

► INSULATED CONTROL DAMPERS

Model: ICD

- THERMALLY INSULATED
- REDUCED CONDENSATION
- REDUCED HEAT TRANSFER OR COLD PENETRATION

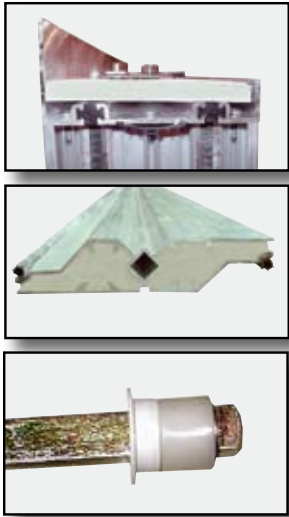


**DODGE ENGINEERING
& CONTROLS, INC.**

Your Complete Solution

► Insulated Control Dampers

Dodge's ICD series of dampers was developed for applications where it is necessary to minimize the transfer of heat or cold penetration and reduce condensation. The thermally broken frame provides an insulating barrier in the ductwork. Thermally broken blades separate the warm and cold air inside the ductwork. Silicone jamb seals effectively seal the penetration of air from one side of the blade to the other.



Construction Features

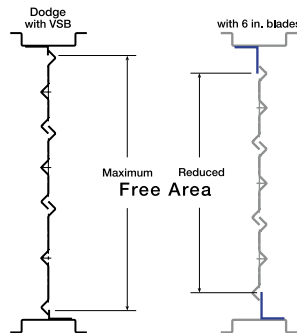
- ICD-44 features an aluminum hat channel frame. ICD-45 has an aluminum hat channel frame that is thermally broken with two polyurethane resin gaps and insulated on four sides with polystyrene.
- ICD series damper blades feature thermally broken airfoil shaped blade with polyurethane foam.
- Silicone blade and jamb seals stay flexible in cold temperatures.
- Dual bearing with acetal inner sleeve and flanged outer bearing features no metal-to-metal or metal-to-plastic contact.



Design Advantages

VSB DESIGN

Dodge's Variable Symmetrical Blade (VSB) design uses a combination of three symmetrical blade sizes (4, 5, and 6 inch) to maximize the free area at any damper height by reducing blade stop height. Traditional damper designs use a single blade width that requires oversized blade stops, limiting free area when the blades are open. The VSB design allows for consistent operating characteristics regardless of airflow direction.



LINKAGE

Dodge's ICD series dampers have blade linkage concealed in the insulated frame. This prevents any transfer point for cold or heat, unlike some of our competitor's products. The linkage is engineered to accurately control each and every blade without need for adjustment.



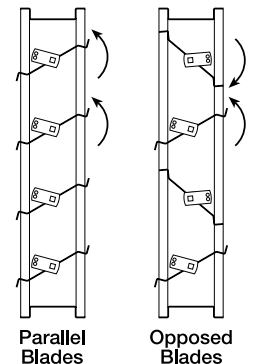
NO TOP OR BOTTOM

ICD series dampers are designed for installation in any position with the blades horizontal. As shown, the damper can be turned over so the actuator is on the left or right side.



PARALLEL VERSUS OPPOSED BLADE OPERATION

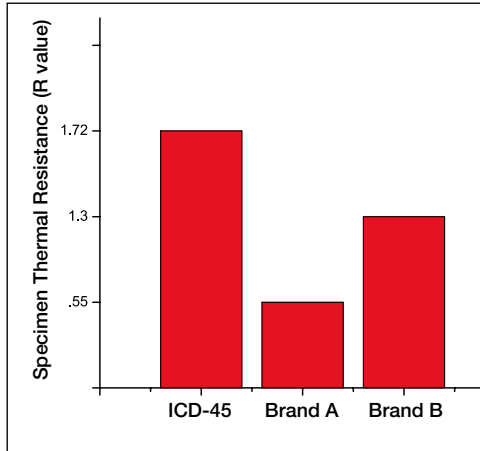
Dodge's ICD series dampers are offered with either opposed or parallel blade operation. Parallel blade orientation is typically used when the damper operates in two positions, open or closed. The damper blades open or close in the same direction. Opposed blade orientation is typically used on dampers that modulate airflow. Adjacent damper blades will open or close opposite one another.



