

VALVE OPERATING TORQUE TABLES

Definition of Valve Torque

The purpose of this manual is to provide a simple yet accurate procedure for sizing actuators to SVF ball valves. By properly sizing an actuator to a valve for a specific application, performance is guaranteed and economics are gained.

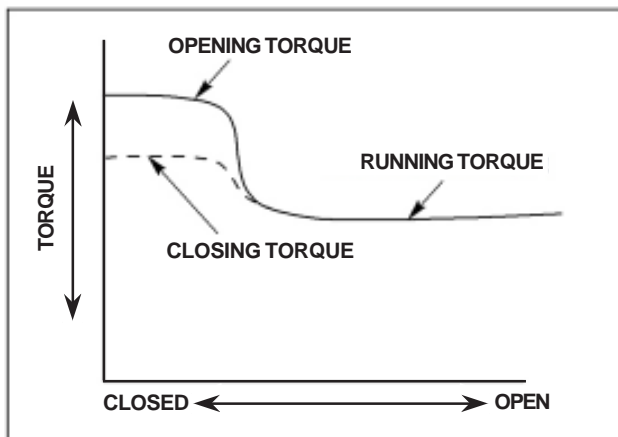
VALVE TORQUE – Before the actuator can be sized for any given valve application, the amount of torque required by the valve must be determined. The operating torque of the ball valve is influenced by a number of factors, some are design and material related, others are application (service condition) related. Design related factors include the type and material of the valve seats. Application factors include system pressure, media, and frequency of operation.

The torque required to operate a ball valve comes from two different areas within the valve, in both cases resulting from friction between metal and relatively soft sealing materials. The two areas in the valve that create torque are the stem and ball/seat.

STEM TORQUE is primarily dependent upon the tightness of the stem nut. Proper adjustment of the stem nut is important to valve performance and life. If the nut is too loose, the valve exhibits stem leakage; if the nut is too tight, the total torque requirement can be increased to the point where the actuator may not be powerful enough to cycle the valve. The design of SVF ball valves is such that the stem torque is constant, i.e. it is not influenced by operation conditions.

BALL/SEAT TORQUE is created by the friction between the ball and seat and is very sensitive to service conditions. The “floating ball” design concept allows the system pressure to force the ball into the downstream seat. The higher the system pressure, the harder the ball is forced into the seat and, therefore, the higher the torque. Since different seat materials have different coefficients of friction, the ball/seat torque also becomes a function of the seat materials being used.

Valve torque is also a function of the media flowing through the valves. Abrasive media have a tendency to increase the amount of friction between ball and seats, whereas some light oils, which provide additional lubricity, can reduce the amount of torque required.



The torque required to operate a ball valve is maximum at the beginning of opening. This is due to change in the ball surface that is in contact with seats. The ball surface contact with the seats is greatest when the valve is closed.

A typical ball valve torque characteristic is demonstrated in the graph shown on the left. Closing torque is about 80% of the opening or breakaway torque for the softer resilient seats. For harder seats such as PEEK, the opening and closing curves are nearly identical. Torque curves in this publication are based on opening curves.



VALVE OPERATING TORQUE TABLES

1

Series 8

R8

SIZE	TFM1 600 Seat Torque		SupraLon™ Seat Torque		Delrin® Seat Torque		UHMWPE Seat Torque	
	in-lb _f	Nm	in-lb _f	Nm	in-lb _f	Nm	in-lb _f	Nm
1/4"	45	5	50	6	50	6	50	6
3/8"	45	5	50	6	50	6	50	6
1/2"	45	5	50	6	50	6	50	6
3/4"	45	5	50	6	60	7	75	8
1"	100	11	150	17	90	10	100	11
1-1/4"	130	15	175	20	300	34	150	17
1-1/2"	280	32	450	51	375	42	175	20
2"	360	41	600	68	675	76	275	31
2-1/2"	560	63	925	105	-	-	-	-
3"	1000	113	1500	170	-	-	-	-

B8

SIZE	TFM1 600 Seat Torque		SupraLon™ Seat Torque		Delrin® Seat Torque		UHMWPE Seat Torque	
	in-lb _f	Nm	in-lb _f	Nm	in-lb _f	Nm	in-lb _f	Nm
1/2"	45	5	50	6	60	7	75	8
3/4"	100	11	150	17	90	10	100	11
1"	130	15	175	20	300	34	150	17
1-1/4"	280	32	450	51	375	42	175	20
1-1/2"	360	41	600	68	675	76	275	31
2"	560	63	925	105	-	-	-	-
2-1/2"	1000	113	1500	170	-	-	-	-

