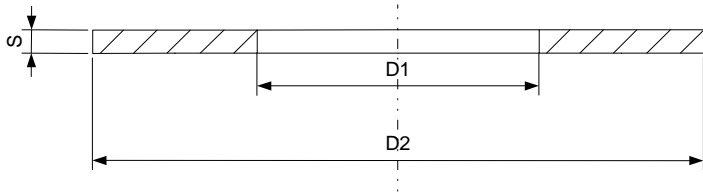
BUTTERFLY VALVE with flanges



31500 series

23-03-2010

Mounting gasket.

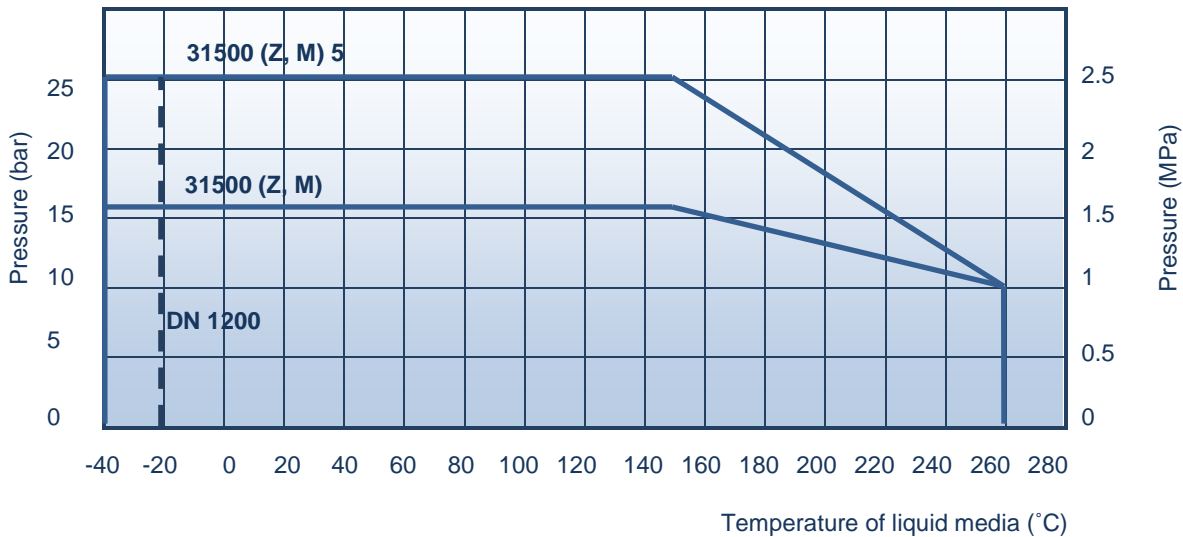


Gasket thickness "S" can be 0.5 – 3.0mm, 2.0mm is recommended.

DN	200	250	300	350	400	450	500	600	700	800	900	1000	1200
D1*(MM)	220	274	325	368	420	470	520	620	720	820	920	1020	1220
D2(MM)	PN10	273	328	378	438	490	540	595	695	810	915	1015	1340
	PN16	273	330	385	445	497	557	618	735	805	910	1010	1340
	PN25	285	342	402	458	515	565	625	730	830	940	1040	1360

Pressure / Temperature Rating.

