

CDTI-50 LOW TEMPERATURE INSULATED CONTROL DAMPER High Performance Aluminum Airfoil

APPLICATION

Ruskin model CDTI-50 is independently tested for Air Performance, Air Leakage, and thermal conductivity. The aluminum air foil blades are designed for higher velocity and pressure HVAC systems. It meets the leakage requirements of the International Energy Conservaiton Code of 3 cfm/sq. ft. at 1" wg. (0.08cmm/m² at 0.25 kPa) leakage.

STANDARD CONSTRUCTION

FRAME

CDTI-50 – 5" x 1" x 6063T6 extruded aluminum hat channel with .125" minimum wall thickness (127mm x 25mm x 3.2mm).

Low profile frame – 5" x 1/2" (127mm x 13mm) top and bottom frames on dampers 12" (305mm) high and less.

BLADE(S)

6" (152mm) wide, 6063T6 heavy gage extruded aluminum, air-foil shape injected with two part high density polyurethane foam. Each blade provided with a thermal isolation gap. R Value = 4.9 opposed (std.) or parallel blade action.

AXLES

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

BEARINGS

Stainless steel.

SEALS

Santoprene blade edge seals and polycarbonate jamb seals.

LINKAGE

Plated steel concealed in frame.

CONTROL SHAFT

6" (152mm) x 1/2" (13mm) diameter. Outboard shaft support bracket supplied with all single section dampers for field mounted actuators. Factory installed jackshaft supplied with all multiple section dampers.

MAXIMUM SIZE

Single section – 60"w x 60"h (1524mm x 1524mm).

Multiple section assembly – Unlimited size.

Dampers larger than the single section maximum are furnished in an assembly of 48" x 60" (1219mm x 1524mm) or less equal sized individual sections.

MINIMUM SIZE

CDTI-50 – Single blade – 6"w x 5"h (152mm x 127mm).

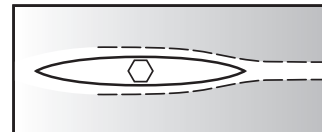
Two blade – 6"w x 9"h (152mm x 229mm).

TEMPERATURE LIMITS

-40°F (-40°C) minimum and +165°F (+73°C) maximum.

NOTES:

1. Dimensions shown in parenthesis () are metric units.
2. Units furnished approximately 1/4" (6mm) smaller than given opening dimensions.



Airfoil Blade Advantage

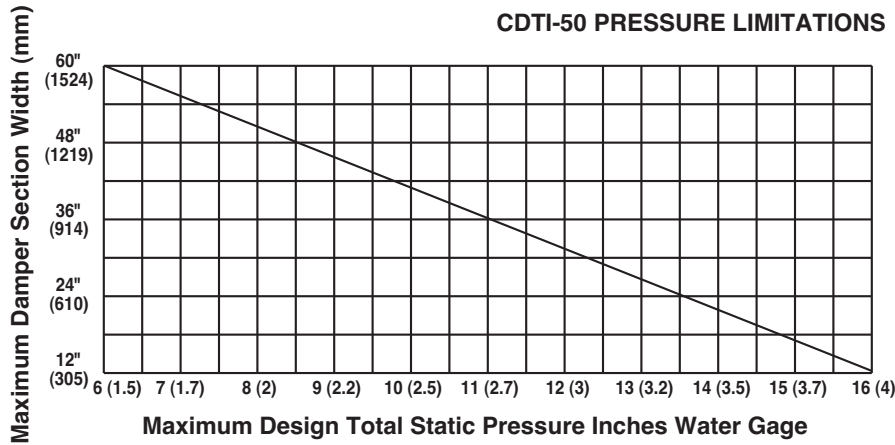
FEATURES

- 340% Thermal Efficiency.
- Airfoil blade design for low pressure drop and less noise generation.
- Positive lock axles, non-corrosive bearings and shake proof linkage for low maintenance operation.
- Blade edge seals mechanically lock into the blade for superior sealing.
- Low temperature variance between inside and outside air
- Highest "R" value rating in the industry

VARIATIONS

- Factory-installed, factory commissioned pneumatic or electric actuators or manual hand quadrants
- SP100 Switch Package to remotely indicate damper blade position
- Front, rear or double flange frame with or without bolt holes
- Face and bypass configurations
- Stainless steel linkage
- T-flange Frame

CDTI-50 PERFORMANCE DATA



Ruskin CDTI-50 dampers may be used in systems with total pressures exceeding 6" w.g. (1.5 kPa) by reducing damper section width as indicated. Example: Maximum design total pressure of 8.5" w.g. (2.1 kPa) would require a maximum section width of 48" (1219mm).

