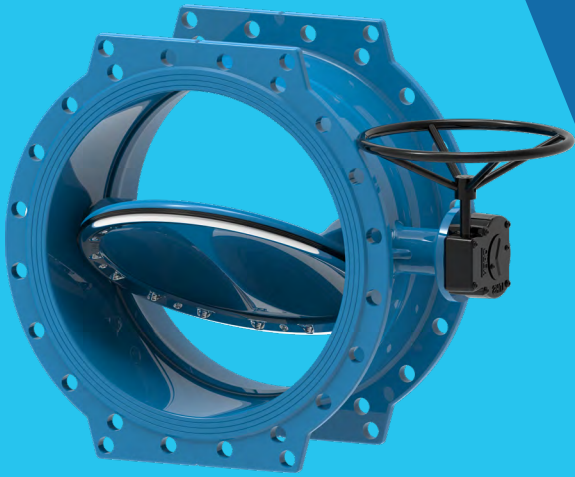




Waterworks

BTF-E Series

DOUBLE ECCENTRIC BUTTERFLY VALVE

Waterworks Product Catalog

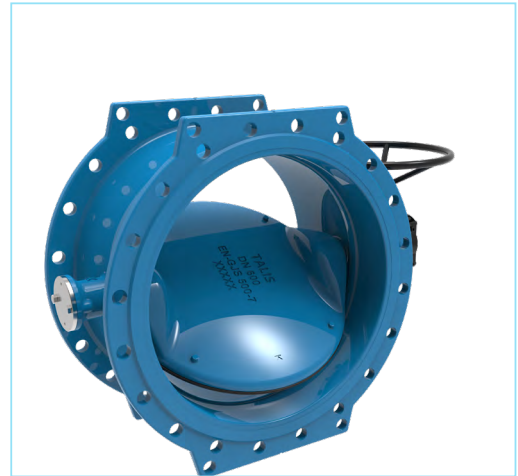
RAPHAEL VALVES INDUSTRIES

BTF-E

DOUBLE ECCENTRIC BUTTERFLY VALVES

RAPHAEL's double eccentric butterfly valve embodies the core attributes of an effective butterfly valve, especially tailored for situations where cost-effectiveness is of utmost importance.

The BTF-E is both functional and dependable, offering streamlined simplicity. It caters to the requirements of standard applications for drinking water, encompassing design, materials, and standards.



APPLICATIONS



Water
Treatment



Water
Distribution



Water
Transmission

TECHNICAL DATA

Nominal diameter (DN): DN200 - DN1800

Nominal pressure (PN): PN10 & PN16

Double eccentric butterfly valve acc. to design standards:

EN 593 and EN1074-1/2

Face-to-face dimension acc. to EN558 series 13 and series 14

Flange Drilling acc. to EN 1092-2

Medium: Drinking water

Temperature: min. -10°C, max. +50°C

Coating: Epoxy min. 250 µm

Actuation types

Handwheel or square cap

Prepared for electric actuation with handwheel

Electric actuation

Adapted for pneumatic actuation

Gearbox enclosure IP67

Optional IP68 for submerged conditions or buried service

ADVANTAGES

- └ **ESSENTIAL:** Design and material selection are optimized for use in low and medium pressure drinking water applications.
- └ **DURABLE:** Uninterrupted corrosion protection with pin-less connection and closed disc eyes ensure long service life and clean water.
- └ **EFFICIENT:** Flow-efficient design for minimized head loss and low energy consumption significantly reduces the cost of ownership.

