

## Standard Installation

### Combination Fire/Smoke Damper Models: FS1(SS), FS2(SS)

### Fire Damper Models: MD19(SS)

#### APPLICATION

These dynamically rated fire/smoke and fire dampers are intended to restrict the passage of flame. The dynamically rated fire/smoke dampers are also intended to restrict the passage of smoke. When the damper is intended to be used as a fire rated damper, the standard installation requires that the damper is positioned so that the closed plane of the blades is within the fire rated masonry/concrete or metal or wood framed gypsum wallboard barrier. When the damper is to be used as a leakage rated damper only, the damper is to be installed within 24" of the smoke barrier and upstream of any duct outlets.

This damper may be mounted in the vertical or horizontal position with the damper blades running horizontally. Airflow can be from either direction. When mounted in the vertical position, the damper may be mounted right side up or upside down and can be mounted in a fire barrier constructed of masonry/concrete or metal or wood (32"W x 32"H maximum in wood framing) framed gypsum wallboard materials. When mounted in the horizontal position, the damper must be mounted with the actuator on the top side of the floor and can only be mounted in a fire barrier constructed of masonry/concrete materials.

#### MULTIPLE PANEL SIZE LIMITATIONS

Actuation		Electric						
Orientation		Horizontal			Vertical			
Assembly		Max Panel 250°	Max Panel 350°	Max Assy	Max Panel 250°	Max Panel 350°	Max Assy 250°	Max Assy 350°
Model	FS1(SS)	24"Wx24"H	not available	not available	36"Wx32"H	not available	108"Wx32"H	not available
	FS2(SS)	24"Wx24"H	24"Wx24"H	not available	36"Wx32"H	36"Wx32"H	108"Wx32"H	108"Wx32"H

Actuation		Pneumatic						
Orientation		Horizontal			Vertical			
Assembly		Max Panel 250°	Max Panel 350°	Max Assy	Max Panel 250°	Max Panel 350°	Max Assy 250°	Max Assy 350°
Model	FS1(SS)	24"Wx24"H	not available	not available	36"Wx32"H	not available	108"Wx32"H	not available
	FS2(SS)	24"Wx24"H	24"Wx24"H	not available	36"Wx32"H	36"Wx32"H	108"Wx32"H	108"Wx32"H

Actuation		Non-Motorized						
Orientation		Horizontal			Vertical			
Assembly		Max Panel 165°	Max Panel 212°	Max Assy	Max Panel 165°	Max Panel 212°	Max Assy 165°	Max Assy 212°
Model	MD19(SS)	24"Wx24"H	24"Wx24"H	not available	36"Wx32"H	36"Wx32"H	108"Wx32"H	108"Wx32"H

#### SUPPLEMENTAL INSTALLATION INSTRUCTIONS/SUBMITTAL DATA

Sleeve Extension  
 Integral Duct Access Door  
 Electric or Pneumatic Heat Response Device (SD-EHRD or SD-PHRD)  
 Integral Dual Position Indication (SD-IDPI)  
 Electric or Pneumatic Sensotherm (SD-ESOT or SD-PSOT)  
 Flow-Rated Smoke Detector (SM-501)  
 No-Flow Smoke Detector (2151)  
 Transitions (SD-TRFS)  
 Sleeves (SD-SLVFS)