Pressure limitations shown on chart to left allow maximum blade deflection of $L/180$ of span on 60" (1524mm) damper widths. Deflections in other damper widths (less than 48" [1219mm]) at higher pressures shown will result in blade deflection substantially less than $L/360$ of span.

TOTAL CFM (cmm) LEAKAGE AT 4" W.G. (1 kPa) STATIC PRESSURE DIFFERENTIAL

DAMPER WIDTH INCHES (mm)	DAMPER HEIGHT INCHES (mm)										
	12" (305)	18" (457)	24" (610)	30" (762)	36" (914)	42" (1067)	48" (1219)	54" (1372)	60" (1524)	66" (1676)	72" (1829)
12" (305)	4 (0.11)	6 (0.17)	8 (0.23)	10 (0.28)	12 (0.34)	14 (0.40)	16 (0.45)	18 (0.51)	20 (0.57)	22 (0.62)	24 (0.68)
24" (610)	8 (0.23)	12 (0.34)	16 (0.45)	20 (0.57)	24 (0.68)	28 (0.79)	32 (0.91)	36 (1.02)	40 (1.13)	44 (1.25)	48 (1.36)
36" (914)	12 (0.34)	18 (0.51)	24 (0.68)	30 (0.85)	36 (1.02)	42 (1.19)	48 (1.36)	54 (1.53)	60 (1.70)	66 (1.87)	72 (2.04)
48" (1219)	16 (0.45)	24 (0.68)	32 (0.91)	40 (1.13)	48 (1.36)	56 (1.59)	64 (1.81)	72 (2.04)	80 (2.27)	88 (2.49)	96 (2.72)
60" (1524)	20 (0.57)	30 (0.85)	40 (1.13)	50 (1.42)	60 (1.70)	70 (1.98)	80 (2.27)	90 (2.55)	100 (2.83)	110 (3.11)	120 (3.40)

To determine leakage at static pressure differentials greater than 4" w.g. (1 kPa), multiply leakage at 4" (1 kPa) (from 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 5" w.g. (1.2 kPa) 24 CFM (.68cmm) x 1.11 = 26.6 CFM leakage at 5" w.g. (1.2 kPa).

Leakage ratings are based on AMCA Standard 500D using Test Setup Apparatus Figure 5.5. Holding torque based on 5 in/lbs per sq. ft. (.57 N-m/m²) on opposed blade. 7 in/lbs sq. ft. (.79 N-m/m²) on parallel blade dampers with a minimum of 40 inch lbs. (4.5 N-m)

LEAKAGE CORRECTION FACTOR

DAMPER WIDTH INCHES (mm)	STATIC PRESSURE Inches Water Gage (kPa)							
	1" (.25)	2" (.50)	3" (.75)	4" (1.0)	5" (1.2)	6" (1.5)	7" (1.7)	8" (2)
12" - 48" (305 - 1219)	.50	.72	.82	1.0	1.11	1.22	1.32	1.41
60" (1524)	.50	.72	.86	1.0	1.11	1.22		

VELOCITY VS. PRESSURE DROP

SOURCE OF DATA: AMCA TEST

Damper size tested

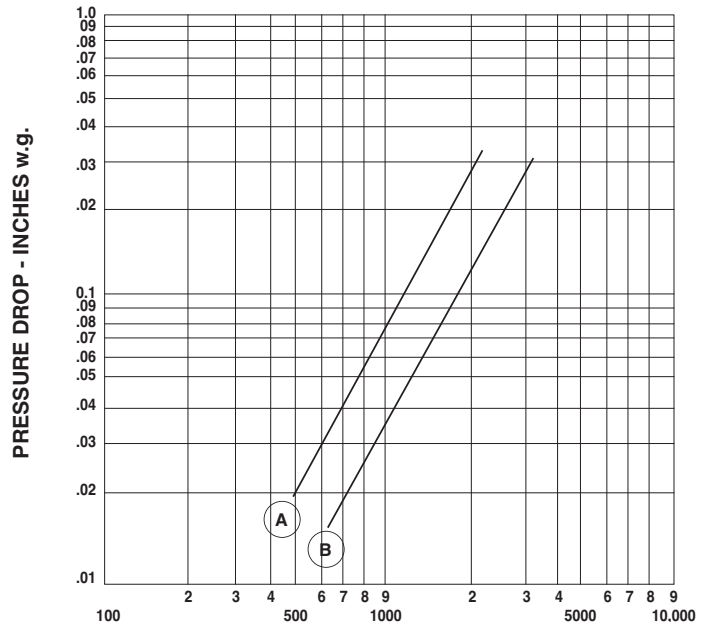
36" x 36" (914mm x 914mm)

