

**Section 1: Dampers**

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Use the following guidelines to determine the actuator quantity and torque requirements for your damper configuration.

### Determine Damper Actuator Locations

Use the following configuration to determine the amount of actuator locations your damper will require.

Single Section ≤ 48 x 74 D2, D3  
 ≤ 60 x 74 D1

Dampers will never ship more than 2 sections wide and one section high.

#### Configuration

Dampers less than 96x74 inch size have a single actuator location. Dampers 96x74 and less than 144x74 are made of three sections, and have two actuator locations, one with two thirds of the area (and torque), and the other with one third.

Exception: Three section wide dampers that are less than 42 square feet, have a single actuator location.

If damper exceeds 74" height a second row is necessary. Apply the same logic above to each row of dampers.

For dampers larger than 144 x 144, please contact the Take-Off Service (takeoff.service@honeywell.com) for a quote and actuator location.

#### Mounting

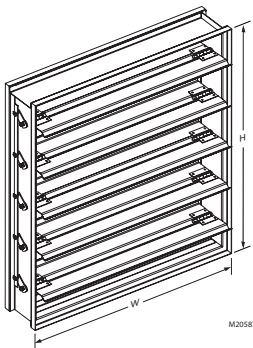
Internal Mount: Only blade drive lever provided. Customer is responsible for providing actuator mounting hardware, and linkage.

External Mount: Actuator shaft will be provided as extension pin to be mounted on side or with jackshaft pre-mounted on damper.

### Determining Damper Actuator Torque Requirements

Use the following procedure to determine the required torque for your damper.

NOTE: Damper area is measured using the W and H dimensions.



### Measuring Damper Area and Torque Requirements

1. Calculate the damper area by multiplying width by height in inches and divide by 144 to obtain square feet.
2. Multiply the area by the correct torque factor from Table 2 below, to show total torque required.
3. Select an actuator with torque higher than the calculated value.

#### EXAMPLE:

W dimension = 96 in.

H dimension = 48 in.

48 in. x 96 in. ÷ 144 = 32 sq. ft.

32 sq. ft. x 7 lb-in./sq. ft. = 244 lb-in.

In this example you need one or more actuators with a combined torque of 244 lb-in or more. Sometimes it's necessary to use more than one actuator in the same actuator location, in which case extra hardware must be used, such as a tandem mounting kit.

Table 2. Approximate industry standard damper lb-in. per sq ft value.

		Face Velocity (fpm)/ Static Pressure (in. wc)				
		500/ 1	1000/ 2	1500/ 3	2000/ 4	2500/ 5
D1 & D2	Parallel	4	7	10.5	12	14
	Opposed	3	5	7.5	8.5	10
D3	Parallel	3	4.5	6.5	7	8
	Opposed	2	3	4.5	5	6

### Damper Sizing

Dampers can be sized using two methods; actual sizing or nominal sizing.

Dampers with actual sizing are made exactly to the dimensions specified, meaning a 24x24 damper is exactly 24x24 inches when built.

Nominally sized dampers are undersized by one quarter inch in both dimensions, meaning a 24x24 damper will be 23.75x23.75 inches when built.

Nominal sizing is the most common method, since that is how dampers destined for duct installation should be sized to fit. Actual sizing is more common with flange or wall mounting

Nominal sizing is Honeywell's default method of manufacturing. If actual sizing is required, please specify accordingly at the time of ordering.

# Product Selection - Dampers

## Standard Rectangular Dampers

HVAC performance is largely dependent on airflow, and Honeywell Control Dampers are built to support improved airflow and heavy use. Honeywell has long been a leading source for commercial control dampers, with products that meet the benchmark AMCA 500D air performance standards. With excellent leakage performance and manufacturing standards, Honeywell control dampers provide efficient and trouble free operation.

## Standard Rectangular Dampers



Honeywell D1, D2, and D3 Control Dampers are constructed to be durable. They feature a symmetrical blade design that translates into a damper that is not flow directional, has maximized free area, and reduced actuator torque compared to asymmetrical blade designs.

### The Right Choice

There's a Honeywell Control Damper that's just right for your application. The D1 ultra-low leakage airfoil damper has low airflow resistance for a more efficient system, and is typically used in high pressure and velocity applications, such as fan isolation. The D2 model is an ultra-low leakage damper with blade and jamb seals, and it's designed for medium pressure and velocity systems, like outdoor air intake or exhaust. The D3 control damper is built for applications with medium pressure and velocity, and where low leakage is not important, like return air.