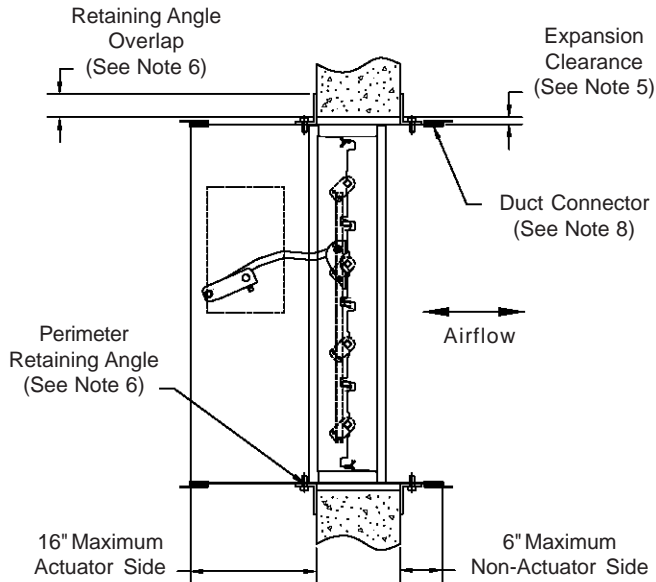
## INSTALLATION

1. **General:** The installation of the damper and all duct connections to the damper sleeve shall conform to NFPA-90A and the SMACNA Fire, Smoke and Radiation Damper Installation Guide. All duct connections shall also conform to UL555 when the damper is intended to be used as a fire damper.
2. **Actuators:** Dampers must be supplied with factory mounted actuators (except Model MD19(SS)) and are intended to close automatically when sensing heat or upon loss of electrical power or release of air pressure. When this damper is used as a leakage rated damper only, it shall be arranged to operate automatically and is to be controlled by a smoke detector. See additional instructions, which detail damper actuator sequence of operations.
3. **Multiple Panel / Multiple Section Assembly:** Refer to page 4 for details.
4. **Sleeves:** Sleeves are required for the proper installation of fire rated dampers, but need not be factory mounted. Dampers with factory mounted external actuators can be supplied without sleeves, but require sideplates. Dampers with factory mounted internal actuators can be supplied without sleeves or sideplates. Sleeves shall be the same gauge or heavier as the duct to which it is attached. Gauges shall conform to SMACNA or ASHRAE duct standards. A field supplied sleeve is attached to the damper frame with  $\frac{3}{16}$ " diameter stainless steel rivets,  $\frac{1}{4}$ " diameter stainless steel bolts, #10 stainless steel sheet metal screws, or  $\frac{1}{2}$ " long welds. Fasteners shall be staggered on each side of the damper frame on 6" maximum centers and 3- $\frac{1}{2}$ " maximum from each corner. For Class I Fire/Smoke dampers, approved caulking (reference note 7) shall be applied along the perimeter between the sleeve and the damper on both sides. For Class II Fire/Smoke dampers, approved caulked (reference note 7) shall be applied along the perimeter between the sleeve and the damper on only one side.
5. **Expansion Clearance:** The opening in the wall for the fire rated damper shall be sized to provide expansion clearance between the sleeve and the opening. The minimum expansion clearance shall be the greater of  $\frac{1}{4}$ " or  $\frac{1}{8}$ " per foot of overall damper/sleeve width and height. The maximum expansion clearance shall not exceed  $\frac{1}{8}$ " per foot of overall damper/sleeve width and height plus 1".
6. **Retaining Angle Attachment:** Perimeter retaining angles shall increase in size, proportionately, so there will be a minimum of 1" overlap on the wall, including at the corners. The angles shall be flush against the barrier. The leg attached to the damper can turn away from or into the opening. In metal frame construction, the angles can be mounted under or over the gypsum board. In wood frame construction, the angles must be mounted over the gypsum board. The perimeter mounting angles shall be fastened on all four