

CATEGORY I

NOTE: Category I values should be used only for proportioning service where full 90° closure is not required.

IDEAL CONDITIONS

- operating frequency at least once per day
- lubricating media - aqueous solutions such as potable water, liquid food products such as beer (except in cold temperatures), clean oil such as lube oil, mineral oil, glycols, etc.
- disc and seat totally resistant to corrosion by line media, no solids deposition on disc or seat
- temperature range from 60°F (16°C) to 150°F (65°C)
- maximum shutoff pressure is 150 psi.

Torque values provided in this category provide allowance for increases of 50% over laboratory tested torque values.

CATEGORY II

NORMAL CONDITIONS

- operating frequency at least once per month
- lubricating media - aqueous liquid
- disc corrosion - mild; minor deposition
- temperature within material limits
- chemical effect on seat - minor

Torque values provided in this category may incorporate a factor of two over shop tests in establishing frictional resistance of media-exposed elements. Experience has indicated that selection of actuators based on Category II values provides totally satisfactory results expect in the most severe application. (All actuator selection tables contained in Grinnell Product Manual are based on Category II torque requirements).

CATEGORY III

SEVERE CONDITIONS

- operating frequency - indefinitely long
- non-lubricating media - air, dry gas, cement
- disc corrosion - severe (iron in uninhibited water)
- temperature possibly outside recommended limits
- chemical effects on elastomer unknown

Torque values provided in this category incorporate a factor of three over shop tests in establishing frictional resistance of media exposed elements. Pneumatic conveying is a typical Category III application.

In selecting actuators under Category III, it is also necessary to compare "Anticipated Seating / Unseating Torque" with "Allowable Operating Torque" on valve. This is especially important in power actuators not equipped with speed controls where impact loading may occur.

Series 1000 RS Butterfly Valves

SEATING AND UNSEATING TORQUES (INCH-LBS) STANDARD DISC DIAMETERS

Notes:

- 1) All actuator selection tables contained in the Grinnell product manuals are based on **CATEGORY - II** torque requirements. **CATEGORY - I SHOULD NOT BE USED UNLESS ALL OF THE CRITERIA FOR IT ARE MET.**
- 2) The charted torque values above are the total of all internal frictional resistances for opening or closing against indicated pressure.
- 3) The effect of dynamic torsion is not considered in this tabulation.
- 4) Torsional capacity of valve stem is not considered in this tabulation.
- 5) If pressure differential is not known, use full rated pressure capability of the valve.
- 6) For detailed information on torque values, refer to engineering information data sheet titled "Criteria for Determining Seating and Unseating Torque"

CATEGORY 1 (IDEAL CONDITIONS)

VALVE SIZE	PRESSURE DIFFERENTIAL				
	0	50	100	150	250
2"	81	87	94	100	114
2.5"	105	115	126	136	157
3"	122	137	152	167	197
4"	189	218	248	277	336
5"	312	367	422	477	588
6"	410	489	569	648	807
8"	1092	1257	1422	1587	1917
10"	1848	2180	2511	2843	3506
12"	2100	2577	3055	3532	4487

CATEGORY 2 (NORMAL CONDITIONS)

VALVE SIZE	PRESSURE DIFFERENTIAL				
	0	50	100	150	250
2"	115	122	128	135	148
2.5"	150	160	171	181	202
3"	175	190	205	220	250
4"	270	299	329	398	417
5"	445	500	556	611	721
6"	585	665	744	824	983
8"	1560	1725	1890	2055	2385
10"	2640	2972	3303	3635	4298
12"	3000	3477	3955	4432	5387

CATEGORY 3 (SEVERE CONDITIONS)

VALVE SIZE	PRESSURE DIFFERENTIAL				
	0	50	100	150	250
2"	288	294	301	307	321
2.5"	375	385	396	406	427
3"	438	452	467	482	512
4"	675	704	734	763	822
5"	1113	1168	1223	1278	1389
6"	1463	1542	1622	1707	1860
8"	3900	4065	4230	4395	4725
10"	6600	6932	7263	7595	8258
12"	7500	7977	8455	8932	9887

