High Performance Butterfly Valve Specification
WKM DynaCentric Butterfly Valve

General: The valve shall be of the ¼ turn double offset design meeting the applicable requirements of ANSI B16.34, API Std. 609 Category B and MSS SP-68. The valve shall operate clock-wise to close. The thermo-plastic seated valves shall be capable of drop tight closure from either direction at full ANSI pressure ratings. Metal seated valves shall be capable of sealing at a minimum FCI 70-2 class IV leak rate. Lug valves shall be capable of end-of-line service to full ANSI pressure ratings. Fire tested valves shall meet the requirements of API 607 4th edition from either direction. Valves for use in H2S service are to be in accordance with NACE MR-01-75, 2002. Valves shall be suitable for all types of flanges gaskets including API 607 spiral wound.

Body: The valves shall be available with flangeless wafer or tapped lug bodies. Semi-lug style bodies are not allowed for any service. Bodies shall be made from carbon steel or CF8M stainless steel. Body lay lengths shall conform to API 609 and MSS SP68 dimensions. Castings shall meet MSS SP-55 quality standard for steel castings. Flange gasket surfaces shall be serrated and shall be 125 to 250 µ inch in accordance with MSS SP-6, MSS SP-44 and ANSI B16.5. Bodies shall have an integral internal stop for positive alignment in the closed position.

Disc: All valves shall have a heavy duty eccentric disc with wide sealing area to minimize seat wear. All discs shall be of a corrosion resistant material suitable for the intended service. Disc shall be securely attached to the stem by groove pins. All valves shall be provided with a thrust washer to positively center the disc in the seat bore. Stem/disc springs shall position the disc against the thrust washer while allowing for thermal expansion and providing positive grounding of the disc.

Seat: Valve shall be available with three seat combinations: soft thermoplastic, fire tested and metal-to-metal. All seats are interchangeable without body modifications; other component changes may be required. All seats shall be pressure responsive from either direction. Seats shall be replaceable without removing the disc or stems.

Fire-tested seats shall consist of two separate metallic rings; one on each side of a thermoplastic insert. With the thermoplastic insert in place, the fire-tested seat shall provide drop tight shut-off. When the insert is damaged, burned or absent, leakage is less than allowed by API 607 requirements.

Valve Stem: The valve stem shall be positioned in the body in a double off-set configuration to allow the disc to swing free of the seat in the open position; thereby reducing operating torque and wear on the seat. The valve stem shall be of a corrosion resistant material capable of transmitting operating torque without failure. The valve stem shall be supported by high load, low friction bearings press fitted into the valve body. The valve stem shall have a retention device designed to meet ANSI B16.34 requirements and to preclude blow out of the stem or stem pieces should stem or disc pin failure occur. Stem packing shall consist of a deep stuffing box with a minimum of four TFE “Vee” rings or high temperature compression packing.

Seat Retainer: Seat retainers shall be either of the close tolerance press fit type or shall be held in place by capscrews. Capscrews shall be of the Allen head design and shall be of sufficient strength to retain the seat retainer in end-of-line service with the downstream flange removed. Seat retainer capscrews shall be placed so that flange gaskets are only minimally interrupted as per API 609.

Testing: Valve shall be 100% shell tested to 1½ times rated working pressure. Valve shall be 100% seat tested to 110% of rated working pressure. Testing shall be in accordance with ANSI B16.34 and MSS SP-68.

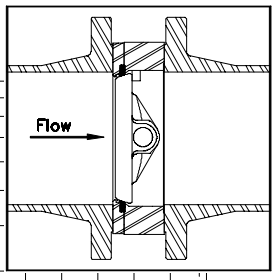
All valves to be designed manufactured by Cameron Valves and Measurement, Oklahoma City, Oklahoma, USA. www.c-a-m.com

WKM DynaCentric
High Performance Butterfly Valve
Torque Requirements with Soft Seats

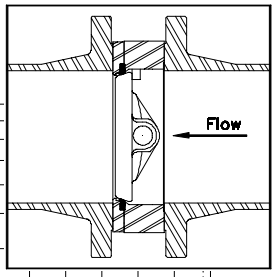
BH-101
12-21-04
Sheet 1

The torque values shown on this sheet are the net required operating torques for actuator sizing. An appropriate safety factor is included for normal wet operating conditions.

S0 Upstream



S0 Downstream



For severe service, additional safety factor should be added:

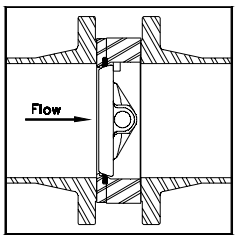
Dry gas or Slurry……1.25

Low Temperature……..1.20

Emergency Shutdown……1.60

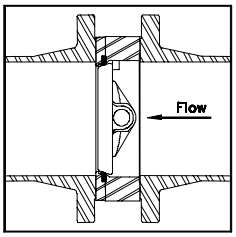
WKM DynaCentric
High Performance Butterfly Valve
Torque Requirements with Soft Seats

The torque values shown in these tables are net required operating torques for actuator sizing. An appropriate safety factor is included for normal wet operating torque.



S0 seats upstream – Valve torque (in.lb.)

	2-1/2"	3"	4"	5"	6"	8"	10"	12"	14"	16"	18"	20"	24"	30"	36"
0-50psi	111	155	348	503	728	1125	2154	3291	4277	6334	8129	11685	15770	23040	36030
100psi	136	190	395	583	860	1290	2430	3790	5050	7469	9533	13556	18540	26980	44450
200psi	179	250	490	737	1110	1600	2990	4790	6610	9740	12340	17297	24080	35390	61520
285psi	214	300	570	871	1330	1900	3460	5640	7930	11670	14726	20477	28790	43200	75000
300psi	225	315	590	899	1370	1950	3550	5790	8160	12010	15147	21038	29620		
400psi	271	380	680	1053	1630	2280	4100	6800	9720	14281	17955	24780	35160		
500psi	318	445	780	1250	1880	2610	4660	7800	11270	16551	20762	28521	40700		
600psi	364	510	875	1368	2140	2940	5220	8800	12820	18821	23570	32262	46240		
700psi	411	575	970	1526	2400	3270	5780	9800	14380	21092	26377	36003	51780		
740psi	429	600	1020	1597	2500	3400	6000	10200	15000	22000	27500	37500	54000		



S0 seats downstream – Valve Torque (in.lb.)

