PA Ventiler AB
EN DEL AV BEIJERTECH

ISO 9001 : 2015
BUREAU VERITAS
Certification

PA 281

CONCENTRIC WAFER BUTTERFLY VALVE EXCELLENCE RANGE TTV STAINLESS STEEL BODY AND DISC WITH EPDM SEAT

Wafer butterfly valve TTV excellence range for cold and hot water, sea water, alcohol, sodium hydroxide, demineralized water, mercury, alcalins.
Approval Bureau Veritas marine certificate. 10 years warranty.
Stainless steel body and disc and EPDM seat.
Between flanges PN10/16 or class 150 according to DN.
Compatible with explosive atmosphere, ATEX Zone 1&21 and Zone 2&22 on request.
Handling possible with stainless steel handle, gearbox or, chain gearbox and stem extension.
Thanks to the ISO 5211 plate and the square stem, an actuator can be installed direct on the valve (up to DN400).

BUREAU VERITAS
Marine & Offshore Division

Certificate 3.1

Lloyd's Register
PED/2014/68/UE

WARRANTY 10 years MANUFACTURE *

SIL3



Size : DN32 to DN600
Connection : Between flanges PN10/16 and Class 150 (PN20)
Min Temperature : -20°C
Max Temperature : +110°C
Max Pressure : 16 Bars up to DN300
Specifications : Long neck for isolation
Wafer type
Full crossing stem
ISO 5211 direct mounting pad

Materials : Stainless steel CF8M body and disc, EPDM seat

*the installation defects and wear defects are not covered by the guarantee

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STAINLESS STEEL BODY AND DISC WITH EPDM SEAT

SPECIFICATIONS :

- Long neck for isolation
- ISO 5211 mounting pad
- Wafer type
- Between flanges PN10/16 from DN32/40 to 400 and Class 150 (PN20) from DN40 to 400 (over on request)
- Betwwen flanges PN10 from DN450 to DN 600
- Full crossing stem
- Removable EPDM seat, dovetail type above DN40
- Stainless steel disc
- 9 positions lever with locking device up to DN200 , stop in all positions but non lockable from DN250 to 300
- Stem extension 75 mm length (option)
- Square lever 30x30 mm for special key (option)

USE :

- Cold and hot water, sea water, alcohol, sodium hydroxide (concentration 70% max), demineralized water, mercury, alcalins
- Min and max Temperature Ts : - 20°C to + 110°C
- Max Pressure Ps : 16 bars up to DN300, 10 bars over (see graph page 5)

RANGE :

- With lever from DN 32 to DN 300
- IP65 gear box possible (**Ref. 1197**) from DN 32 to DN 600
- IP65 chain gear box (**Ref. 1194**) from DN 32 to DN 500
- On request, stem extension with special length (**Ref. 98665**)
- On request, CF8M stainless steel handle and bolting **Ref. 9831250-9831264**

CONNECTION :

- Between flanges PN10/16 from DN32/40 to 400 and Class 150 (PN20) from DN40 to 400
- Between flanges PN10 from DN450 to DN 600

TORQUE VALUES (in Nm with safety coefficient of 30 % included) :

		DN														
	Pressure (Bar)	**32/40**	**50**	**65**	**80**	**100**	**125**	**150**	**200**	**250**	**300**	**350**	**400**	**450**	**500**	**600**
Torque (Nm) with machined disc (on request)	1-5*	2	4	6	8	10	14	15	25	64	118	179	265	353	490	686
	6*	3	5	7	10	12	18	31	55	123	216	333	519	735	931	1372
	10*	6	8	10	14	18	31	59	93	206	330					
Torque (Nm)	**16**	**9**	**11**	**20**	**29**	**47**	**82**	**130**	**210**	**360**	**475**					

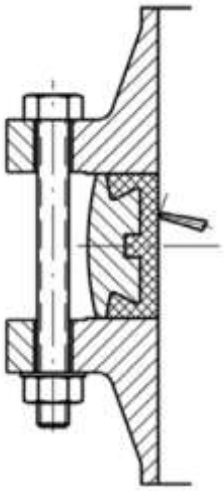
		DN													
	Pressure (Bar)	**350**	**400**	**450**	**500**	**600**	**700**	**750**	**800**	**900**	**1000**	**1100**	**1200**	**1300**	**1400**
Torque (Nm)	**10**	**425**	**640**	**1176**	**1450**	**2850**	**4600**	**5800**	**7400**	**11000**	**13600**	**14200**	**16400**	**17800**	**19200**
*On request	16*	760	1300	1600	2340	3300									

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STAINLESS STEEL BODY AND DISC WITH EPDM SEAT

MAXIMUM TIGHTENING TORQUES FOR BOLTING FLANGES :



		Maximum torques (Nm)			
	Bolting types	5,6 / A307 Gr.B	8,8 / A193 B7	10,9	12,9
Bolting DN	M12 (1/2'')	41,16	84,28	117,6	142,1
	M14 (9/16'')	66,64	132,3	186,2	225,4
	M16 (5/8'')	102,9	205,8	289,1	347,9
	M18 (3/4'')	142,1	284,2	396,9	475,3
	M20 (3/4'')	196	401,8	568,4	676,2
	M22 (7/8'')	259,7	539	764,4	911,4
	M24 (1'')	338,1	695,8	980	1176
	M27 (1''1/8)	499,8	1029	1470	1764
	M30 (1''1/4)	666,4	1421	1960	2352

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FLOW COEFFICIENT Kv (m3 / h) :

DN	Opening Angle								
	10°	20°	30°	40°	50°	60°	70°	80°	90°
32-40	3	4	8	17	25	35	45	56	70
50	3	6	14	22	37	60	95	147	164
65	4	7	10	22	48	78	140	160	201
80	5	12	29	52	88	156	216	281	359
100	9	21	48	87	147	234	346	519	627
125	19	35	78	148	232	372	562	761	995
150	28	48	108	203	324	536	865	1211	1471
200	35	91	206	320	554	952	1427	2163	2509
250	43	143	329	562	865	1471	2336	3460	3936
300	69	216	476	770	1341	2206	3460	4758	5865
350	87	282	606	1101	1817	2768	4325	6661	8179
400	112	363	779	1453	2318	3547	6055	7785	10660
450	138	476	1021	1730	2941	4758	7785	9515	12889
500	173	593	1254	2336	3806	5882	9515	12543	16023
600	260	839	1817	3287	5320	7785	13840	18598	22741

HEAD LOSS CALCULATIONS :

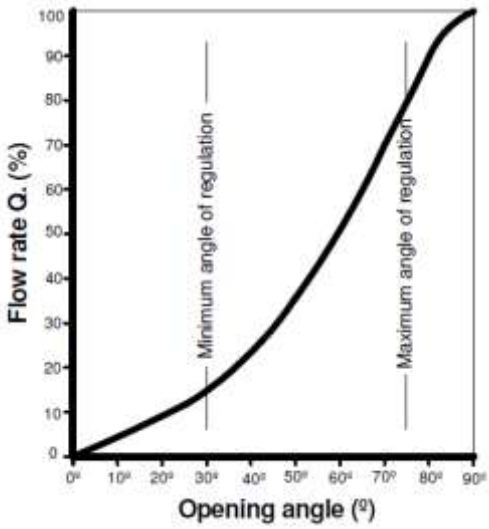
Δp = (Q / Kv)² x SG

Q : flow in m³/h

Δp : Head loss in bar

SG : Specific gravity (= 1 for water)

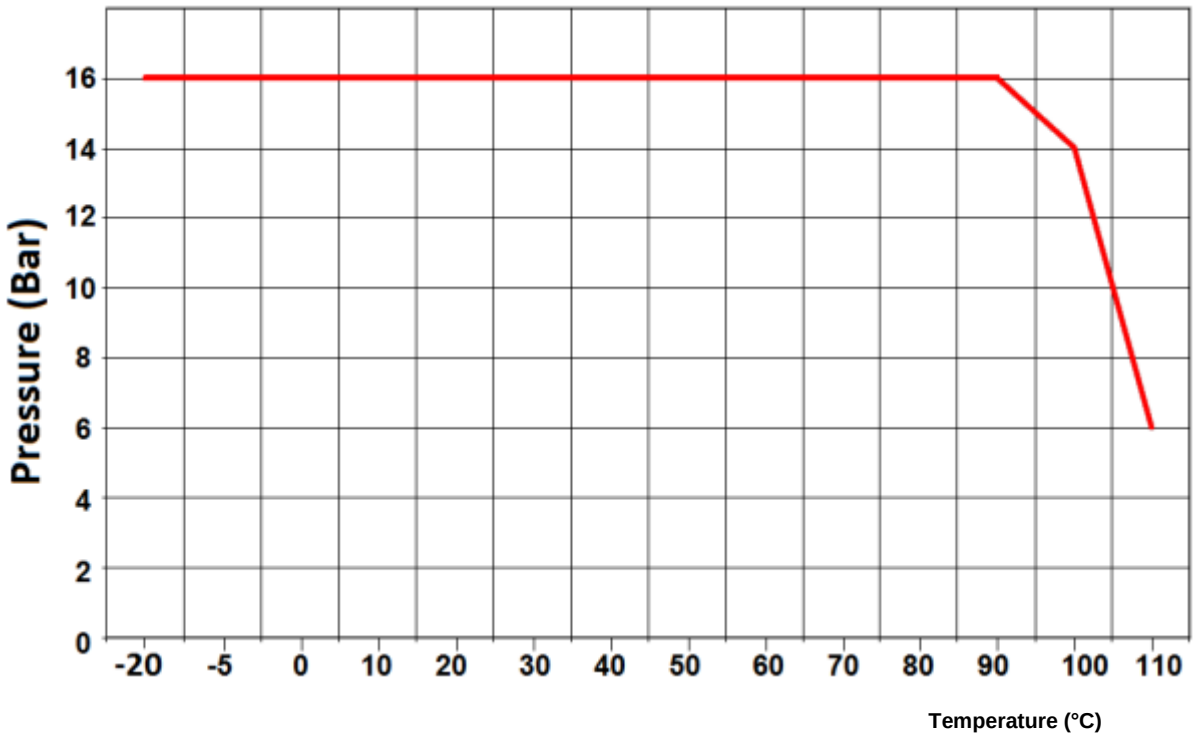
Kv : Volume of water in m³/h, that will flow through a given restriction or valve opening with a pressure drop of 1 bar at 20°C)