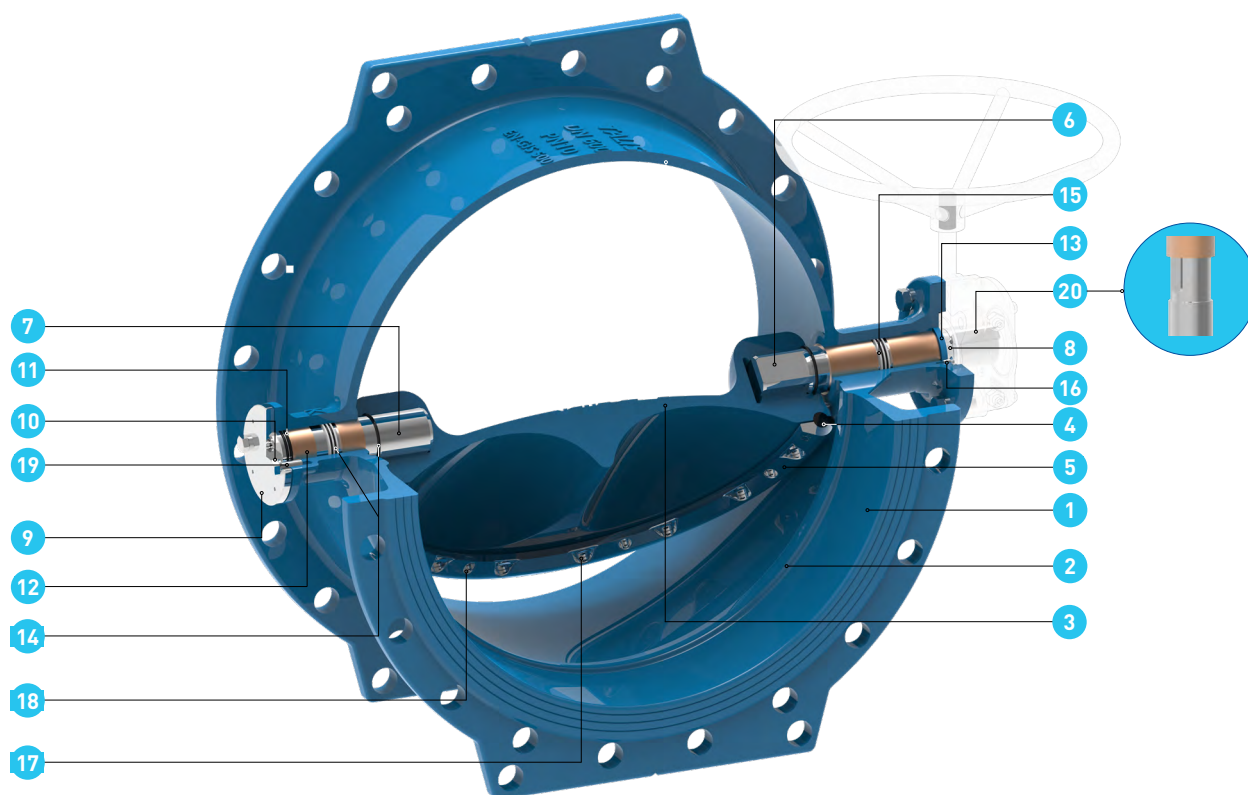
CHARACTERISTICS

- └ **Economic solution** providing all required features for standard drinking water applications.
- └ **Long service life** due to uninterrupted corrosion protection and high quality components.
- └ **Clean drinking water by using** certified high quality components
- └ **100% tested** according to EN 12266-1

APPROVALS

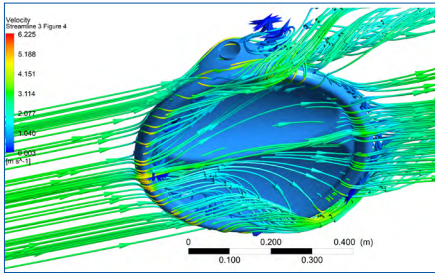
- └ WRAS, ACS, CNAS

MAIN COMPONENTS



POS.	DESCRIPTION	MATERIAL - STANDARD	OPTIONAL	SPARE PART	WATER CONTACT
1	Body	EN-GJS-500-7, epoxy coated 250µm	300µm		x
2	Seat area	Integral, epoxy coated	Welded stainless steel AISI 309L		x
3	Disc	EN-GJS-500-7, epoxy coated 250µm	300µm		x
4	Sealing ring	EPDM	NBR	x	x
5	Retaining ring	CF8	CF8M, AISI 316Ti		x
6	Drive shaft	AISI 420	AISI 431, Duplex		x
7	Shaft	AISI 420	AISI 431, Duplex		x
8	Drive side cover	AISI 304			
9	End cover	AISI 304			
10	Spacer	AISI 304			
11	Washer	POM			
12	Bush	Self-lubricating steel + PTFE coated	Bronze + PTFE coated		x
13	U-ring	NBR		x	
14	O-ring	EPDM	NBR	x	x
15	Washer	PTFE		x	x
16	Screws	A2			
17	Screws	A2			x
18	Set screws	A2			
19	Screws	A2			
20	Key	C45			

BENEFITS & FEATURES



1: Flow-efficient design

- Disc design and inner body diameter are designed for maximum flow
- Low energy consumption due to minimized head loss
- Reduced total cost of ownership