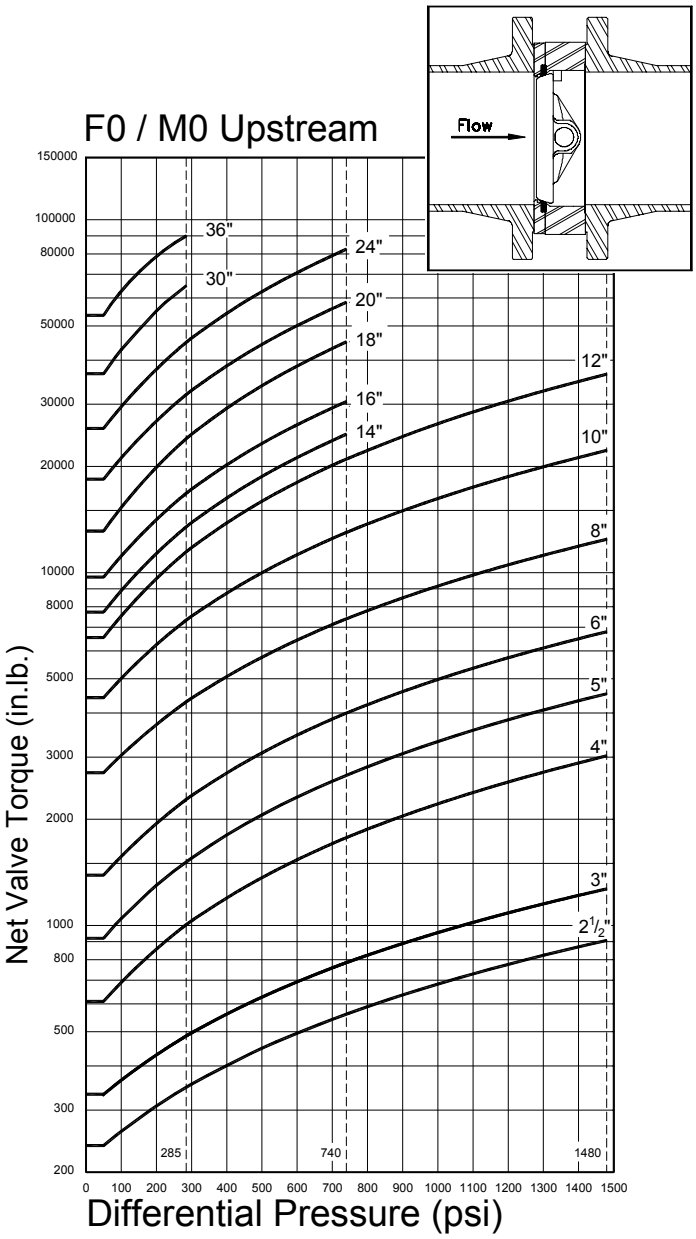
	2-1/2"	3"	4"	5"	6"	8"	10"	12"	14"	16"	18"	20"	24"	30"	36"
0-50psi	111	155	348	503	728	1125	2154	3291	4277	6334	8129	11685	15770	23040	36030
100psi	143	200	419	618	911	1364	2563	4013	5380	7947	10131	14371	19714	30000	46580
200psi	208	291	561	846	1276	1841	3381	5458	7586	11174	14134	19743	27603	43820	70000
285psi	263	368	681	1040	1587	2247	4077	6686	9462	13917	17536	24309	34308	55980	90000
300psi	272	381	702	1074	1642	2319	4200	6903	9793	14401	18137	25114	35491		
400psi	337	472	844	1302	2007	2796	5018	8348	11999	17628	22140	30486	43379		
500psi	402	563	986	1530	2373	3274	5836	9793	14205	20855	26143	35858	51268		
600psi	466	653	1128	1757	2738	3751	6654	11237	16411	24082	30146	41230	59156		
700psi	531	744	1269	1985	3104	4229	7473	12682	18618	27309	34149	46601	67045		
740psi	557	780	1326	2076	3250	4420	7800	13260	19500	28600	35750	48750	70200		

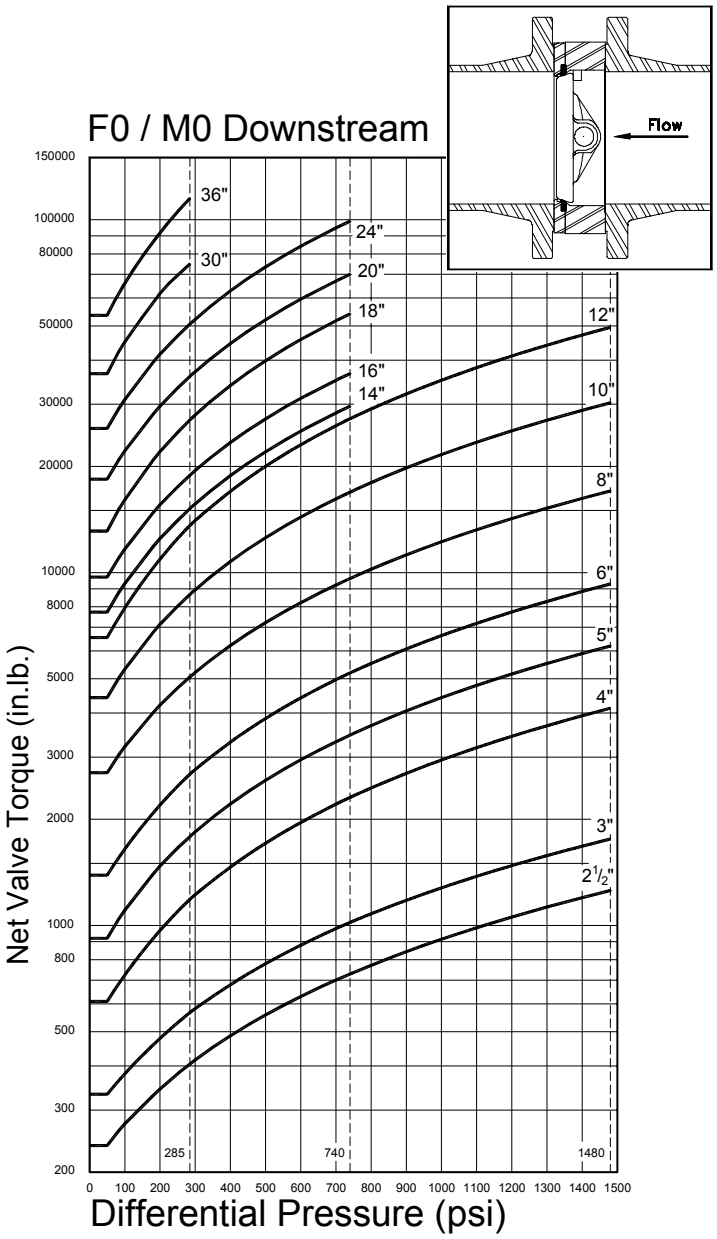
For severe service, additional safety factor should be added:
Dry gas or Slurry……1.25 Low Temperature ……..……..…1.20
Emergency Shutdown……1.60

WKM DynaCentric
High Performance Butterfly Valve
Torque Requirements with Metal Seats

BH-102
2-21-06
Sheet 1

The torque values shown on this sheet are the net required operating torques for actuator sizing. An appropriate safety factor is included for normal wet operating conditions.





For severe service, additional safety factor should be added:

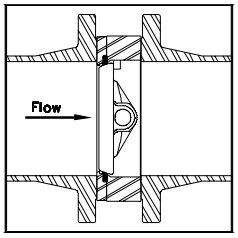
Dry gas or Slurry……1.25	Low Temperature……..1.20
Emergency Shutdown……1.60	High Temperature (600°-700°F)…… 1.30
	Extended High Temp.(750°-1000°F).1.50

WKM DynaCentric
High Performance Butterfly Valve
Torque Requirements with Metal Seats

The torque values shown in these tables are net required operating torques for actuator sizing. An appropriate safety factor is included for normal wet operating torque.