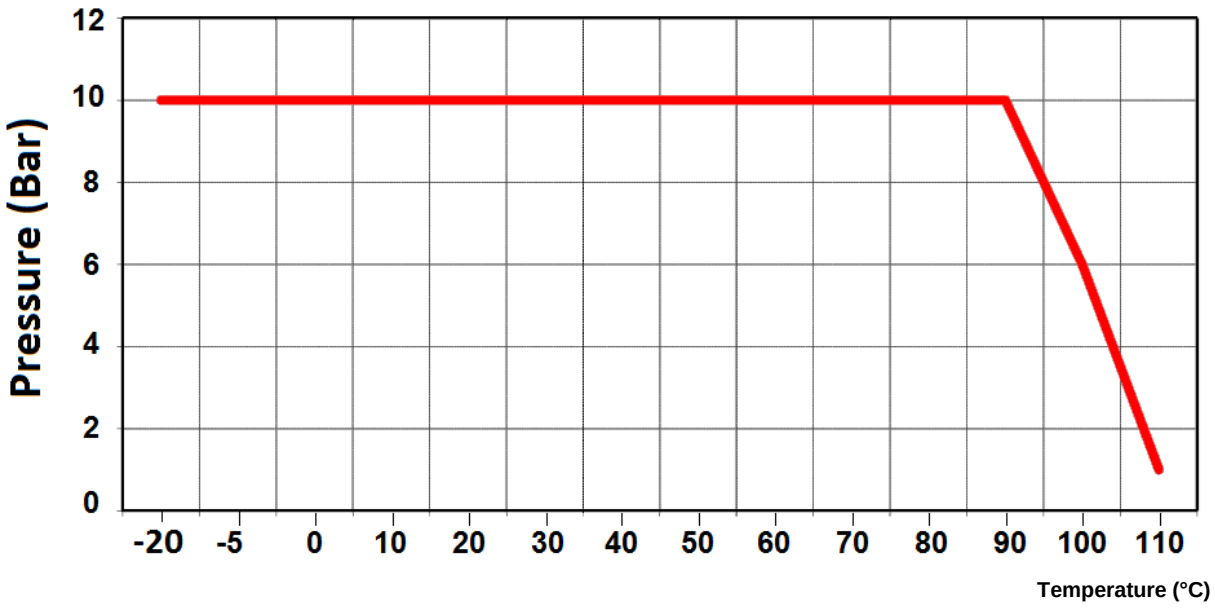
CONCENTRIC WAFER BUTTERFLY VALVE EXCELLENCE RANGE TTV
STAINLESS STEEL BODY AND DISC WITH EPDM SEAT

PRESSURE / TEMPERATURE GRAPH (STEAM EXCLUDED) :

- ***Ps 16 BAR DN40-300 :***



- ***Ps 10 BAR DN350-1200 :***



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STAINLESS STEEL BODY AND DISC WITH EPDM SEAT

REPAIRABILITY :



SEAT



DISC



HANDLE



	DN	40	50	65	80	100	125	150	200	250	300
Seat	Ref.	9865000	9865001	9865002	9865003	9865004	9865005	9865006	9865007	9865050	9865051
Disc	Ref.	9865020	9865021	9865022	9865023	9865024	9865025	9865026	9865027	9865028	9865029
Handle	Ref.	9831331		9831332	9831333		9831334		9831335	9831336	9831337

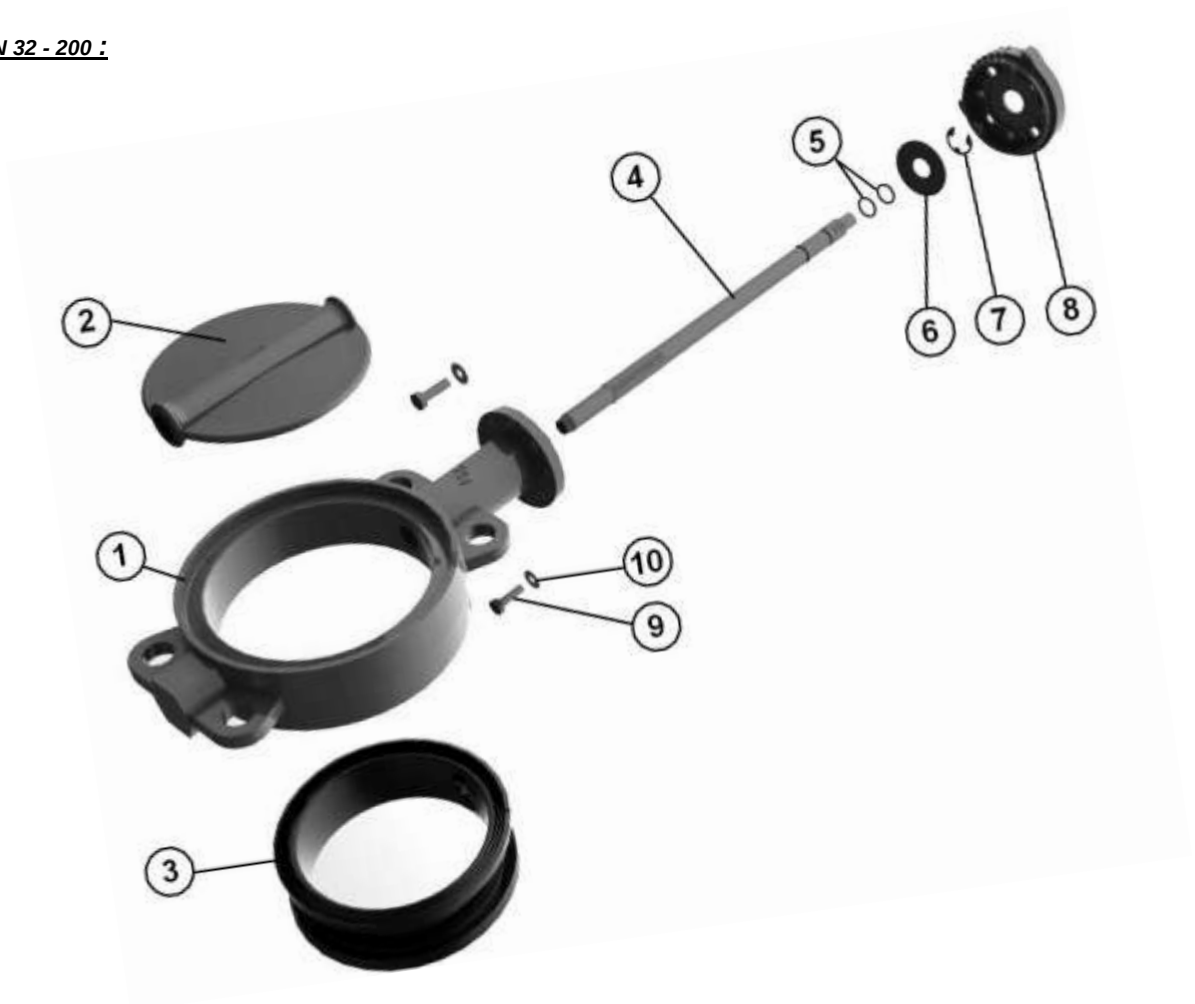
	DN	350	400	450	500
Seat	Ref.	9865018	9865019	9865201	9865202
Disc	Ref.	9865212	9865213	9865214	9865215

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CONCENTRIC WAFER BUTTERFLY VALVE EXCELLENCE RANGE TTV
STAINLESS STEEL BODY AND DISC WITH EPDM SEAT

MATERIALS DN 32 - 200 :



Item	Designation	Materials
1	Body	ASTM A351 CF8M
2	Disc	
3	Seat	EPDM
4	Stem	AISI 316
5	O ring	NBR
6	Ring	AISI 316
7	Circlips	
8	Plate	ASTM A351 CF8M
9	Plate screw	A4
10	Washer	AISI 316
	Lever	Aluminium ADC10 with epoxy painting 50µ thickness

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CONCENTRIC WAFER BUTTERFLY VALVE EXCELLENCE RANGE TTV
STAINLESS STEEL BODY AND DISC WITH EPDM SEAT

MATERIALS DN 250 - 400 :