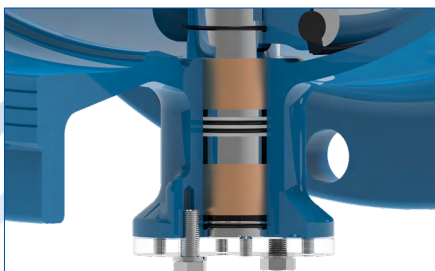
2: Optimized for drinking water

- Materials in contact with water are certified high quality
- WRAS and ACS approval on components and full product
- Corrosion protection and stainless steel components ensure clean water



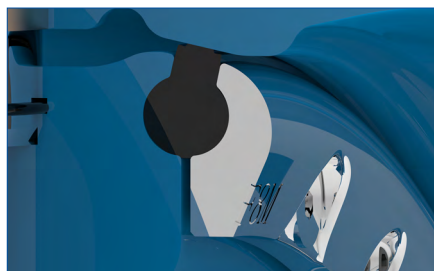
3: Uninterrupted corrosion protection

- Shaft-disc connection by means of a square shaft without pins
- Closed disc eyes
- 250 µm epoxy coating
- Clean water and high durability



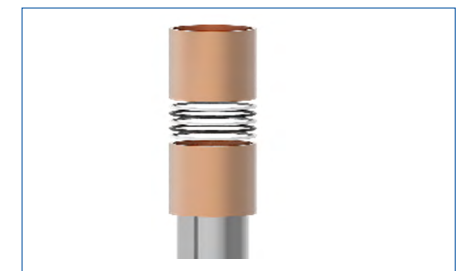
4: Adjustable disc position

- Lower cover design allows axial adjusting of disc position over time for vertical installations
- Easy maintenance without disassembling the valve



5: Low-wear sealing ring

- Saw-tooth profile for self-sealing effect and low friction
- Wearing is compensated by compressing the sealing ring over time
- High durability



6: Self-lubricating bushes

- Self-lubricating bushes of steel + bronze
- PTFE coated
- Without lead
- Maintenance-free

ENERGY EFFICIENCY

B7 Series contributes to an overall optimized hydraulic system for a low consumption of energy.

Key figures are Kv and z (zeta) values:

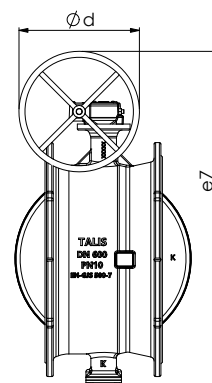
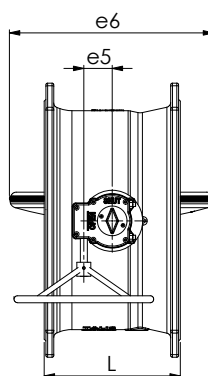
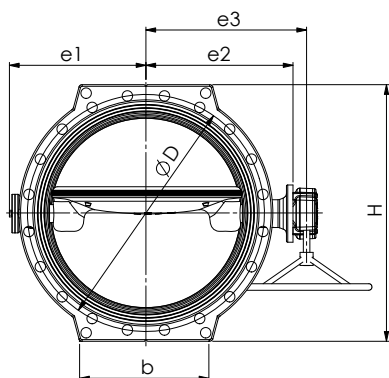
- The Kv-factor of a valve indicates the water flow in m³/h at a pressure drop across the valve of 1 kg/cm² at 5-30°C when the valve is 100% open.
- The head loss coefficient z (zeta) or resistance coefficient is a dimensionless measure in fluid mechanics reflecting the resistance in a certain hydraulic element.
- High Kv factors and low zeta values mean reduced pressure losses and smaller pump capacities.

BTF-E valves minimize total cost of ownership

DN	PN10		PN16	
	Kv m ³ /h	z (zeta)	Kv m ³ /h	z (zeta)
200	1,517	0.90	1,412	0.85
250	2,472	0.83	2,108	0.82
300	5,138	0.49	5,291	0.46
350	7,941	0.38	7,465	0.43
400	10,371	0.38	10,238	0.39
450	13,302	0.37	13,302	0.37
500	16,649	0.36	15,639	0.41
600	27,684	0.27	25,509	0.32
700	40,826	0.23	33,778	0.34
800	55,806	0.21	44,118	0.34
900	60,260	0.23	58,068	0.25
1000	74,395	0.23	69,258	0.27
1200	111,503	0.22	105,928	0.24
1400	175,246	0.16	145,814	0.23
1600	217,147	0.18	207,041	0.20
1800	232,271	0.25	241,039	0.23