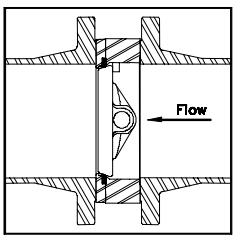
F0/M0 seats upstream – Valve Torque (in.lb.)

	2-1/2"	3"	4"	5"	6"	8"	10"	12"	14"	16"	18"	20"	24"	30"	36"
0-50psi	238	333	609	920	1389	2710	4422	6547	7728	9709	13116	18395	25623	36600	53610
100psi	261	366	694	1046	1578	3050	5043	7595	8956	11218	15432	21289	29746	42805	62660
200psi	308	431	863	1300	1957	3729	6286	9689	11412	14235	20063	27079	37991	55130	78620
285psi	348	487	1006	1514	2278	4307	7343	11470	13500	16800	24000	32000	45000	64980	90000
300psi	355	497	1032	1552	2335	4409	7530	11784	13868	17253	24695	32868	46237		
400psi	401	562	1201	1805	2714	5089	8773	13878	16325	20270	29326	38658	54482		
500psi	449	628	1370	2058	3092	5769	10016	15973	18781	23288	33958	44447	62728		
600psi	495	693	1539	2311	3470	6448	11259	18068	21237	26305	38589	50237	70974		
700psi	542	759	1707	2563	3849	7128	12503	20162	23693	29323	43221	56026	79219		
740psi	561	785	1775	2665	4000	7400	13000	21000	24675	30530	45074	58342	82518		
800psi	589	824	1876	2816	4227	7808	13746	22257							
900psi	636	890	2045	3069	4605	8488	14989	24351							
1000psi	682	955	2214	3322	4984	9167	16232	26446							
1100psi	729	1021	2383	3575	5362	9847	17476	28541							
1200psi	776	1086	2552	3828	5741	10527	18719	30635							
1300psi	823	1152	2721	4080	6119	11206	19962	32730							
1400psi	870	1218	2890	4333	6497	11886	21205	34824							
1480psi	907	1270	3025	4535	6800	12430	22200	36500							



F0/M0 seats downstream – Valve Torque (in.lb.)

	2-1/2"	3"	4"	5"	6"	8"	10"	12"	14"	16"	18"	20"	24"	30"	36"
0-50psi	238	333	609	920	1389	2710	4422	6547	7728	9709	13116	18395	25623	36600	53610
100psi	274	383	733	1105	1665	3211	5326	8051	9314	11660	16085	22135	30942	45080	66020
200psi	344	482	979	1474	2218	4212	7134	11059	12485	15562	22023	29616	41579	61750	91710
285psi	405	567	1188	1787	2687	5063	8672	13615	15181	18880	27070	35974	50621	75000	115000
300psi	416	582	1225	1842	2770	5214	8943	14066	15656	19465	27961	37096	52216		
400psi	487	682	1471	2211	3322	6215	10751	17074	18828	23367	33899	44577	62854		
500psi	558	781	1717	2579	3875	7216	12560	20082	21999	27270	39837	52057	73491		
600psi	629	881	1963	2948	4427	8218	14368	23089	25171	31172	45775	59538	84129		
700psi	701	981	2209	3316	4979	9219	16177	26097	28342	35075	51713	67018	94766		
740psi	729	1021	2308	3464	5200	9620	16900	27300	29611	36636	54088	70011	99021		
800psi	771	1080	2455	3685	5531	10221	17985	29105							
900psi	843	1180	2701	4054	6084	11222	19794	32112							
1000psi	914	1280	2947	4422	6636	12224	21602	35120							
1100psi	985	1379	3193	4791	7188	13225	23410	38127							
1200psi	1056	1479	3440	5160	7741	14227	25219	41135							
1300psi	1128	1579	3686	5529	8293	15228	27027	44143							
1400psi	1199	1678	3932	5897	8845	16230	28836	47150							
1480psi	1256	1758	4129	6192	9287	17031	30283	49557							



For severe service, additional safety factor should be added:

Dry gas or Slurry……1.25
Emergency Shutdown……1.60
Low Temperature ……..……..…1.20
High Temperature (600°-700°F)……....1.30
Extended High Temp.(750°-1000°F)….1.50

W-K-M DYNACENTRIC HIGH PERFORMANCE BUTTERFLY VALVE TEMPERATURE LIMITS

Following are recommended temperature limits for standard materials available in DynaCentric high performance butterfly valves.

Body Group

1 – WCC Carbon Steel	- 20°F to 800°F
2 – CF8M Stainless Steel	- 50°F to 1000°F
3 – Carbon Steel f/ NACE	- 20°F to 800°F
5 – LCC Carbon Steel	- 50°F to 650°F

See ANSI B16.34 f / temperature/pressure curves.

Seal Group

S01 – TFE	350°F (400°F intermittent)
S02 – TFM	450°F (500°F intermittent)
F02 – SS / TFM	450°F (500°F intermittent)
F03 – Ni-Cr / TFM	450°F (500°F intermittent)
M01 – 316 SS	750°F
M03 – Ni- Cr	1000°F

- S0 and F0 seats provide bubble tight shut-off up to rated working pressure. See Temperature / Pressure Curve below.
- Standard leakage rate of M0 seats is less than .005 ml/psi/NPS/minute.