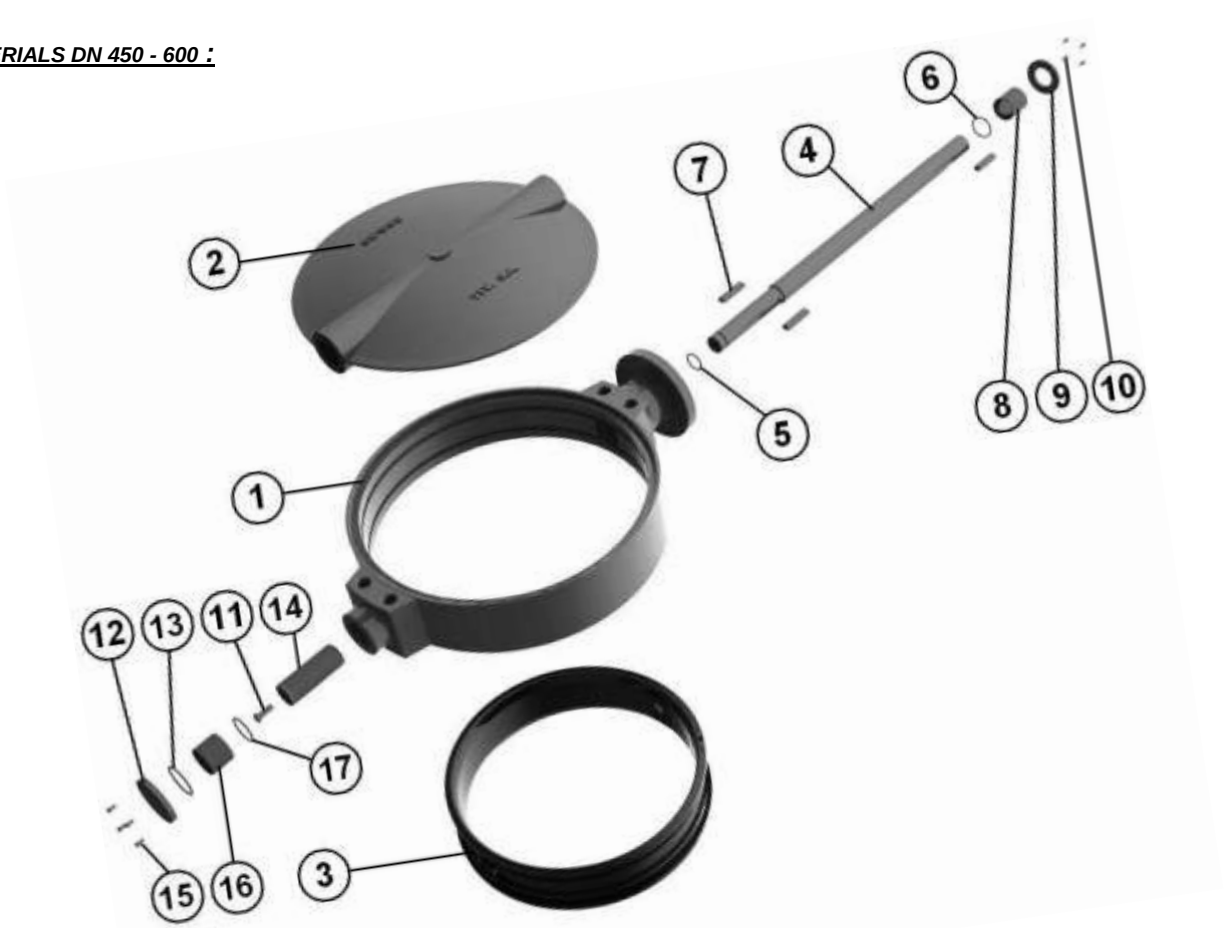
Item	Designation	Materials
1	Body	ASTM A351 CF8M
2	Disc	
3	Seat	EPDM
4	Stem	AISI 316
5	O ring	NBR
6	Circlips	AISI 316
7	Ring	
8	Spring	
Lever (up to DN300)		Ductile iron EN GJS-500-7 with epoxy painting 50µ thickness

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CONCENTRIC WAFER BUTTERFLY VALVE EXCELLENCE RANGE TTV
STAINLESS STEEL BODY AND DISC WITH EPDM SEAT

MATERIALS DN 450 - 600 :



Item	Designation	Materials
1	Body	ASTM A351 CF8M
2	Disc	
3	Seat	EPDM
4	Stem	AISI 316
5	O ring	NBR
6	O ring	
7	Pin	AISI 316
8	Bushing	BRONZE
9	Ring	AISI 316
10	Screw	A4
11	Screw	
12	Cap	AISI 316
13	O ring	NBR
14	Bushing	AISI 316
15	Screw	A4
16	Bushing	BRONZE
17	O ring	NBR

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CONCENTRIC WAFER BUTTERFLY VALVE EXCELLENCE RANGE TTV
STAINLESS STEEL BODY AND DISC WITH EPDM SEAT

GEARBOX MATERIALS REF. 1197 :



Item	Designation	Materials Ref. 1197
1	Screw	AISI 304
2	Pointer	PVC
3	Bonnet	Aluminium
4	O ring	NBR
5	Pin	Carbon steel
6	Quadrant	Ductile iron EN GJS-400-15
7	Gasket	NBR
8	Body	Aluminium
9	Adjusting bolt	Carbon steel
10	Washer	Galvanized steel
11	Nut	Galvanized steel
12	Cap	NBR 70
13	Bushing	Bronze
14	Worm	Carbon steel 45
15	Gasket	NBR
16	Stem	Carbon steel 45
17	Handwheel	Carbon steel
18	Pin	Carbon steel

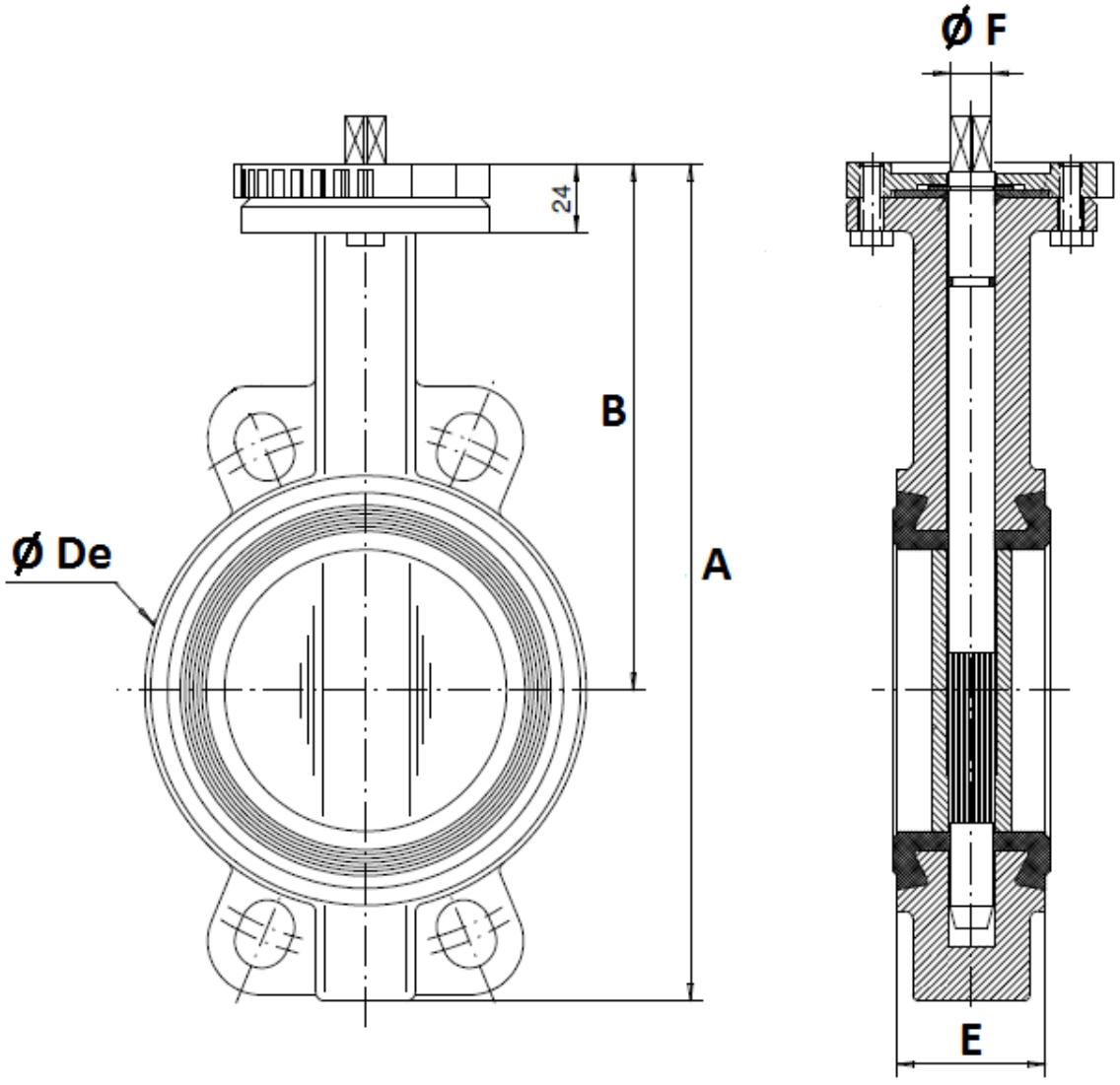
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CONCENTRIC WAFER BUTTERFLY VALVE EXCELLENCE RANGE TTV
STAINLESS STEEL BODY AND DISC WITH EPDM SEAT

SIZE (in mm) :

- **Valves DN 32 - 200 :**



DN	32/40	50	65	80	100	125	150	200
A	206	228	248	265	298	331	349	430
B	140	156	161	169	187	206	215	255
Ø De	82	102	119	135	155	185	208	270
E	33	43	46	46	52	56	56	60
Ø F	9.5	9.5	12	14	14	17	17	21
Weight (Kg)	2.46	3.66	4.4	4.6	6	7.6	9.2	14.7

