



Volume Control Dampers Remotely Operated Balancing Dampers Fire/Smoke Dampers

Metropolitan Air Technology (MAT) was founded in 1992 to bring to market a newly patented concept in the field of manually controlled, remotely operated air volume balancing dampers. Remotely operated balancing dampers are required in installations where the balancing damper is inaccessible for direct manual adjustment due to drywall ceilings, high ceilings, or interference from other mechanical systems.

In response to market demand for a full commercial damper line, we expanded our offering with the introduction of a line of volume control dampers and a UL classified line of fire/smoke dampers.

We're committed to the continuous evolution of our products, stellar customer service, and a top-notch quality management system. As a member of the U.S. Green Building Council, we monitor changes and trends within the green building industry to help identify our customer's future needs and enhance our product development efforts.

Our products are manufactured in the USA and sold in North America and international markets.

MAT products are protected by US and International patents.

Trump Tower
Chicago, Illinois, USA



**American Made.
World Proven.**

Volume Control Dampers

Rectangular Dampers

<i>Model</i>		
CD-200-AL & CD-201-AL	Aluminum Dampers	A-1
	Performance Data	A-2
CD-200 & CD-201	Steel Dampers	A-3
	Performance Data	A-4-A-5
CD-200-HD & CD-201-HD	Heavy Duty Steel Dampers	A-6
	Performance Data	A-7-A-8
CD-200-AF-AL & CD-201-AF-AL	Aluminum Airfoil Blade Dampers	A-9
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CD-200-AF & CD-201-AF	Steel Airfoil Blade Dampers	A-13
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CD-200-AF-HD & CD-201-AF-HD	Heavy Duty Steel Airfoil Blade Dampers	A-17
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Round Dampers

<i>Model</i>		
CD-250	Single Blade	A-24



Proud to be a member of the USGBC Metropolitan Air Technology is committed to developing products that support the mission of LEED® (Leadership in Energy and Environmental Design).

Model CD-200-AL & CD-201-AL Opposed Blade & Parallel Blade Damper

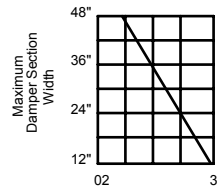
Pressure - up to 3" w.g. - See pressure limit table

FPM Table

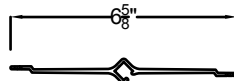
12" wide	- 2600 FPM
24"	- 2200
36"	- 2000
48"	- 1700
52"	- 1600

Jackshafting provided over 52" wide

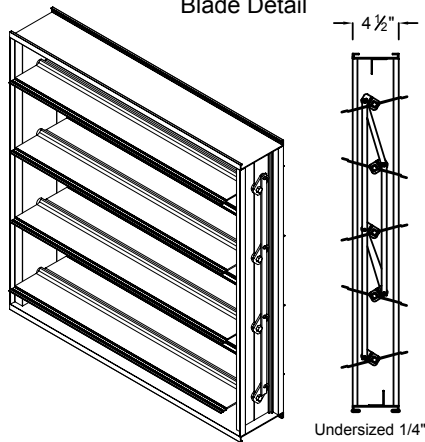
Pressure Limitations



Maximum Design Total Static Pressure Inches Water Gauge



Blade Detail



Undersized 1/4"



Suggested Specifications

Furnish and install at location shown on drawing, or in accordance with schedules, dampers meeting the following specifications: Rectangular damper shall have .125 airfoil extruded aluminum blades and .081 extruded aluminum frame. Damper to have thrust bushings and meet the low pressure drop equal to Metropolitan Air Technology's model CD-200-AL or CD-201-AL.

Standard Construction

- Frame: .081 Extruded Aluminum
- Blade: .125 Extruded Aluminum
- Bearing: Nylon
- Linkage: Concealed in frame
- Axles: 1/2"Ø Cast Zinc with thrust bushings
- Control Shaft: 1/2" x 6" long outboard support bearing supplied with all single section dampers for field mounted actuators. Factory-installed jackshaft supplied with all multi-section dampers.

Options

- .125 Extruded Aluminum Frame (box frame)
- 1-1/2" .125 Extruded Aluminum Flanged Frame
- Bronze Bushing
- Blade Seals PVC (175°F)
- Blade Seals Silicone (400°F & #304 Stainless Steel Bushing)
- Compression Jamb Seals (stainless steel)
- Header Plates (End Flange)
- Hand Quadrant
- Factory Installed Pneumatic or Electric Actuators
- Stand Off Bracket, 2"
- Position Switch
- Face and By-pass Damper
- Chain Operator
- Heresite coated (air dry)
- Epoxy Coated (powder coated @ 415°)
- Weather Shield Enclosure for Actuator
- Explosion-proof Enclosure for Actuator

Min. Size 5"w x 4"h

8" and under single blade

Max. Size 52"w x 72"h (single section)

Multi-section: unlimited



Sizes tested: 36" w x 36" h,
12" w x 12" h

Model CD-200-AL (opposed) & CD-201-AL (parallel)

6235 South Oak Park Avenue Chicago, IL 60638 USA
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Represented by:

Model CD-200-AL & CD-201-AL Opposed Blade & Parallel Blade Damper Performance Data

Leakage Performance

Damper Width X Height	1 in. w.g. Class	4 in. w.g. Class	8 in. w.g. Class
12" x 12"	3.6 (Class 1A)	7.6 (Class 1A)	10.3 (Class 1A)
36" x 36"	0.5 (Class 1A)	5.6 (Class 1A)	20.8 (Class 1A)

Note: At 1" w.g. 12"x12" damper leaks 3.6 cfm per square foot.
 Note: At 1" w.g. 36"x36" damper leaks 0.5 cfm per square foot.

AMCA Standards

Class	Pressure	Leakage, ft ³ /min /ft ²			
		Required Rating E	xtended Ranges (optional)		
		0.25 kPa (1")	1.0 kPa (4")	2.0 kPa (8")	3.0 kPa (12")
1A		15.2 (3)	40.6 (8)	55.9 (11)	71.1 (14)
1		20.3 (3)	40.6 (8)	55.9 (11)	71.1 (14)
2		50.8 (10)	102 (20)	142 (28)	178 (35)
3		203 (40)	406 (80)	569 (112)	711 (140)

Leakage Classification per AMCA publication 511-99

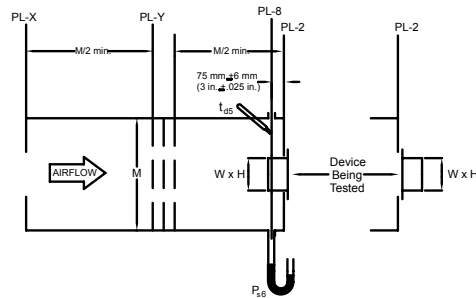


Figure 5.5- Test Device Setup with Inlet Chamber

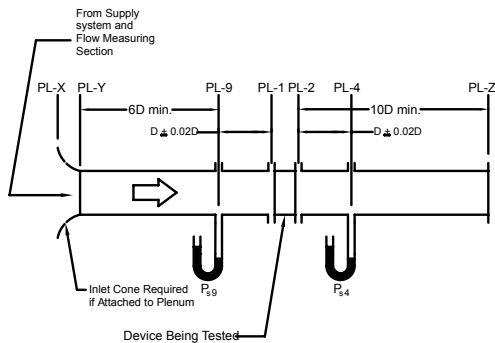
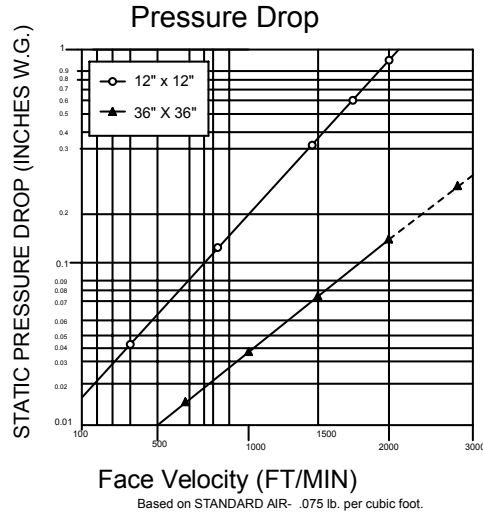


Figure 5.3- Test Device Setup with Inlet and Outlet Ducts



12" x 12" (305mm x 305mm)

Face Velocity ft/min (m/s)	Pressure drop w.g. (PA)	CFM
407 (2.0)	.040 (1.24)	407
820 (4.1)	.150 (4.97)	820
1234 (6.3)	.340 (12.42)	1234
1641 (8.3)	.610 (22.35)	1641
2057 (10.4)	.950 (34.77)	2057

36" x 36" (914mm x 914mm)

Face Velocity ft/min (m/s)	Pressure drop w.g. (PA)	CFM
392 (1.99)	.005 (1.24)	3528
789 (4.01)	.02 (4.97)	7100
1208 (6.14)	.05 (12.42)	10,877
1598 (8.12)	.09 (22.35)	14,382
2006 (10.19)	.14 (34.77)	18,061



The ratings shown are based on tests made in accordance with AMCA standard 500.

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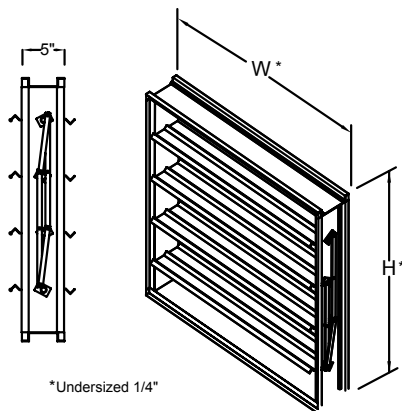
Model CD-200 & CD-201 Opposed Blade & Parallel Blade Damper

Ratings:

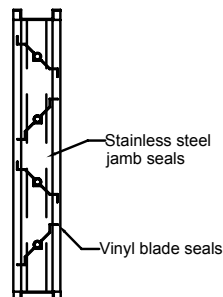
Pressure - up to 4" w.g.

FPM Table

12" wide	- 3500 FPM
24"	- 2800
36"	- 2300
48"	- 2100



OPTIONAL:



Suggested Specifications

Furnish and install at location shown on drawing, or in accordance with schedules, dampers meeting the following specifications: Rectangular damper shall have 16 gauge galvanized steel blades with galvanized steel rollformed frames. Damper to be equal to MAT's model CD-200 or CD-201.