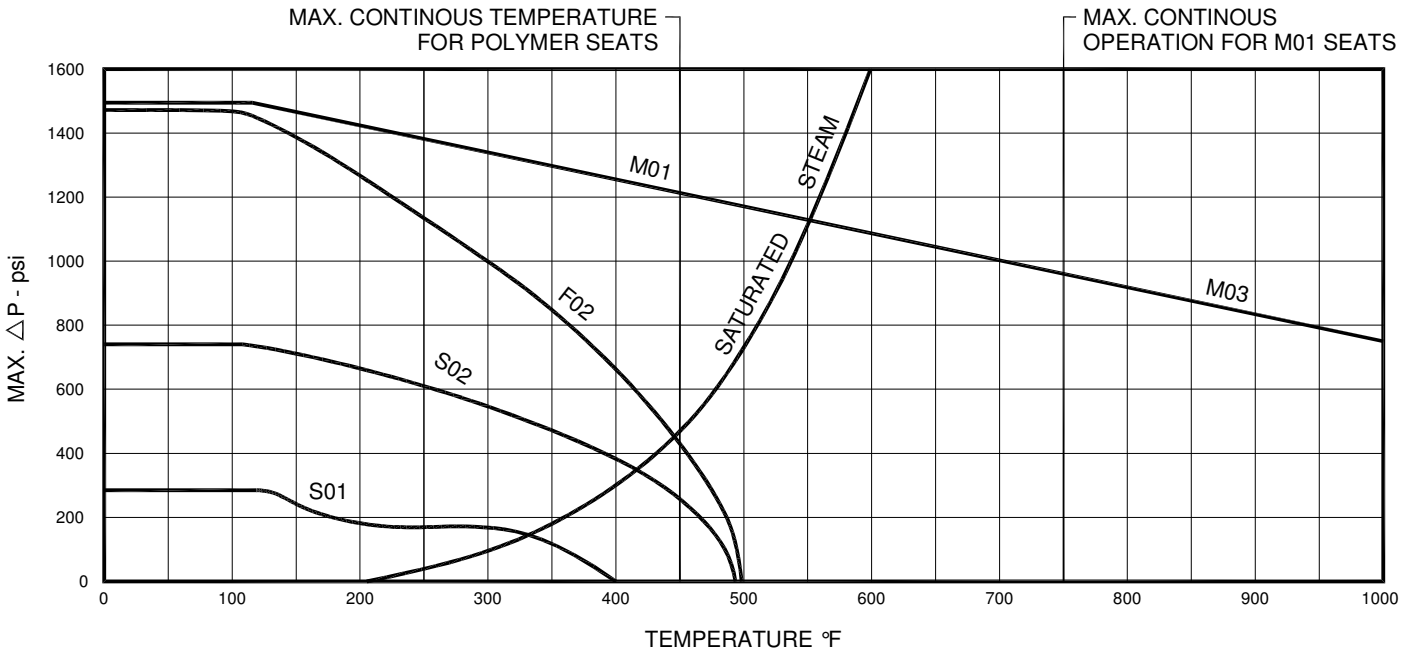
Trim Group

01 – CS Disc 17-4 Stem	650°F
02 – SS Disc 17-4 Stem	650°F
03 – SS Disc Ni-Cr Stem	700°F
04 – Ni-Cu Disc Ni-Cu Stem	750°F
05 – SS Disc 316SS Stem	700°F
06 – SS Disc-HF-6 O'lay 17-4 Stem	650°F
07 – SS Disc-HF-6 O'lay Ni-Cr Stem	1000°F

Packing Group

11 – TFE 'V'	450°F
13 – High Temp. Graphitized	700°F
14 – Grafoil	1000°F

SEAT PRESSURE / TEMPERATURE LIMITATIONS
Seat ratings are based on differential pressures with the disc in the FULLY CLOSED Position and refer to seat only.



Valve Body Pressure Ratings

Pressure/Temperature Ratings*
For DynaCentric Valve Bodies with
17-4 SS or Ni-Cr Alloy Stems

	Temp. °F	Class 150			Class 300			Class 600		
		CS	LCC	SS	CS	LCC	SS	CS	LCC	SS
❑	-20° to 100°	285	290	275	740	750	720	1480	1500	1440
❑	200°	260	260	235	675	750	620	1350	1500	1240
❑	300°	230	230	215	655	730	560	1315	1455	1120
❑	400°	200	200	195	635	705	515	1270	1410	1025
❑	500°	170	170	170	600	665	480	1200	1330	955
❑	600°	140	140	140	550	605	450	1095	1210	900
❑	650°	125	125	125	535	590	445	1075	1175	890
Δ	700°	110		110	535		430	1065		870
Δ	750°	95		95	505		425	1010		855
Δ	800°	80		80	410		420	825		845
Δ	850°			65			420			835
Δ	900°			50			415			830
Δ	950°			35			385			775
Δ	1000°			20			350			700

*In accordance with ANSI B16.34

Ratings shown above are maximum working pressure ratings for the valve body at various temperatures. Practical pressure limitations according to actual service conditions are determined by seat, trim and packing ratings.

NOTE: Carbon steel listed is not recommended for prolonged usage above 800º F (427º C).

Stem Materials

❑ ASTM A564 Type 630, H1150 + H1150, Ni-Cr Alloy UNS 7718, or Ni-Cu Alloy UNS No. 5500.
Δ Ni-Cr Alloy UNS No. 7718 or Ni-Cu Alloy UNS 5500.

NOTE: Valves with 17-4 PH stems are only recommended up to a maximum temperature of 650º F (343º C).

Ni-Cr Alloy UNS 7718 stems are required for temperatures above 650º F (343º C).

Ni-Cu Alloy UNS 5500 stems can be furnished for applications requiring high corrosion resistance and full ASME ratings.

Body Materials

Carbon Steel – ASTM A516 Gr. 70, ASTM A216 Gr. WCC
Low Temp CS – ASTM A352 Gr. LCC
Stainless Steel – ASTM A351 Gr. CF8M

Maximum Shut-off Pressures for DynaCentric Valves with 316SS Stems (CWP)

SIZE	ΔP MAX – 316 SS STEMS		
	Class 150	Class 300	Class 600
2½”	285	740	-
3”	285	740	650
4”	285	285	650
5”	285	720	-
6”	285	400	650
8”	285	450	650
10”	180	500	650
12”	250	740	650
14”	200	740	-
16”	285	740	-
18”	285	740	-
20”	285	740	-
24”	285	740	-
30”	285	-	-
36”	285	-	-

Note: Cold working pressures for DynaCentric butterfly valves with 316 SS stems are derated per the table to the left. These derated pressures are based on torque with F0/M0 seats downstream. Ni-Cr stems are available for those applications requiring higher working pressure with maximum corrosion resistance.

