VC-411 TORQUE DATA: The torque required to operate a VC-411 control damper is the greatest torque value that the damper will see in operation. The tables below give torque values for various face velocities, differential pressures, and sealing requirements. The torque required for a damper without seals is the torque due to velocity or pressure, whichever is greater. The torque required for a damper with seals is the torque due to velocity or pressure or sealing the damper, whichever is greater. In either case, 20 in./lbs. should be the minimum torque selected. Additionally, safety factors should be used when using these values to size an actuator.

SEALING TORQUE (in./lbs.)

Damper Height (in.) \ Damper Width (in.)	12	18	24	30	36	42	48
12	20	23	25	28	30	33	35
18	29	33	36	40	43	47	50
24	35	39	42	46	49	53	56
30	40	44	48	52	57	61	65
36	48	53	57	61	66	72	77
42	58	67	70	76	81	87	92
48	63	69	75	81	87	93	99
54	72	79	85	92	98	105	112
60	72	79	85	92	98	105	112
66	83	91	98	106	114	121	128
72	92	99	108	116	124	132	140
78							
84							
90							
96							

VELOCITY TORQUE (in./lbs.)

Damper Height (in.) \ Damper Width (in.)	12	18	24	30	36	42	48
12	1	1	1	2	2	2	3
18	1	2	3	3	4	4	5
24	3	4	5	6	7	8	9
30	3	4	6	7	8	10	11
36	4	5	7	8	10	11	13
42	4	6	8	10	12	14	15
48	5	7	10	12	14	16	19
54	6	9	11	14	16	19	22
60	6	9	11	14	16	19	22
66	7	10	13	16	19	22	25
72	8	11	14	18	21	24	28
78	9	12	16	20	24	27	31
84	10	14	18	22	26	30	34
90	10	14	18	22	26	30	34
96	10	15	19	24	28	33	37

PRESSURE TORQUE (in./lbs.)

Damper Height (in.) \ Damper Width (in.)	12	18	24	30	36	42	48
12	1	1	2	2	3	3	4
18	2	3	4	4	5	6	7
24	3	4	5	6	7	8	9
30	3	4	6	7	9	10	11
36	4	5	7	9	10	12	13
42	4	6	8	10	11	13	15
48	5	7	9	12	14	16	18
54	6	8	11	13	16	19	21
60	6	8	11	13	16	19	21
66	7	10	13	15	18	21	24
72	8	11	14	17	21	24	27
78	8	12	16	19	23	26	30
84	9	13	17	21	25	29	33
90	9	13	17	21	25	29	33
96	10	14	19	23	27	32	36

Note: Care should be taken in designing systems requiring higher pressures and higher velocities which, in turn, will elevate the operating torque of the dampers. The shaded areas above depict dampers that may exceed the design limits of extended shaft operation (250 in./lbs. max.). When this value is exceeded the use of "in-duct" or jack-shafted actuators is required.

Above values are based on 1000 fpm face velocity. Use multipliers below for greater velocities.

FACE VELOCITY (fpm)	MULTIPLIERS
1500	2.25
2000	4
2500	6.25
3000	9

Above values are based on 1 in. wg. differential pressure. Use multipliers below for greater pressures.

DIFFERENTIAL PRESSURE	MULTIPLIERS
2	2
3	3
4	4
5	5
6	6
7	7

VC-412 TORQUE DATA: The torque required to operate a VC-412 control damper is the greatest torque value that the damper will see in operation. The tables below give torque values for various face velocities, differential pressures, and sealing requirements. The torque required for a damper without seals is the torque due to velocity or pressure, whichever is greater. The torque required for a damper with seals is the torque due to velocity or pressure or sealing the damper, whichever is greater. In either case, 20 in./lbs. should be the minimum torque selected. Additionally, safety factors should be used when using these values to size an actuator.

SEALING TORQUE (in./lbs.)

Damper Height (in.) \ Damper Width (in.)	12	18	24	30	36	42	48
12	35	45	56	66	77	88	99
18	40	51	62	72	83	94	105
24	53	68	82	96	111	125	140
30	66	84	102	120	138	156	174
36	80	101	123	144	166	188	209
42	93	118	143	168	194	219	244
48	99	124	149	174	200	225	250
54	112	141	170	198	227	256	285
60	125	158	190	222	255	287	320
66	138	174	210	246	282	318	354
72	152	191	231	270	310	350	389
78							
84							
90							
96							

VELOCITY TORQUE (in./lbs.)

Damper Height (in.) \ Damper Width (in.)	12	18	24	30	36	42	48
12	2	3	4	4	5	6	7
18	2	3	4	4	5	6	7
24	3	4	5	6	7	9	10
30	4	5	7	8	10	11	13
36	4	6	8	10	12	14	16
42	5	7	10	12	14	17	19
48	5	7	10	12	14	17	19
54	6	9	11	14	17	19	22
60	7	10	13	16	19	22	25
66	7	11	14	18	21	25	28
72	8	12	16	20	24	27	31
78	8	12	16	20	24	27	31
84	9	13	17	22	26	30	34
90	10	14	19	24	28	33	37
96	10	15	20	25	30	35	40

PRESSURE TORQUE (in./lbs.)