Standard Construction

- Frame: 18ga. Rollformed Galvanized Steel
- Blades: 4"-7" wide, 16ga. Galvanized Steel
- Bearing: Nylon
- Linkage: Concealed in frame
- Axles: 3/8" square plated steel
- Control Shaft: Ø1/2" x 4-1/2" long shaft supplied with all single section dampers for field mounted actuators. Factory-installed jackshaft supplied with all multiple section dampers

Options

- Blade Seals PVC (180° F)
- Compression Jamb Seals (stainless steel)
- Header Plates (end flange)
- Hand Quadrant
- Stand Off Bracket, 2"
- Factory Installed Pneumatic or Electric Actuators
- Face and Bypass Damper
- Chain Operator
- Position Switch
- Heresite coated (air dry)
- Epoxy coated (powder coated) (*epoxy coated linkage)
- Stainless Steel bushings
- Flange frame (one side)

Min. Size 6"w x 6"h

Max. Size 48"w x 60"h (single section)
9"h and under - single blade
Multi-section: unlimited



Model CD-200 (opposed) & CD-201 (parallel)

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Represented by:

Model CD-200 & CD-201 Opposed Blade & Parallel Blade Damper Performance Data

		Leakage, ft ³ /min /ft			
		Required Rating		Extended Ranges (optional)	
Pressure Class	1"	4"	8"	12"	
	I	4	8	11	14
II	10	20	28	35	
III	40	80	1121	40	

All data corrected to represent standard air at a density of 0.075 lbs/ft³.

		Leakage, L/s /m ²			
		Required Rating		Extended Ranges (optional)	
Pressure Class	0.25 kPa	1.0 kPa	2.0 kPa	3.0 kPa	
	I	20.3	40.6	55.9	71.1
II	50.8	102	142	178	
III	203	406	569	711	

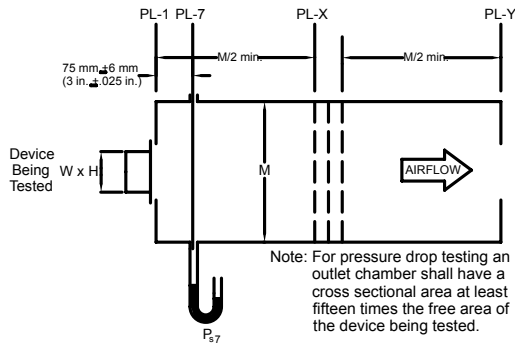


Figure 5.4- Test Device Setup with Outlet Chamber

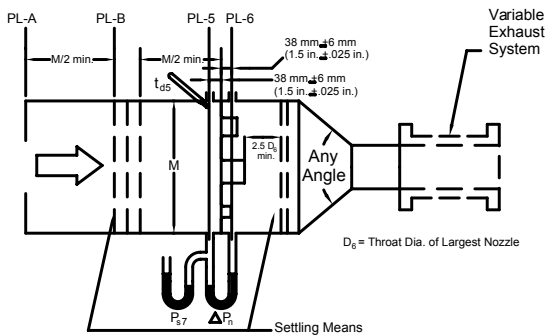


Figure 6.3- Airflow Rate Measurement Setup- Multiple Nozzle Chamber on Fan Inlet

Imperial Units (Forward Flow)

Damper Width X Height	1 in. w.g. Class	4 in. w.g. Class	8 in. w.g. Class	*Torque (per sq. ft.)
36" x 36"	Class III	Class III	Class III	5.55 lbs-in

*Torque applied to hold damper in closed position

Imperial Units (Back Flow)

Damper Width X Height	1 in. w.g. Class	4 in. w.g. Class	8 in. w.g. Class	*Torque (per sq. ft.)
36" x 36"	Class III	Class III	Class III	5.55 lbs-in

*Torque applied to hold damper in closed position

Air leakage is based on operation between 50° F to 104° F. All data corrected to represent air density of 0.075 lbs/ft³.

Standard International Units(Forward Flow)

Damper Width X Height (mm)	250 Pa Class	1 KPa Class	2 KPa Class	*Torque
915 X 915	Class III	Class III	Class III	6,394 grams-cm

*Torque applied to hold damper in closed position

Standard International Units(Back Flow)

Damper Width X Height (mm)	250 Pa Class	1 KPa Class	2 KPa Class	*Torque
915 X 915	Class III	Class III	Class III	6,394 grams-cm

*Torque applied to hold damper in closed position

Air leakage is based on operation between 10° C to 40° C. All data corrected to represent air density of 1.201 kg/m³.



Model CD-200 & CD-201 Opposed Blade & Parallel Blade Damper Performance Data

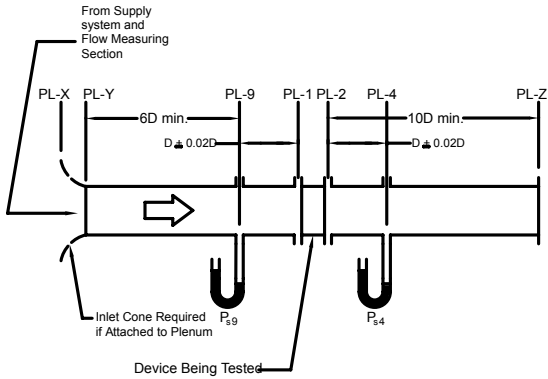


Figure 5.3- Test Device Setup with Inlet and Outlet Ducts

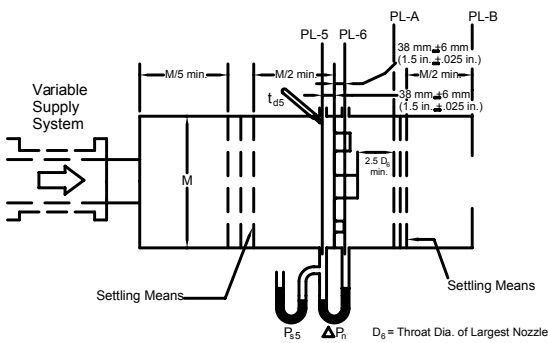
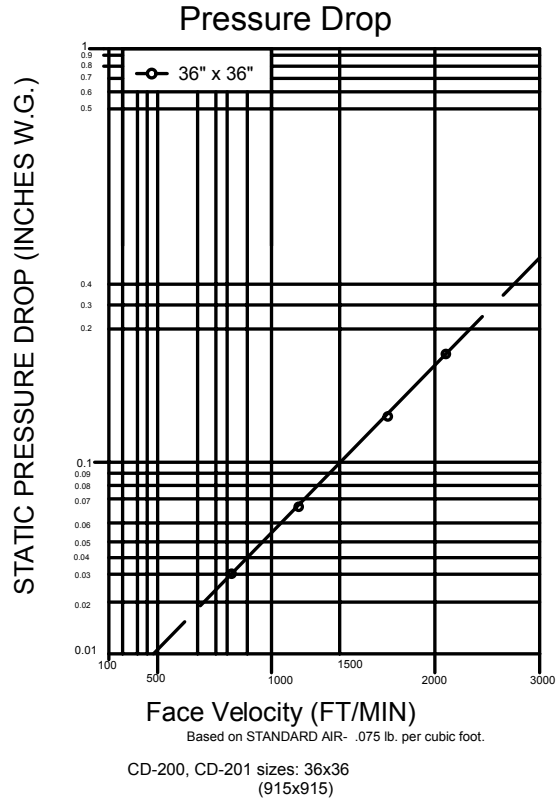


Figure 6.5- Airflow Rate Measurement Setup- Multiple Nozzle Chamber on Fan Outlet



36 x 36	
Face Velocity ft/min (m/s)	Pressure Drop in. w.g. (Pa)
1000 (5.08)	0.055
1500 (7.62)	0.100
2000 (10.16)	0.175



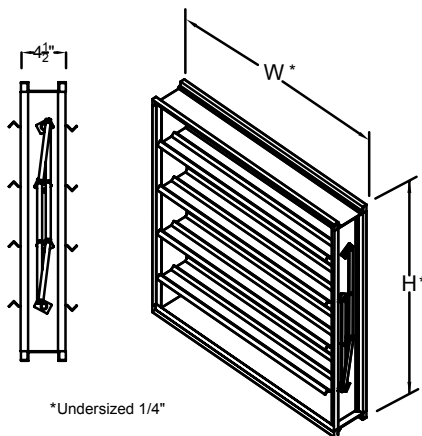
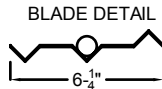
Model CD-200-HD & CD-201-HD Opposed Blade & Parallel Blade Damper

Ratings:

Pressure - up to 12" w.g.
See pressure limit table

FPM Table

12" wide	- 3500 FPM
24"	- 2800
36"	- 2300
48"	- 2100
52"	- 2000



Min. Size 6" w x 8" h (single blade)
6" w x 13" h (multiple blades)
Max. Size 48" w x 60" h (single section)
Multi-section: unlimited

Suggested Specifications

Furnish and install at location shown on drawing, or in accordance with schedules, dampers meeting the following specifications: Rectangular damper shall have 16 gauge galvanized steel blades with galvanized steel frame. Damper to be equal to MAT's model CD-200-HD or CD-201-HD.

Standard Construction

- Frame: 4-1/2" deep, 16ga. Formed Galv. Steel
- Blades: 6" wide, 16ga. Formed Galv. Steel
- Bearing: Bronze Oilite
- Linkage: Concealed in frame
- Axles: Ø1/2" plated steel
- Control Shaft: Ø1/2" x 6" long shaft supplied with all single section dampers for field mounted actuators. Factory-installed jackshaft supplied with all multiple section dampers

Options

- Blade Seals PVC (180° F)
- Compression Jamb Seals (stainless steel)
- Header Plates (end flange)
- Hand Quadrant
- Stand Off Bracket, 2"
- Factory Installed Pneumatic or Electric Actuators
- Chain Operator
- Position Switch
- Heresite coated (air dry)
- Epoxy coated (powder coated)
- Stainless Steel bushings
- Flange frame (one side)
- Single Flange
- Double Flange
 - Bolt holes in flange
- 304 Stainless Steel construction
- 304L Stainless Steel construction*
- 316 Stainless Steel construction*
- 316L Stainless Steel construction*
- 14ga. construction
- 12ga. construction
- 10ga. construction
- 6-1/2" deep frame
- Face and Bypass Damper (*304 stainless steel linkage)



Model CD-200-HD (opposed) & CD-201-HD (parallel)

Represented by:

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Model CD-200-HD & CD-201-HD Opposed Blade & Parallel Blade Damper Performance Data

		Leakage, ft ³ /min /ft			
		Required Rating		Extended Ranges (optional)	
Class	Pressure	1"	4"	8"	12"
I		4	8	11	14
II		10	20	28	35
III		40	80	1121	40

All data corrected to represent standard air at a density of 0.075 lbs/ft³.