DYNACENTRIC BUTTERFLY VALVE
MATERIAL SELECTION GUIDE

LADINGS	MATERIALS OF CONSTRUCTION											
	BODY GROUPS			TRIM GROUPS					SEAL GROUPS			
	1	2	3	01*	02	03	04	05	S01	S02	F02	M01
Asphalt, Emulsion/liquid	A	A	A	A	A	A	A	A	A	A	A	A
Barium Carbonate	B	B	B	B	B	B	B	B	A	A	B	B
Barium Chloride	C	C	C	D	C	C	B	C	A	A	C	C
Barium Hydroxide	C	B	C	C	B	B	B	B	A	A	B	B
Barium Sulfate	B	B	B	C	B	B	A	B	A	A	B	B
Barium Sulfide	B	B	B	C	B	B	B	B	A	A	B	B
Beer	C	A	C	B	A	A	A	A	A	A	A	A
Beet Sugar Liquors	B	A	B	B	A	A	A	A	A	A	A	A
Benzaldehyde	A	A	A	A	A	A	A	A	A	A	A	A
Benzene, Benzoil	B	A	B	B	A	A	A	G	U	U	U	G
Benzoic Acid	D	B	D	D	B	B	B	B	A	A	B	B
Borax Liquors	C	B	C	C	B	B	A	B	A	A	B	B
Boric Acid	D	B	D	C	B	B	A	B	A	A	B	B
Brines	C	B	C	C	C	B	A	C	A	A	B	B
Bromine, Dry	D	D	D	D	D	D	A	D	A	A	D	D
Bromine, Wet	D	D	D	D	D	D	B	D	A	A	D	D
Butadiene	B	A	B	B	A	A	C	A	B	B	A	A
Butane	A	A	A	A	A	A	A	A	A	A	A	A
Butylene	A	A	A	A	A	A	A	A	A	A	A	A
Buttermilk	D	A	D	B	A	A	D	A	A	A	A	A
Butyric Acid	D	B	D	D	B	B	B	B	A	A	B	B
Calcium Bisulfide	D	B	D	D	B	B	B	B	A	A	B	B
Calcium Carbonate	D	B	D	B	A	B	B	A	A	A	B	B
Calcium Chloride	C	B	C	B	B	B	A	B	A	A	B	B
Calcium Hydroxide, 20%	B	B	B	C	B	B	A	B	A	A	B	B
Calcium Hypochlorite	D	C	D	D	C	C	C	C	A	A	C	C
Calcium Sulfate	C	B	C	C	B	B	B	B	A	A	B	B
Carbolic Acid	D	B	D	B	B	B	B	B	A	A	B	B
Carbon Bisulfide	B		B	B	B		A	B	B	A	A	
Carbon Dioxide, Dry	A	A	A	A	A	A	A	A	A	A	A	A
Carbonic Acid	D	B	D	C	B	B	A	B	A	A	B	B
Carbon Tetrachloride, Dry	B	A	B	A	A	A	A	A	A	A	A	A
Carbon Tetrachloride, Wet	D	B	D	B	B	B	B	B	A	A	B	B
Carbobonated Water	B	A	B	B	A	A	A	A	A	A	A	A
China Wood Oil, Tung Oil	C	A	C	C	A	A	A	A	A	A	A	A
Chlorinated Solvents, Dry	C	B	C	C	B	B	B	B	A	A	B	B
Chlorine Gas, Dry	B	B	B	B	C	B	B	C	A	A	B	B
Chlorine, Wet	D	D	D	D	D	D	C	D	A	A	D	D
Chloroacetic Acid	D	C	D	D	C	C	B	C	A	A	C	C
Chlorobenzene, Dry	B	A	B	B	B	A	A	B	A	A	A	A
Chloroform, Dry	B	A	B	B	A	A	A	A	A	A	A	A
Chlorosulphonic Acid, Dry	B	B	B	B	B	B	A	B	A	A	B	B
Chlorosulphonic Acid, Wet	D	D	D	D	D	D	C	D	A	A	A	A
Chrome Alum	B	A	B	B	A	A	B	A	A	A	A	A
Chromic Acid	D	C	D	D	C	C	B	C	A	A	C	C
Citrus Juices	D	B	D	C	B	B	A	B	A	A	B	B
Coconut Oil	C	B	C	B	B	B	B	B	A	A	B	B
Coffee Extracts, Hot	C	A	C	B	A	A	A	A	A	A	A	A
Coke Oven Gas	B	A	B	B	A	A	B	A	A	A	A	A

APPLICATION CODE

A-Excellent
B-Good
C-Fair
D-Not Recommended

NOTE: All ladings at ambient temperature except as noted. * Size 14" and larger, Class 150/300 valves are available with CS trim.

DYNACENTRIC BUTTERFLY VALVE
MATERIAL SELECTION GUIDE

LADINGS	MATERIALS OF CONSTRUCTION											
	BODY GROUPS			TRIM GROUPS					SEAL GROUPS			
	1	2	3	01*	02	03	04	05	S01	S02	F02	M01
Cooking Oil	B	A	B	B	A	A	A	A	A	A	A	A
Copper Acetate, 10%	C	B	C	C	B	B	B	B	A	A	B	B
Copper Chloride	D	D	D	D	D	D	C	D	A	A	D	D
Copper Nitrate	D	B	D	D	B	B	C	B	A	A	B	B
Copper Sulfate	D	C	D	D	C	C	B	C	A	A	C	C
Corn Oil	C	B	C	B	B	B	B	B	A	A	B	B
Cottonseed Oil	C	B	C	B	B	B	B	B	A	A	B	B
Creosote Oil	B	B	B	B	B	B	A	B	A	A	B	B
Cresylic Acid	B	B	B	B	B	B	B	B	A	A	B	B
Crude Oil	B	A	B	A	A	A	A	A	A	A	A	A
Cutting Oils, Water Emulsion	B	A	B	B	A	A		A	A	A	A	A
Cyclohexane	A	A	A	A	A	A	A	A	A	A	A	A
Diacetone Alcohol	A	A	A	A	A	A	A	A	A	A	A	A
Diesel Fuels	A	A	A	A	A	A	A	A	A	A	A	A
Diethylamine	A	A	A	A	A	A	A	A	A	A	A	A
Dowtherms	B	A	B	B	A	A	A	A	A	A	A	A
Drilling Mud	B	A	B	A	A	A	A	A	A	A	A	A
Drip Cocks, Gas	B	A	B	B	A	A	A	A	A	A	A	A
Dry Cleaning Fluids	B	A	B	B	A	A	B	A	A	A	A	A
Drying Oil	C	B	C	C	B	B	B	B	A	A	B	B
Epsom Salt	C	B	C	C	B	B	B	B	A	A	B	B
Ethane	A	A	A	A	A	A	A	A	A	A	A	A
Ethers	B	A	B	B	A	A	B	A	A	A	A	A
Ethyl Diethyl Acetate	B	B	B	B	B	B	B	B	A	A	B	B
Ethylene, Liquid or Gas	A	A	A	A	A	A	A	A	A	A	A	A
Ethyl Acrylate	A	A	A	A	A	A	A	A	A	A	A	A
Ethyl Chloride, Dry	B	A	B	B	A	A	B	A	A	A	A	A
Ethyl Chloride, Wet	D	B	D	D	B	B	B	B	A	A	B	B
Ethylene Glycol	B	B	B	B	B	B	B	B	A	A	B	B
Ethylene Oxide	B	B	B	B	B	B	B	B	A	A	B	B
Fatty Acids	D	B	D	B	B	B	B	B	A	A	B	B
Ferric Chloride	D	D	D	D	D	D	C	D	A	A	D	D
Ferric Nitrate	D	C	D	D	C	C	C	C	A	A	C	C
Ferric Sulfate	D	B	D	D	B	B	B	B	A	A	B	B
Ferrous Chloride	D	D	D	D	D	D	C	D	A	A	D	D
Ferrous Sulfate	D	B	D	D	B	B	B	B	A	A	B	B
Ferrous Sulfate, Saturated	C	A	C	C	A	A	A	A	A	A	A	A
Fertilizer Solutions	B	B	B	B	B	B	B	B	A	A	B	B
Fish Oils	B	A	B	B	A	A	A	A	A	A	A	A
Fluorine Dry	B	A	B	B	A	A	A	A	C	C	C	A
Fluorosilicic Acid	D	C	D	D	C	C	C	C	A		C	C
Food Fluids and Pastes	C	A	C	C	A	A	A	A	A	A	A	A
Formaldehyde, Cold	A	A	A	A	A	A	A	A	A	A	A	A
Formaldehyde, Hot	D	C	D	D	C	C	B	C	A	A	C	C
Formic Acid, Cold	D	B	D	C	B	B	B	B	A	A	B	B
Formic Acid, Hot	D	D	D	D	D	D	B	D	A	A	D	D
Freon, Dry (12)	B	A	B	A	A	A	A	A	A	A	A	A
Fruit Juices	D	A	D	D	A	A	A	A	A	A	A	A
Fuel Oils	B	A	B	A	A	A	A	A	A	A	A	A

