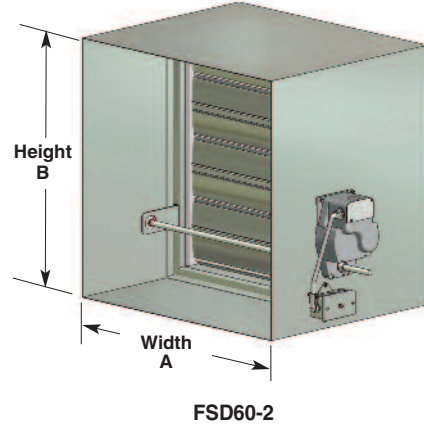


FSD60-2, FSD60LP-2 COMBINATION FIRE AND SMOKE DAMPER 1½ HOUR UL555 RATED, UL555S LEAKAGE CLASS 2

APPLICATION

Ruskin FSD60-2 Series ultra low leakage combination fire and smoke dampers provide point-of-origin fire and smoke containment. The FSD60-2 includes high strength one-piece airfoil blades to ensure the lowest resistance to airflow and is rated up to 4000 fpm (20.3 m/s) and 8 in. wg (2 kPa).

Ruskin FSD60LP-2 ultra low leakage, low profile, and low pressure drop combination fire and smoke damper is provided with an integral sleeve/frame design. All FSD60-2 Series dampers may be installed vertically in walls or horizontally in masonry floors and are rated for airflow and leakage in either direction.



STANDARD CONSTRUCTION		
Description	FSD60-2	FSD60LP-2
Frame	5" x 16 gage (127 x 1.6) galvanized, single piece, hat-shaped channel, structurally superior to 13 (2.3) gage channel frame.	Integral sleeve and frame 20 (1.0) gage galvanized single piece.
Blades	One-piece airfoil, 6" (152) wide and 16 (1.6) gage galvanized steel equivalent thickness. Blades are approximately 6" (152) on center.	One-piece low profile aerodynamic shape, 20 gage (1.0) galvanized.
Bearings	Stainless steel sleeve type, pressed into frame.	Stainless steel sleeve type, pressed into frame.
Jamb Seal	Stainless steel, flexible metal compression type.	Stainless steel, flexible metal compression type.
Blade Seal	Silicone edge type for smoke seal to 450°F (232°C) and galvanized steel for flame seal to 1900°F (1038°C) mechanically fastened to the blade edge.	Stainless steel, flexible metal compression type.
Linkage	Concealed in frame.	N/A

DAMPER SIZES

Sizes indicated below are for ratings of 2000 FPM (10.2 m/s) and 4 in. w.g. (1 kPa).

MINIMUM SIZE

FSD60LP-2 - 6"w x 6"h (152 x 152)
FSD60-2 - 8"w x 6"h (203 x 152)

MAXIMUM SIZE

FSD60LP-2
Single Section Vertical or Horizontal – 36"w x 14"h (914 x 356)
FSD60-2
Single Section Vertical – 32"w x 48"h (813 x 1219)
Single Section Horizontal – 30"w x 48"h (762 x 1219)
FSD60-2
Multiple Section Vertical
120"w x 96"h (3048 x 2438)
Multiple Section Horizontal
Electric Actuator – 120"w x 96"h (3048 x 2438)
Pneumatic Actuators – 144"w x 96"h (3658 x 2438)

CONTROLLED CLOSURE DEVICE (HEAT-ACTUATED)

EFL (Electric Fuse Link) - 165°F (74°C) standard. 212°F (100°C), 250°F (121°C), 350°F (177°C) available.
PFL (Pneumatic Fuse Link) - 165°F (74°C) standard. 212°F (100°C), 285°F (141°C) available.

NOTES

- Dampers are furnished approximately 1/4" (6) smaller than given opening dimensions.
- Dimensions shown in parentheses () indicate millimeters.

MAXIMUM OPERATIONAL RATINGS		
Description	FSD60-2	FSD60LP-2
UL555S Leakage Rating	Class 2	Class 2
UL555 Hourly Rating	1½ Hour	1½ Hour
Maximum Velocity	4000 FPM (20.3 m/s)	2000 FPM (10.2 m/s)
Maximum Pressure	8 in. wg (2 kPa)	4 in. wg (1 kPa)
Temperature	350°F (177°C)	350°F (177°C)

OPTIONS

- FM Approvals** as Specification Tested Product.
- DTS** (Damper Test Switch) test switch for cycle testing.
- TS150 FireStat** for reopenable operation in dynamic smoke management systems.
- DSDF/DSDN Duct Smoke Detector** (Flow rated or No-Flow).
- SP100 Switch Package** to allow remote indication of damper blade position.
- MCP** control panels for test purposes or smoke management systems.
- Factory Sleeves** of various lengths and gages to ensure field compliance with UL installation requirements.
- FAST Angle** factory supplied for labor saving angle one-side installation. Other angles of various sizes and gages also available for one-side or two-side installation.