DIMENSIONS & WEIGHT

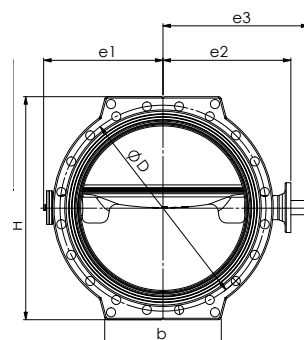
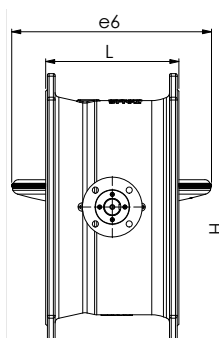
DOUBLE ECCENTRIC BUTTERFLY VALVE - BTF-E WITH HANDWHEEL



DN	PN	Weight	D	d	e1	e2	e3	L	e5	e6	e7	H	b
		kg	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
300	10	61	400	300	235	270	298	270	55	280	683	445	150
	16	67	410	300	243	288	322	270	55	280	715	460	150
350	10	80	460	300	265	310	344	290	55	330	759	505	180
	16	88	470	300	272	315	349	290	55	330	771	520	180
400	10	102	515	300	295	340	374	310	55	375	819	565	200
	16	119	525	300	307	359	397	310	69	375	854	580	200
450	10	149	565	300	347	385	423	330	69	430	920	640	275
	16	149	585	300	347	385	423	330	69	430	920	640	275
500	10	161	620	400	350	410	452	350	69	480	1002	670	368
	16	197	650	400	373	410	452	350	81	480	1025	715	368
600	10	235	725	400	400	455	497	390	81	580	1097	780	400
	16	315	770	400	428	504	555	390	104.5	580	1183	840	400
700	10	352	840	400	480	550	601	430	104.5	675	1281	895	430
	16	408	840	400	497	555	616	430	53	675	1313	910	430
800	10	494	950	500	540	600	661	470	53	780	1451	1022	450
	16	569	950	500	555	600	661	470	53	780	1466	1030	450
900	10	652	1050	500	592	647	708	510	53	880	1550	1115	510
	16	660	1050	600	626	665	730	510	130	880	1656	1125	536
1000	10	893	1160	600	678	717	782	550	130	982	1760	1230	560
	16	1158	1170	600	701	772	850	550	140	982	1851	1255	560
1200	10	1568	1380	600	799	865	943	630	140	1171	2042	1455	655
	16	1771	1390	600	822	930	1027	630	140	1171	2149	1485	655
1400	10	2008	1590	500	920	1025	1122	710	182	1375	2292	1675	755
	16	2337	1590	600	973	1055	1163	710	209	1375	2436	1685	755
1600	10	3125	1820	600	1061	1180	1288	790	209	1569	2649	1915	900
	16	3702	1820	600	1104	1215	1327	790	256	1569	2731	1930	900
1800	10	4617	2020	600	1195	1286	1398	870	256	1776	2893	2115	1013
	16	5209	2020	800	1198	1335	1434	870	246	1776	3032	2130	1013

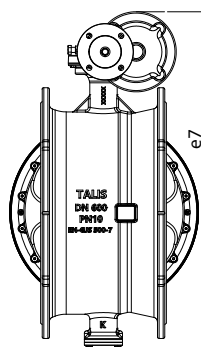
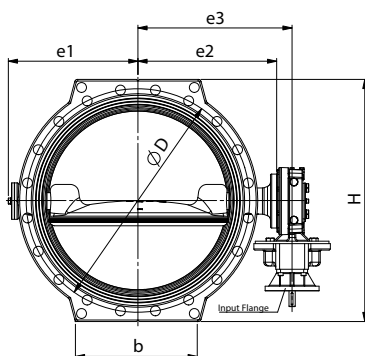
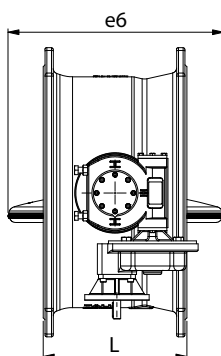
DIMENSIONS & WEIGHT