		Leakage, L/s /m ²			
		Required Rating		Extended Ranges (optional)	
Class	Pressure	0.25 kPa	1.0 kPa	2.0 kPa	3.0 kPa
I		20.3	40.6	55.9	71.1
II		50.8	102	142	178
III		203	406	569	711

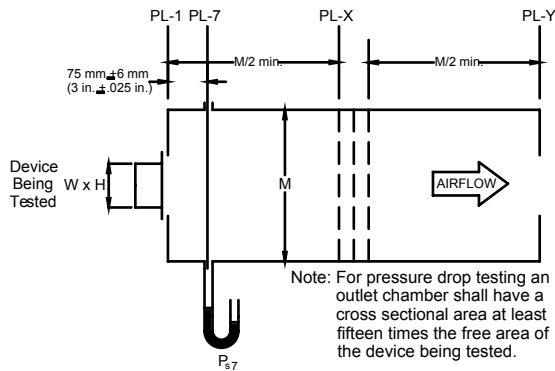


Figure 5.4- Test Device Setup with Outlet Chamber

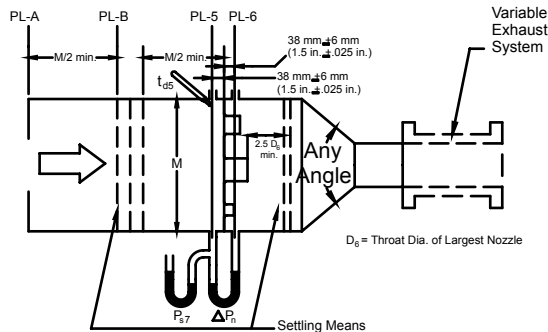


Figure 6.3- Airflow Rate Measurement Setup- Multiple Nozzle Chamber on Fan Inlet

Imperial Units (Forward Flow)

Damper Width X Height	1 in. w.g. Class	4 in. w.g. Class	8 in. w.g. Class	*Torque (per sq. ft.)
36" x 36"	Class III	Class III	Class III	5.55 lbs-in

*Torque applied to hold damper in closed position

Imperial Units (Back Flow)

Damper Width X Height	1 in. w.g. Class	4 in. w.g. Class	8 in. w.g. Class	*Torque (per sq. ft.)
36" x 36"	Class III	Class III	Class III	5.55 lbs-in

*Torque applied to hold damper in closed position

Air leakage is based on operation between 50° F to 104° F. All data corrected to represent air density of 0.075 lbs/ft³.

Standard International Units(Forward Flow)

Damper Width X Height (mm)	250 Pa Class	1 KPa Class	2 KPa Class	*Torque
915 X 915	Class III	Class III	Class III	6,394 grams-cm

*Torque applied to hold damper in closed position

Standard International Units(Back Flow)

Damper Width X Height (mm)	250 Pa Class	1 KPa Class	2 KPa Class	*Torque
915 X 915	Class III	Class III	Class III	6,394 grams-cm

*Torque applied to hold damper in closed position

Air leakage is based on operation between 10° C to 40° C. All data corrected to represent air density of 1.201 kg/m³.



Model CD-200-HD & CD-201-HD Opposed Blade & Parallel Blade Damper Performance Data

CD-200-HD, CD-201-HD
Pressure Limitations

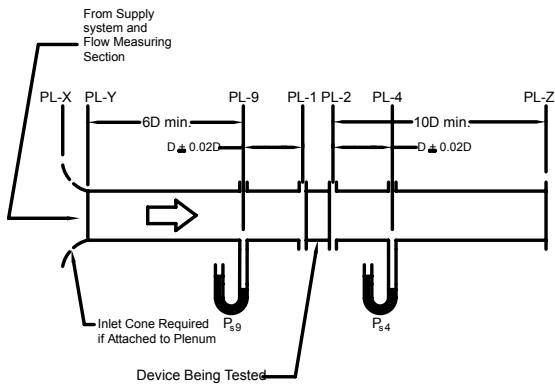
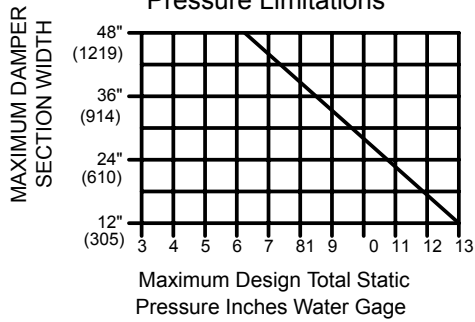


Figure 5.3- Test Device Setup with Inlet and Outlet Ducts

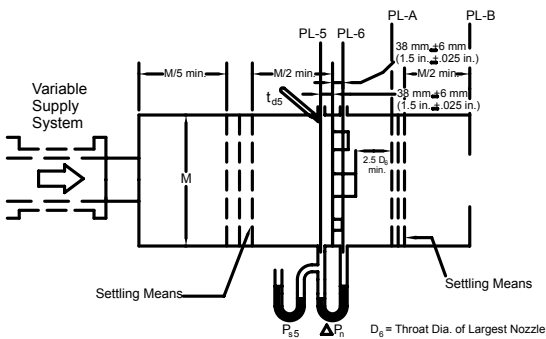
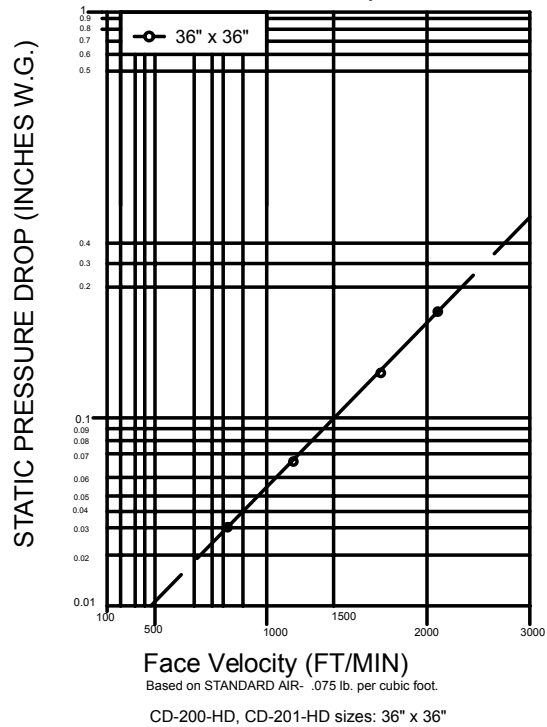


Figure 6.5- Airflow Rate Measurement Setup- Multiple Nozzle Chamber on Fan Outlet

Pressure Drop



Face Velocity (FT/MIN)

Based on STANDARD AIR- .075 lb. per cubic foot.

CD-200-HD, CD-201-HD sizes: 36" x 36"

36" x 36" (914mm x 914mm)

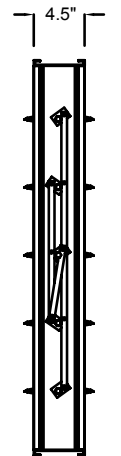
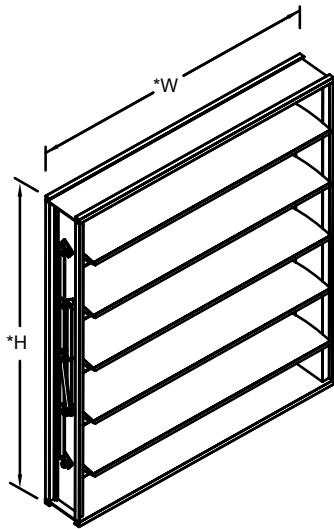
Face Velocity ft/min (m/s)	Pressure Drop in. w.g. (Pa)
1000 (5.08)	0.055 (13.7)
1500 (7.62)	0.100 (24.9)
2000 (10.16)	0.175 (43.6)



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Model CD-200-AF-AL & CD-201-AF-AL Damper



*Undersized 1/4"



Suggested Specifications

Furnish and install at location shown on drawing, or in accordance with schedules, dampers meeting the following specifications: Rectangular damper shall have 3/8" thick nose hollow airfoil blade and .081 extruded aluminum top and bottom frames. Damper to have thrust bushings and meet the low pressure drop and low leakage equal to MAT's model CD-200 or CD-201. Damper bears the AMCA seal for air performance and leakage.

Standard Construction

- Frame: .081 Extruded Aluminum (6063-T5)
- Blades: Hollow Airfoil with .375" thick end nose (6063-T5) Extruded Aluminum
- Extended Shaft: 1/2" diameter
- Bearing: Bronze Oilite
- Linkage: Concealed in frame
- Pivot Axles: Zinc with Thrust Bushings
- Blade Seals: Removable EPDM (250° F)
- Jamb Seals: Stainless steel (compression)

Options

- .125 Extruded Aluminum Box Frame
- .125 Extruded Aluminum Flanged Frame
- Insulated (Foam-filled blades)
- Header Plates (End Flange)
- Hand Quadrant
- Factory Actuators
- Stand Off Bracket, 2"
- Face and By-pass Damper
- Chain Operate
- Position Switch
- Stainless Steel Bearings
- Air Dry Heresite Coated
- Powder Coated - Epoxy

Min. Size 8"w x 8"h

Max. Size 60"w x 72"h (single section)
Multi-section: unlimited



Model CD-200-AF-AL (opposed) & CD-201-AF-AL (parallel)

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Fax: +1.708.594.0396 www.metairtech.com

Represented by:

Model CD-200-AF-AL & CD-201-AF-AL Damper Performance Data

Imperial Units (CD-200-AF-AL Opposed Blade, Forward Flow)

Damper Width X Height	1 in. w.g.	4 in. w.g.	8 in. w.g.	*Torque (per sq. ft.)
36" X 36"	Class 1A	Class 1C	Class 1	10 lbs-in
12" X 48"	Class 1	Class 1	Class 1	17.5 lbs-in
48" X 36"	Class 1A	Class 1	Class 2	10 lbs-in
60" X 36"	Class 1A	Class 2		10 lbs-in

*Torque applied to close and seat damper in during the test.

