RUSKIN®

3900 Dr. Greaves Rd. • Kansas City, MO 64030 • (816) 761-7476 • FAX (816) 765-8955

CD50 LOW LEAKAGE CONTROL DAMPER

EXTRUDED ALUMINUM

STANDARD CONSTRUCTION

FRAME
5" x 1" x 6063T5 extruded aluminum hat channel with .125" minimum wall thickness (127 x 25 x 3.2). Low profile, 5" x 1/2" (127 x 13) top and bottom frames on dampers 12" (305) high and less. Mounting flanges on both sides of frame.

BLADES
6" (152) wide, 6063T5 heavy gage extruded aluminum, airfoil shape.

LINKAGE
Concealed in frame.

AXLES
1/2 " (13) plated steel hex.

BEARINGS
Molded synthetic.

SEALS
Blade Edge – Extruded Ruskiprene (TPR) for -72°F to +275°F (-58°C to +135°C).
Jamb – Flexible metal compressible type.

CONTROL SHAFT
Removable, 1/2" (13) diameter shaft extends 6" (152) beyond frame.

FINISH
Mill.

MINIMUM SIZE
Single blade, parallel action – 6"w x 5"h (152 x 127).
Two blade, opposed action – 6"w x 9"h (152 x 229).

MAXIMUM SIZE
Single section – 60"w x 72"h (1524 x 1829).
Multiple section assembly – Unlimited size.
Dampers larger than the single section maximum are furnished in an assembly of 48" x 72" (1219 x 1829) or less equal sized individual sections.

FEATURES

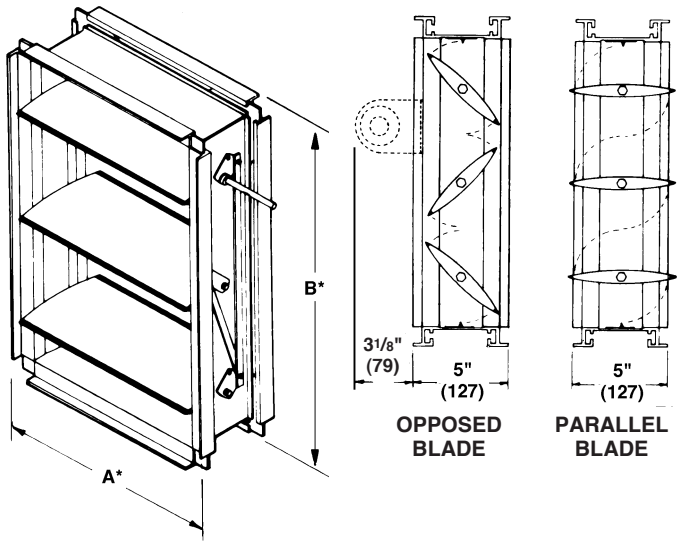
Ruskin's premier damper for medium pressure commercial and industrial HVAC systems offers the lowest leakage available with a standard, commercial built damper. The CD50 was the first AMCA-licensed low leakage damper and bears the AMCA Air Leakage Seal.

Linkage is concealed in the frame out of the airstream for low maintenance and reduced air turbulence. Hexagonal axles ensure a positive lock with blades. An easily replaceable, double-edge blade seal features an inflatable pocket that assists in blade seal.

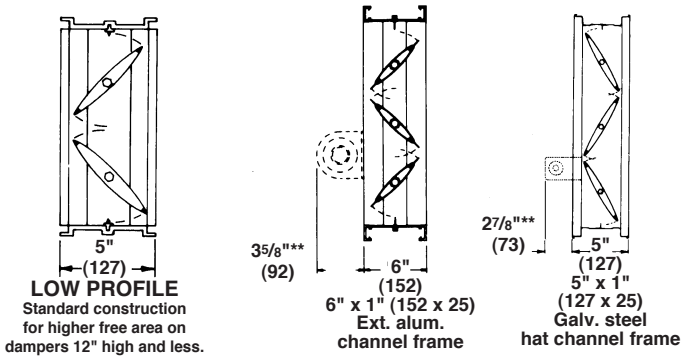
NOTE: Dimensions shown in parenthesis ( ) indicate millimeters.

*Units furnished approximately 1/4" (6) smaller than given opening dimensions.

