KVC Industries Corp.

Seating & Unseating Torques
KVC models 1000 & 2000

The seating and unseating torque anticipated in butterfly valves varies widely with service conditions. Factors affecting torque are as follows:

1) **Operating frequency**
   The first opening after a sustained period of closure is the tough one.

2) **Media Lubricating Characteristics**
   Water is probibily the best all round lubricant for metal-elastomer contact. Is the service completely dry? Seat compounds contain some lubricant. Is it extracted in service?

Lubricating	**Non-Lubricating**
Water	Air – dry gases
Aqueous process streams	Dry powders, pellets
Lubricating oils i.e.: diesel oil, JP fuels	Industrial solvents ie: acetone, ethyl acetate

3) **Condition of disc edge**
   Is it an iron disc in corrosive service? Iron discs in uninhibited water corrode, the edge roughens and corrosion deposits build up. Is there an anticipated deposit on seating surfaces – calcium in a hard water system – various salts in sea water?

4) **Temperature – High or Low**
   Operating temperatures approaching the upper limits of the seat material tend to increase its hardness over a sustained period. Temperatures approaching the lower limits of seat material raise its hardness immediately. Both conditions increase operating torque.

   Anticipated Torque increase: EPDM – above 100ºC (212ºF) – below -18ºC (0ºF).
   Buna-N – above 82ºC (180ºF) – below 0ºC (32ºF).

5) **Chemical attack on seat material causing swelling**
   Increased interference and torque results.

The following torque tables are based upon “Normal” and “Severe” conditions and are shown as in/lbs:

Normal Conditions:

- Operating frequency at least once a month.
- Lubricating media – aqueous liquid.
- Disc corrosion – mild w/ minor deposition.
- Temperature within material limits.
- Chemical effect on seat – minor.

Torque values provided for normal conditions 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 upon normal condition values provide satisfactory results.

Severe Conditions:

- Operating frequency – indefinitely long.
- Non-lubricating media – air, dry gas, cement powder.
- Disc corrosion – severe (iron in uninhibited water).
- Temperature possibly outside recommended limits.
- Chemical effects on elastomer unknown.

KVC Industries Corp.

Seating & Unseating Torques
KVC models 1000 & 2000

Torque values provided for severe conditions incorporate a factor of three over shop tests in establishing frictional resistance of media exposed elements. Caustic cleaning is a typical Severe application.

In selecting actuators under Severe conditions, it is also necessary to compare “Anticipated Seating & Unseating Torque” with “Allowable Operating Torque” on the valve. This is especially important in power actuators not equipped with speed controls where impact loading may occur.

Normal Conditions:

Valve Size		Pressure Differential ΔP		
		100	**150**	**200**
2	50	71	80	97
2½	65	115	133	159
3	80	177	204	239
4	100	283	310	398
5	125	451	531	620
6	150	726	885	974
8	200	1239	1487	1947
10	250	2036	2478	3363
12	300	2832	3186	4425
14	350	4248	5310	8487
16	400	6284	8143	13272
18	450	8851	11064	17700
20	500	10621	14160	22128
24	600	17700	23016	36288

Severe Conditions:

Valve Size		Pressure Differential ΔP		
		100	**150**	**200**
2	50	94	106	129
2½	65	153	177	211
3	80	235	271	318
4	100	377	412	529
5	125	600	706	825
6	150	966	1177	1295
8	200	1648	1978	2590
10	250	2708	3296	4473
12	300	3767	4237	5885
14	350	5650	7062	11288
16	400	8358	10830	17652
18	450	11772	14715	23541
20	500	14126	18833	29430
24	600	23541	30611	48263

If pressure differential (ΔP) is not known, use full rated pressure capability of the valve. Dynamic torque values are not considered in the above table.

For 3-way valve assemblies where one valve is opening and another is closing, multiply toque by a 1.5 factor.