L8

SIZE	TFM1 600 Seat Torque		SupraLon™ Seat Torque		Delrin® Seat Torque		UHMWPE Seat Torque	
	in-lb _f	Nm	in-lb _f	Nm	in-lb _f	Nm	in-lb _f	Nm
1/4"	45	5	50	6	50	6	50	6
3/8"	45	5	50	6	50	6	50	6
1/2"	45	5	50	6	50	6	50	6
3/4"	45	5	50	6	60	7	75	8
1"	100	11	150	17	90	10	100	11
1-1/4"	130	15	175	20	300	34	150	17
1-1/2"	280	32	450	51	375	42	175	20
2"	360	41	600	68	675	76	275	31
2-1/2"	560	63	925	105	-	-	-	-
3"	1000	113	1500	170	-	-	-	-

1



VALVE OPERATING TORQUE TABLES

Series 8

continued

D8

SIZE	TFM1600 Seat Torque		SupraLon™ Seat Torque		Delrin® Seat Torque		UHMWPE Seat Torque	
	in-lbf	Nm	in-lbf	Nm	in-lbf	Nm	in-lbf	Nm
1/4"	45	5	50	6	50	6	50	6
3/8"	45	5	50	6	50	6	50	6
1/2"	45	5	50	6	50	6	50	6
3/4"	45	5	50	6	60	7	75	8
1"	100	11	150	17	90	10	100	11
1-1/4"	130	15	175	20	300	34	150	17
1-1/2"	280	32	450	51	375	42	175	20
2"	360	41	600	68	675	76	275	31

R89

SIZE	TFM1600 Seat Torque		Delrin® Seat Torque		UHMWPE Seat Torque	
	in-lbf	Nm	in-lbf	Nm	in-lbf	Nm
1/4"	45	5	50	6	50	6
3/8"	45	5	50	6	50	6
1/2"	45	5	50	6	50	6
3/4"	45	5	60	7	75	8
1"	100	11	90	10	100	11
1-1/4"	130	15	300	34	150	17
1-1/2"	280	32	375	42	175	20
2"	360	41	675	76	275	31
2-1/2"	560	63	-	-	-	-
3"	1000	113	-	-	-	-



VALVE OPERATING TORQUE TABLES

Series 8

continued

C8		
TFM1 600 Seat Torque		
SIZE	in-lb _f	Nm
1/4"	45	5
3/8"	45	5
1/2"	45	5
3/4"	45	5
1"	100	11
1-1/4"	130	15
1-1/2"	280	32
2"	360	41

F8		
TFM1 600 Seat Torque		
SIZE	in-lb _f	Nm
1/2"	45	5
3/4"	45	5
1"	100	11
1-1/4"	130	15
1-1/2"	280	32
2"	360	41

FB8		
TFM1 600 Seat Torque		
SIZE	in-lb _f	Nm
1/4"	45	5
3/8"	45	5
1/2"	45	5
3/4"	100	11
1"	130	15
1-1/4"	280	32
1-1/2"	360	41
2"	560	63
2-1/2"	1000	113

N8		
SupraLon™ Seat Torque		
SIZE	in-lb _f	Nm
1/4"	50	6
3/8"	50	6
1/2"	50	6
3/4"	50	6
1"	150	17
1-1/4"	175	20
1-1/2"	450	51
2"	600	68
2-1/2"	925	105
3"	1500	170

BN8		
SupraLon™ Seat Torque		
SIZE	in-lb _f	Nm
1/2"	50	6
3/4"	150	17
1"	175	20
1-1/4"	450	51
1-1/2"	600	68
2"	925	105
2-1/2"	1500	170

RJ8		TFM1 600 Seat Torque		SupraLon™ Seat Torque	
SIZE	in-lb _f	Nm	in-lb _f	Nm	
1/4"	45	5	50	6	
3/8"	45	5	50	6	
1/2"	45	5	50	6	
3/4"	45	5	50	6	
1"	100	11	150	17	
1-1/4"	130	15	175	20	
1-1/2"	280	32	450	51	
2"	360	41	600	68	
2-1/2"	560	63	925	105	
3"	1000	113	1500	170	



VALVE OPERATING TORQUE TABLES

CleanFLOW™

SB7

TFM1 600 Seat Torque		
SIZE	in-lbf	Nm
1/2"	60	7
3/4"	60	7
1"	100	11
1-1/2"	200	23
2"	250	28
2-1/2"	450	51
3"	1300	147
4"	1400	158