**Jackshaft standard on multiple section dampers.



FRAME CONSTRUCTION OPTIONS



VARIATIONS

Variations to the CD50 basic design are available at additional cost. They include:
- Anodize and special finishes
- Pneumatic or electric actuators
- SP100 Switch Package
- Front or rear or flange frame
- 5" x 1" x 16 gage (127 x 25 x 1.6) galvanized steel hat channel frame
- 6" x 1" x 6063T5 (152 x 25 x 3.2) extruded aluminum hat channel frame
- Face and bypass mixing damper assemblies

QTY.	OPENING DIM.		FRAME STYLE			VARIATIONS
	A*	B*	STD.	Front Flange FF	Rear Flange RF	

JOB **LOCATION**

CONTRACTOR

CD50 PERFORMANCE DATA

AREA FACTOR TABLE

Height Dim. B	Dimension A – Width In Inches																				
	8" (203)	10" (254)	12" (305)	14" (356)	16" (406)	18" (457)	20" (508)	22" (559)	24" (610)	26" (660)	28" (711)	30" (762)	32" (813)	34" (864)	36" (914)	38" (965)	40" (1016)	42" (1067)	44" (1118	46" (1168)	48" (1219)
8" (203)	5.41	4.07	3.26	2.70	2.31	2.02	1.79	1.63	1.48	1.37	1.24	1.16	1.08	1.01	.94	.91	.85	.81	.78	.74	.72
10" (254)	4.12	3.08	2.47	2.05	1.75	1.53	1.36	1.23	1.12	1.04	.94	.88	.81	.76	.72	.69	.64	.62	.59	.57	.54
12" (305)	3.07	2.30	1.84	1.52	1.30	1.14	1.01	.92	.83	.77	.70	.66	.61	.57	.53	.51	.48	.46	.44	.42	.40
14" (356)	2.44	1.83	1.46	1.21	1.04	.91	.80	.73	.66	.61	.56	.52	.48	.45	.42	.41	.38	.36	.35	.33	.32
16" (406)	2.13	1.59	1.28	1.06	.91	.79	.70	.64	.58	.54	.48	.46	.42	.39	.37	.35	.34	.32	.31	.29	.28
18" (457)	1.81	1.36	1.09	.90	.77	.67	.59	.54	.49	.46	.41	.39	.36	.34	.31	.30	.29	.27	.26	.25	.24
20" (508)	1.57	1.18	.94	.78	.66	.59	.52	.47	.43	.40	.36	.34	.31	.29	.27	.26	.25	.24	.23	.22	.21
24" (610)	1.29	.96	.77	.64	.55	.48	.42	.39	.35	.32	.29	.28	.25	.24	.22	.21	.20	.19	.18	.18	.17
28" (711)	1.09	.81	.65	.54	.46	.40	.36	.33	.29	.27	.25	.23	.21	.20	.19	.18	.17	.16	.16	.15	.14
32" (813)	.93	.70	.56	.46	.40	.35	.31	.28	.26	.24	.21	.20	.19	.17	.16	.16	.15	.14	.13	.13	.12
36" (914)	.80	.60	.48	.40	.34	.30	.26	.24	.22	.20	.18	.17	.16	.15	.14	.13	.13	.12	.12	.11	.11
40" (1016)	.73	.55	.44	.36	.31	.27	.24	.22	.20	.18	.17	.15	.14	.14	.13	.12	.11	.11	.10	.10	.10
44" (1118)	.66	.50	.40	.33	.28	.25	.22	.20	.18	.17	.15	.14	.13	.12	.12	.11	.11	.10	.10	.09	.09
48" (1219)	.58	.43	.35	.29	.25	.22	.19	.17	.16	.15	.13	.12	.11	.11	.10	.10	.09	.09	.08	.08	.08
52" (1321)	.55	.41	.33	.27	.23	.20	.18	.16	.15	.14	.12	.12	.11	.10	.09	.09	.09	.08	.08	.08	.07
56" (1422)	.51	.38	.30	.25	.22	.19	.17	.15	.14	.13	.12	.11	.10	.09	.08	.08	.08	.08	.07	.07	.07
60" (1524)	.47	.35	.28	.23	.20	.17	.15	.14	.13	.12	.11	.10	.10	.09	.08	.08	.07	.07	.07	.06	.06
64" (1626)	.44	.33	.26	.22	.19	.16	.14	.13	.12	.11	.10	.09	.09	.08	.08	.07	.07	.07	.06	.06	.06
68" (1727)	.42	.31	.25	.21	.17	.15	.13	.12	.11	.11	.09	.09	.08	.08	.07	.07	.06	.06	.06	.05	.05
72" (1829)	.39	.29	.23	.19	.16	.14	.13	.12	.11	.10	.09	.08	.08	.07	.07	.06	.06	.06	.06	.05	.05