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	BODY GROUPS			TRIM GROUPS					SEAL GROUPS			
	1	2	3	01*	02	03	04	05	S01	S02	F02	M01
Furfural	A	B	A	A	B	B	A	B	A	A	B	B
Gallic Acid	D	B	D	D	B	B	B	B	A	A	B	B
Gas, Manufactured	B	B	B	B	B	B	A	B	A	A	B	B
Gas, Natural	B	A	B	B	A	A	A	A	A	A	A	A
Gas Odorizers	B	B	B	B	B	B	B	B	A	A	B	B
Gasoline	A	A	A	A	A	A	A	A	A	A	A	A
Gasoline, Sour	B	A	B	B	A	A	A	A	A	A	A	A
Gelatin	D	A	D	D	A	A	A	A	A	A	A	A
Glucose	B	A	B	B	A	A	A	A	A	A	A	A
Glue	A	A	A	A	A	A	A	A	A	A	A	A
Glycerine, Glycerol	B	A	B	A	A	A	A	A	A	A	A	A
Glycols	B	B	B	B	B	B	B	B	A	A	B	B
Grease	A	A	A	A	A	A	B	A	A	A	A	A
Heptane	A	A	A	A	A	A	A	A	A	A	A	A
Hexane	A	A	A	A	A	A	A	A	A	A	A	A
Hexanol, Tertiary	A	A	A	A	A	A	A	A	A	A	A	A
Hydraulic Oil	A	A	A	A	A	A	A	A	A	A	A	A
Hydrobromic Acid	D	D	D	D	D	D	C	D	A	A	D	D
Hydrochloric Acid, Air Free	D	D	D	D	D	D	C	D	A	A	D	D
Hydrocyanic Acid	D	B	D	D	B	B	B	B	A			B
Hydrofluoric Acid	D	D	D	D	D	D	A	D	A	C	D	D
Hydrogen Gas, Cold	B	A	B	B	A	A	B	A	A	A	A	A
Hydrogen Peroxide	D	B	D	D	B	B	A	B	A	A	B	B
Hydrogen Sulfide, Dry	CONSULT FACTORY											
Hydrogen Sulfide, Wet	CONSULT FACTORY											
Hydrofluosilicic Acid	D	C	D	D	C	C	B	C	A	A	C	C
Hypo (Sodium Thiosulfate)	D	A	D	D	A	A	B	A	A	A	A	A
Hypochlorites, Sodium	D	C	D	D	C	C	B	C	A	A	C	C
Illuminating Gas	A	A	A	A	A	A	A	A	A	A	A	A
Ink	D	A	D	D	A	A	B	A	A	A	A	A
Iodine, Wet	D	D	D	D	D	D	D	D	A	A	D	D
Iodoform, Dry	B	B	B	B	B	B	B	B	A	A	B	B
Iso-Octane	A	A	A	A	A	A	A	A	A	A	A	A
Isopropyl Alcohol	B	B	B	B	B	B	B	B	A	A	B	B
Isopropyl Ether	A	A	A	A	A	A	A	A	A	A	A	A
JP Fuels	A	A	A	A	A	A	A	A	A	A	A	A
Kerosene	B	A	B	A	A	A	A	A	A	A	A	A
Ketchup	D	A	D	D	A	A	B	A	A	A	A	A
Ketones	A	A	A	A	A	A	A	A	A	A	A	A
Lacquers and Solvents	C	A	C	C	A	A	A	A	A	A	A	A
Lactic Acid, Dilute Cold	D	A	D	D	B	A	C	B	A	A	A	A
Lactic Acid, Dilute Hot	D	A	D	D	B	A	D	B	A	A	A	A
Lactic Acid, Concentrate Cold	D	A	D	D	B	A	D	B	A	A	A	A
Lactic Acid, Concentrate Hot	D	B	D	D	B	B	D	B	A	A	B	B
Lard Oil	C	A	C	B	A	A	B	A	A	A	A	A
Lead Acetate	D	B	D	D	B	B	B	B	A	A	B	B
Linoleic Acid	B	A	B	B	B	A	B	B	A	A	A	A
Linseed Oil	A	A	A	A	A	A	B	A	A	A	A	A
Liquefied Petroleum Gas (LPG)	B	B	B	B	B	B	B	B	A	A	B	B

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	1	2	3	01*	02	03	04	05	S01	S02	F02	M01
Lubricating Oil	A	A	A	A	A	A	B	A	A	A	A	A
Magnesium Bisulfate, 10%	C	A	C	C	A	A	B	A	A			A
Magnesium Chloride	C	D	C	C	D	D	B	D	A	A	D	D
Magnesium Hydroxide	B	A	B	B	A	A	A	A	A	A	A	A
Magnesium Hydroxide, Hot	B	A	B	B	A	A	A	A	A	A	A	A
Magnesium Sulfate	B	B	B	B	B	B	B	B	A	A	B	B
Maleic Acid	B	C	B	D	C	C	B	C	A	A	C	C
Malic Acid	D	A	D	D	A	A	B	A	A	A	A	A
Mayonnaise	D	A	D	D	A	A	B	A	A	A	A	A
Mecuric Chloride	D	D	D	D	D	D	D	D	A	A	A	D
Mecuric Cyanide, 10%	D	B	D	D	B	B	D	B	A	A	B	B
Mercury	A	A	A	A	A	A	C	A	A	A	A	A
Mercaptans	A	A	A	A	A	A	D	A	A	A	A	A
Methane	A	A	A	A	A	A	A	A	A	A	A	A
Methyl Acetate	A	A	A	A	A	A	A	A	A	A	A	A
Methyl Acetone	A	A	A	A	A	A	A	A	A	A	A	A
Methylamine	B	B	B	B	B	B	B	B	A	A	B	B
Methyl Cellosolve	B	B	B	B	B	B	B	B	A	A	B	B
Methyl Chloride, Dry	B	A	B	B	A	A	A	A	A	A	A	A
Methyl Ethyl Ketone (MEK)	A	A	A	A	A	A	A	A	A	A	A	A
Methyl Formate	B	B	B	B	B	B	B	B	A	A	B	B
Methylene Chloride, Dry	B	B	B	B	B	B	B	B	A	A	B	B
Milk	D	A	D	B	A	A	A	A	A	A	A	A
Mine Waters, Acid	D	B	D	D	B	B	B	B	A	A	B	B
Mineral Oil	B	A	B	A	A	A	A	A	A	A	A	A
Mineral Spirits	B	B	B	B	B	B	B	B	A	A	B	B
Mixed Acids, Cold	C	A	C	C	A	A	B	A	A	A	A	A
Molasses	A	A	A	A	A	A	A	A	A	A	A	A
Muriatic Acid	D	D	D	D	D	D	B	D	A	A	D	D
Mustard	B	A	B	B	A	A	A	A	A	A	A	A
Naptha	B	A	B	B	A	A	B	A	A	A	A	A
Napthalene	A	A	A	A	A	A	B	A	A	A	A	A
Nickel Ammonium Sulfate, 20%	D	A	D	D	A	A	B	A	A	A	A	A
Nickel Chloride	D	B	D	D	B	B	B	B	A	A	B	B
Nickel Nitrate, 30%	D	B	D	D	B	B	B	B	A	A	B	B
Nickel Sulfate	D	C	D	D	C	C	B	C	A	A	C	C
Nicotinic Acid	B	A	B	B	A	A	A	A	A	A		A
Nitric Acid 10%-80%	D	A	D	D	A	A	D	A	A	A	A	A
Nitric Acid 100%	A	A	A	C	C	A	D	C	A	A	A	A
Nitrobenzene	B	B	B	B	B	B	B	B	A	A	B	B
Nitrogen	A	A	A	A	A	A	A	A	A	A	A	A
Nitrous Acid, 10%	D	B	D	D	B	B	D	B	A	A	B	B
Nitrous Gasses	B	A	B	B	A	A	D	A	A	A	A	A
Nitrous Oxide	A	B	A	A	B	B	D	B	A	A	B	B
Oils, Petroleum, Refined	A	A	A	A	A	A	A	A	A	A	A	A
Oils-Water Mixtures	B	A	B	A	A	A		A	A	A	A	A
Oleic Acid	B	A	B	B	B	A	B	B	A	A	A	A
Oleum	B	B	B	B	B	B	D	B	A	A	B	B
Olive Oil	B	A	B	B	A	A	A	A	A	A	A	A