sides and on both faces of the damper to the sleeve only, with  $\frac{3}{16}$ " diameter stainless steel nuts and bolts or by tack welding with beads  $\frac{1}{2}$ "  $\pm$   $\frac{1}{4}$ " in length or with #10 stainless steel sheet metal screws or  $\frac{3}{16}$ " stainless steel pop rivets. All connections shall be spaced on 6" maximum centers and 3" maximum from each corner (a minimum of 2 fasteners are required per side). Perimeter retaining angles shall be a minimum of 1- $\frac{1}{2}$ " x  $\frac{7}{8}$ " x 16 gauge steel. Corners of angles are not welded together for dampers with width or height dimensions exceeding 24". For dampers 24"W x 24"H or smaller, the corners of the perimeter mounting angles can be welded. Some local codes may not allow welded corners. Attachment of these angles must not restrict operation of the damper. Perimeter retaining angles and their mounting fasteners are not typically supplied with the damper.
7. **Caulking:** Caulk shall be one of the following: Dow Corning RTV732, Silco Sil-Bond RTV 4500, General Electric IS808, or Novagard RTV300. Caulking is allowed between the retaining angles and the damper sleeve, and between the retaining angles and the face of the floor or wall construction. Caulking is not allowed between the damper sleeve and the wall or floor inside the opening.
8. **Duct Connections:** All connecting ducts shall not be continuous, but shall terminate at the fire damper sleeve. Duct connections not listed as breakaways shall be considered rigid. For rigid type duct connections, the sleeve shall be a minimum of 16-GA on dampers not exceeding 36" wide or 24" high or 24" diameter and 14-GA on larger units. Maximum sleeve thickness shall not exceed 10-GA galvanized steel. Dampers supplied with thinner sleeves require a breakaway connection. The following breakaway duct-to-sleeve connections may be used: Plain "S" Slip, Double "S" Slip, Inside Slip, Hemmed "S" Slip, Standing "S" Slip, Standing "S" Slip (Bar Reinforced), Standing "S" Slip (Angle Reinforced), and Standing "S" Slip (Alternate Bar). Breakaway joints shall have no more than two No. 10 sheet metal screws on each side and on the bottom. The screws shall penetrate both sides of the slip pocket. When a breakaway joint is used along the top and bottom duct connection, a flat drive slip no longer than 20 inches is permitted on the two sides. The damper is normally supplied with a factory attached sleeve (see Note 4 when field supplied sleeve). The standard factory supplied sleeve is 20-GA stainless steel (18-GA on dampers wider or higher than 84") and assumes that a breakaway type duct connection will be employed.
9. **Maintenance:** Dampers shall be maintained at intervals as stated in NFPA 90A and 92A. Local codes or building conditions may require more frequent inspections and maintenance. A duct access door is to be located on the jackshaft side of each damper for periodic inspection and maintenance.