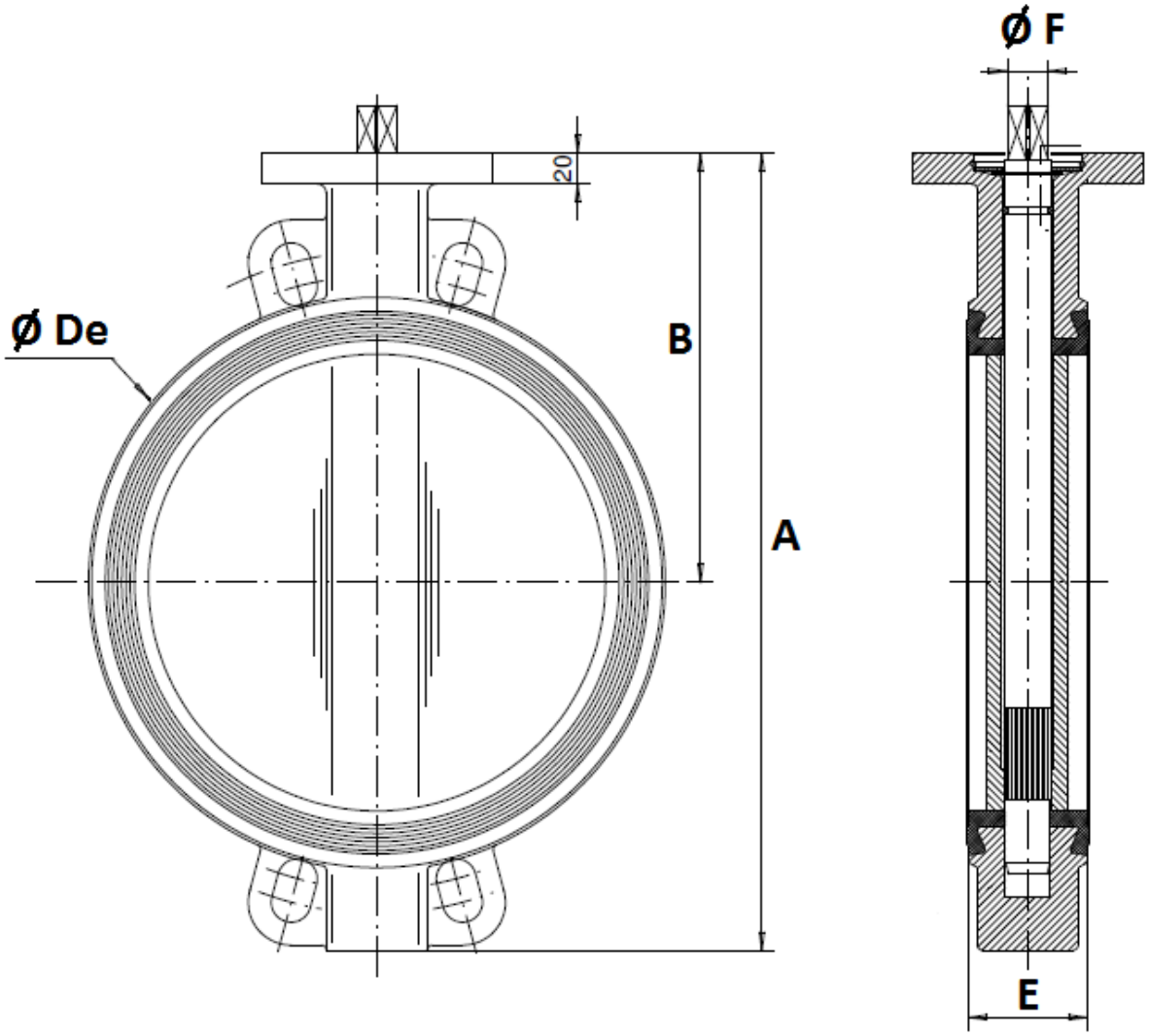
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CONCENTRIC WAFER BUTTERFLY VALVE EXCELLENCE RANGE TTV
STAINLESS STEEL BODY AND DISC WITH EPDM SEAT

SIZE (in mm) :

- **Valves DN 250 -400 :**



DN	250	300	350	400
A	461	524	570	644
B	248	280	300	340
Ø De	328	381	437	486
E	68	78	78	102
Ø F	23	26.5	26.5	33
Weight (Kg)	24.7	33	39	52

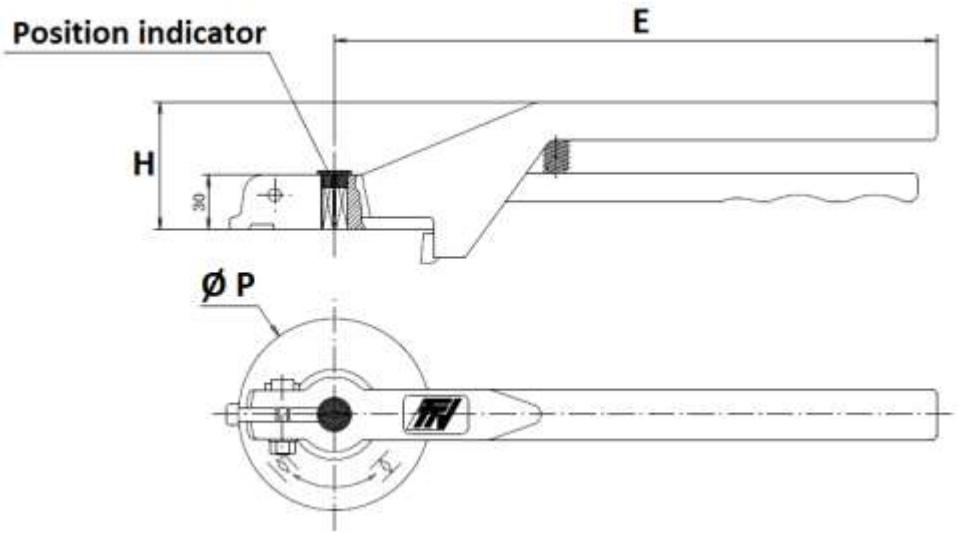
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STAINLESS STEEL BODY AND DISC WITH EPDM SEAT

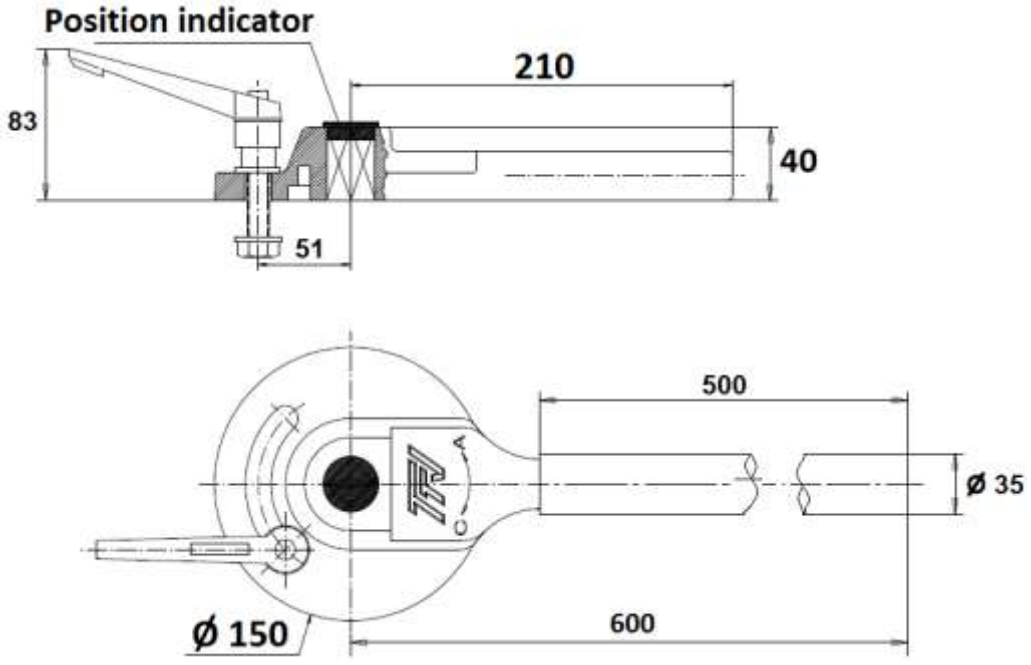
STANDARD LEVERS SIZE (in mm) :

DN 32 – 200 :



DN	32-100	125-200
E	205	330
H	57	70
Ø P	88	105

DN 250 – 300 :



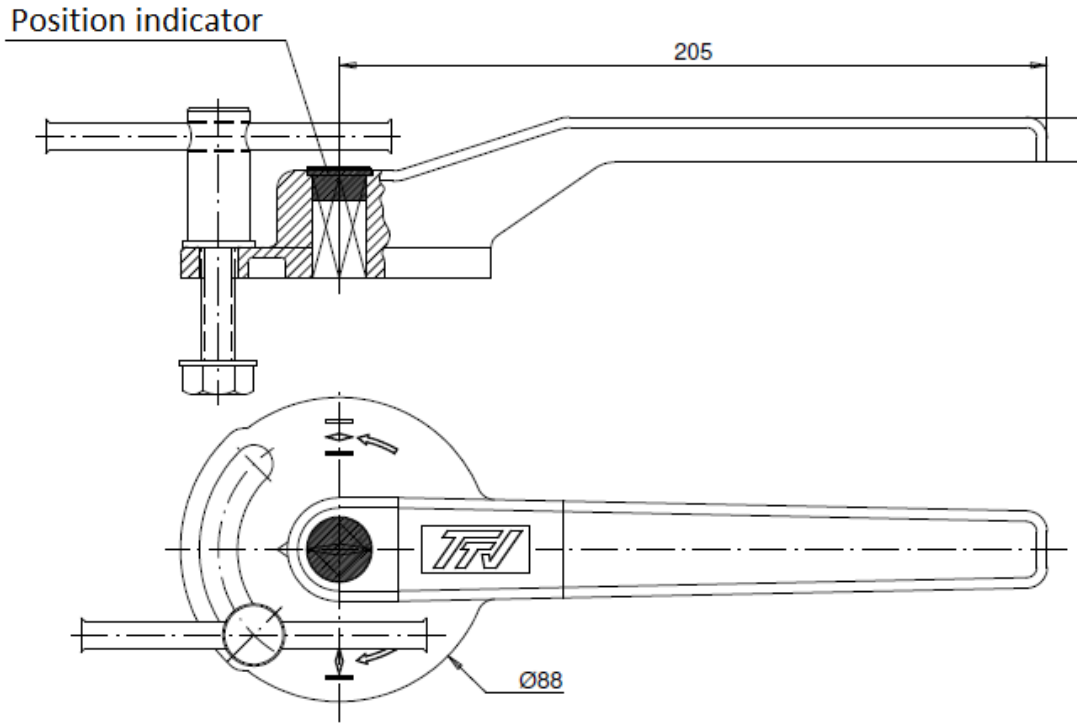
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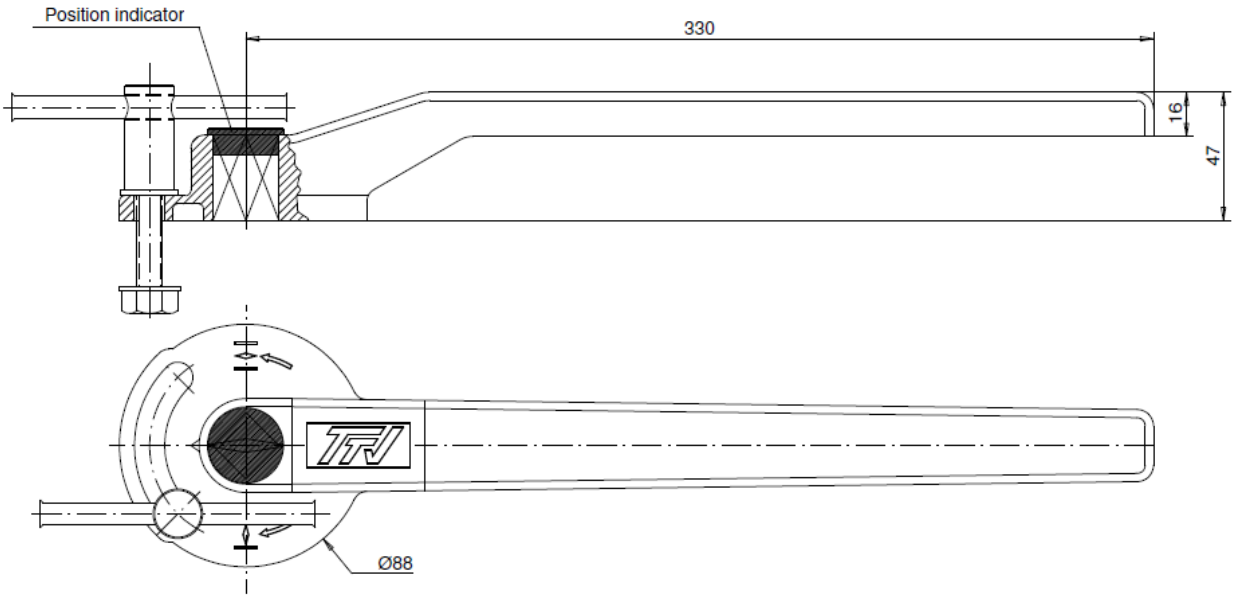
CONCENTRIC WAFER BUTTERFLY VALVE EXCELLENCE RANGE TTV
STAINLESS STEEL BODY AND DISC WITH EPDM SEAT