UL CLASSIFIED

UL555 Listing R5531

Model FSD60-2 series meets the requirements for smoke dampers established by:

- National Fire Protection Association** NFPA Standards 80, 90A, 92A, 92B and 101
- ICC International Building Codes**
- CSFM California State Fire Marshal** Listing (#3235-0245:0126)
- New York City** (BSA Listing #176-82-SM)

FSD60-2 AMCA LICENSED AIR PERFORMANCE DATA



Ruskin Company certifies that the FSD60-2 shown hereon 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 performance for the FSD60-2.

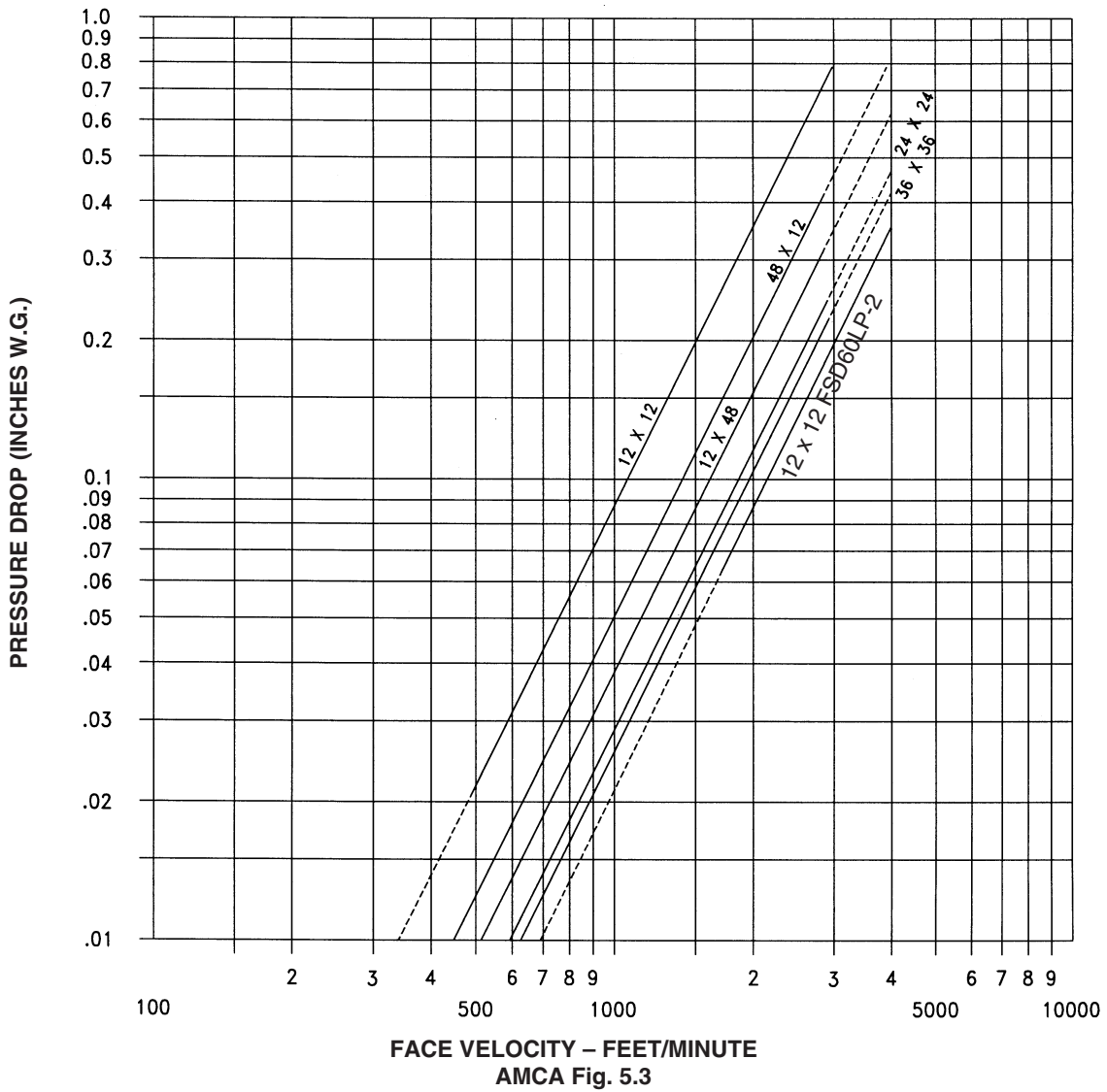
The FSD60LP-2 pressure drop depicted on the chart below is preliminary data only. AMCA Certified testing pending.