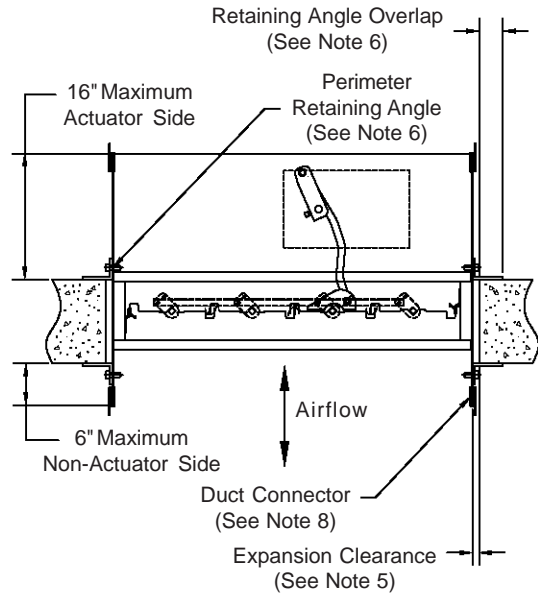


## STANDARD MOUNTING DETAILS

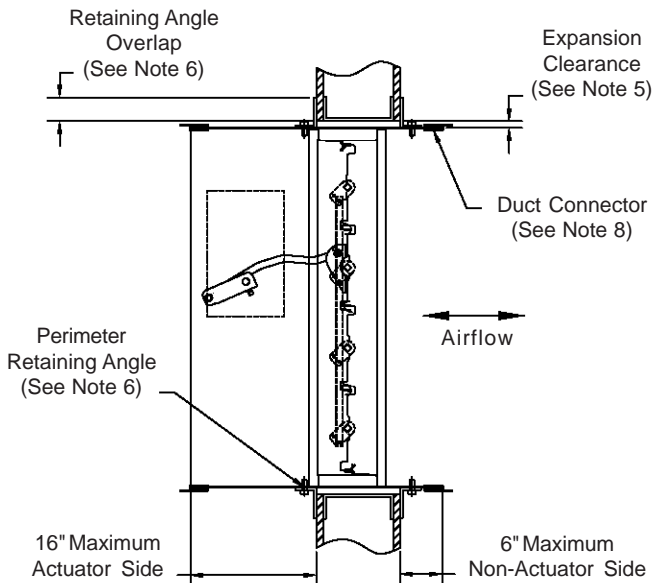
### Vertical, 2-Side Retaining, Masonry (108"W x 32"H Maximum)



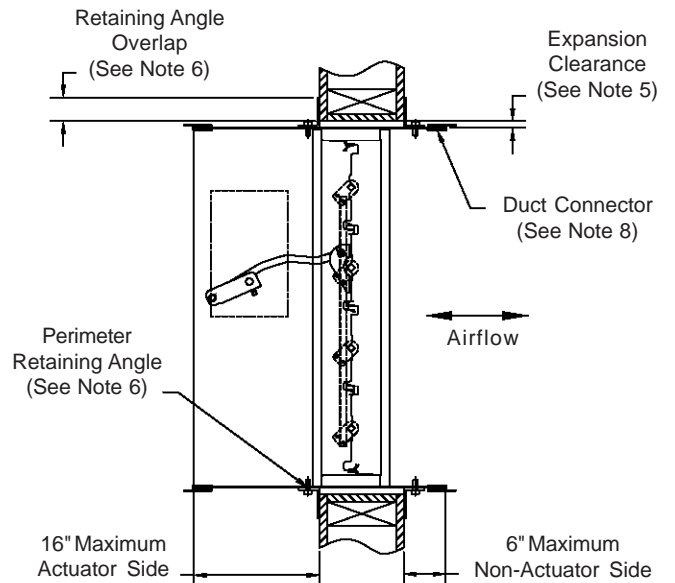
### Horizontal, 2-Side Retaining, Masonry (24"W x 24"H Maximum)



### Vertical, 2-Side Retaining, Metal Stud (108"W x 32"H Maximum)



### Vertical, 2-Side Retaining, Wood Stud (32"W x 32"H Maximum)



\*See multiple panel size limitations on page 1 for further restrictions.

**MULTIPLE PANEL / MULTIPLE SECTION INSTALLATION DETAILS**

Fire/Smoke Dampers (Models FS1(SS), FS2(SS))

1. Damper assemblies ordered without factory mounted sleeves are limited in size, so that the entire assembly ships as a single section.
2. Multiple panel wide damper assemblies are mechanically and electrically linked.
3. Damper assembly sections that are mechanically and electrically linked share a single heat response device and a single supply connection point. Multiple actuators within a linked section are factory wired together.

Fire Dampers (MD19(SS))

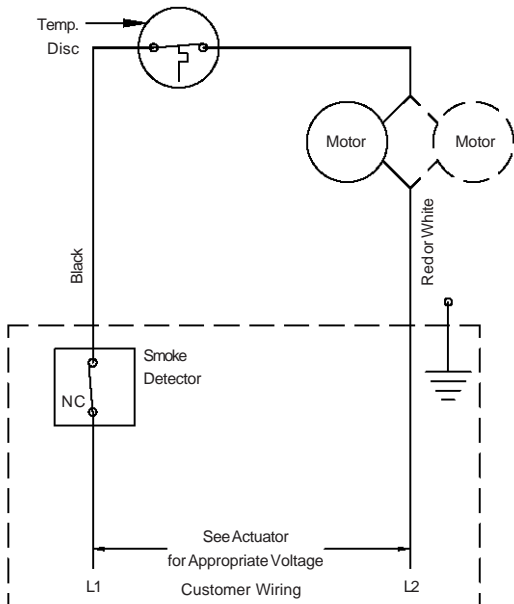
1. Damper assemblies ordered without factory mounted sleeves are limited in size, so that the entire assembly ships as a single section.
2. Multiple panel wide damper assemblies are not mechanically linked between panels.
3. Damper assembly sections that are not mechanically linked each have their own heat response device, such that they operate independently.
4. Damper assemblies that ship in multiple sections shall be fastened together using 1/4" diameter stainless steel bolts, lockwashers, and nuts. Fasteners shall be on 6" maximum centers on both faces of the frame.