DOUBLE ECCENTRIC BUTTERFLY VALVE - BTF-E BARE SHAFT AND SQUARE SHAFT PREPARED FOR PNEUMATIC ACTUATOR



DN	PN	Weight	D	e1	e2	e3	L	e6	H	b	For gearbox / electric actuator		For pneumatic actuator
		kg									Round shaft Ø mm	Key	Square shaft mm
300	10	57	400	235	270	307.5	270	280	445	150	28	A8x32	22 x 22
	16	62	410	243	288	339	270	280	460	150	28	A8x45	27 x 27
350	10	75	460	265	310	361	290	330	505	180	28	A8x45	27 x 27
	16	83	470	272	315	366	290	330	520	180	36	A10x45	27 x 27
400	10	97	515	295	340	391	310	375	565	200	36	A10x45	27 x 27
	16	112	525	307	359	410	310	375	580	200	42	A12x56	36 x 36
450	10	142	565	347	385	447	330	430	640	275	42	A12x56	36 x 36
	16	142	585	347	385	447	330	430	640	275	42	A12x56	36 x 36
500	10	154	620	350	410	471	350	480	670	368	42	A12x56	36 x 36
	16	188	650	373	410	472	350	480	715	368	50	A14x56	36 x 36
600	10	226	725	400	455	517	390	580	780	400	50	A14x56	36 x 36
	16	292	770	428	504	582	390	580	840	400	60	A18x70	46 x 46
700	10	329	840	480	550	627	430	675	895	430	60	A18x70	46 x 46
	16	380	840	497	555	632	430	675	910	430	72	A20x70	46 x 46
800	10	466	950	540	600	677	470	780	1022	450	72	A20x70	46 x 46
	16	541	950	555	600	708	470	780	1030	450	80	A22x100	55 x 55
900	10	628	1050	592	647	756	510	880	1115	510	80	A22x100	55 x 55
	16	721	1050	626	665	772	510	880	1125	536	80	A22x100	55 x 55
1000	10	861	1160	678	717	827	550	982	1230	560	80	A22x100	55 x 55
	16	1109	1170	701	772	895	550	982	1255	560	100	A28x100	75 x 75
1200	10	1519	1380	799	865	988	630	1171	1455	655	100	A28x100	75 x 75
	16	1708	1390	822	930	1051	630	1171	1485	655	100	A28x110	75 x 75
1400	10	1945	1590	920	1025	1145	710	1375	1675	755	100	A28x110	75 x 75
	16	2202	1590	973	1055	1215	710	1375	1685	755	157	A40x140	-
1600	10	2990	1820	1061	1180	1340	790	1569	1915	900	157	A40x140	-
	16	3482	1820	1104	1215	1382	790	1569	1930	900	157	A40x140	-
1800	10	4397	2020	1195	1286	1453	870	1776	2115	1013	157	A40x140	-
	16	4987	2020	1198	1335	1495	870	1776	2130	1013	157	A40x140	-

DOUBLE ECCENTRIC BUTTERFLY VALVE - BTF-E WITH GEARBOX PREPARED FOR ELECTRIC ACTUATOR



DN	PN	Weight	D	d	e1	e2	e3	L	e6	e7	H	b
		kg	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
300	10	68	400	300	235	270	319	270	280	704	445	150
	16	84	410	200	243	288	337	270	280	680	460	150
350	10	86	460	300	265	310	360	290	330	775	505	180
	16	105	470	200	272	315	365	290	330	737	520	180
400	10	119	515	300	295	340	390	310	375	835	565	200
	16	134	525	300	307	359	409	310	375	866	580	200
450	10	164	565	300	347	385	435	330	430	932	640	275
	16	172	585	300	347	385	435	330	430	932	640	275
500	10	184	620	300	350	410	460	350	480	960	670	368
	16	218	650	300	373	410	470	350	480	993	715	368
600	10	256	725	300	400	455	515	390	580	1065	780	400
	16	345	770	300	428	504	554	390	580	1132	840	400
700	10	382	840	300	480	550	600	430	675	1230	895	430
	16	433	840	300	497	555	605	430	675	1252	910	430
800	10	524	950	300	540	600	669	470	780	1359	1022	450
	16	620	950	300	555	600	670	470	780	1375	1030	450
900	10	655	1050	300	592	647	723	510	880	1465	1115	510
	16	766	1050	300	626	665	745	510	880	1521	1125	536
1000	10	906	1160	300	678	717	797	550	982	1625	1230	560
	16	1165	1170	300	701	772	865	550	982	1716	1255	560
1200	10	1575	1380	300	799	865	958	630	1171	1907	1455	655
	16	1801	1390	600	822	930	1047	630	1171	2169	1485	655
1400	10	2038	1590	600	920	1025	1162	710	1375	2382	1675	755
	16	2337	1590	600	973	1055	1183	710	1375	2456	1685	755
1600	10	3125	1820	600	1061	1180	1308	790	1569	2669	1915	900
	16	3702	1820	1000	1104	1215	1347	790	1569	2951	1930	900
1800	10	4617	2020	1000	1195	1286	1418	870	1776	3113	2115	1013
	16	5209	2020	1000	1198	1335	1454	870	1776	3152	2130	1013