Imperial Units (CD-200-AF-AL Opposed Blade, Reverse Flow)

Damper Width X Height	1 in. w.g. 4	in. w.g. 8	in. w.g.	*Torque (per sq. ft.)
36" X 36"	Class 1A	Class 1C	Class 1	10 lbs-in
12" X 48"	Class 1A	Class 1C	Class 1	17.5 lbs-in
48" X 36"	Class 1A	Class 1	Class 2	10 lbs-in
60" X 36"	Class 1A	Class 1		10 lbs-in

*Torque applied to close and seat damper in during the test.

Air leakage is based on operation between 50° F to 104° F. All data corrected to represent air density of 0.075 lbs./ft.³

Imperial Units (CD-201-AF-AL Parallel Blade, Forward Flow)

Damper Width X Height	1 in. w.g. 4	in. w.g. 8	in. w.g.	*Torque (per sq. ft.)
36" X 36"	Class 1	Class 1C	Class 1	32.5 lbs-in
12" X 48"	Class 1	Class 1	Class 1	32.5 lbs-in
48" X 36"	Class 1A	Class 1	Class 2	32.5 lbs-in
60" X 36"	Class 1A	Class 2		16 lbs-in

*Torque applied to close and seat damper in during the test.

Imperial Units (CD-201-AF-AL Parallel Blade, Reverse Flow)

Damper Width X Height	1 in. w.g. 4	in. w.g. 8	in. w.g.	*Torque (per sq. ft.)
36" X 36"	Class 1A	Class 1C	Class 1	32.5 lbs-in
12" X 48"	Class 1C	Class 1C	Class 1	32.5 lbs-in
48" X 36"	Class 1A	Class 1	Class 2	32.5 lbs-in
60" X 36"	Class 2C	Class 2		16 lbs-in

*Torque applied to close and seat damper in during the test.

Pressure Class	Leakage, ft ³ /min/ft ²			
	Required Rating	Extended Ranges (optional)		
1A	1"	4"	8"	12"
1	3n	/a	n/an	/a
2	4	8	11	14
3	10	20	28	35
	40	80	112	140

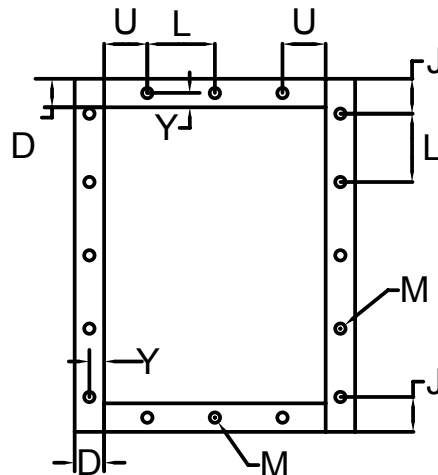
All data corrected to represent standard air at a density of 0.075 lbs/ft³

Frame Construction Options

Flange (D dim): Standard 2" Options 1-1/2 to 4"
Bolt Holes - base design does not include holes. Options see dim L in table below.

Bolt hole dia. (M dim): 7/16". Options - see table below

Dim.	Standard (Min./Max)	Description
J	(D/2 min.)	First/Last Space in Jamb
F	(1 min.)	No. of holes in Jamb
L	6" (2"/12")	Hole Spacing
M	7/16" (1/4"/11/16")	Mounting hole Diameter
U	(3/4" min.)	First/Last Space in Head/Sill
V	(1 min.)	No. of holes in Head/Sill
Y	D/2M (3/4"/D-3/4")	Centerline of bolt hole from inside edge of frame



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 Rating Seal applies to Air Performance and Air Leakage ratings.

Model CD-200-AF-AL & CD-201-AF-AL Damper Performance Data

Metric Units (CD-200-AF-AL Opposed Blade, Forward Flow)

Damper Width X Height (mm)	0.25 kPa	1.0 kPa	2.0 kPa	*Torque (per sq. m.)
915 X 915	Class 1A	Class 1C	Class 1	12 N-m
305 X 1220	Class 1	Class 1	Class 1	22 N-m
1220 X 915	Class 1A	Class 1	Class 2	12 N-m
1524 X 915	Class 1A	Class 2		12 N-m

*Torque applied to close and seat damper in during the test.

Metric Units (CD-200-AF-AL Opposed Blade, Reverse Flow)

Damper Width X Height	0.25 kPa	1.0 kPa	2.0 kPa	*Torque (per sq. m.)
915 X 915	Class 1A	Class 1C	Class 1	12 N-m
305 X 1220	Class 1A	Class 1C	Class 1	22 N-m
1220 X 915	Class 1A	Class 1	Class 2	12 N-m
1524 X 915	Class 1A	Class 1		12 N-m

*Torque applied to close and seat damper in during the test.

Air leakage is based on operation between 50° F to 104° F. All data corrected to represent air density of 0.075 lbs/ft.³

Metric Units (CD-201-AF-AL Parallel Blade, Forward Flow)

Damper Width X Height	0.25 kPa	1.0 kPa	2.0 kPa	*Torque (per sq. m.)
915 X 915	Class 1	Class 1C	Class 1	40 N-m
305 X 1220	Class 1	Class 1	Class 1	40 N-m
1220 X 915	Class 1A	Class 1	Class 2	40 N-m
1524 X 915	Class 1A	Class 2		20 N-m

*Torque applied to close and seat damper in during the test.

Metric Units (CD-201-AF-AL Parallel Blade, Reverse Flow)

Damper Width X Height	0.25 kPa	1.0 kPa	2.0 kPa	*Torque (per sq. m.)
915 X 915	Class 1A	Class 1C	Class 1	40 N-m
305 X 1220	Class 1C	Class 1C	Class 1	40 N-m
1220 X 915	Class 1A	Class 1	Class 2	40 N-m
1524 X 915	Class 2C	Class 2		20 N-m

*Torque applied to close and seat damper in during the test.

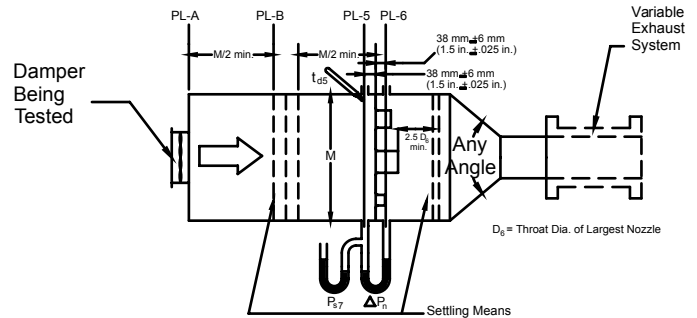


Figure 6.3- Airflow Rate Measurement Setup- Multiple Nozzle Chamber on Fan Inlet

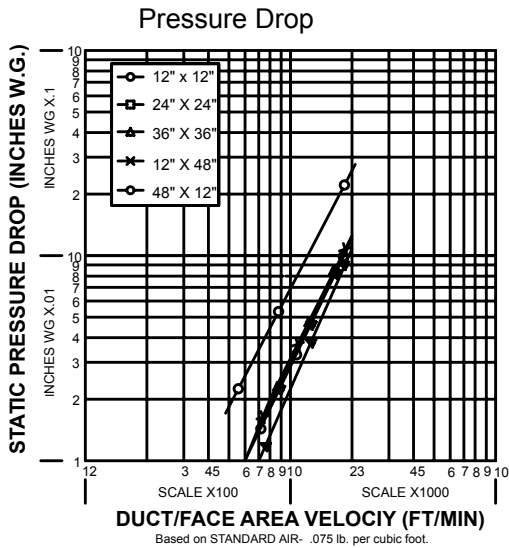
		Leakage, L / s / m ²			
		Required Rating		Extended Ranges (optional)	
Class	Pressure	0.25 kPa	1.0 kPa	2.0 kPa	3.0 kPa
	1A		15.2n	/a	n/an
1		20	41	56	71
2		51	102	142	178
3		203	406	569	711

All data corrected to represent standard air at a density of 1.2 kg/m³



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 Rating Seal applies to Air Performance and Air Leakage ratings.

Model CD-200-AF-AL & CD-201-AF-AL Damper Performance Data



CD-200-AF-AL, 201-AF-AL sizes: 12" x 12", 24" x 24", 48" x 12", 12" x 48", 36" x 36" (305 x 305mm, 610 x 610mm, 1219 x 305mm, 305 x 1219mm, 914 x 914mm)

Pressure drop test per AMCA Standard 500-D, Figure 5.3.