**ELECTRIC WIRING SCHEMATICS**

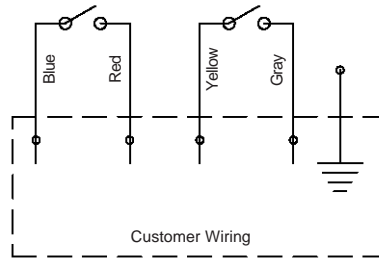
Notes

1. All wiring to be in accordance with N.E.C. (NFPA 70).
2. Refer to actuator label for appropriate voltage.
3. Connect incoming ground to the actuator assembly.
4. If the actuator remains electrically energized, yet the damper remains in the closed position, check to ensure that the reset button on the heat response device is depressed.

**Electric Heat Response Device (EHRD)**



**Integral Dual Position Indication (IDPI)**



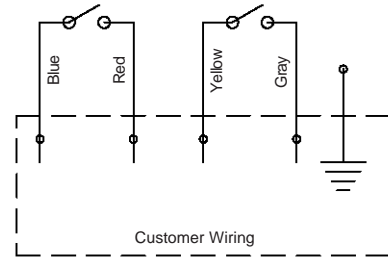
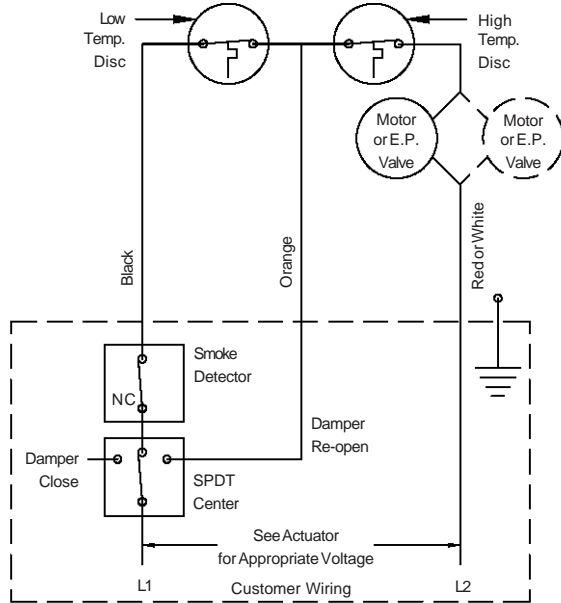
Integral Dual Position Indication (IDPI) Wiring Chart			
actuator mounting location	damper full open	damper full close	damper mid-stroke
	closed circuit		
external left	red / blue	yellow / gray	none
external right	yellow / gray	red / blue	none
internal left	yellow / gray	red / blue	none
internal right	red / blue	yellow / gray	none

\* This wiring is opposite if the actuator is rotated 90°.



**ELECTRIC WIRING SCHEMATICS (CONT.)**

**Electric/Pneumatic Sensotherm (ESOT/PSOT) with included Integral Dual Position Indication (IDPI)**



Integral Dual Position Indication (IDPI) Wiring Chart			
actuator mounting location	damper full open	damper full close	damper mid-stroke
	closed circuit		
external left	red / blue	yellow / gray	none
external right	yellow / gray	red / blue	none
internal left	yellow / gray	red / blue	none
internal right	red / blue	yellow / gray	none

\* This wiring is opposite if the actuator is rotated 90°.