ASTM A351 CF8M STAINLESS STEEL LEVERS SIZE (in mm) (ON REQUEST) :

DN 40 - 100



DN 125 - 200



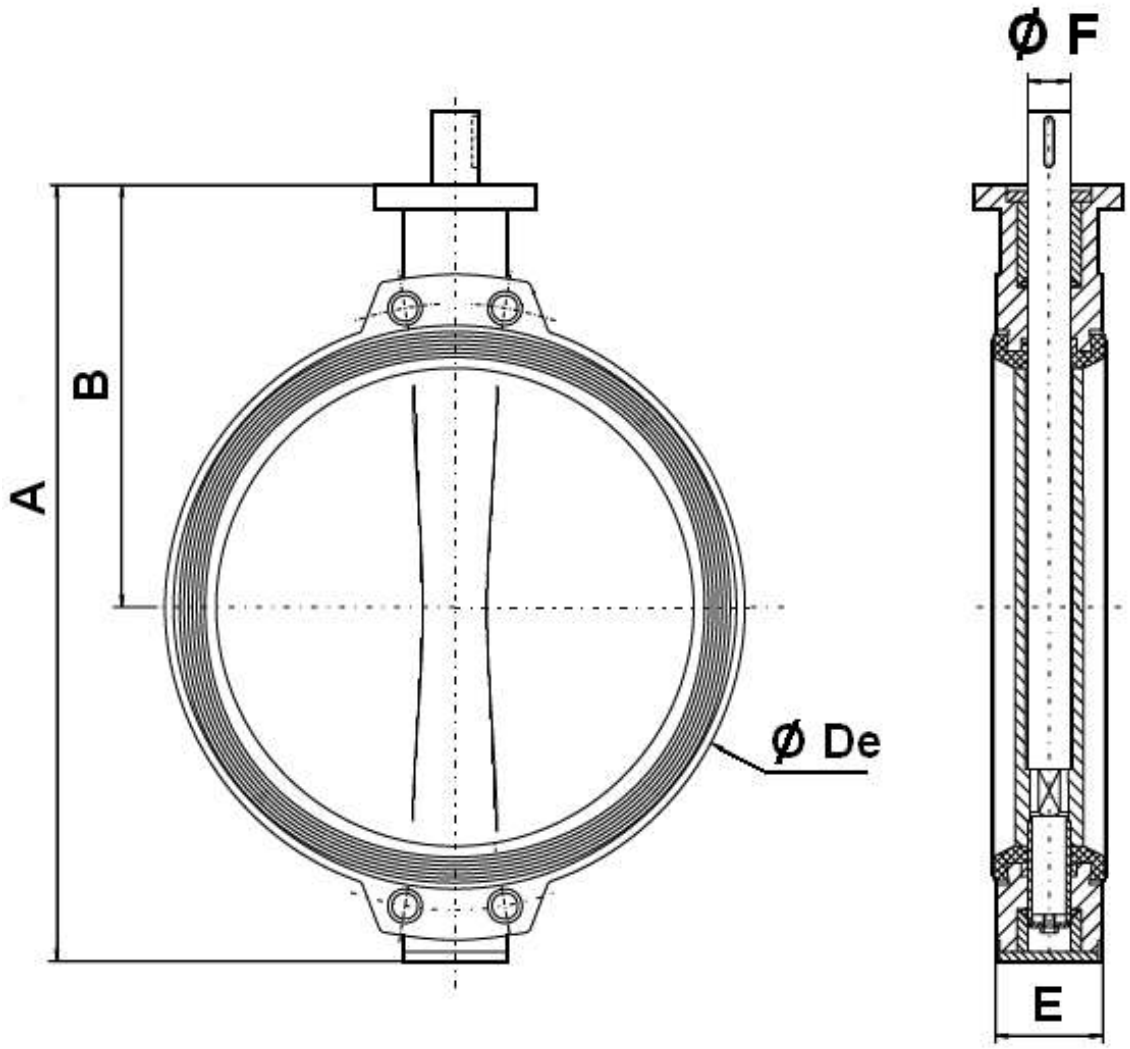
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CONCENTRIC WAFER BUTTERFLY VALVE EXCELLENCE RANGE TTV STAINLESS STEEL BODY AND DISC WITH EPDM SEAT

SIZE (in mm) :

- **Valves DN 450 - 600 :**



DN	450	500	600
A	738	822	965
B	394	440	507
Ø De	538	595	695
E	114	127	154
Ø F	50	50	60
Ø P	175	175	250
Weight (Kg)	87	117	177

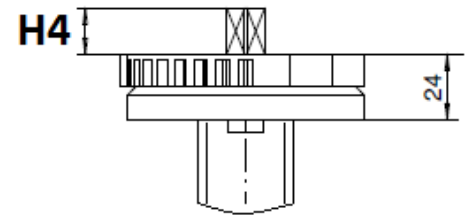
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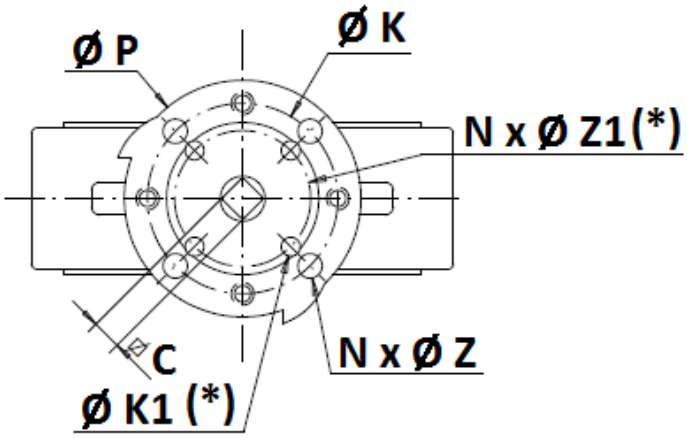
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STAINLESS STEEL BODY AND DISC WITH EPDM SEAT

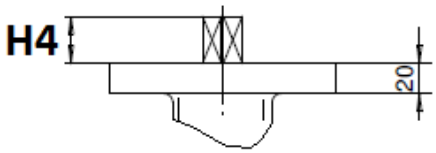
ISO MOUNTING PAD SIZE DN32-400 (in mm) :

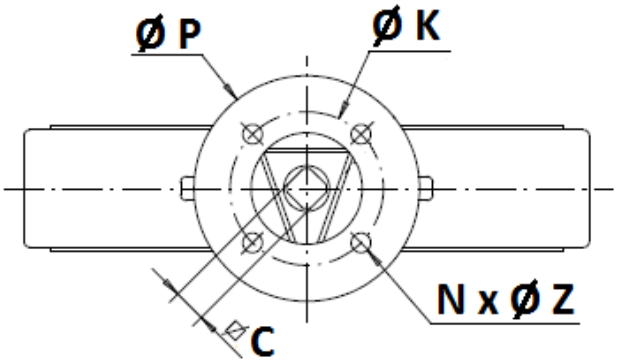
DN 32 – 200





DN250-400



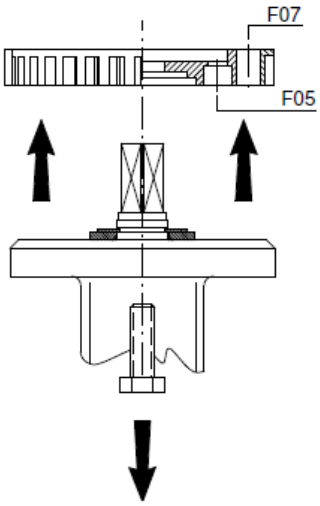


(*) : Only from DN32 to DN100 (see installation with ISO plate F05 next page)