12" x 12" (305mm x 305mm)	
Face Velocity ft/min (m/s)	Pressure Drop in. w.g. (Pa)
1000 (5.08)	0.07 (17)
1500 (7.62)	0.16 (39)
2000 (10.16)	0.28 (69)

24" x 24" (610mm x 610mm)	
Face Velocity ft/min (m/s)	Pressure Drop in. w.g. (Pa)
1000 (5.08)	0.03 (8)
1500 (7.62)	0.07 (18)
2000 (10.16)	0.13 (32)

48" x 12" (1219mm x 305mm)	
Face Velocity ft/min (m/s)	Pressure Drop in. w.g. (Pa)
1000 (5.08)	0.03 (8)
1500 (7.62)	0.07 (17)
2000 (10.16)	0.12 (31)

12" x 48" (305mm x 1219mm)	
Face Velocity ft/min (m/s)	Pressure Drop in. w.g. (Pa)
1000 (5.08)	0.03 (8)
1500 (7.62)	0.07 (18)
2000 (10.16)	0.13 (32)

36" x 36" (914mm x 914mm)	
Face Velocity ft/min (m/s)	Pressure Drop in. w.g. (Pa)
1000 (5.08)	0.03 (7)
1500 (7.62)	0.06 (15)
2000 (10.16)	0.11 (27)

CD-200-AF-AL, 201-AF-AL Pressure Limitations

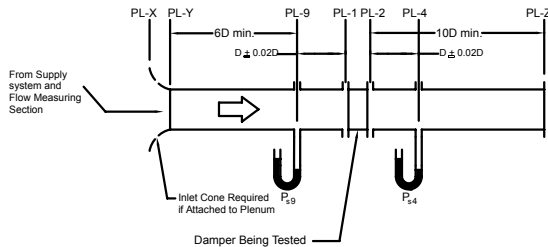
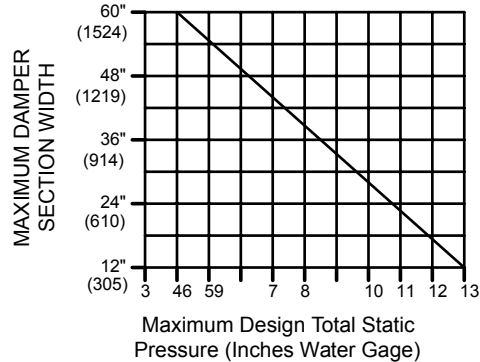


Figure 5.3- Test Device Setup with Inlet and Outlet Ducts

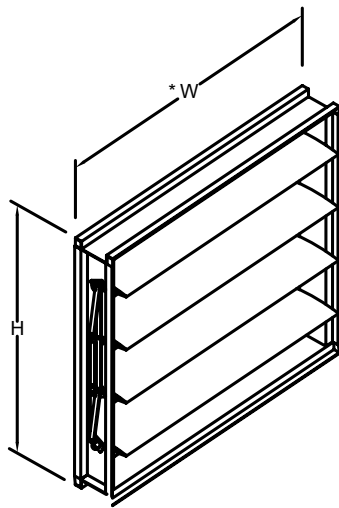


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Model CD-200-AF & CD-201-AF Damper



* Undersized 1/4"
Standard



Suggested Specifications

Furnish and install at location shown on drawing, or in accordance with schedules, dampers meeting the following specifications: Rectangular damper shall have double thick, galvanized steel (equivalent to 14 gauge) blades with galvanized steel rollformed frame. Damper to meet the low pressure drop and low leakage equal to Metropolitan Air Technology's model CD-200-AF, CD-201-AF.

Standard Construction

- Frame: Rollformed Galvanized Steel
- Blade: 5"-7" wide galvanized steel airfoil (double skin construction of 14 ga equivalent thickness)
- Extended Shaft: 1/2" diameter
- Bearing: Bronze Nylon
- Linkage: Concealed in frame
- Axles: Zinc plated
- Blade Seals: Silicone (400°F)
- Jamb Seals: Stainless steel (compression)

Options

- Stand Off Bracket, 2"
- Header plates (end flange)
- Hand quadrant
- Chain operated
- Factory Installed Pneumatic or Electric Actuators
- Face and By-pass damper
- Position switch
- Stainless steel bearings
- Heresite coated (air dry)
- Epoxy coated (powder coated @ 415°)
- Bronze oilite bushing
- Flange frame (one side)
- Stainless Steel bushing
- Insulated (1/2" fiberglass)

Min. Size 8"w x 6"h

Max. Size 48w x 60"h (single section)
9" h and under - single blade
Multi-section: unlimited



Model CD-200-AF (opposed) & CD-201-AF (parallel)

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Represented by:

Model CD-200-AF & CD-201-AF Damper Performance Data

Imperial Units (Forward Flow)

Damper Width X Height	1 in. w.g. Class	4 in. w.g. Class	8 in. w.g. Class	*Torque (per sq. ft.)
12" x 12"	Class I	Class II	Class II	15 lbs-in
24" X 24"	Class I	Class I	Class I	12.59 lbs-in
36" X 36"	Class II	Class II	Class II	15.55 lbs-in
12" X 48"	Class III	Class III	Class II	12.59 lbs-in
48" X 12"	Class I	Class I	Class I	12.59 lbs-in
60" X 36"	Class II	Class II	Class II	15 lbs-in

*Torque applied to hold damper in closed position

**36" x 36" size is certified by Certaire Technical Services, LTD.

Air leakage is based on operation between 50° F to 104° F. All data corrected to represent air density of 0.075 lbs/ft.³

Pressure Class	Leakage, ft ³ /min /ft			
	Required Rating	Extended Ranges (optional)		
	1"	4"	8"	12"
I	4	8	11	14
II	10	20	28	35
III	40	80	1121	40

All data corrected to represent standard air at a density of 0.075 lbs/ft.

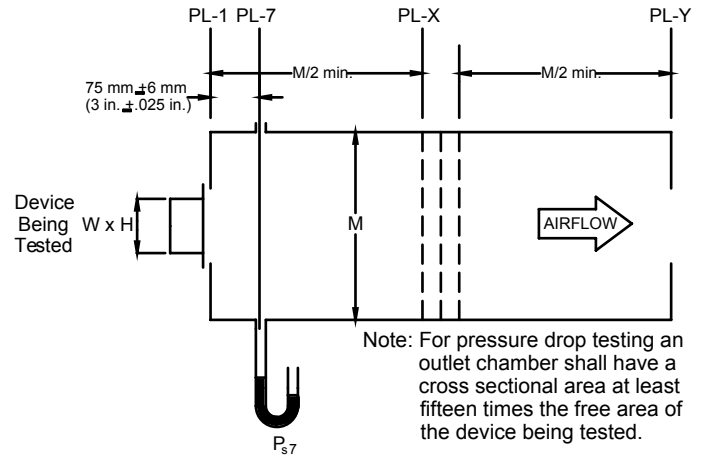


Figure 5.4- Test Device Setup with Outlet Chamber

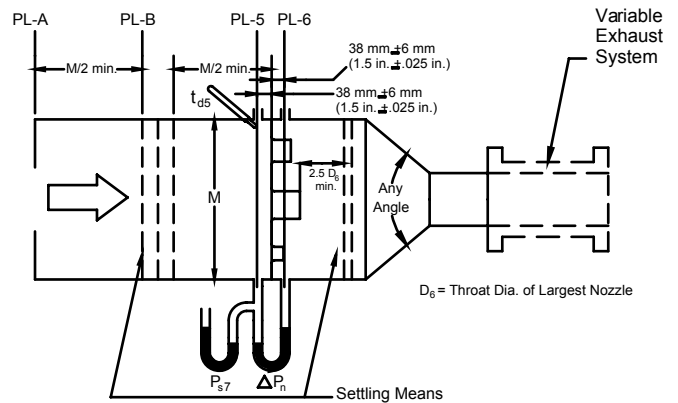


Figure 6.3- Airflow Rate Measurement Setup- Multiple Nozzle Chamber on Fan Inlet



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Model CD-200-AF & CD-201-AF Damper Performance Data

Standard International Units (Forward Flow)

Damper Width X Height (mm)	250 Pa Class	1 KPa Class	2 KPa Class	*Torque
305 x 305	Class I	Class II	Class II	2,679 grams-cm
610 X 610	Class I	Class I	Class I	2,248 grams-cm
915 X 915	Class II	Class II	Class II	2,735 grams-cm
305 X 1220	Class III	Class III	Class II	2,248 grams-cm
1220 X 305	Class I	Class I	Class I	2,248 grams-cm
1525 X 915	Class II	Class II	Class II	2,679 grams-cm

*Torque applied to hold damper in closed position
 **36" x 36" size is certified by Certaire Technical Services, LTD.

Air leakage is based on operation between 10° C to 40° C. All data corrected to represent air density of 1.201 kg/m.³

Pressure Class	Leakage, L/s /m ²			
	Required Rating		Extended Ranges (optional)	
I	0.25 kPa	1.0 kPa	2.0 kPa	3.0 kPa
II	20.3	40.6	55.9	71.1
III	50.8	102	142	178
	203	406	569	711

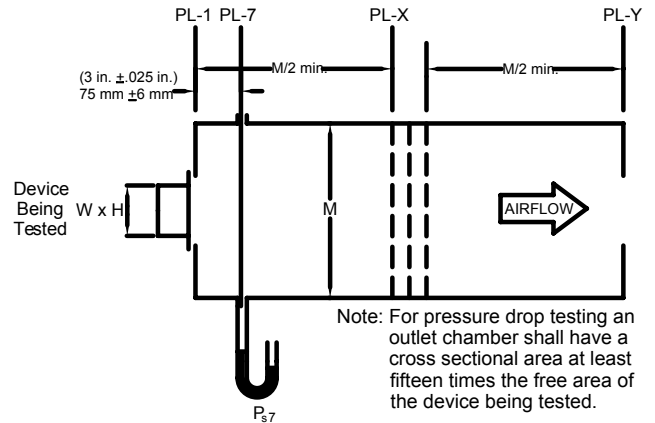


Figure 5.4- Test Device Setup with Outlet Chamber

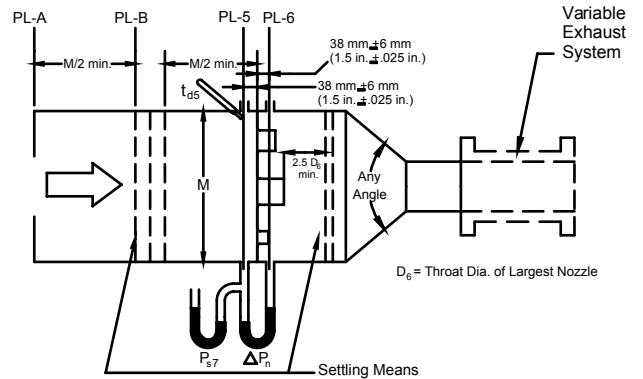
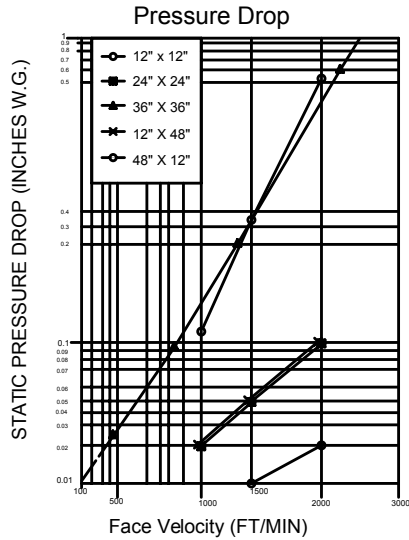