► Damper Performance Testing Criteria

Thermal Performance

During thermal performance test, per ASTM Standard C1363-97 conducted at Architectural Testing Laboratories (ATI), the ICD-45 outperformed competitor's thermally broken dampers. (Report #53166.01-201-46)



Dry Ice Test

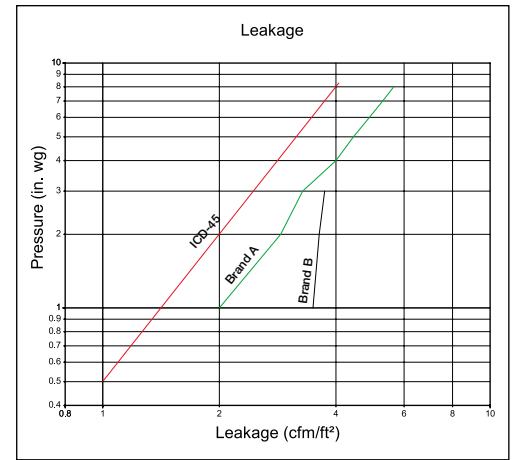
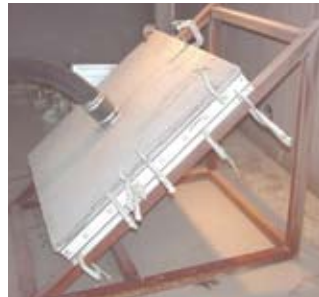
The thermal breaks in the damper blades and frame reduce the transfer of heat from the “cool side” to the “warm side”. When compared to a standard airfoil blade design, ICD airfoil blade, with thermal breaks, prevents ice from forming on the opposite side of the blade.



Leakage Test

ICD series dampers exceed the IECC (International Energy Conservation Code) requirements for damper leakage ratings of at 3 cfm/ft² @ 1 in. wg (54.8 cmh/m² @ 249 Pa) or 8 cfm/ft² @ 4 in. wg (146.3 cmh/m² @ 996 Pa) or less when integral to the building envelope. Leakage testing was performed on the ICD-45 at Environ Laboratories at a temperature of -40°F/C yielded leakage rates of less than 2 cfm/ft² @ 1 in. wg (36.6 cmh/m² @ 249 Pa) and less than 4 cfm/ft² @ 4 in. wg (73.2 cmh/m² @ 996 Pa).

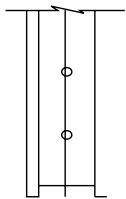
Comparing a 36 in. x 36 in. (914mm x 914mm) damper, Dodge's ICD series has the lowest leakage in the industry.



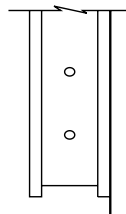
► The Dodge Difference

Three frame options are available on the ICD series dampers:

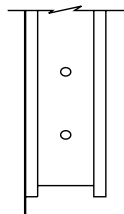
- Flanged to Duct
- Single Flange
- Single Reverse Flange



Flanged to Duct



Single Flange (actuator side)



Single Reverse Flange (opposite actuator)



Flanged to Duct is installed between two pieces of ductwork. The ICD-45 provides the thermal break necessary to prevent the transfer of heat or cold that is transmitted through the metal duct.

► Damper Performance Testing Criteria

Pressure loss through an open damper (change in pressure) and leakage through a closed damper are two performance criteria required to appropriately select and apply a control damper in an HVAC system.

Any damper's pressure loss depends on where and how the damper is installed in the HVAC system. AMCA Standard 500-D defines several configurations to be used for testing damper pressure drop. Dampers are tested for pressure loss in the three test figures shown and provides data for each.

AMCA Figure 5.2 Pressure Drop

Dimension (in.)	12 x 12	24 x 24	36 x 36	12 x 48	48 x 12
(mm)	305 x 305	610 x 610	914 x 914	305 x 1219	1219 x 305
Velocity - fpm (m/s)	Pressure Drop - in. wg (Pa)				
500 (2.5)	.03 (7.5)	.02 (5)	.01 (2.5)	.01 (2.5)	.03 (7.5)
1000 (5.1)	.11 (27.4)	.08 (19.9)	.05 (12.5)	.06 (14.9)	.14 (34.8)
1500 (7.6)	.25 (62.3)	.19 (47.3)	.11 (27.4)	.14 (34.8)	.32 (79.7)
2000 (10.2)	.45 (112)	.34 (84.7)	.21 (52.3)	.25 (62.3)	.57 (142)
2500 (12.7)	.71 (176.9)	.53 (132)	.33 (82.2)	.40 (99.6)	.89 (221.7)
3000 (15.2)	1.03 (256.6)	.77 (191.8)	.47 (117.1)	.57 (142)	1.29 (321.3)
3500 (17.8)	1.40 (348.7)	1.05 (261.5)	.64 (159.4)	.78 (194.3)	1.76 (438.4)
4000 (20.3)	1.83 (455.8)	1.37 (341.3)	.84 (209.2)	1.02 (254.1)	2.30 (572.9)