### Blade Design

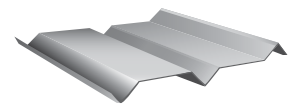
#### Airfoil Blades - D1 Dampers

Honeywell Airfoil Control Dampers have blades constructed of double skin galvanized steel. Its shape results in increased strength, but also a lower resistance to airflow, which makes it ideal for high pressure systems.

#### 3V Blades - D2 and D3 Dampers

The D2 and D3 models feature a 3V blade design, with three V-grooves that run the length of the blade for structural rigidity and strength. The 3V

blade is primarily designed to be used in low to medium pressure and velocity applications.



### Applications And Operation

Honeywell Commercial Control Dampers are designed for isolation or airflow control in medium- to high-pressure and velocity HVAC systems. Typical use includes volume control in zone applications and air handling units, generator room ventilation, stand-alone exhaust air units, or economizer applications. Operating range is from 2000 to 4000 fpm maximum velocity, and 2.5 to 10 inch wg pressure.

Dampers are designed to operate with a wide range of Honeywell actuators and accessories. Spring return and non-fail-safe actuators are available with a wide range of control options and output torque, to insure precise control of your damper application.

### Performance

Honeywell certifies that the D1, D2, and D3 models of control dampers are tested according to AMCA Publication 511 and Standard 500D for air performance in pressure drop and leakage.

Both D1 and D2 offer leakage ratings equivalent to both AMCA Class 1A and Class 1. The Class 1A rating offers IECC (International Energy Conservation Code) leakage compliance.

				Material		Frame Gauge		Blade Seals		Jamb Seals	Blade Axle Bearings		Axles		Linkage Material		Flange	
S — Standard O — Optional				Galvanized	Stainless	16	12	TPE	Silicone	Stainless	Synthetic	Stainless	Galvanized	Stainless	Galvanized	Stainless	None	Single, Double, Reverse
	Leakage @ 1 in wg cfm/ft2	Max Velocity fpm	Max Pressure in wg															
D1 Ultra-Low Leakage	3	4000	10	S	O	S	O	S	O	S	S	O	S	O	S	O	S	O
D2 Ultra-Low Leakage	3	3000	5	S	O	S	O	S	O	S	S	O	S	O	S	O	S	O
D3 Control Damper	120	3000	5	S	O	S	O	n/a	n/a	n/a	S	O	S	O	S	O	S	O

For a copy of the specification sheet the D1 (63-2671) or D2 and D3 (63-2398), visit [customer.honeywell.com](http://customer.honeywell.com).

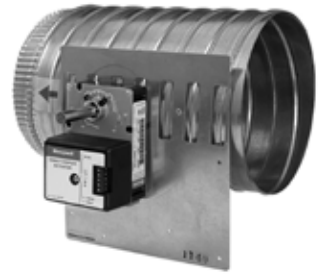
### Standard Round Dampers



D690

The D690 round control dampers are available in sizes from 6 to 16 inches, and are used in zone applications controlling airflow in round duct. The dampers are constructed with neoprene and silicone seals for tight close off and low leakage. The DM7600 model consists of a D690 damper, but includes a factory mounted actuator.

- Oilite bearings for durability
- 90 degree damper travel
- Designed to accept Honeywell direct coupled actuators up to 44 lb-in torque
- Maximum velocity 2,500 fpm
- Temperature range 32°F to 130°F (0°C to 54°C)



DM7600

#### D690 ROUND DAMPERS SELECTION GUIDE

Product Number	Damper Diameter	
	(inch)	(mm)
D690A1002	6	152
D690A1010	8	203
D690A1028	10	254
D690A1036	12	305
D690A1044	14	356
D690A1051	16	406

#### DM7600 ROUND DAMPERS SELECTION GUIDE

Product Number	Damper Diameter		Input Signal	Timing (sec, min.)
	(inch)	(mm)		
DM7600A1005	6	152	2 to 10 Vdc or 4 to 20 mA	90 sec
DM7600A1013	8	203	2 to 10 Vdc or 4 to 20 mA	90 sec
DM7600A1021	10	254	2 to 10 Vdc or 4 to 20 mA	90 sec
DM7600A1039	12	305	2 to 10 Vdc or 4 to 20 mA	90 sec
DM7600A1047	14	356	2 to 10 Vdc or 4 to 20 mA	90 sec
DM7600A1054	16	406	2 to 10 Vdc or 4 to 20 mA	90 sec
DM7600B1004	6	152	SPDT floating	90 sec
DM7600B1012	8	203	SPDT floating	90 sec
DM7600B1020	10	254	SPDT floating	90 sec
DM7600B1038	12	305	SPDT floating	90 sec
DM7600B1046	14	356	SPDT floating	90 sec
DM7600B1053	16	406	SPDT floating	90 sec

### Custom Dampers

Need a custom damper? Contact the Take-Off Service: 1-888-664-4092 or [takeoff.service@honeywell.com](mailto:takeoff.service@honeywell.com).