EXAMPLE:

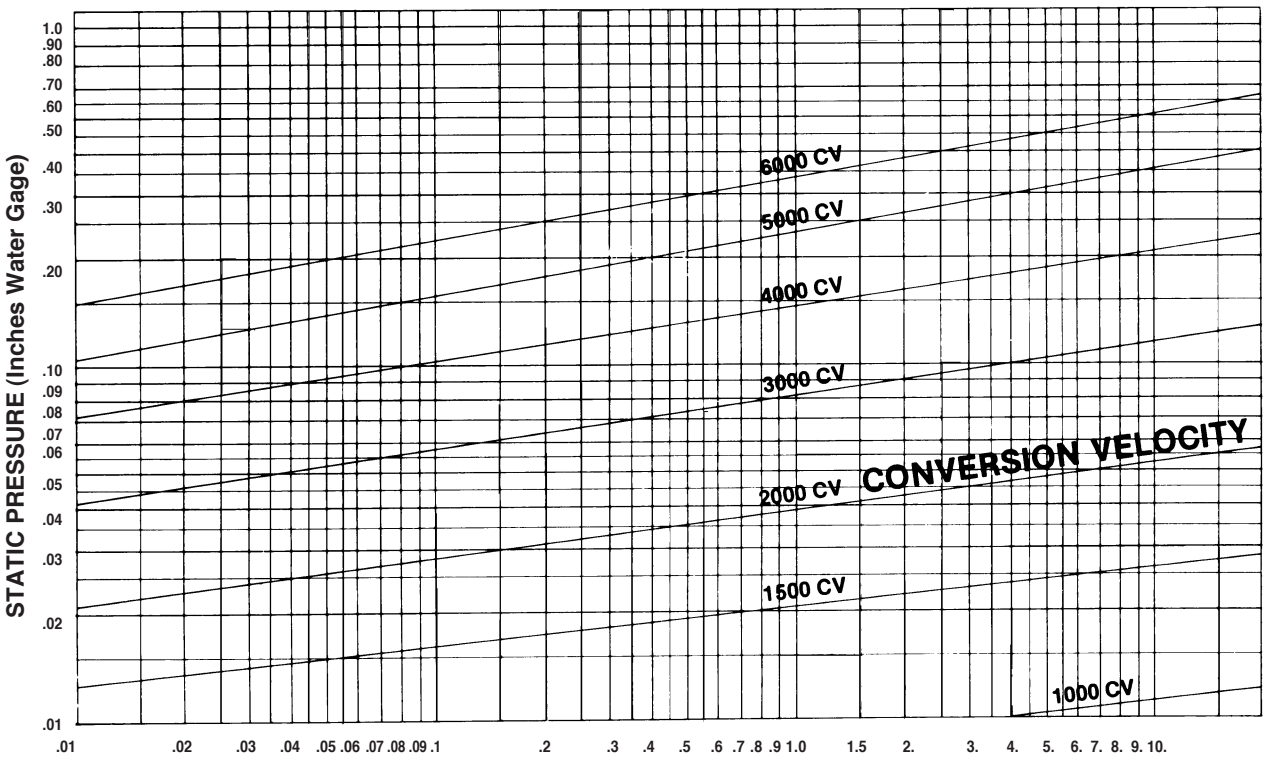
Find the pressure drop across a 24" wide x 24" high CD50 control damper handling 8570 CFM. From the table area factor is .35. **CFM x AREA FACTOR EQUALS CONVERSION VELOCITY.**

Therefore, CV (Conversion Velocity) = 8570 CFM x .35 = 3000. From Pressure Drop Chart, Pressure Drop = .07 inches w.g.

Use the table and chart to determine pressure drop through Ruskin CD50 Control Dampers.

1. Determine area factor for damper by entering the area factor table with duct width and height.
2. Find the conversion velocity (CV) by multiplying area factor for selected size damper by flow rate in CFM: CV = Area Factor x CFM.
3. Enter pressure drop chart with area factor and proceed up to appropriate conversion velocity (CV) line. Then read straight across to pressure drop at left side of chart.

CD50 PRESSURE DROP CHART



NOTES:

1. Ratings are based on AMCA Standard 500 using Test Setup Apparatus Figure 5.3 (damper installed with duct upstream & downstream).
2. Static Pressure and Conversion Velocities are corrected to .075 lb./cu. ft. air density.
3. For installations where Control Damper is not installed in duct work such as Return Air from ceiling plenum thru damper into return air shaft; multiply static pressure drop obtained from the above table by $2.8 + \sqrt{1 \div \text{area factor}}$.