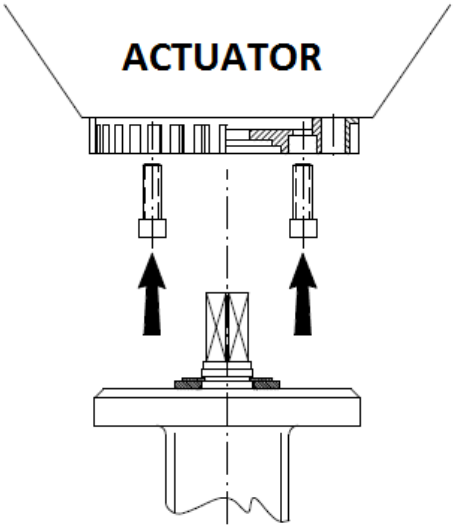
DN	32/40	50	65	80	100	125	150	200	250	300	350	400
H4	14		16		20			24			29	
C	8		9	11		14		17	19	22		27
Ø K	70								102		140	
ISO	F07								F10		F14	
N x Ø Z	4 x 9								4 x 11		4 x 18	
Ø K1	50					-						
ISO 1	F05											
N x Ø Z1	4 x 7											
Ø P	88					105			150		170	

CONCENTRIC WAFER BUTTERFLY VALVE EXCELLENCE RANGE TTV
STAINLESS STEEL BODY AND DISC WITH EPDM SEAT

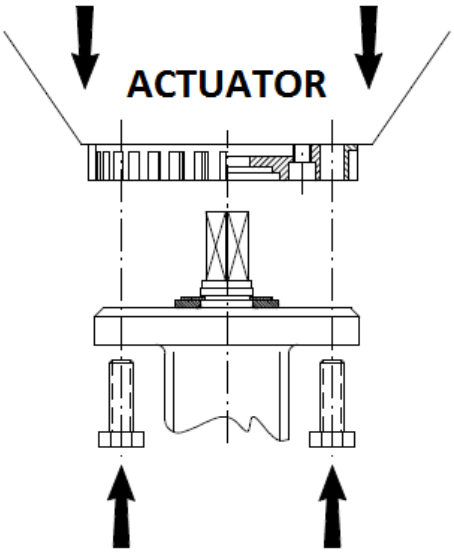
ISO PLATE INSTALLATION FOR DN32-100 ISO F05 :



Unscrew and remove the flange



Screw the flange to the actuator with hexagon socket screws



Screw the valve to the flange

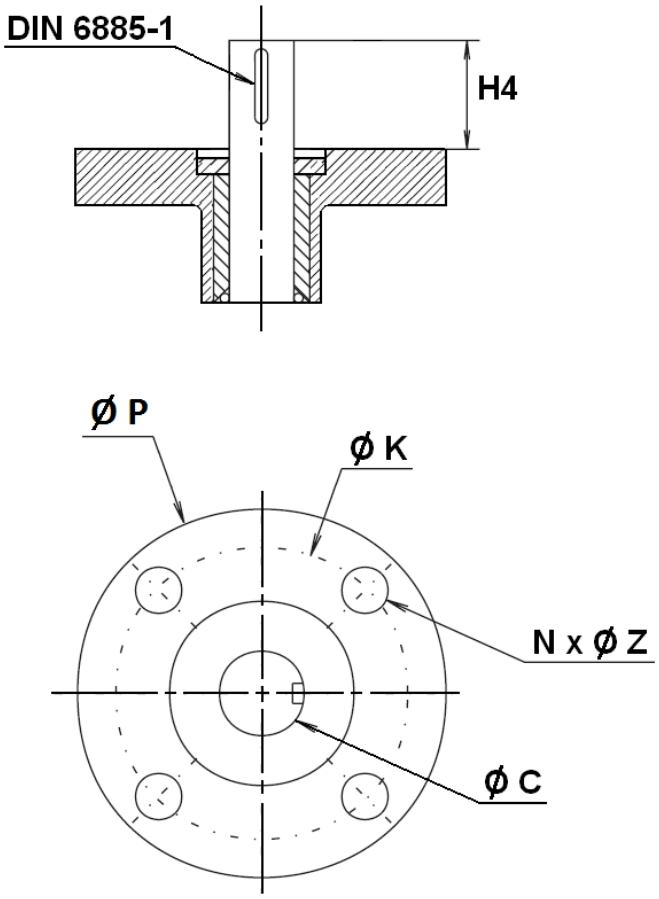
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STAINLESS STEEL BODY AND DISC WITH EPDM SEAT

ISO MOUNTING PAD SIZE DN450-600 (in mm) :

DN 450 - 600



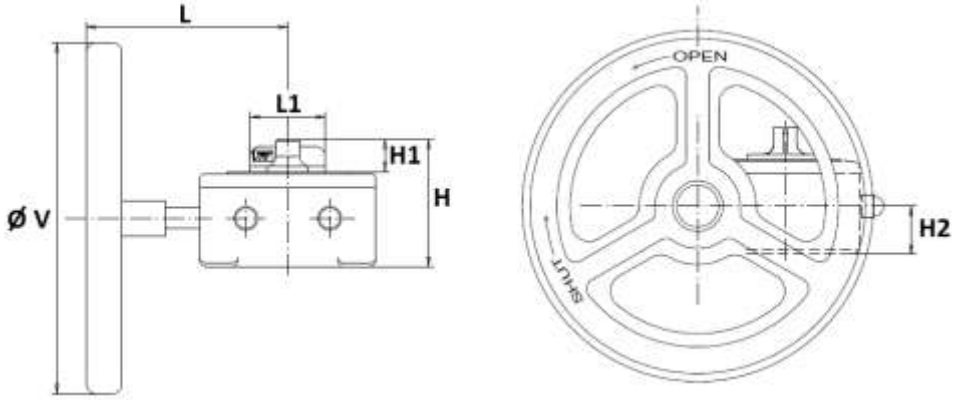
DN	450	500	600
H4	80	80	90
Ø C	50	50	60
Ø K	140	140	165
ISO	F14	F14	F16
N x Ø Z	4 x 18	4 x 18	4 x 22
Ø P	175	175	250

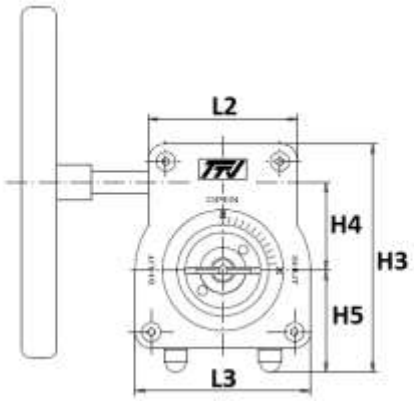
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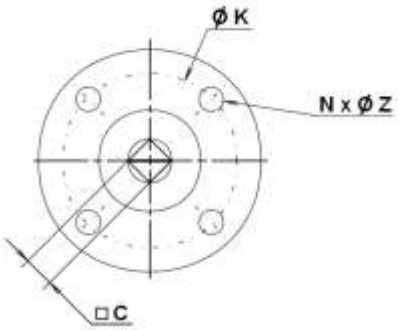
CONCENTRIC WAFER BUTTERFLY VALVE EXCELLENCE RANGE TTV
STAINLESS STEEL BODY AND DISC WITH EPDM SEAT

GEARBOX SIZE REF.1197 DN32-400 (in mm) :





ISO plate size :



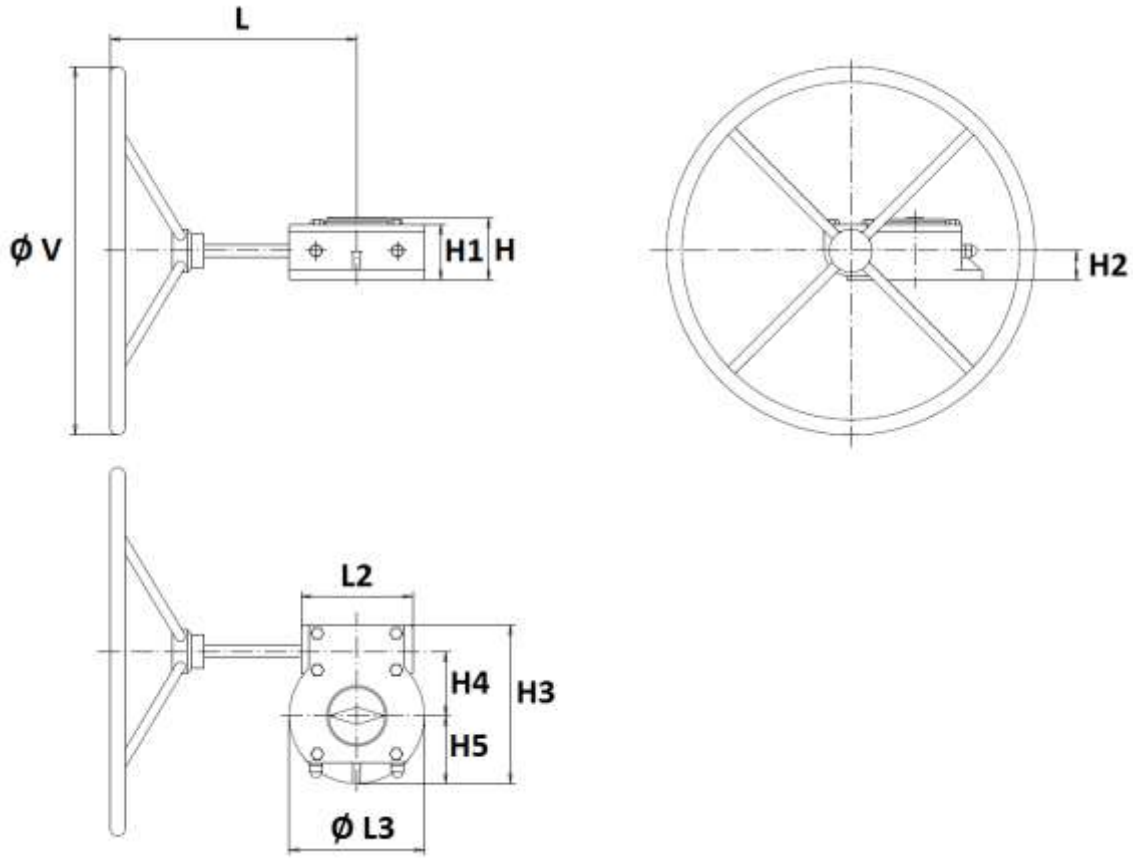
DN	32/50	65	80/100	125/150	200	250	300	350	400
L	115	115	115	115	115	223.5	223.5	325	325
L1	43	43	43	43	43	55	55	75	75
L2	85	85	85	85	85	110	110	150	150
L3	100	100	100	100	100	142	142	185	185
H	73	73	73	73	73	103	103	126	126
H1	19	19	19	19	19	33	33	32	32
H2	27.5	27.5	27.5	27.5	27.5	42	42	51	51
H3	130	130	130	130	130	176	176	224	224
H4	50	50	50	50	50	60	60	80	80
H5	58	58	58	58	58	82	82	98	98
Ø V	140	140	140	200	200	300	300	400	400
C	8	9	11	14	17	19	22	22	27
Ø K	70	70	70	70	70	102	102	140	140
ISO	F07	F07	F07	F07	F07	F10	F10	F14	F14
N x Ø Z	4 x M8	4 x M8	4 x M8	4 x M8	4 x M8	4 x M10	4 x M10	4 x M16	4 x M16
Weight (Kg)	1.35	1.35	1.35	1.75	1.75	4	4	9.5	9.5