To determine the AMCA Licensed air performance:

Locate the applicable feet per minute face velocity on the bottom of the velocity vs. pressure drop chart below. Move up the chart to the most appropriate size damper line. From the intersection point, move left to determine the pressure drop on the left side of the chart.

For other damper sizes refer to **Air Performance Data For All Fire and Smoke Dampers** spec sheet.

VELOCITY vs. PRESSURE DROP



AMCA Fig. 5.3

EXTENDED OPERATIONAL RATINGS (FSD60-2 ONLY)

The UL555 and UL555S Test Standards require all fire smoke dampers to prove closure or operation against heated air flow velocities of at least 2,000 feet per minute (10.2 m/s) and 4 inches of water (1 kPa) and minimum operating temperature of 250°F. All Ruskin fire

smoke dampers in all sizes meet the minimum requirements. In addition Ruskin FSD60-2 dampers exceed those minimum requirements. Ruskin FSD60-2 dampers exceed these minimum requirements in many cases.

2,000 FPM Fail Close Operation				
MODEL	SIZE	STATIC PRESSURE	TEMPERATURE	INSTALLATION
FSD60-2	120" x 96"	4" w.g.	350°	Vertical
FSD60-2	144" x 96"	4" w.g.	350°	Horizontal
FSD60LP-2	36" x 14"	4" w.g.	350°	Vertical or Horizontal
3,000 FPM Fail Close Operation				
FSD60-2	64" x 72" 120" x 36" 32" x 96"	4" w.g.	250°	Vertical
FSD60-2	60" x 72" 120" x 36" 30" x 96"	4" w.g.	250°	Horizontal
FSD60-2	64" x 64" 120" x 32" 32" x 96"	4" w.g.	350°	Vertical
FSD60	60" x 64" 120" x 32" 30" x 96"	4" w.g.	350°	Horizontal
FSD60-2	120" x 96"	6" w.g.	250°	Vertical
FSD60-2	144" x 96"	6" w.g.	250°	Horizontal
4,000 FPM Fail Close Operation				
FSD60-2	48" x 48" 96" x 24" 24" x 96"	8" w.g.	250°	Vertical or Horizontal

ACTUATOR REQUIREMENTS

- * UL555S requires that all smoke dampers have factory mounted actuators in order to bear the UL label.
- Fire smoke dampers larger than single section may require multiple actuators. See "Smoke Damper Multiple Section Detail" spec sheet for details.
- Ruskin's smoke dampers are UL555S labeled with either electric

or pneumatic actuators mounted internal (in air stream) or external (out of air stream).

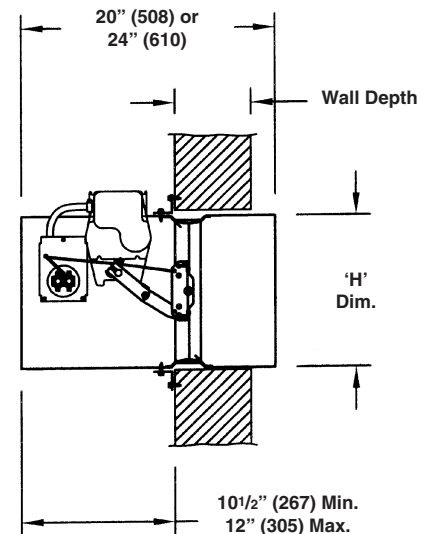
- Fire smoke dampers utilizing multiple actuators must have all actuators **field** wired to a common point for simultaneous closure. All field wiring shall be in accordance with applicable codes, ordinances and regulations.

FSD60LP-2 SLEEVE DIMENSIONAL DATA

The drawing shows the standard position of the FSD60LP-2 when installed. The mounting location provides enough space for the actuators, controls (FAST) retaining angles and duct connections. The minimum sleeve length is 20" (508). Consult Ruskin for shorter sleeve lengths.