**ESOT/PSOT Wiring, Test, and Operating Instructions**

Damper is supplied with one low temperature thermal disc and one high temperature thermal disc. All dampers require a master control switch (supplied by others) for re-openable operation.

**CUSTOMER WIRING**

1. Connect input power lead L1 from the normal closed position lead of the (MCS) switch to damper lead L1.  
**Note:** If a smoke detector or other sensing device is to be employed, its NC contact set should be wired in series between the (MCS) position switch normal wire and lead L1.
2. Connect incoming lead L2 to damper lead L2.
3. Connect the reopen switch lead from (MCS) to orange damper lead.
4. Connect the incoming ground lead to the wiring enclosure.
5. Install IDPI (if used) per the schematic.
6. Replace enclosure cover.

**CIRCUIT TEST**

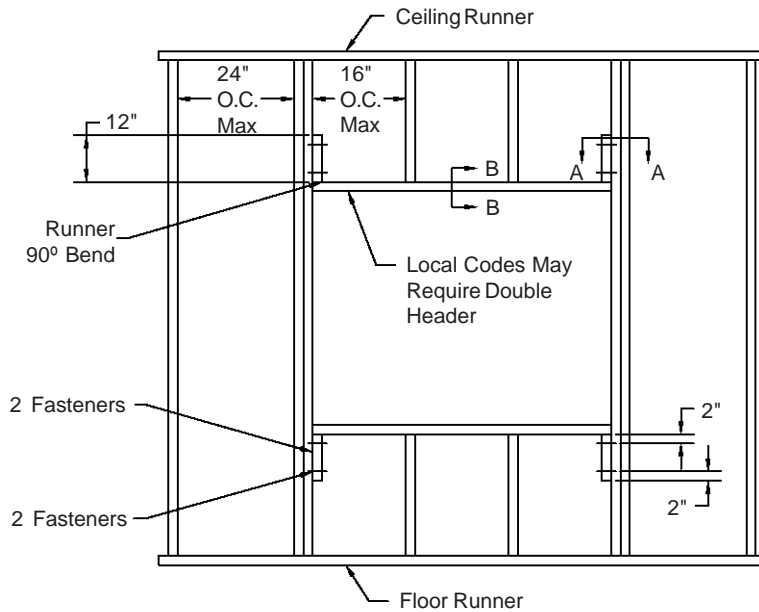
1. Place (MCS) switch in damper close position.
2. Apply power.  
**Result:** The closed indicator light (if used) should be on and the damper blades closed.
3. Transfer (MCS) switch to damper re-open position.  
**Result:** The damper blades should open; the closed indicator light (if used) should go off and the open indicator light (if used) should go on.
4. Transfer (MCS) switch to the normal position.  
**Result:** The damper blades should remain open and the open indicator light (if used) should remain on.
5. Transfer the (MCS) switch to the closed position.  
**Result:** The damper blades should close; the open indicator light (if used) should go off and the closed indicator light (if used) should go on.

**EMERGENCY OPERATION (SMOKE MANAGEMENT)**

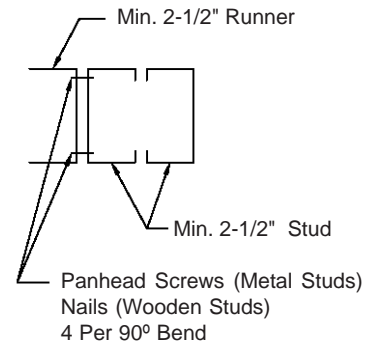
1. **MCS closed position:** Damper will close regardless of whether the thermal switch device has activated or not and regardless of the command from the smoke system.
2. **MCS re-open position:** If the damper has not been exposed to an elevated temperature higher than its rating, the damper will open. Also, the damper will open regardless of whether the low temperature thermal disc (165°F or 212°F) has activated or not and regardless of a command from additional sensing devices, such as a smoke detector.