Damper Height (in.) \ Damper Width (in.)	12	18	24	30	36	42	48
12	2	3	4	5	6	7	8
18	2	3	4	5	6	7	8
24	3	5	6	8	9	11	12
30	4	6	8	10	12	14	16
36	5	8	10	13	15	18	20
42	6	9	12	15	18	21	24
48	6	9	12	15	18	21	24
54	7	11	14	18	21	25	28
60	8	12	16	20	24	28	32
66	9	14	18	23	27	32	36
72	10	15	20	25	30	35	40
78	10	15	20	25	30	35	40
84	11	17	22	28	33	39	44
90	12	18	24	30	36	42	48
96	13	20	26	33	39	46	52

Note: Care should be taken in designing systems requiring higher pressures and higher velocities which, in turn, will elevate the operating torque of the dampers. The shaded areas above depict dampers that may exceed the design limits of extended shaft operation (610 in./lbs. max.). When this value is exceeded the use of "in-duct" or jack-shafted actuators is required.

Above values are based on 1000 fpm face velocity. Use multipliers below for greater velocities.

FACE VELOCITY (fpm)	MULTIPLIERS
1500	2.25
2000	4
2500	6.25
3000	9
3500	12.25
4000	16
4500	20.25
5000	25

Above values are based on 1 in. wg. differential pressure. Use multipliers below for greater pressures.

DIFFERENTIAL PRESSURE	MULTIPLIERS
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10

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VC-413 TORQUE DATA: The torque required to operate a VC-413 control damper is the greatest torque value that the damper will see in operation. The tables below give torque values for various face velocities, differential pressures, and sealing requirements. The torque required for a damper without seals is the torque due to velocity or pressure, whichever is greater. The torque required for a damper with seals is the torque due to velocity or pressure or sealing the damper, whichever is greater. In either case, 20 in./lbs. should be the minimum torque selected. Additionally, safety factors should be used when using these values to size an actuator.

SEALING TORQUE (in./lbs.)

Damper Height (in.) \ Damper Width (in.)	12	18	24	30	36	42	48	54	60
12	34	45	56	66	77	88	99	110	120
18	40	51	62	72	83	94	105	116	126
24	53	68	82	96	111	125	140	154	168
30	66	84	102	120	138	156	174	192	210
36	80	101	123	144	166	188	209	231	252
42	93	118	143	168	194	219	244	269	294
48	99	124	149	174	200	225	250	275	300
54	112	141	170	198	227	256	285	314	342
60	125	158	190	222	255	287	320	352	384
66	138	174	210	246	282	318	354	390	426
72	152	191	231	270	310	350	389	429	468
78									
84									
90									
96									

VELOCITY TORQUE (in./lbs.)

Damper Height (in.) \ Damper Width (in.)	12	18	24	30	36	42	48	54	60
12	2	3	4	4	5	6	7	7	8
18	2	3	4	4	5	6	7	7	8
24	3	4	5	6	7	9	10	11	12
30	4	5	7	8	10	11	13	14	16
36	4	6	8	10	12	14	16	18	20
42	5	7	10	12	14	17	19	21	24
48	5	7	10	12	14	17	19	21	24
54	6	9	11	14	17	19	22	25	27
60	7	10	13	16	19	22	25	28	31
66	7	11	14	18	21	25	28	32	35
72	8	12	16	20	24	27	31	35	39
78	8	12	16	20	24	27	31	35	39
84	9	13	17	22	26	30	34	39	43
90	10	14	19	24	28	33	37	42	47
96	10	15	20	25	30	35	40	45	50

PRESSURE TORQUE (in./lbs.)

Damper Height (in.) \ Damper Width (in.)	12	18	24	30	36	42	48	54	60
12	2	3	4	5	6	7	8	9	10
18	2	3	4	5	6	7	8	9	10
24	3	5	6	8	9	11	12	14	15
30	4	6	8	10	12	14	16	18	20
36	5	8	10	13	15	18	20	23	25
42	6	9	12	15	18	21	24	27	30
48	6	9	12	15	18	21	24	27	30
54	7	11	14	18	21	25	28	32	35
60	8	12	16	20	24	28	32	36	40
66	9	14	18	23	27	32	36	41	45
72	10	15	20	25	30	35	40	45	50
78	10	15	20	25	30	35	40	45	50
84	11	17	22	28	33	39	44	50	55
90	12	18	24	30	36	42	48	54	60
96	13	20	26	33	39	46	52	59	65

Note: Care should be taken in designing systems requiring higher pressures and higher velocities which, in turn, will elevate the operating torque of the dampers. The shaded areas above depict dampers that may exceed the design limits of extended shaft operation (1300 in./lbs. max.). When this value is exceeded the use of "in-duct" or jack-shafted actuators is required.

Above values are based on 1000 fpm face velocity. Use multipliers below for greater velocities.

FACE VELOCITY (fpm)	MULTIPLIERS
1500	2.25
2000	4
2500	6.25
3000	9
3500	12.25
4000	16
4500	20.25
5000	25
5500	30.25
6000	36

Above values are based on 1 in. wg. differential pressure. Use multipliers below for greater pressures.

DIFFERENTIAL PRESSURE	MULTIPLIERS
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10
11	11
12	12
13	13
14	14
15	15

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