Below is a sample list of the products we frequently provide.

#### CUSTOM RECTANGULAR DAMPERS

Number	Description
VCD34	Galvanized Insulated Airfoil Damper
VCD40	Aluminum Narrow Frame Airfoil Damper
VCD42	Aluminum Airfoil Damper (Galvanized Frame)
VCD43	Aluminum Airfoil Damper
VCD45	Aluminum thermally broken insulated Damper

#### CUSTOM ROUND DAMPERS

Number	Description
VCDR53	Galvanized Round Damper – to 24 inches
VCDRM53	Galvanized Round Multi-Blade Damper – to 36 inches

# Submittal Data - Dampers

## D1 Series Rectangular Volume Control Dampers



The D1 series control damper is an ultra-low leakage damper, with rugged steel airfoil blades designed to meet the highest standards established. It is leakage and pressure drop tested according to the AMCA 500D standard, and meets leakage Class 1 and Class 1A, which also qualifies the damper for the International Energy Conservation Code (IECC). It is intended for application in medium to high pressure and velocity systems.

### PERFORMANCE DATA

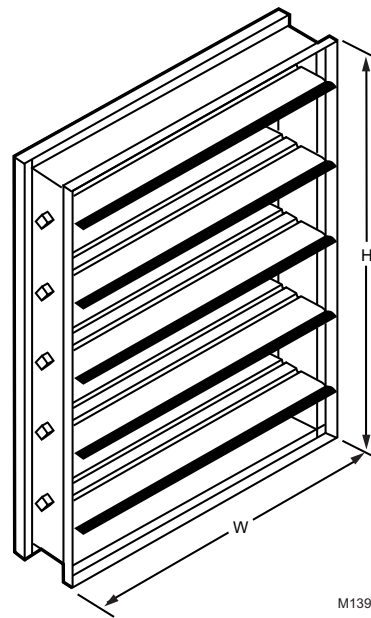
D1 Velocity Limits.

Damper Width (in.)	Maximum Velocity (fpm)
12	4000
24	4000
36	3500
48	3000
60	2500

### SPECIFICATIONS

Size Range <sup>1</sup>	
Minimum Size	
One Blade .....	6 in. wide by 6 in. high
Two Blade .....	6 in. wide by 10 in. high
Maximum Size .....	
Single Section .....	60 in. wide by 74 in. high
Multiple Section.....	Unlimited
Temperature Rating.....	180 °F (82 °C) maximum <sup>2</sup>
Maximum Pressure.....	10 in. wg.
Standard Construction <sup>3</sup> .....	14 gauge galvanized steel, airfoil shaped
Blade Action.....	Parallel or Opposed
Frame <sup>3</sup> .....	16 gauge galvanized steel Hat-channel
Blade Axle Bearings .....	Synthetic (Acetal)
Linkage <sup>3</sup> .....	Steel Side linkage out of airstream (concealed in frame)
Axles <sup>3</sup> .....	1/2 in. diameter plated steel
Jamb Seals <sup>3</sup> .....	304 Stainless Steel
Blade Edge Seals <sup>3</sup> .....	TPE
<sup>1</sup> Width and height dimensions furnished 1/4 in. undersized - standard	
<sup>2</sup> Temperature rating with standard options	
<sup>3</sup> Customized options are available	

### DIMENSIONS DIAGRAM



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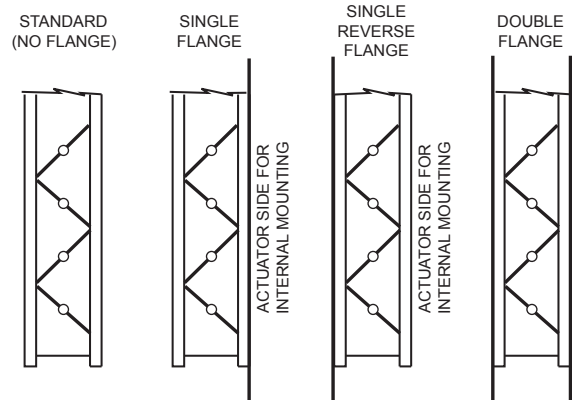
### LEAKAGE RATE