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LADINGS	MATERIALS OF CONSTRUCTION											
	BODY GROUPS			TRIM GROUPS					SEAL GROUPS			
	1	2	3	01*	02	03	04	05	S01	S02	F02	M01
Oxalic Acid	D	D	D	D	D	D	B	D	A	A	D	D
Oxygen	B	A	B	A	A	A	A	A	A	A	A	A
Ozone, Wet	C	A	C	C	A	A	A	A	A	A	A	A
Ozone, Dry	A	A	A	A	A	A	A	A	A	A	A	A
Paints and Solvents	A	A	A	A	A	A	A	A	A	A	A	A
Palmitic Acid	C	A	C	C	B	A	B	B	A	A	A	A
Palm Oil	C	B	C	C	B	B	A	B	A	A	B	B
Paraffin	B	A	B	A	A	A	A	A	A	A	A	A
Paraformaldehyde	B	B	B	B	B	B	B	B	A	A	B	B
Pentane	B	A	B	A	A	A	B	A	A	A	A	A
Perchlorethylene, Dry	B	B	B	B	B	B	A	B	A	A	B	B
Petrolatum	C	B	C	C	B	B	A	B	A	A	B	B
Phenol	B	A	B	B	A	A	A	A	A	A	A	A
Phosphoric Acid 10% Cold	D	B	D	D	B	B	B	B	A	A	B	B
Phosphoric Acid 10% Hot	D	D	D	D	D	D	C	D	A	A	D	D
Phosphoric Acid 50% Cold	D	B	D	D	B	B	C	B	A	A	B	B
Phosphoric Acid 50% Hot	D	D	D	D	D	D	C	D	A	A	D	D
Phosphoric Acid 85% Cold	B	A	B	B	B	A	A	B	A	A	A	A
Phosphoric Acid 85% Hot	C	A	C	C	C	A	A	C	A	A	A	A
Phthalic Acid	C	B	C	C	B	A	A	B	A		B	B
Phthalic Anhydride	C	B	C	C	B	B	C	B	A	A	B	B
Picric Acid	C	B	C	C	B	B	A	B	A	A	B	B
Pine Oil	B	A	B	B	A	A	A	A	A	A	A	A
Potassium Bisulfite, 10%	D	B	D	D	B	B	D	B	A	A	B	B
Potassium Bromide	D	B	D	D	B	B	B	B	A	A	B	B
Potassium Carbonate	C	A	C	B	A	A	B	A	A	A	A	A
Potassium Chlorate	B	A	B	B	A	A	B	A	A	A	A	A
Potassium Chloride	C	C	C	C	C	C	B	C	A	A	C	C
Potassium Cyanide	B	B	B	B	B	B	B	B	A	A	B	B
Potassium Dichromate	B	A	B	B	A	A	B	A	A	A	A	A
Potassium Diphosphate	A	A	A	A	A	A	B	A	A	A	A	A
Potassium Ferricyanide	B	B	B	B	B	B	B	B	A	A	B	B
Potassium Ferrocyanide	B	B	B	B	B	B	B	B	A	A	B	B
Potassium Hydroxide, Dilute Cold	B	B	B	B	B	B	A	B	A	A	B	B
Potassium Hydroxide, Dilute Hot	B	A	B	B	B	A	A	B	A	B	B	A
Potassium Hydroxide to 70%	A	A	A	A	A	A	A	A	A	B	B	A
Potassium Iodide	C	B	C	C	B	B	B	B	A	A	B	B
Potassium Nitrate	B	A	B	B	A	A	A	A	A	A	A	A
Potassium Permanganate	A	A	A	A	A	A	B	A	A	A	A	A
Potassium Sulfate	B	B	B	B	B	B	B	B	A	A	B	B
Potassium Sulfide, 10%	C	B	C	B	B	B	D	B	A	A	B	B
Potassium Sulfite, 10%	D	B	D	D	B	B	D	B	A	A	B	B
Producer Gas	B	B	B	B	B	B	A	B	A	A	B	B
Propane	A	A	A	A	A	A	A	A	A	A	A	A
Propyl Alcohol	A	A	A	A	A	A	A	A	A	A	A	A
Propylene Glycol	A	A	A	A	A	A	A	A	A	A	A	A
Pyrogallic Acid	B	B	B	B	B	B	B	B	A	A	B	B
Quench Oil, Water Soluble	A	A	A	A	A	A	A	A	A	A	A	A
Resins and Rosins	C	A	C	B	A	A	A	A	A	A	A	A