Figure 6.3- Airflow Rate Measurement Setup- Multiple Nozzle Chamber on Fan Inlet



Model CD-200-AF & CD-201-AF Damper Performance Data



Based on STANDARD AIR- .075 lb. per cubic foot.
 CD-200-AF, 201-AF sizes: 12x12, 24x24, 48x12, 12x48, 36x36
 (305x305, 610x610, 1219x305, 305x1219, 914x914)

**Only 36" x 36" size is certified by Certain Technical Services, LTD.

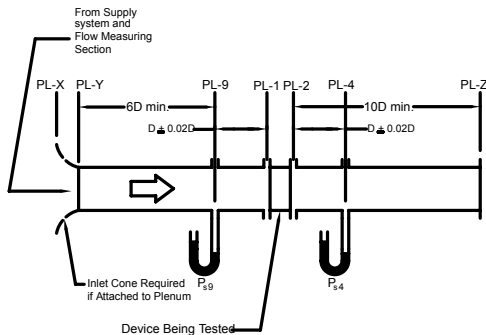
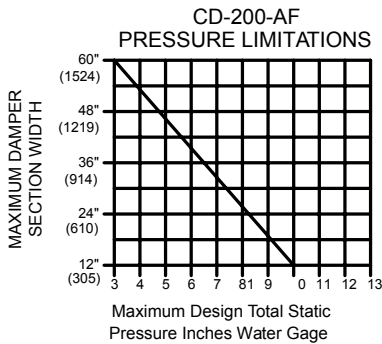


Figure 5.3- Test Device Setup with Inlet and Outlet Ducts

12 x 12

Face Velocity ft/min (m/s)	Pressure Drop in. w.g. (Pa)
1000 (5.08)	0.14 (35)
1500 (7.62)	0.32 (79)
2000 (10.16)	0.53 (132)

24 x 24

Face Velocity ft/min (m/s)	Pressure Drop in. w.g. (Pa)
1000 (5.08)	0.02 (5)
1500 (7.62)	0.05 (12)
2000 (10.16)	0.10 (25)

48 x 12

Face Velocity ft/min (m/s)	Pressure Drop in. w.g. (Pa)
1000 (5.08)	0.05 (12)
1500 (7.62)	0.13 (32)
2000 (10.16)	0.22 (55)

12 x 48

Face Velocity ft/min (m/s)	Pressure Drop in. w.g. (Pa)
1000 (5.08)	0.02 (5)
1500 (7.62)	0.05 (12)
2000 (10.16)	0.10 (25)

36 x 36

Face Velocity ft/min (m/s)	Pressure Drop in. w.g. (Pa)
1000 (5.08)	0.14 (35)
1500 (7.62)	0.35 (87)

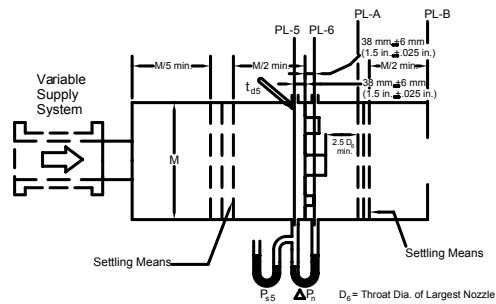
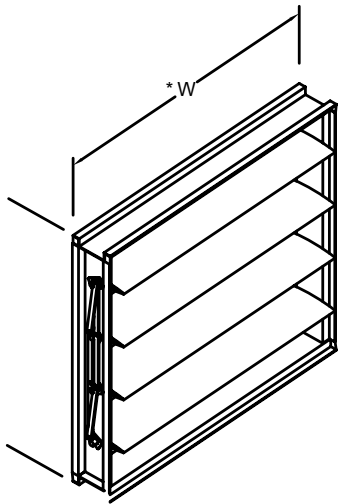


Figure 6.5- Airflow Rate Measurement Setup- Multiple Nozzle Chamber on Fan Outlet

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Model CD-200-AF-HD & CD-201-AF-HD Damper



* Undersized 1/4"
Standard



Min. Size 8" w x 8" h
Max. Size 48" w x 60" h (single section)
9" h and under - single blade
Multi-section: unlimited

Suggested Specifications

Furnish and install at location shown on drawing, or in accordance with schedules, dampers meeting the following specifications: Rectangular damper shall have double thick, galvanized steel (equivalent to 14 gauge) blades with galvanized steel frame. Damper to meet the low pressure drop and low leakage equal to Metropolitan Air Technology's model CD-200-AF-HD, CD-201-AF-HD.

Standard Construction

- Frame: 16 ga. formed galvanized Steel
- Blade: 6" wide galvanized steel airfoil (double skin construction of 14 ga equivalent thickness)
- Extended Shaft: 1/2" diameter
- Bearing: Nylon
- Linkage: Concealed in frame
- Axles: Zinc plated
- Blade Seals: PVC (175° F)
- Jamb Seals: Stainless steel (compression)

Options

- Hand quadrant
- Chain operated
- Factory Installed Pneumatic or Electric Actuators
- Position switch
- Stand Off Bracket, 2"
- Side plate (end flange)
- Stainless steel bearings
- Face and By-pass damper
- Single Flange
- Double Flange
 - Bolt Holes in Flange
- 6-1/2" deep frame
- 304 stainless steel construction
- 304L stainless steel construction*
- 316 stainless steel construction*
- 316L stainless steel construction*
- 12ga. construction
- 10ga. construction
- Heresite coated (air dry)
- Epoxy coated (powder coated @ 415°)
- Insulated (Foam Filled Blades)
(*304 stainless steel linkage)



Model CD-200-AF-HD (opposed) & CD-201-AF-HD (parallel)

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Represented by:

Model CD-200-AF-HD & CD-201-AF-HD Damper Performance Data

Imperial Units (Forward Flow)

Damper Width X Height	1 in. w.g. Class	4 in. w.g. Class	8 in. w.g. Class	*Torque (per sq. ft.)
12" X 12"	Class I	Class II	Class II	15 lbs-in
24" X 24"	Class I	Class I	Class I	12.59 lbs-in
36" X 36"	Class II	Class II	Class II	15.55 lbs-in
12" X 48"	Class III	Class III	Class II	12.59 lbs-in
48" X 12"	Class I	Class I	Class I	12.59 lbs-in
60" X 36"	Class II	Class II	Class II	15 lbs-in

*Torque applied to hold damper in closed position

**Only 36" x 36" size is certified by Certaire Technical Services, LTD.

Air leakage is based on operation between 50° F to 104° F. All data corrected to represent air density of 0.075 lbs/ft.³

Class	Pressure	Leakage, ft ³ /min /ft			
		Required Rating		Extended Ranges (optional)	
I	1"	4	8	11	14
	4"	10	20	28	35
II	1"	40	80	1121	40
	4"				

All data corrected to represent standard air at a density of 0.075 lbs/ft.

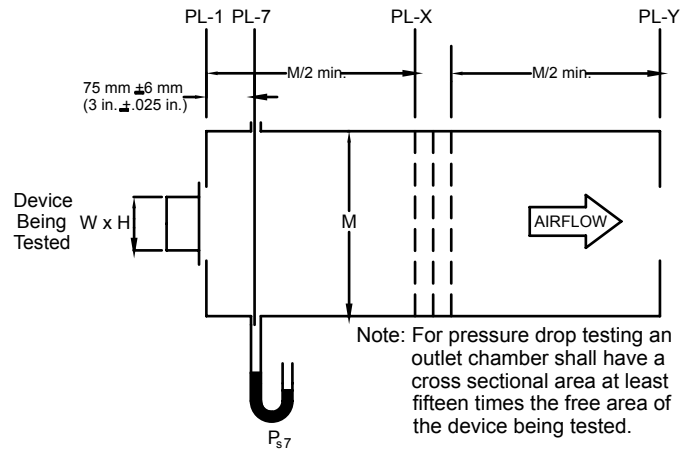


Figure 5.4- Test Device Setup with Outlet Chamber

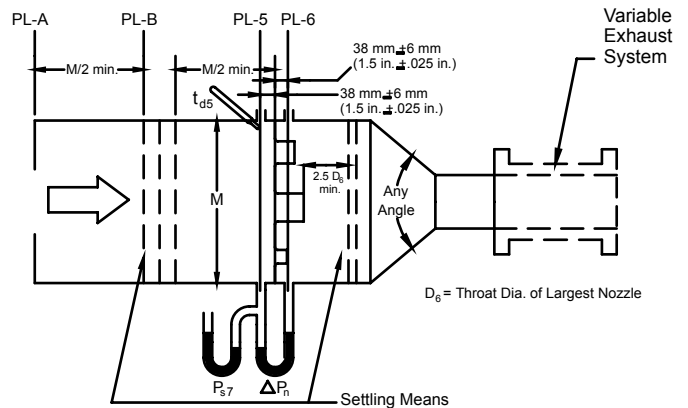


Figure 6.3- Airflow Rate Measurement Setup- Multiple Nozzle Chamber on Fan Inlet



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Model CD-200-AF-HD & CD-201-AF-HD Damper Performance Data

Standard International Units (Forward Flow)

Damper Width X Height (mm)	250 Pa Class	1 KPa Class	2 KPa Class	*Torque
305 x 305	Class I	Class II	Class II	2,679 grams-cm
610 X 610	Class I	Class I	Class I	2,248 grams-cm
915 X 915	Class II	Class II	Class II	2,735 grams-cm
305 X 1220	Class III	Class III	Class II	2,248 grams-cm
1220 X 305	Class I	Class I	Class I	2,248 grams-cm
1525 X 915	Class II	Class II	Class II	2,679 grams-cm

*Torque applied to hold damper in closed position
 **Only 915 x 915 size is certified by Certain Technical Services, LTD.