AMCA Figure 5.3 Pressure Drop

Dimension (in.)	12 x 12	24 x 24	36 x 36	12 x 48	48 x 12
(mm)	305 x 305	610 x 610	914 x 914	305 x 1219	1219 x 305
velocity - fpm (m/s)	Pressure Drop - in. wg (Pa)				
500 (2.5)	.01 (2.5)	.01 (2.5)	.01 (2.5)	.01 (2.5)	.04 (10)
1000 (5.1)	.04 (10)	.03 (7.5)	.02 (5)	.02 (5)	.06 (14.9)
1500 (7.6)	.09 (22.4)	.08 (19.9)	.04 (10)	.06 (14.9)	.14 (34.8)
2000 (10.2)	.17 (42.3)	.14 (34.8)	.08 (19.9)	.10 (24.9)	.25 (62.3)
2500 (12.7)	.26 (64.7)	.22 (54.8)	.12 (29.9)	.17 (42.3)	.40 (99.6)
3000 (15.2)	.38 (94.6)	.32 (79.7)	.18 (44.8)	.24 (59.8)	.58 (144.5)
3500 (17.8)	.52 (129.5)	.43 (107.1)	.24 (59.8)	.33 (82.2)	.79 (196.7)
4000 (20.3)	.67 (166.9)	.57 (142)	.32 (79.7)	.43 (107.1)	1.03 (256.6)

AMCA Figure 5.5 Pressure Drop

Dimension (in.)	12 x 12	24 x 24	36 x 36	12 x 48	48 x 12
(mm)	305 x 305	610 x 610	914 x 914	305 x 1219	1219 x 305
Velocity - fpm (m/s)	Pressure Drop - in. wg (Pa)				
500 (2.5)	.05 (12.5)	.05 (12.5)	.03 (7.5)	.04 (10)	.05 (12.5)
1000 (5.1)	.23 (57.3)	.21 (52.3)	.14 (34.8)	.18 (44.8)	.22 (54.8)
1500 (7.6)	.52 (129.5)	.47 (117.1)	.33 (82.2)	.42 (104.6)	.51 (127)
2000 (10.2)	.93 (231.7)	.84 (209.2)	.58 (144.5)	.74 (184.3)	.90 (224.2)
2500 (12.7)	1.44 (358.7)	1.32 (328.8)	.91 (226.7)	1.16 (288.9)	1.41 (351.2)
3000 (15.2)	2.08 (518.1)	1.9 (473.3)	1.31 (326.3)	1.68 (418.5)	2.04 (508.1)
3500 (17.8)	2.83 (704.9)	2.59 (645.1)	1.79 (445.9)	2.28 (567.9)	2.78 (692.5)
4000 (20.3)	3.70 (921.6)	3.39 (844.4)	2.34 (582.9)	2.98 (742.3)	3.70 (921.6)

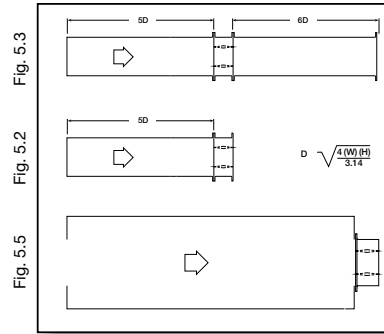
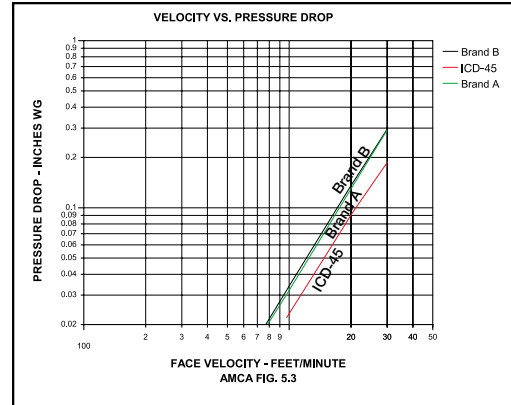


Figure 5.3 illustrates a fully ducted damper.

Figure 5.2 illustrates a ducted damper exhausting air into an open area.

Figure 5.5 illustrates a plenum mounted damper.



When comparing a 24 in. x 24 in. (610mm x 610mm) damper, the ICD series has the lowest pressure drop in the industry which means lower fan cost or smaller damper size required.

► Strong Support

Let Dodge Engineering & Controls provide dampers and damper actuation to meet your project needs. Send us your damper schedule for a quote and great pricing.



Our dampers are shipped directly to you from many convenient locations throughout the country to better serve you.

We also offer **Fast Track** service for even faster delivery.

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Chelmsford, MA 01824

WARRANTY

Dodge Engineering & Controls warrants this equipment to be free from defects in material and workmanship for a period of one year from the purchase date. Any units or parts which prove defective during the warranty period will be replaced at our option when returned to the factory, transportation prepaid. Dodge Engineering & Controls shall not be liable for damages resulting from misapplication or misuse of its products. Dodge Engineering & Controls will not be responsible for any installation or removal costs. Dodge Engineering & Controls will not be responsible for any service work or backcharges without prior written authorization.

Actuators are warranted by the actuator manufacturer. Should actuators furnished by Dodge Engineering & Controls prove defective during this period, they should be returned to the factory. Call Dodge Engineering & Controls prior to return for proper authorization for returning materials.