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CONCENTRIC WAFER BUTTERFLY VALVE EXCELLENCE RANGE TTV
STAINLESS STEEL BODY AND DISC WITH EPDM SEAT

GEARBOX SIZE REF.1197 DN450-600 (in mm) :



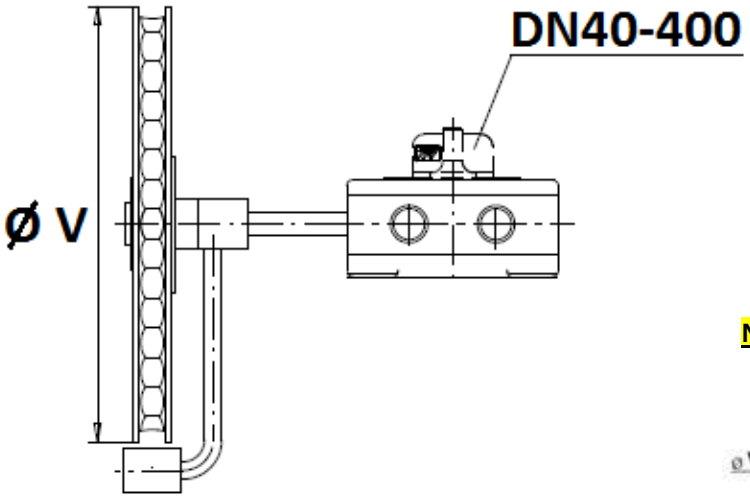
DN	450	500	600
L	381	402	447
L2	150	182	194
Ø L3	200	220	285
H	93	102	123.4
H1	82	91	109.5
H2	42	48	55
H3	226	258	322.5
H4	86	104.5	130
H5	100	110	142.5
Ø V	600	600	700
Weight (Kg)	18.8	26.8	38.3

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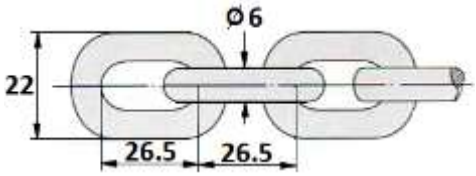
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CONCENTRIC WAFER BUTTERFLY VALVE EXCELLENCE RANGE TTV
STAINLESS STEEL BODY AND DISC WITH EPDM SEAT

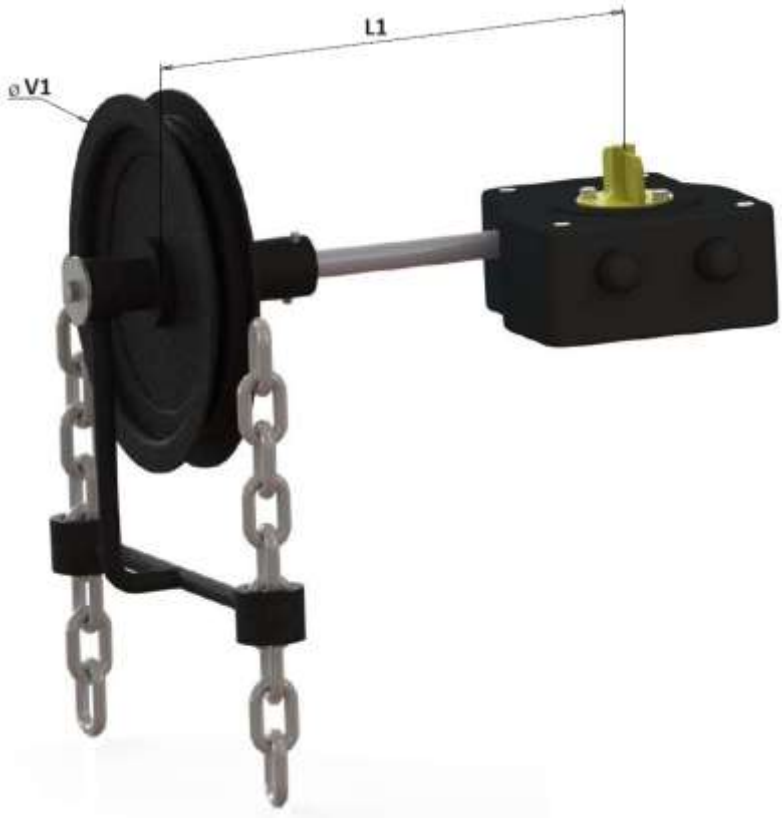
CHAIN GEARBOX SIZE REF.1194 (in mm) :



Chain size :



NEW TYPE (MODIFICATION IN PROGRESS) :



DN	32/50	65	80/100	125/150	200	250	300	350	400	450	500
L	120			215		325		331	352	350	365
L1	110					250		300			
Ø V	160			210		300		400		500	500
Ø V1											
Weight (in Kg)	2.35	2.35	2.35	2.75	2.75	6.8	6.8	14.3	14.3	26.2	33.7

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CONCENTRIC WAFER BUTTERFLY VALVE EXCELLENCE RANGE TTV
STAINLESS STEEL BODY AND DISC WITH EPDM SEAT

GEARBOX SPECIFICATIONS :

DN	32/50	65	80/100	125/150	200	250	300	350
Ref.	1197050	1197065	1197100	1197150	1197200	1197250	1197300	1197350
Ratio factor	37 : 1	37 : 1	37 : 1	37 : 1	37 : 1	36 : 1	36 : 1	50 : 1
Turns number for closing / opening	9.25	9.25	9.25	9.25	9.25	9	9	12.5
Input torque (Nm)	9	9	9	9	9	18.5	18.5	32
Output torque (Nm)	250	250	250	250	250	500	500	1200

DN	400	450	500	600
Ref.	1197400	1197451	1197501	1197601
Ratio factor	50 : 1	38 : 1	55 : 1	52 : 1
Turns number for closing / opening	12.5	9.5	13.75	13
Input torque (Nm)	32	56.8	64	115.4
Output torque (Nm)	1200	1620	2640	4500

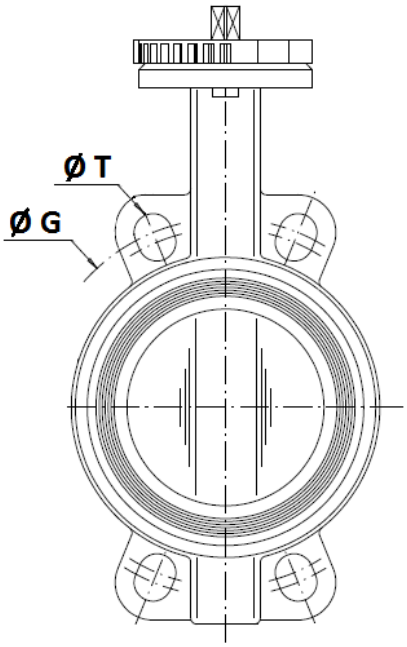
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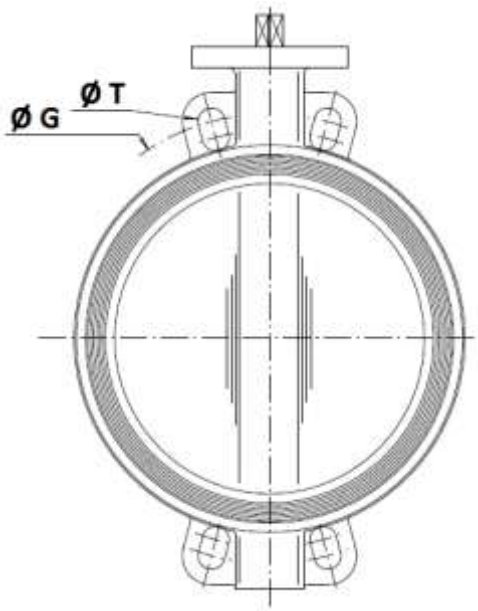
CONCENTRIC WAFER BUTTERFLY VALVE EXCELLENCE RANGE TTV
STAINLESS STEEL BODY AND DISC WITH EPDM SEAT

BETWEEN FLANGES SIZE (in mm) :