setup per AMCA 500D-97 fig. 5.3

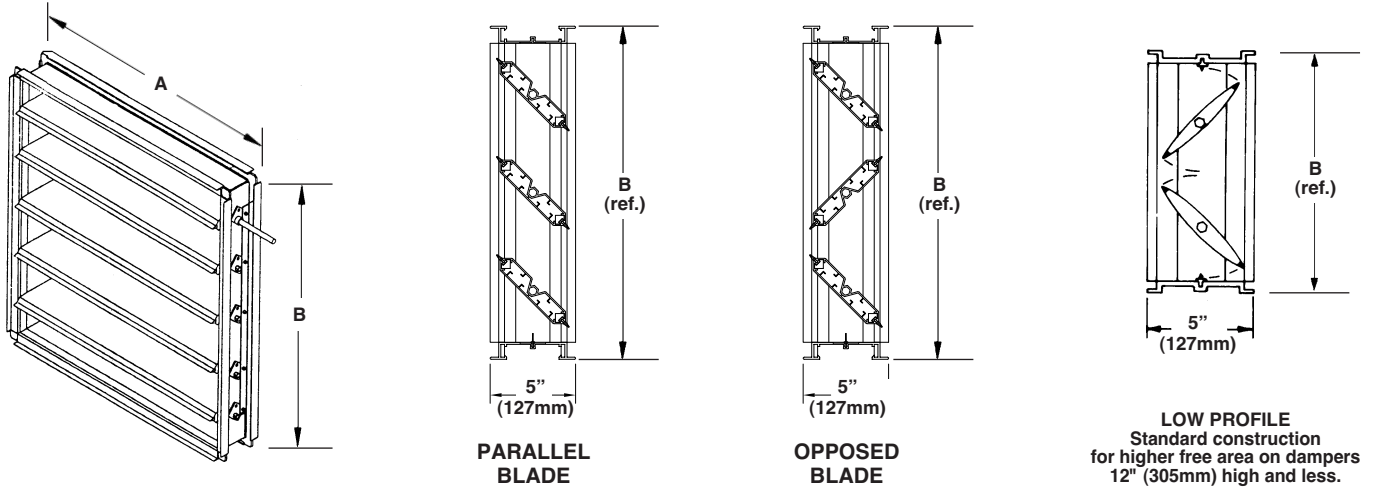
(ductwork upstream and downstream)

A = CDTI-50 mounted "in-duct"