TOTAL CFM LEAKAGE AT 1" W.G. STATIC PRESSURE DIFFERENTIAL

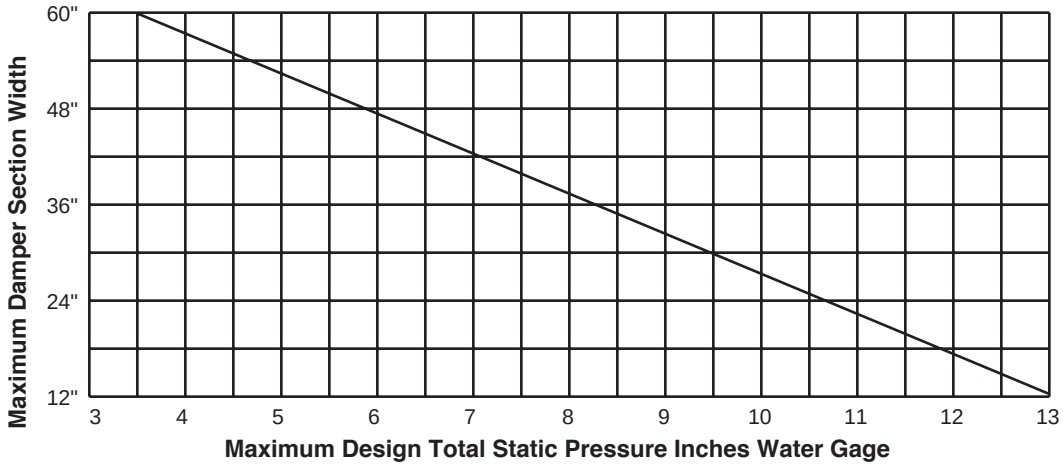
DAMPER WIDTH (INCHES)	DAMPER HEIGHT (INCHES)											
	8" (203)	12" (305)	18" (457)	24" (610)	30" (762)	36" (914)	42" (1067)	48" (1219)	54" (1372)	60" (1524)	66" (1676)	72" (1829)
6" (152)	3	4	6	9	11	13	15	17	19	21	23	25
12" (305)	2	3	4	5	7	8	9	11	12	13	15	16
24" (610)	4	5	8	11	13	16	19	21	23	26	29	31
36" (914)	5	8	12	16	20	23	27	31	35	39	43	47
48" (1219)	6	7	13	15	21	24	28	32	36	40	44	48
60" (1524)	7	10	15	20	25	30	35	40	45	50	55	60

LEAKAGE CORRECTION FACTOR

DAMPER WIDTH (INCHES)	STATIC PRESSURE (Inches Water Gage)										
	1" (25)	2" (51)	3" (76)	4" (102)	5" (127)	6" (152)	7" (178)	8" (203)	9" (229)	10" (254)	11" (279)
6" (152)	1.0	1.6	2.0	2.4	2.7	3.1	3.4	3.6	3.9	4.1	4.4
12" (305)	1.0	1.6	2.0	2.4	2.7	3.1	3.4	3.6	3.9	4.1	
24" (610)	1.0	1.6	2.0	2.4	2.7	3.1	3.4	3.6	3.9		
36" (914)	1.0	1.6	2.0	2.4	2.7	3.1	3.4	3.6			
48" (1219)	1.0	1.5	1.9	2.4	2.7*	3.4*					
60" (1524)	1.0	1.4	2.0								

*For opposed blades only

CD50 PRESSURE LIMITATIONS



The CD50 dampers may be used in systems with total pressures exceeding 3.5" w.g. by reducing damper section width as indicated. Example: Maximum design total pressure of 8.5" w.g. would require the CD50 damper with Maximum Section Width of 36".

Pressure Limitations shown on chart above allow maximum blade deflection of $^1/_{180}$ of span on 60" damper widths. Deflections in other damper widths (less than 48") at higher pressures shown will result in blade deflection substantially less than $^1/_{180}$ of span.

Ruskin Manufacturing Company certifies that the CD50 Damper shown herein is licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 511 and comply with the requirements of the AMCA Certified Ratings Program. The AMCA Certified Ratings Seal applies to air leakage performance only.

To determine leakage at static pressure differentials higher than one inch water gage, multiply leakage at one inch (from upper table) by correction factor for higher static pressure and appropriate UNIT WIDTH (from lower table). Example: Find leakage for a 36"w x 24"h damper at 3 inches w.g. 16 CFM x 2.0 = 32 CFM leakage at 3 inches w.g.