Air leakage is based on operation between 10° C to 40° C. All data corrected to represent air density of 1.201 kg/m.³

Pressure Class	Leakage, L/s /m ²			
	Required Rating	Extended Ranges (optional)		
	0.25 kPa	1.0 kPa	2.0 kPa	3.0 kPa
I	20.3	40.6	55.9	71.1
II	50.8	102	142	178
III	203	406	569	711

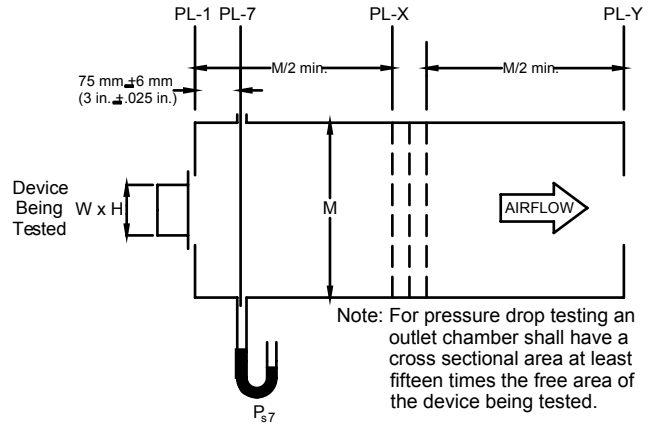


Figure 5.4- Test Device Setup with Outlet Chamber

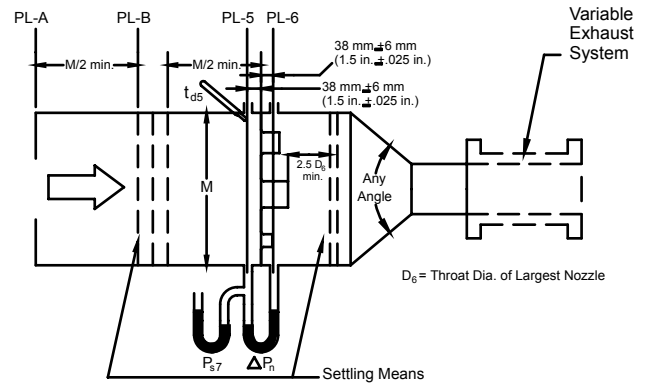
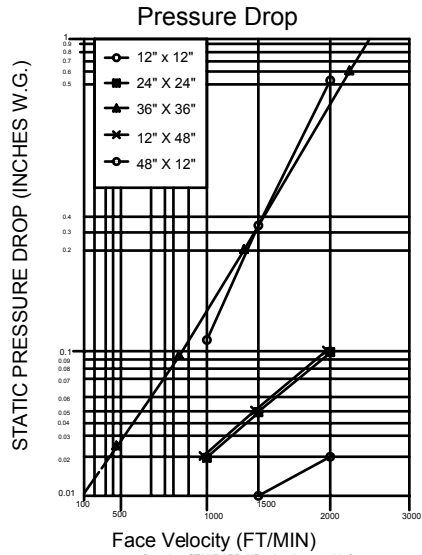


Figure 6.3- Airflow Rate Measurement Setup- Multiple Nozzle Chamber on Fan Inlet

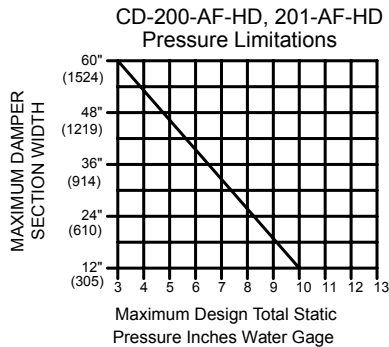


Model CD-200-AF-HD & CD-201-AF-HD Damper Performance Data



CD-200-AF-HD, 201-AF-HD sizes: 12x12, 24x24, 48x12, 12x48, 36x36 (305x305, 610x610, 1219x305, 305x1219, 914x914)

**36" x 36" size is certified by Certainle Technical Services, LTD.



12" x 12" (305mm x 305mm)

Face Velocity ft/min (m/s)	Pressure Drop in. w.g. (Pa)
1000 (5.08)	0.14 (35)
1500 (7.62)	0.32 (79)
2000 (10.16)	0.53 (132)

24" x 24" (610mm x 610mm)

Face Velocity ft/min (m/s)	Pressure Drop in. w.g. (Pa)
1000 (5.08)	0.02 (5)
1500 (7.62)	0.05 (12)
2000 (10.16)	0.10 (25)

48" x 12" (1219mm x 305mm)

Face Velocity ft/min (m/s)	Pressure Drop in. w.g. (Pa)
1000 (5.08)	0.05 (12)
1500 (7.62)	0.13 (32)
2000 (10.16)	0.22 (55)

12" x 48" (305mm x 1219mm)

Face Velocity ft/min (m/s)	Pressure Drop in. w.g. (Pa)
1000 (5.08)	0.02 (5)
1500 (7.62)	0.05 (12)
2000 (10.16)	0.10 (25)

36" x 36" (914mm x 914mm)

Face Velocity ft/min (m/s)	Pressure Drop in. w.g. (Pa)
1000 (5.08)	0.14 (35)
1500 (7.62)	0.35 (87)
2000 (10.16)	0.48 (120)

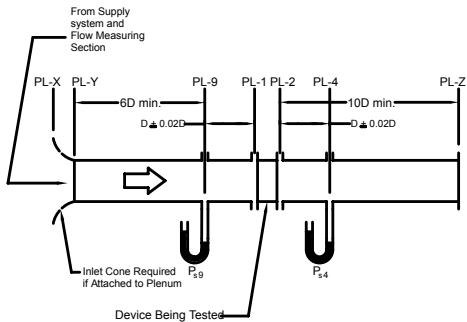


Figure 5.3- Test Device Setup with Inlet and Outlet Ducts

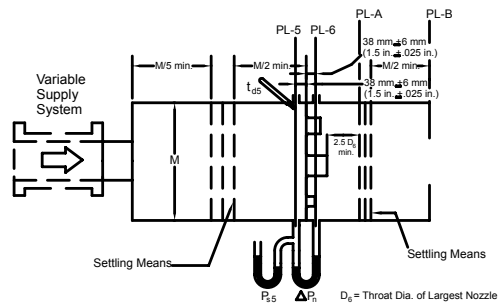


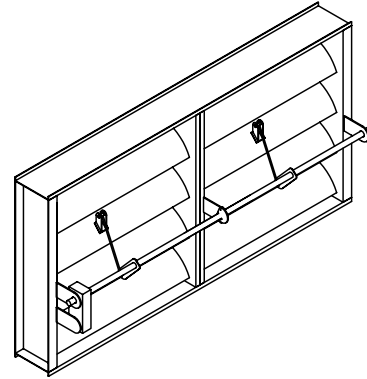
Figure 6.5- Airflow Rate Measurement Setup- Multiple Nozzle Chamber on Fan Outlet

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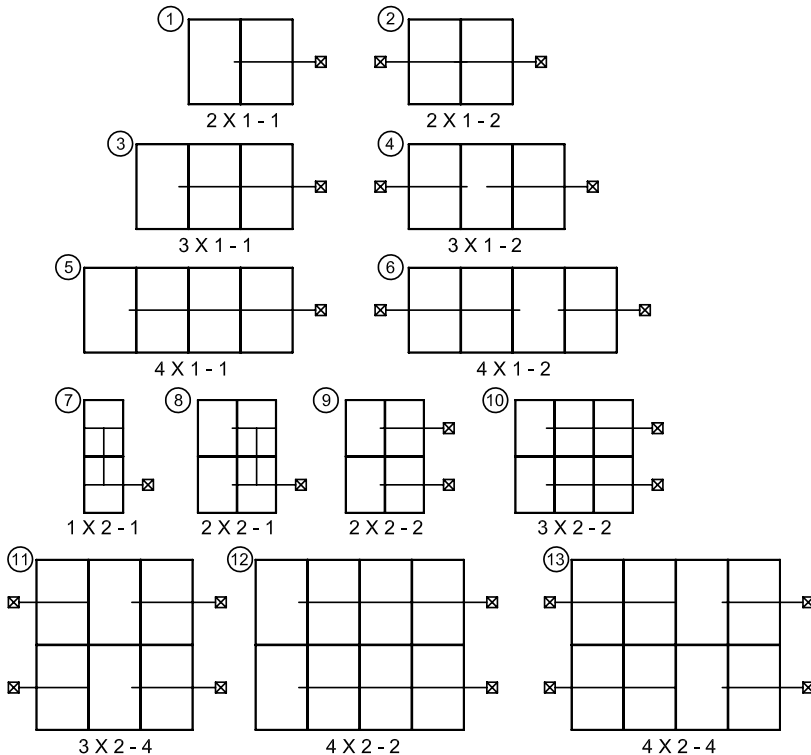
Jackshafting Details

1. The primary function of a Jackshaft is to distribute power equally to each section of a multiple section damper. This is best achieved by linking the operator directly to the Jackshaft which in turn will control all of the individual sections as one.
2. Dampers are undersized approximately 1/4" for both width and height on entire multi-section assembly.
3. Dampers are self-supporting only in the largest recommended single section. Additional bracing at every 8 feet of damper width and height is recommended on multiple section assemblies.
4. During field installation of damper sections, it is important that final linkage positions are set so that all sections open and close simultaneously for their given operator.
5. Jackshafting will be located near the bottom of damper section height.
6. If actuators are field mounted, actuator must be powered up and then locked down on shaft.