GEARBOX & ACTUATOR SIZING

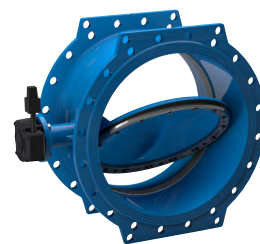
OPERATION WITH HANDWHEEL

STANDARD GEARBOX, CLOCKWISE CLOSING, IP67



DN	PN	Torque at shaft Nm	Connection ISO 5211 - Shaft Ø mm	Gearbox size	Ratio:1	Number of turns	Handwheel Ø mm	Max. input torque at gearbox Nm
300	10	610	F10 - 28	242-30S	40	10	300	650
	16	760	F12 - 28	242-40S	40	10	300	1200
350	10	650	F12 - 28	242-30M	40	10	300	650
	16	850	F12 - 36	242-40S	40	10	300	1200
400	10	740	F12 - 36	242-40S	40	10	300	1200
	16	930	F14 - 42	242-40M	40	10	300	1200
450	10	1000	F14 - 42	242-40M	40	10	300	1200
	16	1200	F14 - 42	242-40M	40	10	300	1200
500	10	1420	F14 - 42	242-45M	50	13	400	2000
	16	1780	F14 - 50	242-45M	50	13	400	2000
600	10	1710	F14 - 50	242-45M	50	13	400	2000
	16	2140	F16 - 60	AB1250N	55	14	400	3250
700	10	2770	F16 - 60	AB1250N	55	14	400	3250
	16	3250	F16 - 72	AB2000N	109	27	500	4500
800	10	3520	F16 - 72	AB2000N	109	27	500	4500
	16	4400	F25 - 80	AB2000NLB	109	27	500	4500
900	10	4440	F25 - 80	AB2000NLB	109	27	500	4500
	16	6300	F25 - 80	AB1950N/PR4	217	54	600	7000
1000	10	6600	F25 - 80	AB1950N/PR4	217	54	600	7000
	16	9000	F30 - 100	AB3000NLB/PR4	243	61	600	9000
1200	10	8400	F30 - 100	AB3000NLB/PR4	243	61	600	9000
	16	10200	F30 - 100	AB3000NLB/PR6	348	87	600	11000
1400	10	15000	F30 - 100	AB6800N/PR6	468	117	500	17000
	16	17400	F35 - 157	A200N/PR10	729	182	600	26000
1600	10	18600	F35 - 157	A200N/PR10	729	182	600	26000
	16	21000	F40 - 157	A250N/PR10	729	182	600	32000
1800	10	30000	F40 - 157	A250N/PR10	729	182	600	32000
	16	39000	F48 - 157	HOW8-MPR19	1229	307	800	39000

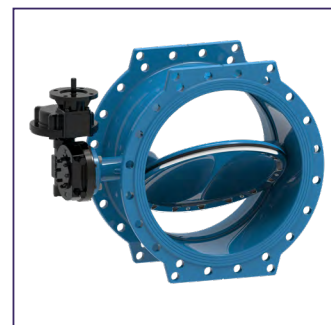
OPERATION WITH HANDWHEEL OR SQUARE CAP
OPTIONAL GEARBOX, ANTI-CLOCKWISE CLOSING AND/OR IP68



