

Torques Required to Operate ST&H Butterfly Valves

STANDARD BUTTERFLY VALVE TORQUE

SEAT DESIGN : 1. CARTRIDGE TYPE

SEAT : EPDM, BUNA-N

ACTUAL TORQUE : N.m				ACTUAL TORQUE : lbf.inch				ACTUAL TORQUE : kgf.m						
SIZE	3bar	10bar	16bar	SIZE	50psi	145psi	230psi	SIZE	3kgf/cm ²	10kgf/cm ²	16kgf/cm ²			
50A	2"	16	42	42	50A	2"	142	367	367	50A	2"	2	5	5
65A	2.5"	29	42	42	65A	2.5"	254	367	367	65A	2.5"	3	5	5
80A	3"	29	42	55	80A	3"	254	367	480	80A	3"	3	5	6
100A	4"	42	42	67	100A	4"	367	367	593	100A	4"	5	5	7
125A	5"	67	67	74	125A	5"	593	593	649	125A	5"	7	7	8
150A	6"	71	94	110	150A	6"	621	824	971	150A	6"	8	10	12
200A	8"	118	151	215	200A	8"	1,039	1,332	1,896	200A	8"	12	16	22
250A	10"	303	370	453	250A	10"	2,675	3,273	4,006	250A	10"	31	38	47
300A	12"	383	459	523	300A	12"	3,386	4,063	4,627	300A	12"	39	47	54
350A	14"	337	800	1,521	350A	14"	2,961	7,076	13,385	350A	14"	34	82	156
400A	16"	461	1,802	1,991	400A	16"	4,047	15,948	17,506	400A	16"	49	184	203
450A	18"	619	2,028	2,676	450A	18"	5,445	17,950	23,542	450A	18"	64	207	275
500A	20"	766	2,214	3,305	500A	20"	6,737	19,595	29,076	500A	20"	78	227	337
600A	24"	1,237	5,436	5,324	600A	24"	10,872	48,107	46,847	600A	24"	128	554	544

SEAT DESIGN : 2. STANDARD BOOT TYPE

SEAT : EPDM, BUNA-N

ACTUAL TORQUE : N.m			ACTUAL TORQUE : lbf.inch			ACTUAL TORQUE : kgf.m					
SIZE	10bar	16bar	SIZE	145psi	255psi	SIZE	10kg/cm ²	16kg/cm ²			
50A	2"	34	75	50A	2"	294	294	50A	2"	4	4
65A	2.5"	34	75	65A	2.5"	294	310	65A	2.5"	6	6
80A	3"	34	75	80A	3"	294	500	80A	3"	4	6
100A	4"	64	76	100A	4"	587	660	100A	4"	7	8
125A	5"	71	102	125A	5"	621	790	125A	5"	8	10
150A	6"	71	102	150A	6"	621	903	150A	6"	8	11
200A	8"	121	160	200A	8"	1,073	1,410	200A	8"	13	17
250A	10"	336	433	250A	10"	2,967	4,502	250A	10"	34	45
300A	12"	405	530	300A	12"	36,207	5,077	300A	12"	42	55
350A	14"	1,172	1,521	350A	14"	10,307	13,385	350A	14"	121	156
400A	16"	1,532	1,991	400A	16"	13,475	17,506	400A	16"	156	203
450A	18"	2,060	2,676	450A	18"	18,115	23,542	450A	18"	211	275
500A	20"	2,543	3,305	500A	20"	22,368	29,076	500A	20"	259	337
600A	24"	4,098	5,324	600A	24"	49,051	46,847	600A	24"	419	544

Torques Required to Operate ST&H Butterfly Valves

TEFLON SEAT

ACTUAL TORQUE : N.m			TORQUE : lbf.inchs		
SIZE		11bar	SIZE		165psi
50A	2"	19	50A	2"	13
65A	2.5"	25	65A	2.5"	19
80A	3"	51	80A	3"	38
100A	4"	51	100A	4"	38
125A	5"	103	125A	5"	808
150A	6"	145	150A	6"	808
200A	8"	281	200A	8"	1395
250A	10"	358	250A	10"	3858
300A	12"	637	300A	12"	47070

• NOTE :

All torques shown on the chart were derived from test data using water at 5'c.
 For torque using dry gases, multiply these numbers by 1.6
 Above table has additional 30% safety factor to average net torque

The torques listed are applicable to sea water, lubricating type of hydro carbons and most media at temperature 0~82 °C (32~180 °F).
 The operating speed of the actuator must be considered in order to avoid water hammer when the valve is closed in junction with Liquid.

The factors affect the torque required to operate Butterfly Valves

- Valve Diameter
- Shaft Diameter
- Bearing Friction Coefficient
- Type of Seat Material
- Shut off Pressure
- Velocity
- Shape of Disc
- System Head Characteristics
- Piping Arrangement

Actuator torques can be calculated using the following formulas.

- $T_a = T_b + T_s + T_h = 1.2T_b \pm T_d$
- $T_s = C_s D^2$
- $T_b = 4.17D^2 d f P$
- $T_d = C_t D^3 P$
- $T_h = 3.06D^4$

$$V = C_f \sqrt{p} = \frac{Q}{0.785D^2}$$

- Ta : The required actuator torque(lb-ft)
- Ts : Seating or unseating torque(lb-ft)
- Td : Dynamic torque(lb-ft)
- Th : Hydrostatic torque(lb-ft)
- Q : Flow (cubic for per second)
- V : Velocity (feet per second)
- D : Diameter of valve (feet)
- d : Diameter of Shaft (inch)
- P : Pressure drop across valve(psi)
- Cs : Coefficient of Seating or unseating torque
- Ct : Coefficient of dynamic torque
- Cf : Coefficient of flow
- f : Bearing friction coefficient