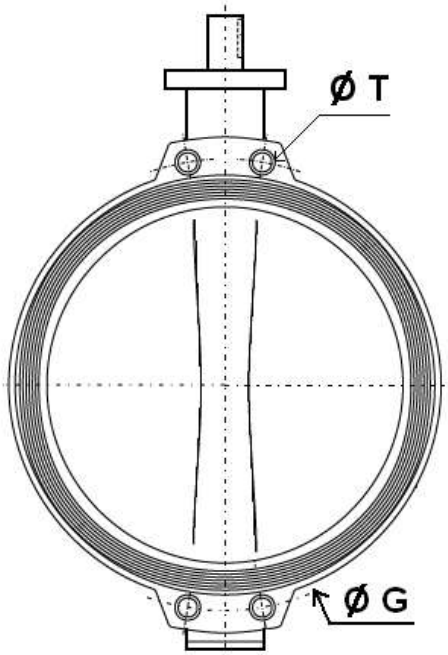
DN 32-200



DN250 – 400



DN450-600



	DN (mm)	32	40	50	65	80	100	125	150	200	250	300	350	400
	NPS (")	1"1/4	1"1/2	2"	2"1/2	3"	4"	5"	6"	8"	10"	12"	14"	16"
PN10	Ø G	100	110	125	145	160	180	210	240	295	350	400	460	515
	Ø T	18	18	18	18	18	18	18	23	23	23	23	23	27
PN16	Ø G	100	110	125	145	160	180	210	240	295	355	410	470	525
	Ø T	18	18	18	18	18	18	18	23	23	27	27	27	30
Class 150	Ø G	88.9	98.5	120.6	139.7	152.4	190.5	215.9	241.3	298.5	362	431.8	476.3	539.8
	Ø T	16	16	19	19	19	19	23	23	23	26	26	29	29

	DN (mm)	450	500	600
	NPS (")	18"	20"	24"
PN10	Ø G	565	620	725
	Ø T	M24	M24	M27
PN16	Ø G	585	650	770
	Ø T	M27	M30	M33
Class 150	Ø G	577.9	635	749.3
	Ø T (BSW)*	1 1/8"	1 1/8"	1 1/4"
	Ø T (Metric)	M30	M30	M33

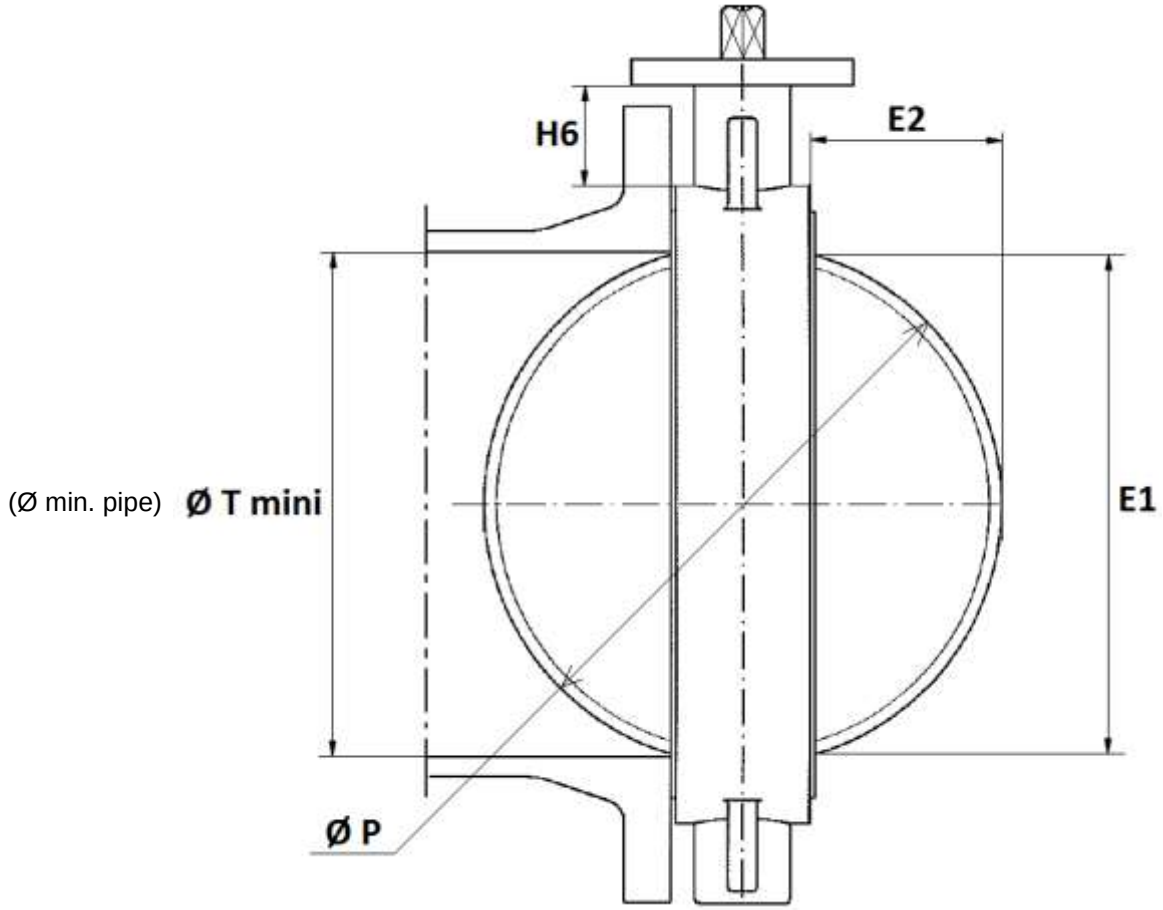
* Threaded BSW on standard, on request metric threaded for Class 150

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CONCENTRIC WAFER BUTTERFLY VALVE EXCELLENCE RANGE TTV
STAINLESS STEEL BODY AND DISC WITH EPDM SEAT

NECK AND DISC SIZE (in mm) :



DN	32/40	50	65	80	100	125	150	200	250	300	350	400	450	500	600
E1	23	24.5	46	65	85	109	136	188	238	289	331	385	424	479	575
E2	3.5	3.5	9.5	17	24	33.5	45.5	69	90	110.5	131	148	162.5	184	221
H6	76	82	80	80	88	93	89	99	71	76	69	80	96	119	127
Ø T mini	26	27.5	49	68	88	112	139	191	241	292	334	388	427	482	578
Ø P	40	50	65	80	100	123	147	198	248	299	340	398	439	495	596

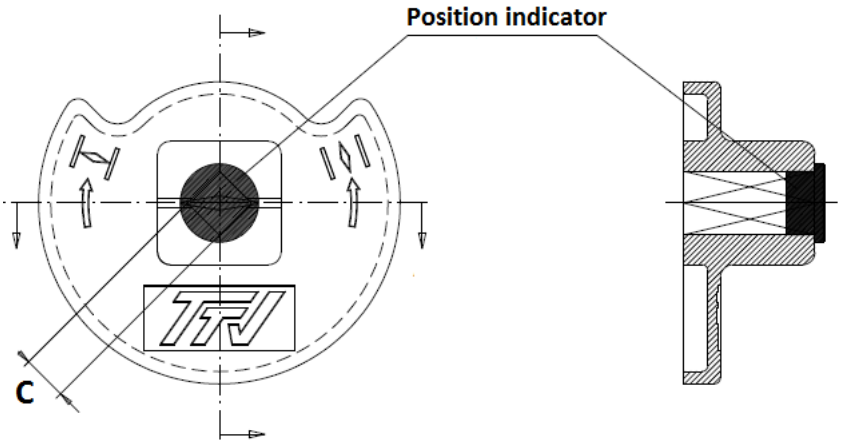
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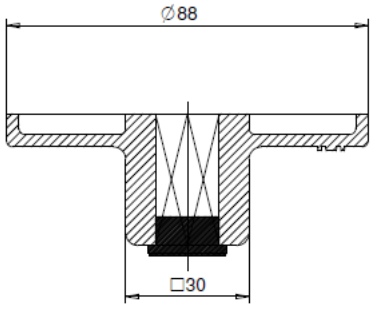
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CONCENTRIC WAFER BUTTERFLY VALVE EXCELLENCE RANGE TTV
STAINLESS STEEL BODY AND DISC WITH EPDM SEAT

SIZE (in mm) :

- **Square lever for special key (30x30 mm) :**





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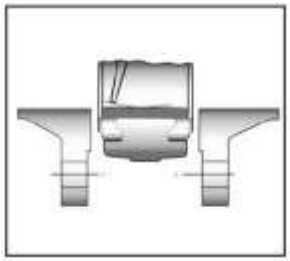
PA 281

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STAINLESS STEEL BODY AND DISC WITH EPDM SEAT

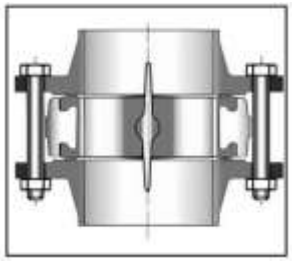
STANDARDS :

- Manufacturer certified ISO 9001 : 2015
- Designing according to ISO 10631 and EN 593
- DIRECTIVE 2014/68/EU : For liquids or Gas of Group 1
  - DN32-50 : Risk category I, CE marking
  - DN65-200 : Risk category II, CE0094 marking
  - DN250-300 : Risk category III, CE0094 marking
  - DN350 : Risk category II, CE0094 marking
  - DN400-600 : Risk category III, CE0094 marking
- Certificate 3.1 on request
- Pressure tests according to EN 12266-1, Rate A
- Between flanges according to EN 1092-1 PN10/16
- ISO 5211 mounting pad
- Length according to :
  - ISO 5752 short series 20
  - EN 558 series 20 (NF 29305)
  - BS 5155 series 4
  - DIN 3202 part 3, series K1
  - API 609 Table 1 up to DN600
  - ASME B16.10 Table 8 column 3 up to DN350, column 4 from DN400 to 600
- ATEX Group II Category 2 G/2D Zone 1 & 21 Zone 2 &22 (on request)
- The valves are suitable for use in a safety instrumented system up to SIL 2 in low demand mode. Under consideration of the minimum required hardware fault tolerance HFT= 1 the valves may be used in a redundant architecture up to SIL 3.
- Approval certificate **Marine BUREAU VERITAS on request**

INSTALLATION INSTRUCTIONS :



Half open valve introduction



Complete opened disc valves when screw tightening

