

AIR PERFORMANCE DATA FOR ALL COMBINATION FIRE AND SMOKE AND SMOKE DAMPERS

The air performance of a damper is described by the pressure drop across the damper. So what is pressure drop? Pressure drop can be defined as the resistance to airflow across an open damper and increases as turbulent flow increases. Ruskin's pressure drop testing was conducted in accordance with AMCA Standard 500 using figure 5.3 (shown at right). All data has been corrected to represent standard air at a density of .075 lb/ft. Actual pressure drop is dependent upon many factors. This pressure drop information along with an analysis of other system influences should be used to estimate actual pressure losses for a damper installed in a given HVAC system.

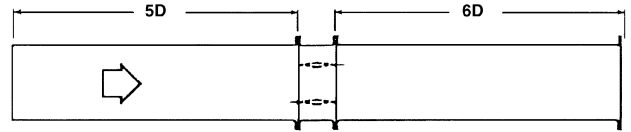


Figure 5.3 (above) illustrates a fully ducted damper.

For AMCA Certified Ratings Air Performance information refer to the damper model specification sheet.

PERFORMANCE DATA FOR SD and FSD60, 60-2, 60-3, 60-V, 60M, 60-3M, 37

To determine the pressure drop:

1. Select the damper free area factor based on the damper width and height (A x B) from the chart.
2. Solve the formula using the free area factor.
3. For installations where damper is not installed in ductwork, multiply static pressure drop obtained from the formula by $2.8 + \sqrt{\text{FREE AREA FACTOR}}$

Formula

$$\Delta P = 1.60 \left[\frac{\left(\frac{\text{CFM}}{\text{FREE AREA FACTOR}} \right) - \text{Vel.}}{4005} \right]^2$$

ΔP = Pressure drop in inches w.g.
 Vel. = Duct Velocity in feet per minute
 CFM = Duct area (sq. ft.) x Vel. (fpm)

FREE AREA FACTOR

Height Damper B Dim.	Width - Damper A Dim.						
	8	12	16	20	24	28	30
8	0.17	0.29	0.42	0.54	0.67	0.79	0.86
10	0.24	0.42	0.60	0.78	0.97	1.15	1.24
12	0.29	0.51	0.72	0.94	1.15	1.37	1.47
14	0.32	0.55	0.79	1.03	1.26	1.50	1.62
16	0.39	0.68	0.98	1.27	1.56	1.85	2.00
18	0.44	0.77	1.09	1.42	1.74	2.07	2.23
20	0.51	0.90	1.28	1.66	2.04	2.42	2.61
24	0.64	1.11	1.58	2.05	2.52	3.00	3.23
28	0.78	1.37	1.95	2.53	3.12	3.70	3.99
32	0.91	1.58	2.25	2.93	3.60	4.27	4.61
36	1.03	1.79	2.55	3.32	4.08	4.85	5.23
40	1.18	2.05	2.93	3.80	4.68	5.55	5.99
44	1.30	2.26	3.23	4.19	5.16	6.12	6.61
48	1.42	2.47	3.53	4.59	5.64	6.70	7.22

PERFORMANCE DATA FOR SD AND FSD36, 35

To determine the pressure drop:

1. Select the damper free area factor based on the damper width and height (A x B) from the chart.
2. Solve the formula using the free area factor.
3. For installations where damper is not installed in ductwork, multiply static pressure drop obtained from the formula by $2.8 + \sqrt{\text{FREE AREA FACTOR}}$

Formula

$$\Delta P = 2.75 \left[\frac{\left(\frac{\text{CFM}}{\text{FREE AREA FACTOR}} \right) - \text{Vel.}}{4005} \right]^2$$

ΔP = Pressure drop in inches w.g.
 Vel. = Duct Velocity in feet per minute
 CFM = Duct area (sq. ft.) x Vel. (fpm)

FREE AREA FACTOR

Height Damper B Dim.	Width - Damper A Dim.							
	8	12	16	20	24	28	32	36
8	0.18	0.31	0.45	0.58	0.71	0.85	0.98	1.12
10	0.23	0.40	0.57	0.74	0.91	1.08	1.25	1.42
12	0.30	0.53	0.76	0.98	1.21	1.53	1.66	1.88
14	0.33	0.58	0.82	1.07	1.32	1.56	1.81	2.06
16	0.40	0.69	0.99	1.28	1.58	1.87	2.17	2.46
18	0.44	0.77	1.10	1.43	1.76	2.09	2.42	2.75
20	0.53	0.92	1.32	1.71	2.11	2.50	2.89	3.29
24	0.62	1.09	1.55	2.01	2.48	2.94	3.40	3.87
28	0.78	1.35	1.93	2.50	3.08	3.66	4.23	4.81
32	0.93	1.62	2.31	2.99	3.68	4.37	5.06	5.75
36	1.05	1.83	2.61	3.39	4.18	4.96	5.74	6.52
40	1.19	2.08	2.96	3.85	4.73	5.62	6.50	7.39
44	1.32	2.31	3.29	4.28	5.26	6.25	7.23	8.21
48	1.45	2.52	3.60	4.68	5.75	6.83	7.91	8.98

PERFORMANCE DATA FOR SD50

To determine the pressure drop:

1. Select the damper free area factor based on the damper width and height (A x B) from the chart.
2. Solve the formula using the free area factor.
3. For installations where damper is not installed in ductwork, multiply static pressure drop obtained from the formula by $2.8 + \sqrt{\text{FREE AREA FACTOR}}$

Formula

$$\Delta P = 1.60 \left[\frac{\left(\frac{\text{CFM}}{\text{FREE AREA FACTOR}} \right) - \text{Vel.}}{4005} \right]^2$$

ΔP = Pressure drop in inches w.g.
 Vel. = Duct Velocity in feet per minute
 CFM = Duct area (sq. ft.) x Vel. (fpm)

FREE AREA FACTOR

Height Damper B Dim.	Width - Damper A Dim.							
	8	12	16	20	24	28	32	36
8	0.18	0.32	0.45	0.59	0.72	0.86	0.99	1.13
10	0.24	0.42	0.59	0.77	0.95	1.12	1.30	1.48
12	0.31	0.55	0.78	1.01	1.24	1.48	1.71	1.94
14	0.35	0.61	0.87	1.13	1.39	1.66	1.92	2.18
16	0.41	0.71	1.01	1.31	1.62	1.92	2.22	2.52
18	0.48	0.83	1.20	1.56	1.91	2.27	2.63	2.99
20	0.56	0.97	1.38	1.80	2.21	2.62	3.04	3.45
24	0.69	1.20	1.71	2.22	2.73	3.24	3.75	4.26
28	0.82	1.43	2.03	2.64	3.25	3.86	4.47	5.07
32	0.97	1.69	2.41	3.12	3.84	4.56	5.28	6.00
36	1.10	1.91	2.73	3.55	4.36	5.18	6.00	6.81
40	1.23	2.14	3.06	3.97	4.88	5.80	6.71	7.62
44	1.36	2.37	3.38	4.39	5.40	6.41	7.42	8.43
48	1.51	2.63	3.75	4.87	6.00	7.12	8.24	9.36