Leakage ratings are based on AMCA Standard 500 using Test Setup Apparatus Figure 5.5. Torque applied holding damper closed at 7 in. lbs. per sq. ft. of damper with minimum of 20 in. lbs. Air leakage is based on operation between 50°F to 104°F.

CD50 SOUND RATINGS

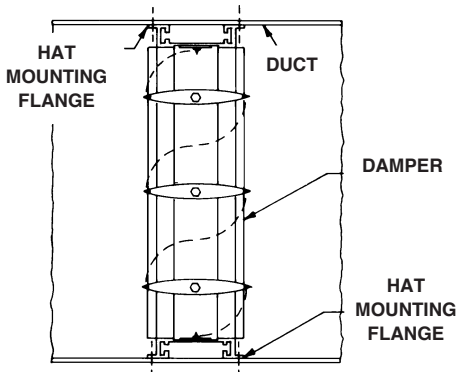
Damper Size	Damper Full Open		Damper 75% Open		Damper 50% Open		Damper 25% Open	
	CFM	NC	CFM	NC	CFM	NC	CFM	NC
12 x 12	2000	17	1500	11	1000	11	500	*
	3000	28	2250	22	1500	19	750	*
	4000	35	3000	29	2000	24	1000	*
18 x 18	2250	17	1688	10	1125	21	563	*
	4500	33	3375	26	2250	32	1125	*
	6750	43	5063	37	3375	40	1688	15
24 x 24	4000	11	3000	10	2000	26	1000	*
	8000	32	6000	30	4000	38	2000	21
	12000	43	9000	42	6000	46	3000	31

NC = Noise criteria in Decibels is based on 10db room effect and 10db of room attenuation.
* = Less than 10 NC
See ASHRAE Handbook (1977 Fundamentals, Chapter 7) for explanation of NC Ratings.

SUGGESTED SPECIFICATION

Furnish and install, at locations shown on plans, or in accordance with schedules, LOW LEAKAGE DAMPER, WITH PUBLISHED LEAKAGE DATA CERTIFIED UNDER THE AMCA CERTIFIED RATINGS PROGRAM showing leakage through a 48" x 48" damper at 4 in. w.g. pressure difference to be less than 5.2 cfm per sq. ft. Same published leakage data shall also include leakage information for all available damper sizes at pressure differences from 1 in w.g. through 11 in. w.g. Low leakage dampers shall meet the following minimum construction standards: Frames shall be 5" x 1" x .125" (minimum thickness) 6063T5 extruded aluminum hat channel with hat mounting flanges on both sides of the frame. Each corner shall be reinforced with two die formed internal braces and machine staked for maximum rigidity. Blades shall be airfoil type extruded aluminum (maximum 6" depth) with integral structural reinforcing tube running full length of each blade.

Blade edge seals shall be extruded double edge design with inflatable pocket which enables air pressure from either direction to assist in blade to blade seal off. Blades seals shall be mechanically locked in extruded blade slots, yet shall be easily replaceable in field. Adhesive or clip-on type blade seals are not acceptable. Bearings shall be non-corrosive molded synthetic. Axles shall be hexagonal (round not acceptable) to provide positive locking connection to blades and linkage. Linkage shall be concealed in frame. Damper manufacturer's literature (submitted for approval prior to installation) shall include performance data developed from testing in accordance with AMCA Standard 500 in an AMCA APPROVED LABORATORY showing pressure drop for all sizes of dampers required at all anticipated air flow rates. Dampers shall be in all respects equivalent to Ruskin Model CD50.



TYPICAL
MODEL CD50 INSTALLATION

Two 1/2" hat mounting flanges are provided around damper perimeter for easy and economical installation. Damper may be quickly installed in ductwork by use of sheet metal screws. Dampers must be installed square and free from racking. Actuator must be installed on the linkage side of the damper. Opposed blade dampers must be operated from a power blade.

For complete assembly and installation instructions details refer to the Ruskin "Standard Multiple Section Control Damper Details" and "Induct Mount Control Dampers Installation Instructions."

BRACING OF MULTIPLE SECTION DAMPER ASSEMBLIES

The CD50 is intended to be self supporting only in its largest single section size. Multiple section damper assemblies may require bracing to support the weight of the assembly and to hold against the system pressure. Ruskin recommends appropriate bracing to support the damper horizontally at least once for every 8' of damper width and bracing of vertical assemblies and higher system pressures may require more bracing.

The CD50 is designed for installation with blades running horizontally. Installation with blades running vertically is not recommended. Contact Ruskin for vertical blade installations.

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