SBC7

TFM1 600 Seat Torque		
SIZE	in-lbf	Nm
1/2"	100	11
3/4"	140	16
1"	210	24
1-1/2"	490	55
2"	520	59
2-1/2"	900	102
3"	1400	158
4"	1500	170

SB7F

TFM1 600 Seat Torque		
SIZE	in-lbf	Nm
1/2"	60	7
3/4"	60	7
1"	100	11
1-1/2"	200	23
2"	250	28

SBC7F

TFM1 600 Seat Torque		
SIZE	in-lbf	Nm
1/2"	100	11
3/4"	140	16
1"	210	24
1-1/2"	490	55
2"	520	59

SB9

TFM1 600 Seat Torque		
SIZE	in-lbf	Nm
1/2"	44	5
3/4"	53	6
1"	93	11
1-1/2"	195	22
2"	283	32
2-1/2"	434	49
3"	717	81
4"	1080	122

SBC9

TFM1 600 Seat Torque		
SIZE	in-lbf	Nm
1/2"	44	5
3/4"	53	6
1"	93	11
1-1/2"	195	22
2"	283	32
2-1/2"	434	49
3"	717	81
4"	1080	122



VALVE OPERATING TORQUE TABLES

TSB7

TFM1 600 Seat Torque		
SIZE	in-lbf	Nm
1/2"	60	7
3/4"	60	7
1"	100	11
1-1/2"	200	23
2"	250	28
2-1/2"	450	51

TSBC7

TFM1 600 Seat Torque		
SIZE	in-lbf	Nm
1/2"	100	11
3/4"	140	16
1"	210	24
1-1/2"	490	55
2"	520	59
2-1/2"	900	102

CleanFLOW™

continued

TSB7F

TFM1 600 Seat Torque		
SIZE	in-lbf	Nm
1/2"	60	7
3/4"	60	7
1"	100	11
1-1/2"	200	23
2"	250	28

TSBC7F

TFM1 600 Seat Torque		
SIZE	in-lbf	Nm
1/2"	100	11
3/4"	140	16
1"	210	24
1-1/2"	490	55
2"	520	59

H7

SIZE	Delrin® Seat Torque		PEEK Seat Torque	
	in-lbf	Nm	in-lbf	Nm
1/2"	60	7	66	8
3/4"	200	23	220	25
1"	300	34	330	37
1-1/2"	550	62	605	68
2"	1100	124	1210	137

P4

SIZE	Delrin® Seat Torque		PEEK Seat Torque	
	in-lbf	Nm	in-lbf	Nm
1/2"	55	6	61	7
3/4"	190	22	209	24
1"	290	33	300	34

HBEV

SIZE	Delrin® Seat Torque		PEEK Seat Torque	
	in-lbf	Nm	in-lbf	Nm
1/4"	150	17	160	18
3/8"	150	17	160	18
1/2"	150	17	160	18
3/4"	200	23	220	25
1"	320	36	335	38
1-1/2"	575	65	610	69
2"	1000	113	1150	130



VALVE OPERATING TORQUE TABLES

EZ9

TFM1 600 Seat Torque		
SIZE	in-lbf	Nm
1/4"	35	4
3/8"	35	4
1/2"	35	4
3/4"	50	6
1"	80	9
1-1/4"	120	14
1-1/2"	250	28
2"	300	34

FS7

TFM1 600 Seat Torque		
SIZE	in-lbf	Nm
3"	987	112
4"	1009	114

BZ9

PTFE Seat Torque		
SIZE	in-lbf	Nm
1/2"	31	4
3/4"	66	7
1"	113	13
1-1/2"	240	27
2"	260	29

Flanged

41Rev3

SIZE	TFM1 600 Seat Torque		SupraLon™ Seat Torque	
	in-lbf	Nm	in-lbf	Nm
1-1/2"	208	24	254	29
2"	299	34	368	42
3"	598	68	728	82
4"	988	112	1209	137
6"	1328	150	1532	173

B41Rev3

SIZE	TFM1 600 Seat Torque		SupraLon™ Seat Torque	
	in-lbf	Nm	in-lbf	Nm
1/2"	72	8	91	10
3/4"	81	9	98	11
1"	130	15	172	19
1-1/2"	299	34	368	42
2"	371	42	460	52
2-1/2"	598	68	728	82
3"	988	112	1209	137
4"	1508	171	1846	209
6"	4160	470	5200	588
8"	6500	735	8060	911