Series 1000 RS Butterfly Valves

SEATING AND UNSEATING TORQUES (INCH-LBS)

REDUCED DISC DIAMETERS

Notes:

- 1) All actuator selection tables contained in the Grinnell product manuals are based on **CATEGORY - II** torque requirements. **CATEGORY - I SHOULD NOT BE USED UNLESS ALL OF THE CRITERIA FOR IT ARE MET.**
- 2) The charted torque values above are the total of all internal frictional resistances for opening or closing against indicated pressure.
- 3) The effect of dynamic torsion is not considered in this tabulation.
- 4) Torsional capacity of valve stem in not considered in this tabulation.
- 5) If pressure differential is not known, use full rated pressure capability of the valve.
- 6) For detailed information on torque values, refer to engineering information data sheet titled "Criteria for Determining Seating and Unseating Torque"

CATEGORY 1 (IDEAL CONDITIONS)

VALVE SIZE	PRESSURE DIFFERENTIAL		
	0	50	100
2"	44	51	58
2.5"	58	68	78
3"	67	82	97
4"	104	133	163
5"	171	227	282
6"	225	305	384
8"	764	929	1095
10"	1294	1625	1957
12"	1470	1947	2425

CATEGORY 2 (NORMAL CONDITIONS)

VALVE SIZE	PRESSURE DIFFERENTIAL		
	0	50	100
2"	63	70	77
2.5"	83	93	103
3"	96	111	126
4"	149	178	207
5"	245	300	355
6"	322	401	481
8"	1092	1257	1422
10"	1848	2180	2511
12"	2100	2577	3055

CATEGORY 3 (SEVERE CONDITIONS)

VALVE SIZE	PRESSURE DIFFERENTIAL		
	0	50	100
2"	158	165	171
2.5"	206	217	227
3"	241	256	270
4"	371	401	430
5"	612	667	722
6"	804	884	964
8"	2730	2895	3060
10"	4620	4952	5283
12"	5250	5727	6205

Series 8000 RS Butterfly Valves

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SEATING AND UNSEATING TORQUES (INCH-LBS)
STANDARD DISC DIAMETERS
Notes:

- 1) All actuator selection tables contained in the Grinnell product manuals are based on **CATEGORY - II** torque requirements. **CATEGORY - I SHOULD NOT BE USED UNLESS ALL OF THE CRITERIA FOR IT ARE MET.**
- 2) The charted torque values above are the total of all internal frictional resistances for opening or closing against indicated pressure.
- 3) The effect of dynamic torsion is not considered in this tabulation.
- 4) Torsional capacity of valve stem is not considered in this tabulation.
- 5) If pressure differential is not known, use full rated pressure capability of the valve.
- 6) For detailed information on torque values, refer to engineering information data sheet titled "Criteria for Determining Seating and Unseating Torque"

CATEGORY 2 (NORMAL CONDITIONS)					
VALVE SIZE	PRESSURE DIFFERENTIAL				
	50	100	150	200	250
2"	85	108	126	144	162
2.5"	126	153	175	198	221
3"	180	207	256	298	339
4"	355	414	472	531	590
5"	562	652	715	787	869
6"	918	1035	1152	1269	1386
8"	1440	1692	1944	2205	2476
10"	2466	3010	3550	4095	4660
12"	3510	4140	5616	7686	10556
14"	5200	6000	7500	8550	
16"	6900	8000	9500	10750	
18"	9000	10500	12000	13500	
20"	11000	14000	15200	17600	
24"	16000	21000	28000	33700	

Series 106 RS Butterfly Valves

SEATING AND UNSEATING TORQUES (INCH-LBS)

STANDARD DISC DIAMETERS

Notes:

- 1) All actuator selection tables contained in the Grinnell product manuals are based on **CATEGORY - II** torque requirements. **CATEGORY - I SHOULD NOT BE USED UNLESS ALL OF THE CRITERIA FOR IT ARE MET.**
- 2) The charted torque values above are the total of all internal frictional resistances for opening or closing against indicated pressure.
- 3) The effect of dynamic torsion is not considered in this tabulation.
- 4) Torsional capacity of valve stem is not considered in this tabulation.
- 5) If pressure differential is not known, use full rated pressure capability of the valve.
- 6) For detailed information on torque values, refer to engineering information data sheet titled "Criteria for Determining Seating and Unseating Torque"

CATEGORY 1 (IDEAL CONDITIONS)

VALVE SIZE	PRESSURE DIFFERENTIAL			
	0	50	100	150
24"	4875	8497	12119	15741
30"	7500	14574	21648	28722
36"	10500	22724	34948	47172
42"	21750	49480	77210	104940
48"	28125	68871	109617	150364

CATEGORY 2 (NORMAL CONDITIONS)

VALVE SIZE	PRESSURE DIFFERENTIAL			
	0	50	100	150
24"	9750	13372	16994	20616
30"	15000	22074	29148	36222
36"	21000	33224	45448	57672
42"	43500	71250	98960	126690
48"	56250	96996	137742	179489

CATEGORY 3 (SEVERE CONDITIONS)

VALVE SIZE	PRESSURE DIFFERENTIAL			
	0	50	100	150
24"	14625	18247	21869	25491
30"	22500	38574	36648	43722
36"	31500	43724	55948	68172
42"	65250	92980	120710	148440
48"	84375	125121	165867	206614

Series 106 RS Butterfly Valves

SEATING AND UNSEATING TORQUES (INCH-LBS)
REDUCED DISC DIAMETERS

Notes:

- 1) All actuator selection tables contained in the Grinnell product manuals are based on **CATEGORY - II** torque requirements. **CATEGORY - I SHOULD NOT BE USED UNLESS ALL OF THE CRITERIA FOR IT ARE MET.**
- 2) The charted torque values above are the total of all internal frictional resistances for opening or closing against indicated pressure.
- 3) The effect of dynamic torsion is not considered in this tabulation.
- 4) Torsional capacity of valve stem in not considered in this tabulation.
- 5) If pressure differential is not known, use full rated pressure capability of the valve.
- 6) For detailed information on torque values, refer to engineering information data sheet titled "Criteria for Determining Seating and Unseating Torque"

CATEGORY 1 (IDEAL CONDITIONS)		
VALVE	PRESSURE DIFFERENTIAL	
SIZE	0	50
24"	3250	6872
30"	5000	12074
36"	7000	19224
42"	14500	41968
48"	18750	59917

CATEGORY 2 (NORMAL CONDITIONS)		
VALVE	PRESSURE DIFFERENTIAL	
SIZE	0	50
24"	6500	10907
30"	10000	18293
36"	14000	29127
42"	29000	60823
48"	37500	84390

CATEGORY 3 (SEVERE CONDITIONS)		
VALVE	PRESSURE DIFFERENTIAL	
SIZE	0	50
24"	CF	CF
30"	CF	CF
36"	CF	CF
42"	CF	CF
48"	CF	CF

Series GHP-G2 HP Butterfly Valves

**BI-DIRECTIONAL SEATING AND UNSEATING TORQUES (INCH-LBS)
STANDARD DISC DIAMETERS**

Notes:

- 1) All actuator selection tables contained in the Grinnell product manuals are based on **CATEGORY - II** torque requirements. **CATEGORY - I SHOULD NOT BE USED UNLESS ALL OF THE CRITERIA FOR IT ARE MET.**
- 2) The charted torque values above are the total of all internal frictional resistances for opening or closing against indicated pressure.
- 3) The effect of dynamic torsion is not considered in this tabulation.
- 4) Torsional capacity of valve stem in not considered in this tabulation.
- 5) If pressure differential is not known, use full rated pressure capability of the valve.
- 6) For detailed information on torque values, refer to engineering information data sheet titled "Criteria for Determining Seating and Unseating Torque"