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	1	2	3	01*	02	03	04	05	S01	S02	F02	M01
Road Tar	A	A	A	A	A	A	A	A	A	A	A	A
Road Pitch	A	A	A	A	A	A	A	A	A	A	A	A
RP-1 Fuel	A	A	A	A	A	A	A	A	A	A	A	A
Rubber Latex Emulsions	B	A	B	B	A	A	A	A	A	A	A	A
Rubber Solvent	A	A	A	A	A	A	A	A	A	A	A	A
Salad Oil	C	B	C	B	B	B	B	B	A	A	B	B
Salicylic Acid	D	A	D	D	A	A	A	A	A	A	A	A
Salt	C	B	C	C	B	B	A	B	A	A	B	B
Seawater	D	A	D	C	A	A	A	A	A	A	A	A
Shellac	A	A	A	A	A	A	A	A	A	A	A	A
Silicone Oils	A	A	A	A	A	A	A	A	A	A	A	A
Silver Nitrate	D	B	D	D	B	B	D	B	A	A	B	B
Soap Solution, Stearates	A	A	A	A	A	A	A	A	A	A	A	A
Sodium Acetate	B	B	B	B	B	B	B	B	A	A	B	B
Sodium Aluminate	C	A	C	C	A	A	A	A	A	A	A	A
Sodium Bicarbonate	C	B	C	C	B	B	B	B	A	A	B	B
Sodium Bisulfate, 10%	D	A	D	D	A	A	B	A	A	A	A	A
Sodium Bisulfite, 10%	D	D	D	D	D	D	B	D	A	A	D	D
Sodium Borate	C	D	C	C	D	D	B	D	A	A	D	D
Sodium Bromide, 10%	C	B	C	C	B	B	B	B	A	A	B	B
Sodium Carbonate	B	B	B	B	B	B	A	B	A	A	B	B
Sodium Chlorate	C	B	C	C	B	B	B	B	A	A	B	B
Sodium Chloride	C	B	C	B	B	B	A	B	A	A	B	B
Sodium Chromate	B	B	B	B	B	B	B	B	A	A	B	B
Sodium Cyanide, 10%	A	A	A	C	A	A	B	A	A	A	A	A
Sodium Fluoride	D	B	D	D	B	B	A	B	A	A	B	B
Sodium Hydroxide, Cold 20%	A	A	A	A	A	A	A	A	A	A	A	A
Sodium Hydroxide, Hot 20%	C	B	C	C	B	B	A	B	A	B	B	B
Sodium Hydroxide 50%	B	B	B	B	B	B	A	B	A	C	C	B
Sodium Hydroxide, Cold 70%	C	B	C	B	B	B	B	B	A	C	C	B
Sodium Hydroxide, Hot 70%	B	B	B	B	B	B	B	B	A	D	D	B
Sodium Hypochlorite	D	D	D	D	D	D	D	D	A	A	D	D
Sodium Metaphosphate	A	B	A	A	B	B	B	B	A	A	B	B
Sodium Metasilicate, Cold	C	A	C	C	A	A	A	A	A	A	A	A
Sodium Metasilicate, Hot	D	A	D	D	A	A	A	A	A	A	A	A
Sodium Nitrate	B	B	B	B	B	B	B	B	A	A	B	B
Sodium Perborate	B	B	B	B	B	B	B	B	A	A	B	B
Sodium Peroxide	C	B	C	C	B	B	B	B	A	A	B	B
Sodium Phosphate	B	B	B	B	B	B	B	B	A	A	B	B
Sodium Silicate	A	A	A	A	A	A	B	A	A	A	A	A
Sodium Silicate, Hot	B	B	B	B	B	B	B	B	A	A	B	B
Sodium Sulfate	B	A	B	B	A	A	A	A	A	A	A	A
Sodium Sulfide	B	B	B	B	B	B	A	B	A	A	B	B
Sodium Sulfide, Hot	C	B	C	C	B	B	B	B	A	A	B	B
Sodium Thiosulfate	D	B	D	D	B	B	B	B	A	A	B	B
Sour Gas and Oil	CONSULT FACTORY											
Soybean Oil	C	A	C	C	A	A	A	A	A	A	A	A
Stannic Chloride	D	D	D	D	D	D	C	D	A	A	D	D
Stannous Chloride	D	C	D	D	C	C	A	C	A			

APPLICATION CODE

A-Excellent
B-Good
C-Fair
D-Not Recommended

NOTE: All ladings at ambient temperature except as noted. * Size 14" and larger, Class 150/300 valves are available with CS trim.

DYNACENTRIC BUTTERFLY VALVE
MATERIAL SELECTION GUIDE

LADINGS	MATERIALS OF CONSTRUCTION											
	BODY GROUPS			TRIM GROUPS					SEAL GROUPS			
	1	2	3	01*	02	03	04	05	S01	S02	F02	M01
Starch	A	A	A	A	A	A	A	A	A	A	A	A
Steam 212°F	A	A	A	A	A	A	A	A	A	A	A	A
Stearic Acid	C	A	C	B	A	A	B	A	A	A	A	A
Stoddard Solvent	B	B	B	B	B	B	B	B	A	A	B	B
Styrene	A	A	A	A	A	A	A	A	A	A	A	A
Sugar Liquids	B	A	B	B	B	A	A	B	A	A	A	A
Sulfate, Black or gr. Liquid	C	B	C	C	B	B	B	B	A	A	B	B
Sulfate, White Liquor	D	B	D	D	D	B	B	D	A	A	B	B
Sulphur	B	A	B	B	A	A	A	A	A	A	A	A
Sulphur Dioxide, Dry	B	A	B	D	D	A	A	D	A	A	A	A
Sulphur Trioxide, Dry	B	B	B	B	B	B	B	B	A	A	B	B
Sulfuric Acid 0-7%	D	B	D	D	C	B	B	C	A	A	B	B
Sulfuric Acid 20-50%	D	D	D	D	D	D	B	D	A	A	D	D
Sulfuric Acid 100%	B	A	B	D	C	A	A	C	A	A	A	A
Sulfurous Acid	D	D	D	D	D	D	D	D	A	A	D	D
Synthesis Gas	B	B	B	B	B	B	A	B	A	A	B	B
Tall Oil	B	B	B	B	B	B	A	B	A	A	B	B
Tannic Acid	B	B	B	B	B	B	B	B	A	A	B	B
Tar and Tar Oil	A	A	A	A	A	A	A	A	A	A	A	A
Tartaric Acid	D	B	D	D	B	B	B	B	A	A	B	B
Tetraethyl Lead	C	B	C	C	B	B	A	B	A	A	B	B
Toluolene, Toluol	A	A	A	A	A	A	A	A	A	A	A	A
Tomato Juice	C	A	C	C	A	A	A	A	A	A	A	A
Transformer Oil	A	A	A	A	A	A	A	A	A	A	A	A
Tributyl Phosphate	A	A	A	A	A	A	A	A	A	A	A	A
Trichloroethylene	B	B	B	B	B	B	A	B	A	A	B	B
Turpentine	B	A	B	A	A	A	B	A	A	A	A	A
Urea	C	B	C	C	B	B	A	B	A	A	B	B
Varnish	C	A	C	C	A	A	A	A	A	A	A	A
Vegetable Oil	B	A	B	A	A	A	B	A	A	A	A	A
Vinegar	D	A	D	D	A	A	A	A	A	A	A	A
Vinyl Chloride	D	B	D	D	C	B	A	C	A	A	A	B
Water, Distilled (aerated)	D	A	D	B	A	A	A	A	A	A	A	A
Water, Fresh	C	A	C	B	A	A	A	A	A	A	A	A
Waxes	A	A	A	A	A	A	A	A	A	A	A	A
Whiskey and Wine	D	A	D	B	A	A	A	A	A	A	A	A
Xylene, Dry	A	A	A	A	A	A	A	A	A	A	A	A
Zinc Chloride	D	D	D	D	D	D	B	D	A	A	D	D
Zinc Hydrosulfite	A	A	A	A	A	A	B	A	A	A	A	A
Zinc Sulfate	D	B	D	D	D	B	B	D	A	A	B	B

APPLICATION CODE

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NOTE: All ladings at ambient temperature except as noted.

* Size 14" and larger, Class 150/300 valves are available with CS trim.

Long Term Storage Recommendation

WKM DynaCentric Butterfly Valves

Cameron Valve and Measurement long term storage is as suggested below.

A. Valves are to be packaged per military level A packing.

B. Each valve assembly is to be packaged in a plastic bag per military specification B131, heat sealed with desiccant in each bag.

C. Bagged valve assemblies are to be crated in waterproof wood crates per military specification C626.

D. Crates are to be stored under a tarp in a shaded area where temperature of goods shall not exceed 120 degrees F.

E. No heat source is to be used in storage area.