NOTES

1. The entire frame is not required to be installed within the wall. The center line of the closed blade, should be contained within the wall.
2. See basic UL installation instructions for complete installation requirements.



FSD60-2 SLEEVE DIMENSIONAL DATA

The drawing and corresponding table show the position of the damper when mounted in a factory sleeve. The standard mounting locations provide enough space for the mounting of actuators, controls, installation of retaining angles, and duct connections. The minimum factory sleeve length is 17" (432). Consult Ruskin for shorter sleeve lengths.

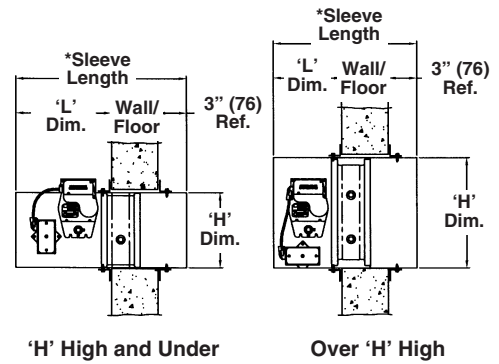
The standard location of a damper mounted in a factory sleeve ("L" dimension) is shown at right.

***Minimum Sleeve Length Formula:**

$$\text{Sleeve Length} = \text{"L" dimension} + \text{wall/floor thickness} + 3" \text{ sleeve non-motor side}$$

NOTE:

1. The entire damper frame is not required to be installed within the wall. The damper blades, when closed should be contained within the wall.
2. See basic UL installation instructions for complete installation requirements.



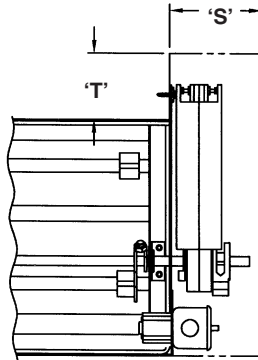
Actuator Side	All dampers with EFL or PFL		All dampers with TS150, SP100 or DTS							
	'H' Over 10" (254) High	'H' 10" (254) High and Under	Electric Actuators		Pneumatic Actuators					
			'H' Over 21" (533) High (see note)	'H' 21" (533) High and Under (see note)	331-4827(P)		331-2961(P)		331-3060(P)	
"L"	7 1/8" (181)	10 5/8" (270)	7 1/8" (181)	10 5/8" (270)	'H' Over 28" (711) High	'H' 28" (711) High & Under	'H' Over 32" (813) High	'H' 32" (813) High & Under	'H' Over 40" (1016) High	'H' 40" (1016) High & Under
					7 1/8" (181)	10 5/8" (270)	7 1/8" (181)	10 5/8" (270)	7 1/8" (181)	10 5/8" (270)

Note: The 21" (533) dimension becomes 32" (813) when the MS4120, MS8120, GGD221 or FSNF and FSAF Series are utilized.

FSD60-2 SERIES SPACE ENVELOPE

Combination fire smoke dampers are required by the UL listing to have all actuators and accessories factory mounted, wired and/or piped. The Ruskin standard is for the actuator to be located on the right hand side of the damper (onto a factory installed sleeve or side plate) as viewed from the jackshaft face of the unit. Larger units may require multiple actuators which are located on the right, left and maybe internal mount locations. See the "Multiple Section Detail" specification sheet for details. Ruskin's fire smoke dampers are not air flow directional, so the dampers may be rotated 180° or turned over as long as the blades are running horizontally in a position to accommodate installation obstructions.

The adjacent chart indicates an "S" and a "T" dimension for the space envelope that each actuator requires for installation. The "S" dimension is the "side" clearance, the "T" dimension is the "top" clearance required for use with Ruskin fire smoke dampers.



Ruskin recommends 6" (152) of additional space beyond the "S" dimension for ease of maintenance.

ACTUATORS	S	T
ML, FSLF, H2000 MS4209	4" (102)	2" (51)
FSNF, FSAF, MS4120	5" (127)	5" (127)
331-4827	5" (127)	6" (152)
331-2961	8" (203)	8" (203)
331-3060	9" (229)	11" (279)

NOTES

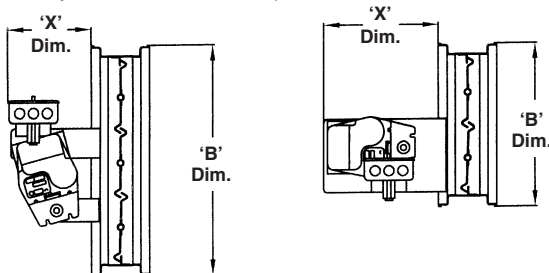
1. The dimensions shown in the chart above are for dampers 14" (356) tall.
2. Dampers shorter than 14" (356) tall, increase the "T" dimension by 1" (25) for every 1" (25) the damper is less than 14" (356).
3. Dampers taller than 14" (356) high reduce the "T" dimension by 1" (25) for every 1" (25) the damper height is greater than 14" (356).