DN	PN	Torque at shaft Nm	Connection ISO 5211 - Shaft Ø mm	Gearbox size	Ratio:1	Number of turns	Handwheel Ø mm	Max. input torque at gearbox Nm
300	10	610	F10 - 28	AB550W	34	9	300	1000
	16	760	F12 - 28	AB550W	34	9	300	1000
350	10	650	F12 - 28	AB550W	34	9	300	1000
	16	850	F12 - 36	AB550W	34	9	300	1000
400	10	740	F12 - 36	AB550W	34	9	300	1000
	16	930	F14 - 42	AB880W	38	10	300	2000
450	10	1000	F14 - 42	AB880W	38	10	300	2000
	16	1200	F14 - 42	AB880W	38	10	300	2000
500	10	1420	F14 - 42	AB880W	38	10	300	2000
	16	1780	F14 - 50	AB880W	38	10	400	2000
600	10	1710	F14 - 50	AB880W	55	14	400	2000
	16	2140	F16 - 60	AB1250W	55	14	400	3250
700	10	2770	F16 - 60	AB1250W	55	14	400	3250
	16	3250	F16 - 72	AB2000W	109	27	500	4500
800	10	3520	F16 - 72	AB2000W	109	27	500	4500
	16	4400	F25 - 80	AB2000WLB	109	27	500	4500
900	10	4440	F25 - 80	AB2000WLB	109	27	500	4500
	16	6300	F25 - 80	AB1950W/PR4	217	54	600	7000
1000	10	6600	F25 - 80	AB1950W/PR4	217	54	600	7000
	16	9000	F30 - 100	AB3000WLB/PR4	243	61	600	9000
1200	10	8400	F30 - 100	AB3000WLB/PR4	243	61	600	9000
	16	10200	F30 - 100	AB3000WLB/PR6	348	87	600	11000
1400	10	15000	F30 - 100	AB6800W/PR6	468	117	500	17000
	16	17400	F35 - 157	A200W/PR10	729	182	600	26000
1600	10	18600	F35 - 157	A200W/PR10	729	182	600	26000
	16	21000	F40 - 157	A250W/PR10	729	182	600	32000
1800	10	30000	F40 - 157	A250W/PR10	729	182	600	32000
	16	39000	F48 - 157	HOW8-MPR19	1229	307	800	39000

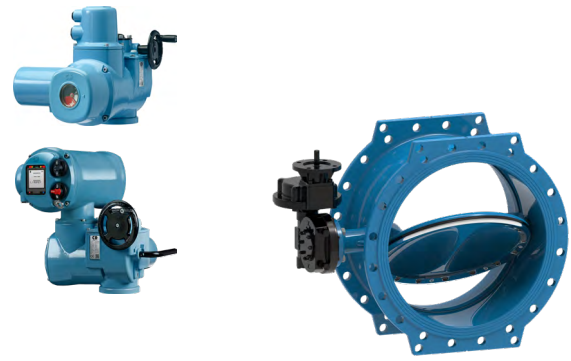
GEARBOX & ACTUATOR SIZING

GEARBOX PREPARED FOR ELECTRIC ACTUATOR



DN	PN	Torque at shaft Nm	Connection ISO 5211 at valve - Shaft Ø mm	Connection ISO 5210 at gearbox - Shaft Ø mm	Gearbox size (Rotork)	Handwheel Ø mm	Ratio:1	Number of turns	Mechanical Advantage	Torque at gearbox Nm	Max. motorized input torque Nm	Required torque at gearbox Nm
300	10	610	F10 - 28	F10 - 20	IW3	300	48	12	15	1085	72	41
	16	760	F12 - 28	F10 - 20	IW3	300	48	12	15	1085	72	51
350	10	650	F12 - 28	F10 - 20	IW3	300	48	12	15	1085	72	43
	16	850	F12 - 36	F10 - 20	IW3	300	48	12	15	1085	72	57
400	10	740	F12 - 36	F10 - 20	IW3	300	48	12	15	1085	72	49
	16	930	F14 - 42	F10 - 20	IW4	300	46	12	16	2440	153	58
450	10	1000	F14 - 42	F10 - 20	IW4	300	92	23	30	2440	81	33
	16	1200	F14 - 42	F10 - 20	IW4	300	92	23	30	2440	81	40
500	10	1420	F14 - 42	F10 - 20	IW4	300	92	23	30	2440	81	47
	16	1780	F14 - 50	F10 - 20	IW4	300	92	23	30	2440	81	59
600	10	1710	F14 - 50	F10 - 20	IW4	300	92	23	30	2440	81	57
	16	2140	F16 - 60	F10 - 20	IW5	300	192	48	61	4447	73	35
700	10	2770	F16 - 60	F10 - 20	IW5	300	192	48	61	4447	73	45
	16	3250	F16 - 72	F10 - 20	IW5	300	192	48	61	4447	73	53
800	10	3520	F16 - 72	F10 - 20	IW5	300	192	48	61	4447	73	58
	16	4400	F25 - 80	F10 - 20	IW6	300	304	76	97	9924	102	45
900	10	4440	F25 - 80	F10 - 20	IW6	300	304	76	97	9924	102	46
	16	6300	F25 - 80	F10 - 20	IW6	300	385	96	122	9924	81	52
1000	10	6600	F25 - 80	F10 - 20	IW6	300	385	96	122	9924	81	54
	16	9000	F30 - 100	F10 - 20	IW6	300	456	114	145	9924	68	62
1200	10	8400	F30 - 100	F10 - 20	IW6	300	456	114	145	9924	68	58
	16	10200	F30 - 100	F10 - 20	IW72	600	505	126	158	20000	127	65
1400	10	15000	F30 - 100	F10 - 20	IW72	600	505	126	158	20000	127	95
	16	17400	F35 - 157	F10 - 20	IW8	600	572	143	174	32000	184	100
1600	10	18600	F35 - 157	F10 - 20	IW8	600	572	143	174	32000	184	107
	16	21000	F40 - 157	F14 - 30	IW8	1000	768	192	233	32000	137	90
1800	10	30000	F40 - 157	F14 - 30	IW8	1000	505	126	153	32000	209	196
	16	39000	F48 - 157	F14 - 30	IW86	1000	572	143	174	44500	256	224