CATEGORY 1 (IDEAL CONDITIONS)							
VALVE	PRESSURE DIFFERENTIAL						
SIZE	0	50	100	150	200	250	285
2"	69	78	86	95	103	112	118
2.5"	107	124	141	158	176	193	205
3"	131	150	169	188	207	226	239
4"	195	230	265	301	336	371	396
5"	245	329	413	496	580	664	722
6"	336	447	558	669	779	890	968
8"	375	624	873	1121	1370	1619	1793
10"	509	933	1358	1782	2207	2632	2929
12"	728	1338	1949	2559	3170	3781	4208

CATEGORY 2 (NORMAL CONDITIONS)							
VALVE	PRESSURE DIFFERENTIAL						
SIZE	0	50	100	150	200	250	285
2"	92	101	109	118	126	135	141
2.5"	122	138	155	171	188	204	216
3"	133	153	173	193	213	232	246
4"	260	296	333	369	406	442	468
5"	327	411	495	579	664	748	807
6"	448	563	677	792	906	1021	1101
8"	386	646	905	1165	1425	1684	1866
10"	678	1119	1560	2000	2441	2882	3191
12"	970	1604	2238	2873	3507	4141	4585

CATEGORY 3 (SEVERE CONDITIONS)							
VALVE	PRESSURE DIFFERENTIAL						
SIZE	0	50	100	150	200	250	285
2"	175	183	192	200	209	217	223
2.5"	270	287	304	332	339	356	368
3"	333	351	370	389	408	427	440
4"	494	529	564	600	635	670	695
5"	621	705	789	872	956	1040	1099
6"	851	962	1073	1184	1295	1406	1483
8"	950	1199	1448	1696	1945	2194	2368
10"	1288	1713	2137	2562	2987	3411	3709
12"	1843	2454	3064	3675	4285	4896	5324

Series GHP-G1 HP Butterfly Valves

BI-DIRECTIONAL SEATING AND UNSEATING TORQUES (INCH-LBS)

PTFE AND RTFE SEATS

PRESSURE DIFFERENTIAL							
VALVE				ANSI 150			ANSI 300
SIZE	0	150	200	285	400	500	740
2"	200	220	280	380	460	520	580
2.5"	200	220	280	380	460	520	580
3"	230	250	320	430	520	590	650
4"	400	475	600	820	995	1120	1235
5"	810	925	1125	1350	1570	1750	1900
6"	980	1370	1600	1850	2150	2390	2900
8"	1720	2060	2330	3200	4020	4870	6720
10"	2700	3340	3650	4700	6250	7450	9850
12"	3750	4590	5250	6400	8160	9690	12940
14"	5520	6750	7560	9150	11450	13300	17200
16"	7100	9350	10450	12600	15000	17500	22200
18"	8700	11900	13300	15800	19500	21900	28500
20"	10000	15600	17500	21000	25200	28700	36140
24"	12250	21700	25340	30600	36900	42100	54000
30"	15000	29200	35000	43500	54500	62500	80000
36"	35000	52500	58500	70000	85000	97500	125000

Notes:

- 1) For solids or abrasive service use 1.3x the above values.
- 2) Torque values represent tested breakaway torques with adequate safety margin for clean service with temperatures above -20 F.
- 3) Above values include packing and bearing as well as eccentric disc imbalance torques.
- 4) Consult the Tyco control valve manual when sizing is to be based on dynamic torque.
- 5) If pressure differential is not know, use full rated pressure capability of the valve.