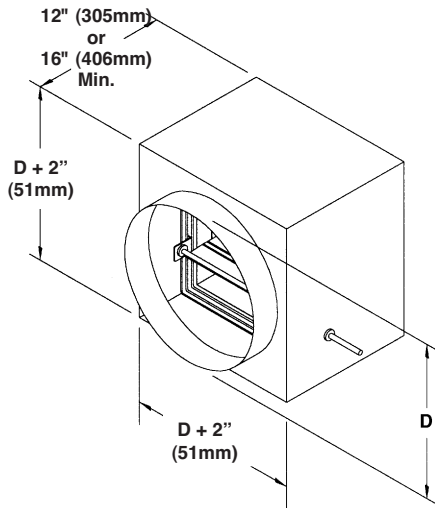
B = CDTI-50 flange mounted



CDTI-50 DIMENSIONAL DATA



***NOTE**
Dampers in full open position will be 6" (152mm) in depth.

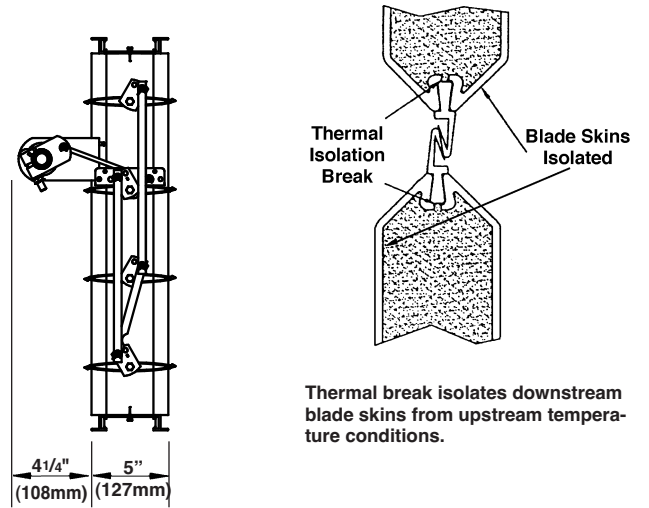
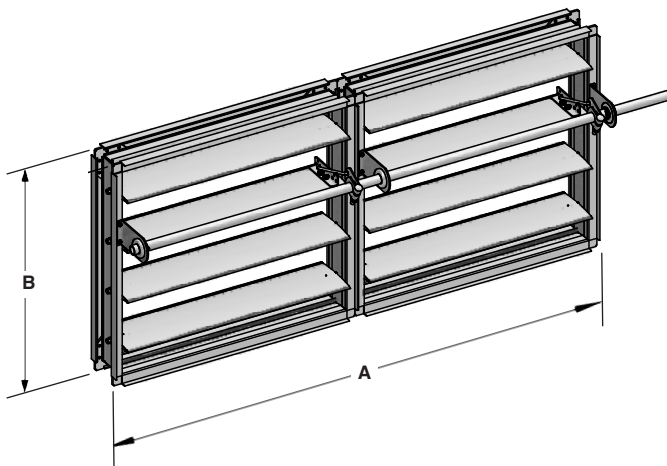


ROUND, OVAL OR RECTANGULAR DUCT TRANSITION CONNECTION

CDTI-50 dampers can be supplied with round connections (R for low pressure, CR sealed for medium pressure or WR welded for high pressure), rectangular connections (C sealed for medium pressure or WC for high pressure), or oval connections (LO for low pressure, CO sealed for medium pressure or WO welded for high pressure).

The overall size of the damper supplied with these connections will be 2" (51mm) larger than the transition.

Minimum sleeve lengths are 12" (305mm) for dampers without jackshafts and 16" (406mm) for dampers with jackshafts.



Thermal break isolates downstream blade skins from upstream temperature conditions.

***Factory jackshafts are standard on Ruskin multiple section dampers.**

SUGGESTED SPECIFICATION

Furnish and install Ruskin CDTI-50, at locations shown on the plans, or in accordance with schedules, low leakage thermally insulated control dampers meeting the following minimum construction standards. Thermally insulated control dampers shall be produced in an ISO9001 certified factory. Frame shall be 5" x 1" x .125" minimum thickness (127mm x 25mm x 3.2mm) 6063T6 extruded aluminum hat channel with hat mounting flanges on both sides of the frame. Each corner shall include two die formed internal braces that are machine staked for maximum rigidity. Blades shall be air-foil type extruded aluminum (maximum 6" [152mm] depth) with thermal break located underneath tooled blade edge seal pocket. Damper blades to be provided with thermal protecting high density CFC foam. Blade edge seals shall be Santoprene type or equivalent mechanically locked into the blade edge. Adhesive or clip-on type seals are unacceptable. Jamb seals shall be polycarbonate compression type to prevent leakage between blade end and damper frame. Blade end overlapping frame is unacceptable. Multiple section dampers must have factory installed jackshafts unless clearly eliminated by engineer.

Bearings shall be corrosion resistant, stainless steel. Axles shall be hexagonal shaped, positively locked into the damper blade. Linkage shall be concealed out of airstream, within the damper frame to

reduce pressure drop and noise generation. Temperature limits shall be -40°F (-40°C) to +165°F (+73°C) maximum.

Submittal must include leakage, maximum air flow and maximum pressure ratings based on testing performed in accordance with AMCA std. 500D for Air Performance, Air Leakage and Thermal Efficiency. Maximum damper leakage shall not exceed 8 cfm/sq. ft. @ 4" w.g. (0.23cmm/m² at 1 kPa). Thermal efficiency shall be no less than 300%.

Specifier Select Options.

SP100: Dampers shall be equipped with factory installed damper position indication switch package. The switch package shall include two position indication switches linked directly to the damper blade to provide full open and full closed damper blade position. The switch package shall be capable of interfacing with the HVAC control system and provide remote damper blade position indication. Switch package shall be Ruskin Model SP-100.

Factory Mounted Damper Actuators: Control damper actuators shall be furnished and commissioned by the damper manufacturer and shall be cycle-tested at the factory prior to shipment to ensure proper operation in the field.

RUSKIN[®]

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

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