#### Leakage Class Definitions

The *maximum* allowable leakage is defined by AMCA as the following:

- Leakage Class 1A-3 cfm/ft<sup>2</sup> @ 1 in. wg (class 1A is only defined at 1 in. wg).
- Leakage Class 1
  - 4 cfm/ft<sup>2</sup> @ 1 in. wg
  - 8 cfm/ft<sup>2</sup> @ 4 in. wg
  - 11 cfm/ft<sup>2</sup> @ 8 in. wg
  - 12.6 cfm/ft<sup>2</sup> @ 10 in. wg

### FLANGE OPTIONS



M18986

## D2 and D3 Series Rectangular Volume Control Dampers



The D2 series control damper is an ultra-low leakage damper, with strong 3V blades. It is leakage and pressure drop tested according to the AMCA 500D standard, and meets leakage Class 1 and Class 1A, which also qualifies the damper for the International Energy Conservation Code (IECC).

The D3 series features the same blades and hardware as the D2 damper, but lacks the seals, making it a damper intended for applications where low leakage performance is not necessary. D2 and D3 dampers are intended for application in low to medium pressure and velocity systems.

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 Programs. The AMCA Certified Ratings Seal applies to air performance ratings only.

### PERFORMANCE DATA

D2, D3 Velocity Limits.

Damper Size in inches.	Maximum Velocity (fpm)
12	3000
24	3000
36	2500
48	2000

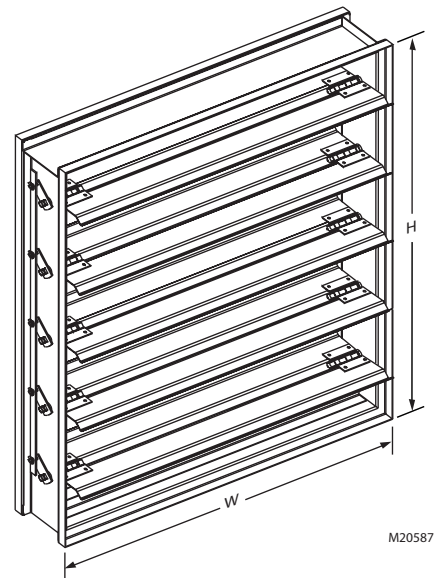
Same logic as D1 window above.

### SPECIFICATIONS

- Size Range<sup>1</sup>
- Minimum Size
  - One Blade.....6 in. wide by 6 in. high
  - Two Blade.....6 in. wide by 10 in. high
- Maximum Size .....
- Single Section.....48 in. wide by 72 in. high
- Multiple Section.....Unlimited
- Temperature Rating.....180 °F (82 °C) maximum
- Maximum Pressure .....5 in. wg.
- Standard Construction<sup>2</sup>.....Blade: 16 gauge galvanized steel 3-V
- Blade Action .....Parallel or Opposed
- Frame<sup>2</sup> .....16 gauge galvanized steel Hat-channel
- Blade Axle Bearings .....Synthetic (Acetal)
- Linkage .....Side linkage out of airstream (concealed in frame)
- Axles.....1/2 in. square plated steel
- Jamb Seals<sup>3</sup> .....Compression-type Stainless Steel

- Blade Edge Seals<sup>2</sup> .....TPE
- <sup>1</sup> Width and height dimensions furnished 1/4 in. undersized - standard
- <sup>2</sup> Customized options are available
- <sup>3</sup> D2 Dampers only

### DIMENSIONS DIAGRAM



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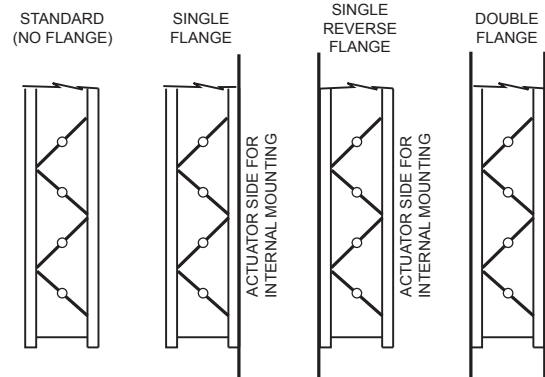
### LEAKAGE RATE (Applies to D2 only)