The max pressure difference depends on the working temperature



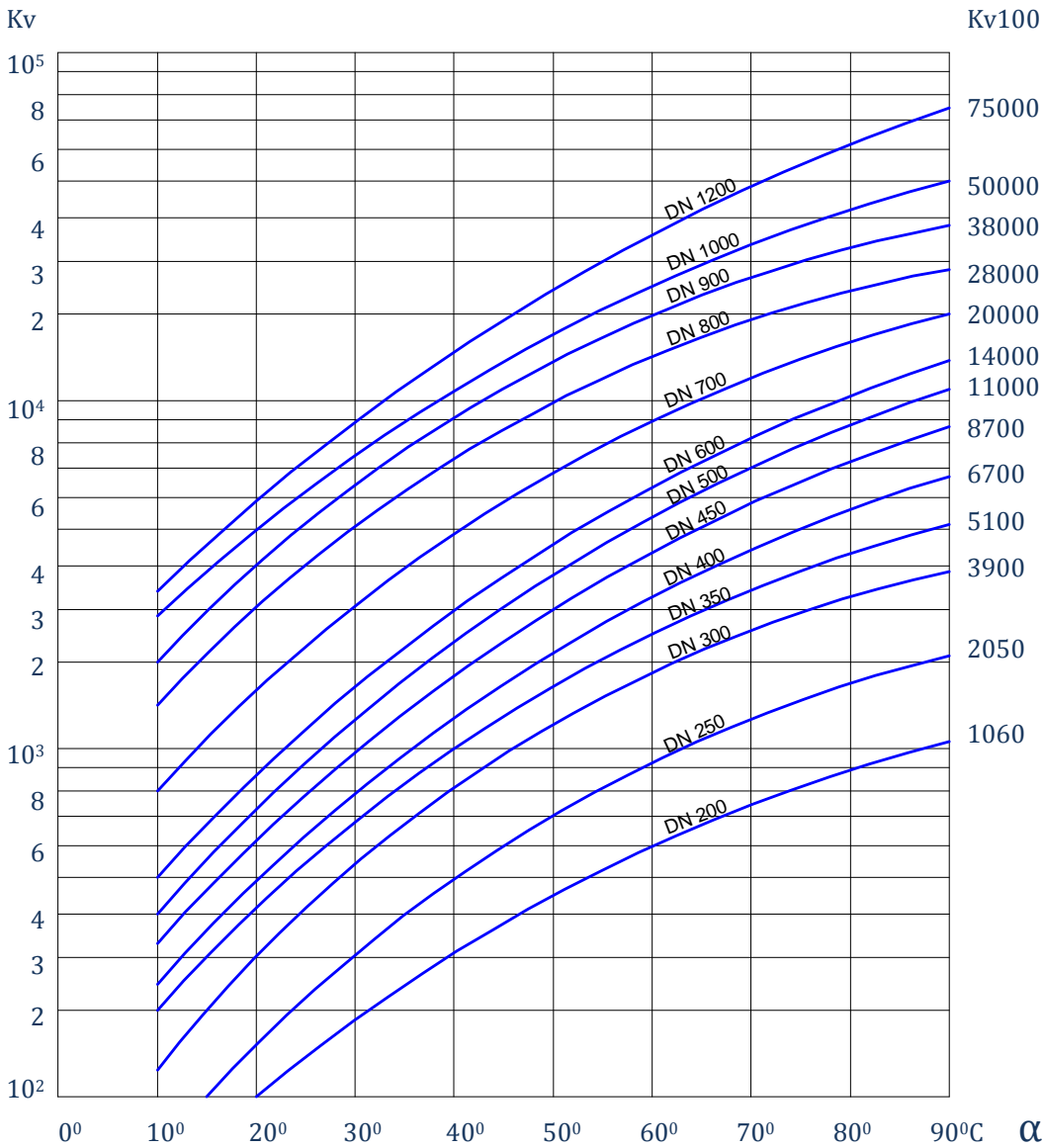
How to order

		3	1	5	00	CS	800	M	5
Body material:	3 – Carbon steel								
Valve type:	1 - butterfly valve,								
Connection:	0, 1, 2 – wafer type, 3 - welded end, 5 – flanged,								
Design options:	00 – Standard, 01 - For steam								
Main seal	(CS) - Stainless steel								
Size DN									
Actuation:	(Z) - bare shaft, (M) - manual gear								
Customization	(5) – ΔP = 25 bar								



The control curves

The curves indicate the regulating values of the valve at different opening angles.



WATER:

Volume flow: $Q = K_v \sqrt{\frac{\Delta p}{\rho}}$

Flow velocity: $V = 354 \frac{Q}{DN^2}$

K_v = KVvalue – Capacity factor

DN = nominal valve size (mm)

α – disc opening angle

Δp = pressure difference, bar

ρ – density of liquid kg/dm^3

V – flow velocity m/s

Q – volume flow m^3/h

Product codes

	Maximum Closing pressure (ΔP)			
	16 bar		25 bar	
bare shaft	31500CS__Z	31300CS__Z	31300CS__Z5	31300CS__Z5
manual gear	31500CS__M	31300CS__M	31300CS__M5	31300CS__M5
For steam on special order. Code number: 31501CS__				