Select: 1 thru 13

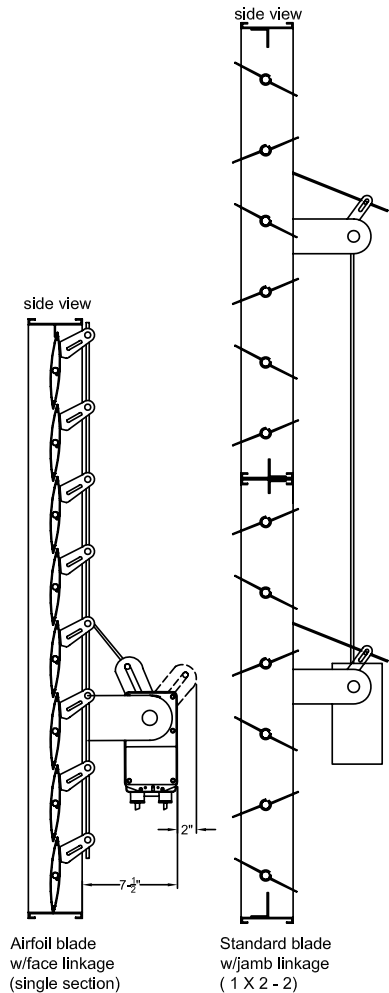
Jackshaft Configurations



OPTIONAL:

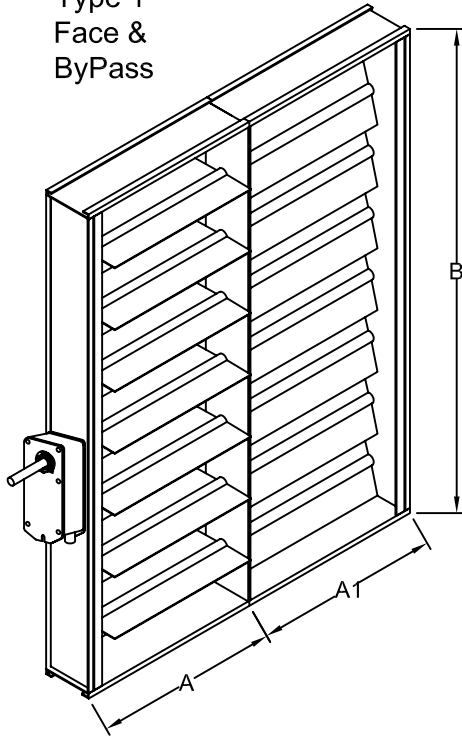
- Actuator in Airstream
- Actuator out of Airstream

CONFIGURATION LEGEND:

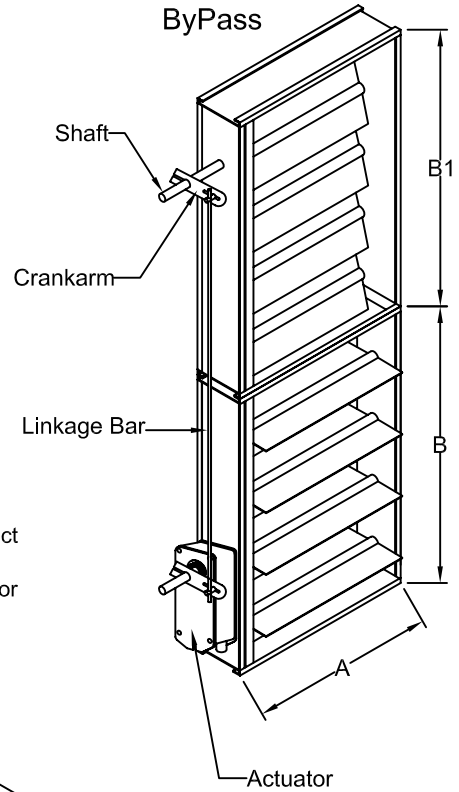


Face & Bypass Details

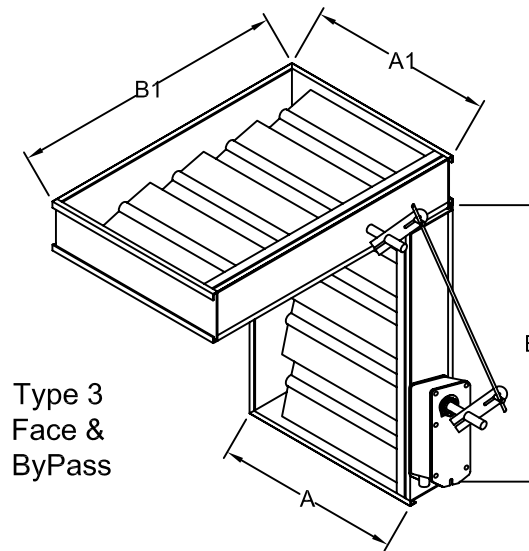
Type 1
Face &
ByPass



Type 2
Face &
ByPass



Mounting the crank arm between the actuator and the damper allows for direct coupled mounting to shaft as well as use of linkage for second damper.



Type 3
Face &
ByPass

Installation & Maintenance Instructions

Before Installing in Duct

1. If the assembly is provided with un-joined jackshaftering that operates more than one section, connect blade jumpers as required or bolt the two jackshafts together, depending on which is provided. Jackshaftering may have been repositioned to prevent damage during shipment. If damper operator is to be mounted out of airstream, the jackshaft should extend through the bearing bracket and approximately 6" beyond frame. Secure jackshaftering in place with provided clamps.
2. If applicable, link lower and upper jackshafts with the crossover bar through the ball joint on crank arm at each jackshaft. Locate crank arm close to bearing support bracket of jackshaft.
3. Improperly installed dampers and damper sections prevent blades from sealing properly (Fig. 1). Gaps between the blades and frame indicate a damper installed out of flat. Misalignment of the damper or damper sections can cause twist in the frame resulting in blade-to-linkage bind. This overloads the damper actuator or renders it inoperative.
4. We recommend lubricating moving parts with dry graphite.
5. Manual dampers should be run through a full-open to full-close cycle by hand to insure proper operation of the damper.
6. Motorized dampers should be checked by a preliminary attempt to operate with the motor. If binding occurs, disconnect one end of the driving linkage (and note its exact position beforehand) to operate damper manually and check per above. Reconnect linkage and check again.
7. Lift panels into duct (or opening) by its frame, not by any blade or hardware. Final position must be square, straight, plumb and without twist.
8. Due to shipping and handling, dampers may arrive at the site slightly racked to twisted. Dampers are to be squared and not twisted prior to installation into square duct or sleeves.
9. Damper should be shimmed in the opening to prevent distortion of the frame by the fasteners holding it in place. Dampers with seals should be caulked to prevent leakage between the frame and duct.

Multiple-Panel Dampers

Multiple-panel dampers will be tagged for ease of assembly.

Operators

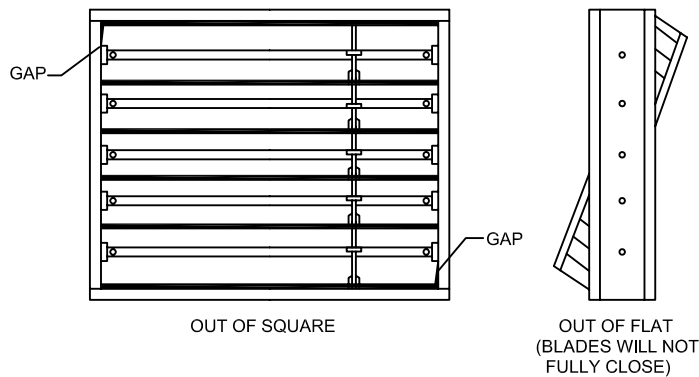
1. An extended shaft kit is supplied if an operator is specified.
2. Reference specific installation instructions supplied with damper operator for motorized dampers.

Maintenance

In general this unit must be kept clean and free from foreign matter that may impede normal movement and seating of blades and seals (if applicable). A cleaning schedule should be established and is entirely dependent upon the environment into which the damper is placed. The damper is basically maintenance free with the above exception and regular lubrication and seal inspection as indicated below.

Bearings and linkage pivots: Lubricate with dry graphite as required to provide free movement.

Fig. (1) Dampers Out of Square and Flat



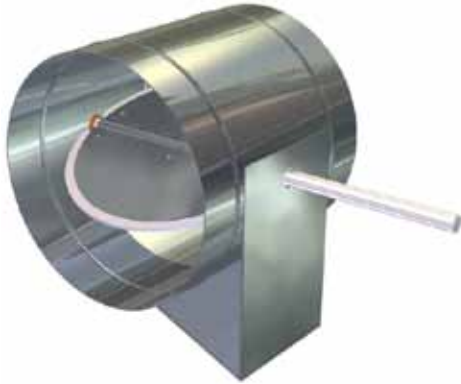
IMPORTANT Check Often Use a square

CAUTION:

Check damper linkage to ensure that blades move freely. Make sure that linkage rods are not bent or damaged. Also check blade brackets for damage. **DO NOT INSTALL IF DAMAGED!**

NEVER DISCONNECT LINKAGE! If for some reason it is necessary, precision mark the linkage arm where it connects to the actuator and re-connect. If linkage has been disconnected without being marked, power motor to full stroke and push linkage rod to extend lower blades to the full open position and connect and tighten to actuator.

Model CD-250 Damper



Suggested Specifications

Furnish and install at locations shown on the drawing, or in accordance with schedules, dampers meeting the following specifications: Round dampers shall consist of a (specify gage as noted in table below) galvanized steel body and blade, with solid shafts turning in bronze oilite bearings. Blade seal shall be cross-linked closed cell material. Maximum air flow velocity of 2000 fpm.

Standard Construction

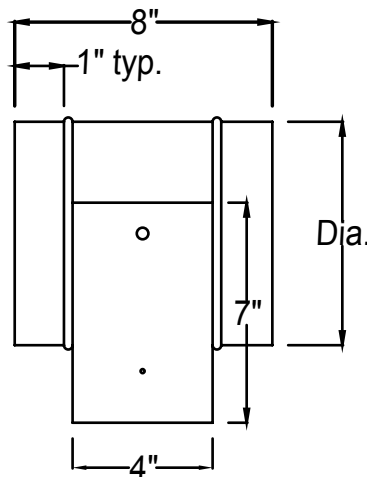
- Shaft: 1/2" round solid aluminum (thru 30")
3/4" round solid steel (32" thru 46")
- Bearing: Bronze oilite (175°)
- Blade Seals: Crosslinked closed cell (200° F)
- Mounting Plate: 20 ga. galvanized steel

Options

- Stainless steel body, blade, shaft and quadrant
- Silicone Blade Seal (400° F)
- All aluminum construction w/ steel plated quadrant
- Nylon 6/6 bushing (for aluminum construction)
- Extended quadrant 2"
- Factory furnished and mounted actuator
- Motor and/or control enclosure
- Stainless steel bearings (700° F)
- Silica Seals (800° F)
- Heavier Gauges:
 - 16 ga
 - 14 ga

MAXIMUM VELOCITY		
DIAMETER	FPM	MAX. PRESSURE DIFFERENTIAL
4 - 8"	2600	6"
10 - 12"	2400	5"
14 - 18"	2300	4"
20 - 24"	2300	3"
26 - 30"	2200	2-1/2"
32 - 46"	2000	1-3/4"

DIAMETER	LENGTH	BODY & BLADE
4 - 10"	8"	24 ga.
12 - 18"	8"	20 ga.
20 - 30"	8"	20 ga.
32 - 46"	8"	18 ga.



Model CD-250 Damper

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