OPERATION WITH ELECTRIC ACTUATOR



DN	PN	Rotork actuator size	Rotork speed RPM	Operating time Rotork s	Actuator torque Rotork Nm	Motorized output torque Rotork Nm	Auma actuator size	Auma speed RPM	Operating time Auma s	Actuator torque Auma Nm	Motorized output torque Auma Nm
300	10	CK60	24	30	60	900	SA 07.6	32	23	60	900
	16	CK60	24	30	60	900	SA 07.6	63	11	60	900
350	10	CK60	24	30	60	900	SA 07.6	32	23	60	900
	16	CK60	24	30	60	900	SA 07.6	63	11	60	900
400	10	CK60	24	30	60	900	SA 07.6	63	11	60	900
	16	CK60	24	29	60	960	SA 07.6	63	11	60	960
450	10	CK60	24	58	60	1800	SA 07.6	63	22	60	1800
	16	CK60	24	58	60	1800	SA 07.6	63	22	60	1800
500	10	CK60	24	58	60	1800	SA 07.6	63	22	60	1800
	16	CK60	24	58	60	1800	SA 07.6	63	22	60	1800
600	10	CK60	24	58	60	1800	SA 07.6	63	22	60	1800
	16	CK60	24	120	60	3660	SA 07.6	90	32	60	3660
700	10	CK60	24	120	60	3660	SA 07.6	90	32	60	3660
	16	CK60	24	120	60	3660	SA 07.6	90	32	60	3660
800	10	CK60	24	120	60	3660	SA 07.6	90	32	60	3660
	16	CK60	24	190	60	5820	SA 07.6	90	51	60	5820
900	10	CK60	24	190	60	5820	SA 07.6	90	51	60	5820
	16	CK60	24	241	60	7320	SA 07.6	90	64	60	7320
1 000	10	CK60	24	241	60	7320	SA 07.6	90	64	60	7320
	16	CK60	24	285	60	8700	SA 07.6	90	76	60	8700
1 200	10	CK60	24	285	60	8700	SA 07.6	90	76	60	8700
	16	CK120	24	316	120	18960	SA 10.2	90	84	120	18960
1 400	10	CK120	24	316	120	18960	SA 10.2	90	84	120	18960
	16	CK120	24	358	120	20880	SA 10.2	90	95	120	20880
1 600	10	CK120	24	358	120	20880	SA 10.2	90	95	120	20880
	16	CK250	24	480	250	58250	SA 14.2	63	183	250	58250
1 800	10	CK250	24	316	250	38250	SA 14.2	63	120	250	38250
	16	CK250	24	316	250	43500	SA 14.2	63	120	250	43500

RAPHAEL, founded in 1949, is the first Israeli manufacturer of water control valves. RAPHAEL's research department constantly strives to introduce new and innovative products and solutions for water control systems including water works, fire-protection and irrigation systems.



Waterworks



Fire Protection



Irrigation



Smart Solutions



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