Example:

- a) 12" (305) tall damper with a FSLF actuator, "T" = 2" (52) and "S" = 4" (102).
- b) 18" (457) tall damper with a FSNF actuator, "T" = 1" (25) and "S" = 5" (127).

FSD60-2 INTERNAL MOUNT ACTUATOR DIMENSION

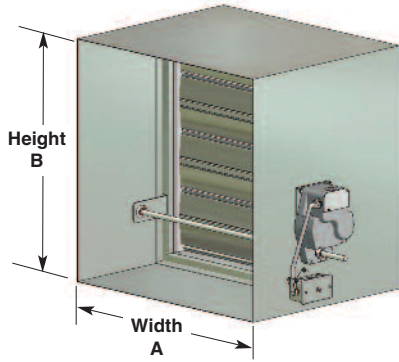
Ruskin model FSD60-2 has been tested for internal mount actuators and accessories. These applications may be preferred where space is limited on the outside of the damper. Internally mounted actuators do not require the damper to have a factory installed sleeve or side plate.



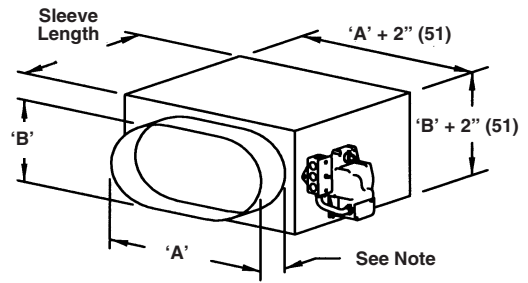
ACTUATORS	B Dim and Above		B Dim and Above	
	B	X	B	X
ML, FSLF, H2000 MS4209	10" (154)	10" (154)	18" (457)	7 1/2" (191)
FSNF, FSAF, MS4120	12" (305)	12 3/4" (324)	21" (533)	5 1/2" (533)
331-4827	16" (406)	15" (381)	21" (533)	7 1/2" (191)
331-2961	16" (406)	17" (432)	24" (610)	7 1/2" (191)
331-3060	20" (508)	19" (483)	26" (660)	9" (229)

(Model FSD60LP-2 not available with internal mount actuators)

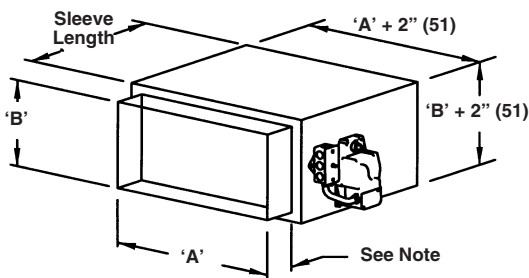
FSD60-2 DIMENSIONAL INFORMATION



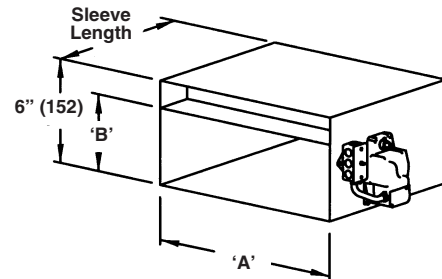
FSD60-2 Style A



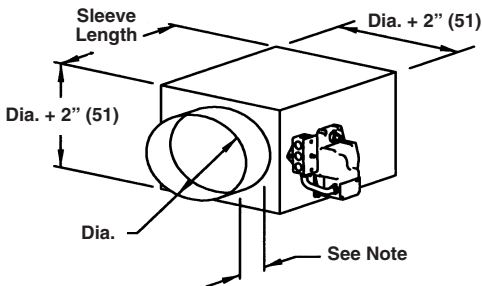
FSD60-2 Style LO,CO & WO
FSD60LP-2 Style LO & CO



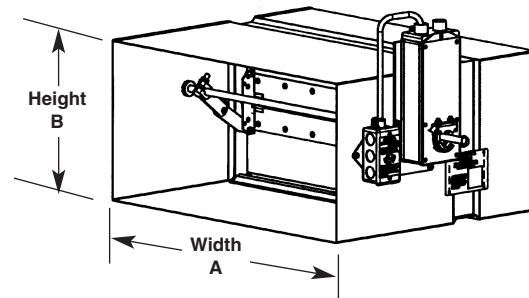
FSD60-2 Style C and WC
FSD60LP-2 Style C



FSD60-2(LP) Style B



FSD60-2 Style R, CR and WR
FSD60LP-2 Style R & CR



FSD60LP-2 Style A

DUCT TRANSITION CONNECTIONS

FSD60-2 Series dampers may be supplied with Round, Oval and Rectangular duct connections.