#### Leakage Class Definitions

The *maximum* allowable leakage is defined by AMCA as the following:

- Leakage Class 1A-3 cfm/ft<sup>2</sup> @ 1 in. wg (class 1A is only defined at 1 in. wg).
- Leakage Class 1
  - 4 cfm/ft<sup>2</sup> @ 1 in. wg
  - 8 cfm/ft<sup>2</sup> @ 4 in. wg

### FLANGE OPTIONS



M18986

# Submittal Data - Dampers

## D690 Round Volume Control Dampers



The D690 Round Control Damper is used in commercial air handling system zone applications to control airflow, but is also suitable for residential zoning applications where the ML6161 actuator is used. The damper is designed for use with all low torque Honeywell Direct Coupled Actuators.

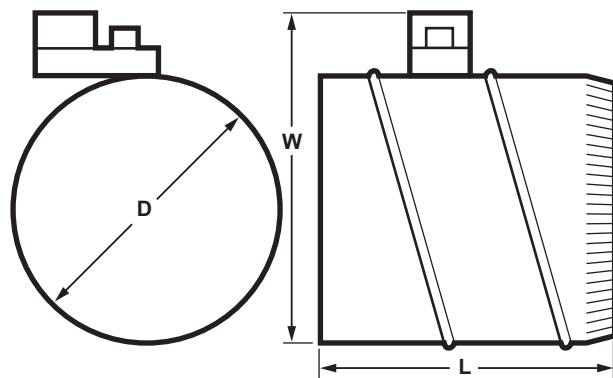
### FEATURES

- Neoprene seal for tight closing and low leakage.
- Oilite bearings for long life.

### SPECIFICATIONS

Application .....Heating, cooling, ventilating  
 Type of Blade .....Single-blade, round  
 Temperature Range.....32 °F to 130 °F (0 °C to 54 °C)  
 Used With.....All Honeywell direct coupled actuators up to 44 lb-in torque.

### DIMENSIONS DIAGRAM



DAMPER DIAMETER (D)		WIDTH (W)		LENGTH (L)	
in.	mm	in.	mm	in.	mm
6	152	9-1/2	241	12	305
8	203	11-1/2	292	12	305
10	254	13-1/2	343	12	305
12	305	15-1/2	394	13	330
14	356	17-1/2	445	15	381
16	406	19-1/2	495	17	432

M17412



# Submittal Data - Dampers

## DM7600 Round Volume Control Dampers



The DM7600 Commercial Zone Damper is used in zoning systems to control airflow. The damper consists of a D690 Control damper, with a Honeywell floating ML6161 or modulating ML7161 Direct Coupled Actuator that is factory mounted to simplify field installation.

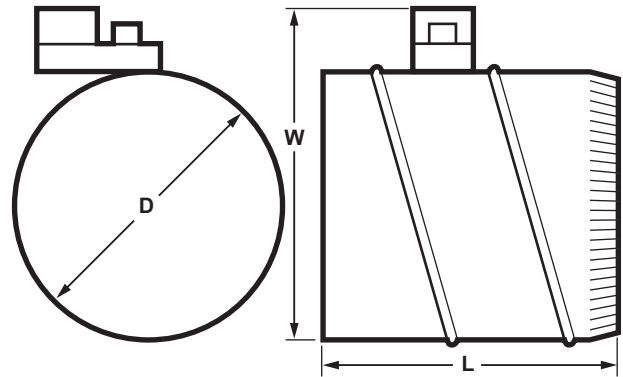
### FEATURES

- Neoprene seal for tight closing and low leakage.
- Oilite bearings for long life.
- Magnetic coupling requires no limit switches or mechanical stops.

### SPECIFICATIONS

Application .....Heating, cooling, ventilating  
 Type of Blade.....Single-blade, round  
 Temperature Range.....32 °F to 130 °F (0 °C to 54 °C)  
 Voltage.....24 Vac  
 Frequency .....50 Hz; 60 Hz

### DIMENSIONS DIAGRAM



DAMPER DIAMETER (D)		WIDTH (W)		LENGTH (L)	
in.	mm	in.	mm	in.	mm
6	152	9-1/2	241	12	305
8	203	11-1/2	292	12	305
10	254	13-1/2	343	12	305
12	305	15-1/2	394	13	330
14	356	17-1/2	445	15	381
16	406	19-1/2	495	17	432

M17412