**NOTE:** If the master control switch (MCS) is in the re-open position and the high temperature thermal disc has not been tripped, the damper will remain open regardless of whether the low temperature thermal disc and/or other sensing devices have tripped or not. If the damper has been exposed to an elevated temperature higher than its temperature degradation rating, or if the electrical or pneumatic supply has been disconnected, the damper will close and remain closed regardless of any (MCS) position.

**FRAMING DETAILS (METAL OR WOOD 1 HOUR AND 2 HOUR RATED BARRIERS)**

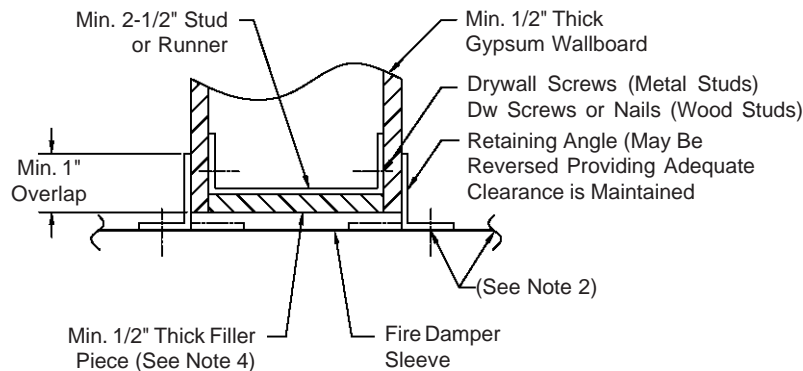


**Section A-A**



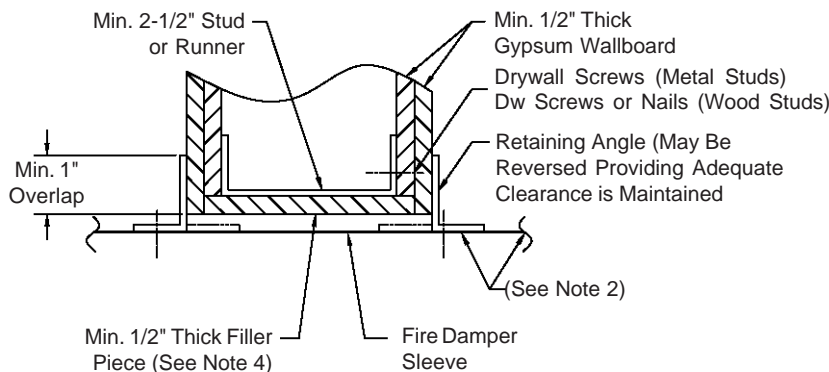
**Section B-B**

(1 Hour Rated Fire Barrier)



**Section B-B**

(2 Hour Rated Fire Barrier)



**NOTES:**

1. These illustrated partition designs have successfully been tested in conjunction with 1-1/2 hour classified fire dampers, for additional designs, reference Underwriters Laboratories, Inc. Fire Resistance Directory. Specific framing requirements of openings may vary with the Local Authority that has jurisdiction. Specific framing requirements should be provided in the architectural and structural drawings.
2. Reference the damper's installation instructions regarding the approved method of attaching the damper to the sleeve, attaching the retaining angles to the sleeve, required expansion clearances, sleeve gauge, etc. Type of framing does not affect the stated required expansion clearance.
3. Gypsum panels surrounding the opening are to be fastened to all stud and runner flanges, 12" o.c. maximum.
4. When wooden studs are used, filler pieces must be installed around the entire opening. Filler pieces are optional when metal studs are used (consult local codes to determine if filler pieces are required). Filler pieces are to be double screwed (or nailed to wooden studs) on 12" max. centers to the web of runners and studs.
5. Double jamb studding shown and required when opening width or length exceeds 36". Single jamb studding acceptable for openings 36"W x 36"H and smaller.