Style	Description
B	Units Under 6" Tall
R	Round Non-Sealed (Low Pressure)
CR	Round Sealed (Medium Pressure)
WR	Round Welded (High Pressure)
C	Rectangular Sealed (Low and Medium Pressure)
WC	Rectangular Welded (High Pressure)
LO	Oval Non-Sealed (Low Pressure)
CO	Oval Sealed (Medium Pressure)
WO	Oval Welded (High Pressure)

The square damper size will be 2" (51) larger in width and height than the round, oval or rectangular duct size ordered.

Approximate damper assembly weight: 17 lbs. per sq. ft. for Style A assembly

MINIMUM and MAXIMUM SIZES

Round Transitions

Minimum 4" (102) diameter
Maximum 94" (2388) diameter

Rectangular and Oval Transitions

Minimum 6"w x 4"h (152 x 102)
Maximum 118"w x 94"h (2997 x 2388) in diameter

'B' Style Transitions

Minimum height 4" (102) 'B' style transitions are utilized on units where the damper height is less than 6" (152).

Consult Ruskin for other available styles and sizes.

Note: For medium pressure units (Styles CR, C and CO) the collar extends 1 1/2" (38) beyond the sleeve length and for low pressure and high pressure units (Styles R, WR, WC and LO) the collar extends 2 1/2" (64) beyond the sleeve length.

SPECIFICATION

Combination fire smoke dampers meeting or exceeding the following specifications shall be furnished and installed at locations shown on plans or as described in schedules. Combination fire smoke dampers shall be produced in an ISO 9001 certified factory and shall be warranted to be free from defects in material and workmanship for a period of 5 years after date of shipment. Dampers shall meet the requirements of NFPA80, 90A, 92A and 92B and shall have a fire rating of 1 1/2 hours in accordance with the latest edition of UL555 and shall be classified as Leakage Class 2 Smoke Dampers in accordance with the latest version of UL555S. Dampers shall be AMCA Licensed and shall bear the AMCA certified rating seal for air performance. AMCA certified testing shall verify pressure drop does not exceed .03" w.g. at a face velocity of 1000 fpm on a 24" x 24" damper.

Damper frame (when size permits) shall be constructed using the UniFrame Design Concept (UDC) and shall be minimum 16 gage (1.6) galvanized steel formed into a structural hat channel superior to 13 gage (2.30) channel frame. Assemblies less than 36" (914) wide x 14" (356) high shall be Low Profile (LP) design to maximize the free area of these smaller dampers. LP frame and blade shall be 20 gage (1.0) and shall include an integral sleeve. Damper blades shall be single piece airfoil shaped with 14 (2.0) gage equivalent thickness. Blade edge seals shall be inflatable silicone mechanically locked into blade edge. Jamb seals shall be stainless

steel compression type. Bearings shall be stainless steel, permanently lubricated sleeve type turning in an extruded hole in the frame for maximum life.

Combination fire smoke dampers and their actuators shall be qualified in accordance with UL555S to an elevated temperature of 250°F (121°C) or 350°F (177°C) depending upon the actuator. Appropriate electric or pneumatic actuators (**specifier select one**) shall be installed by the damper manufacturer at time of damper fabrication. Electric actuators, factory installed on dampers, shall have been tested for prolonged periods of holding (minimum 1 year) with no evidence of reduced spring return performance. Each damper shall be rated for leakage and airflow in either direction through the damper. In addition to the leakage ratings already specified, the dampers shall be AMCA licensed for Air Performance.

Optional FM Approvals Specification

Each combination fire smoke damper shall be listed in Factory Mutual (FM) approvals Specification Tested Product and labeled accordingly.

Combination fire smoke dampers shall be Ruskin FSD60-2 Series. (Consult www.ruskin.com for electronic version of this "Quick" spec as well as for complete 3-part CSI MasterFormat Specifications)

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