Series GHP-G1 HP Butterfly Valves

BI-DIRECTIONAL SEATING AND UNSEATING TORQUES (INCH-LBS)

EPDM AND BUNA N SEATS

PRESSURE DIFFERENTIAL							
VALVE				ANSI 150			ANSI 300
SIZE	0	150	200	285	400	500	740
2"	280	308	392	532	644	728	812
2.5"	280	308	392	532	644	728	812
3"	322	350	448	602	728	826	910
4"	560	665	840	1148	1393	1568	1729
5"	1134	1295	1575	1890	2198	2450	2660
6"	1372	1918	2240	2590	3010	3346	4060
8"	2408	2884	3262	4480	5628	6818	9408
10"	3780	4676	5110	6580	8750	10430	13790
12"	5250	6426	7350	8960	11424	13566	18116
14"	7728	9450	10584	12810	16030	18620	24080
16"	9940	13090	14630	17640	21000	24500	31080
18"	12180	16660	18620	22120	27300	30660	39900
20"	14000	21840	24500	29400	35280	40180	50596
24"	17150	30380	35476	42840	51660	58940	75600
30"	21000	40880	49000	60900	76300	87500	112000
36"	49000	73500	81900	98000	119000	136500	175000

Notes:

- 1) Torque values represent tested breakaway torques with adequate safety margin for clean service with temperatures above -20 F.
- 2) Above values include packing and bearing as well as eccentric disc imbalance torques.
- 3) Consult the Tyco control valve manual when sizing is to be based on dynamic torque.
- 4) If pressure differential is not know, use full rated pressure capability of the valve.

Series GHP-G1 HP Butterfly Valves

BI-DIRECTIONAL SEATING AND UNSEATING TORQUES (INCH-LBS)

ULTRA HIGH MOLECULAR WEIGHT POLYETHYLENE SEATS (UHMWPE)

PRESSURE DIFFERENTIAL							
VALVE				ANSI 150			ANSI 300
SIZE	0	150	200	285	400	500	740
2"	260	286	364	494	598	676	754
2.5"	260	286	364	494	598	676	754
3"	299	325	416	559	676	767	845
4"	520	618	780	1066	1294	1456	1606
5"	1053	1203	1463	1755	2041	2275	2470
6"	1274	1781	2080	2405	2795	3107	3770
8"	2236	2678	3029	4160	5226	6331	8736
10"	3510	4342	4745	6110	8125	9685	12805
12"	4875	5967	6825	8320	10608	12597	16822
14"	7176	8775	9828	11895	14885	17290	22360
16"	9230	12155	13585	16380	19500	22750	28860
18"	11310	15470	17290	20540	25350	28470	37050
20"	13000	20280	22750	27300	32760	37310	46982
24"	15925	28210	32942	39780	47970	54730	70200
30"	19500	37960	45500	56550	70850	81250	104000
36"	45500	68250	76050	91000	110500	126750	162500

Notes:

- 1) Torque values represent tested breakaway torques with adequate safety margin for clean service with temperatures above -20 F.
- 2) Above values include packing and bearing as well as eccentric disc imbalance torques.
- 3) Consult the Tyco control valve manual when sizing is to be based on dynamic torque.
- 4) If pressure differential is not know, use full rated pressure capability of the valve.

Series GHP-G1 HP Butterfly Valves

BI-DIRECTIONAL SEATING AND UNSEATING TORQUES (INCH-LBS)

METAL AND FIRESAFE SEATS

PRESSURE DIFFERENTIAL	
VALVE SIZE	ANSI 150
	285
2"	760
2.5"	760
3"	860
4"	1640
5"	2700
6"	3700
8"	6400
10"	9400
12"	12800
14"	18300
16"	25400
18"	31600
20"	42000
24"	61200
30"	N/A
36"	N/A

Notes:

- 1) Torque values represent tested breakaway torques with adequate safety margin for clean service with temperatures above -20 F.
- 2) Above values include packing and bearing as well as eccentric disc imbalance torques.
- 3) Consult the Tyco control valve manual when sizing is to be based on dynamic torque.
- 4) If pressure differential is not know, use full rated pressure capability of the valve.