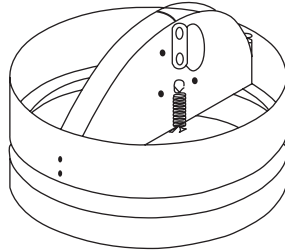


**C-S/R**



**C-RD**



UL/ULC File: R27747

The following installation instructions are UL approved to be used with the following CVS Models: C-RD(-A), C-RD-(A/T), C-S/R(-A), C/FS, C/FSB, C/FS-2F, C/FSX, C/FSR-1, and C/FSR-2.

**Application & General Notes:**

These installation instructions apply to Ceiling Dampers of the round, rectangular, single and butterfly blade types installed in a UL rated floor-ceiling or roof-ceiling assembly. These instructions address the different applications of installing the dampers in a ceiling with supports from 1) ceiling grid system, 2) ductwork above, or 3) structure above. The dampers are designed for operation in the horizontal orientation only.

**Safety Warning:**

Read all installation, operating and maintenance instructions thoroughly before installing or servicing this equipment. Improper installation, adjustment, alteration, service or maintenance can cause property damage, injury or death.

**Receiving & Handling**

Check for damage when this product is received. If damage is found, record all necessary information on the bill of lading and file a claim with the final carrier. Check to be sure that all parts of the shipment are accounted for.

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\*When UL is referred to in this document, it represents UL/ULC (Underwriter’s Laboratories of United States and Canada). This IOM manual is the property of the owners, and is required for future maintenance. Please leave it with the owner when the job is complete.

## Pre-Installation Notes and Guidelines:

These notes and guidelines are formulated in order to aid in completing the damper installation in a timely and efficient manner.

- A. Inspect damper for damage before installing
- B. Dampers must be installed free from twisting or racking
- C. DO NOT compress or stretch the damper into the opening
- D. DO NOT lift the damper by the blades (handle damper using frame or sleeve)
- E. The damper must be protected from dirt, dust and foreign materials before and after installation
- F. When painting, wall-texturing, insulating or any other foreign material is being sprayed within 5 feet of the damper, the damper must be sufficiently covered and protected.

**Table 1: Maximum & Minimum Size Ceiling Dampers:**

MODEL	HOURLY RATING	MIN. SIZE	MAX. SIZE
C/FS	3 hrs.	4x4 (101x101)	24x24 (609x609)
C/FSB	3 hrs.	4x4 (101x101)	24x22 (609x559)
C/FSX	3 hrs.	4x4 (101x101)	24x24 (609x609)
C-RD(-A)	3 hrs.	5" Dia. (127)	18" Dia. (456)
C-RD-T	3 hrs.	5" Dia. (127)	18" Dia. (456)

(All dimensions in parentheses ( ) are in millimeters.)

MODEL	HOURLY RATING	MIN. SIZE	MAX. SIZE
C-RD-A/T	3 hrs.	5" Dia. (127)	18" Dia. (456)
C-S/R(-A)	3 hrs.	4x6 (101x152)	22x22 (558x558)
C/D-P	3 hrs.	12x12 (304x304)	24x24 (609x609)
C/FSR-1	3 hrs.	4" Dia. (101) or 6x6 (152x152)	22" Dia. (558) or 24x24 (609x609)
C/FSR-2	3 hrs.	4" Dia. (101)	22" Dia. (558)
C/FS-2F	3 hrs.	4x4 (101x101)	24x24 (609x609)

## GENERAL NOTES & GUIDELINES

### Application:

Underwriters' Laboratories (UL/ULC) labeled ceiling dampers are designed to function as a heat barrier in air handling duct outlets penetrating fire resistive membrane ceilings. They provide the necessary protection for air inlet and outlet penetrations in assemblies up to 3 hours, which are designed incorporating a "hinged door" damper. CVS's UL/ULC labeled ceiling dampers may be substituted for hinged door type dampers and Fire Stop flaps (ULC) in individual ceiling designs as defined in UL's Fire Resistance Directory. For ceiling construction, refer to the UL Fire Resistance Directory.

## GENERAL NOTES & GUIDELINES, Cont.

### General Installation Notes:

The following instructions and details are of a general nature. Actual installation must also conform to the UL design as listed in the UL Fire Resistance Directory. All assembly components such as hanger wires, diffuser pans, duct drops, sleeves and ducts shall be constructed of steel. In installations where the ceiling opening is greater than 1" larger (in any direction) than the ceiling damper, a thermal blanket (CVS Model CK-2000) shall be used to cover the exposed steel pan of the grille. If flex duct is used, it must be Class 0 or I type and bear the UL listing mark. All butterfly type dampers are shipped from the factory with the blades closed (See fusible link install below). **Even though one type of damper is shown in the following details and drawings, all dampers mount in the same manner (see Detail A).**

### Ceiling Grid System Notes:

Ceiling penetrations should be located within ceiling tiles or panels without necessitating cuts in the ceiling suspension main runners or cross tees. If required, a maximum of one cross runner or cross tee may be cut to enable proper damper location and installation.

## GENERAL CONNECTION NOTES

Attachment at locations such as grille-to-damper and damper-to-duct shall be using one of more of the following:

1. #8 sheet metal screws
2. 3/16" (5mm) steel rivets
3. 1/4" (6mm) tack welds
4. 1/4" (6mm) nut and bolts

When installing fasteners, take special care so they do not interfere with the operation of the damper blades. When hanger wire is used, they must hang vertically and not be splayed, they are to be perpendicular to ceiling.

### Square/Rectangular Connections Notes:

Fasteners used for square/rectangular connections shall be a minimum of one per side spaced on a maximum of 6" (152mm) on center.

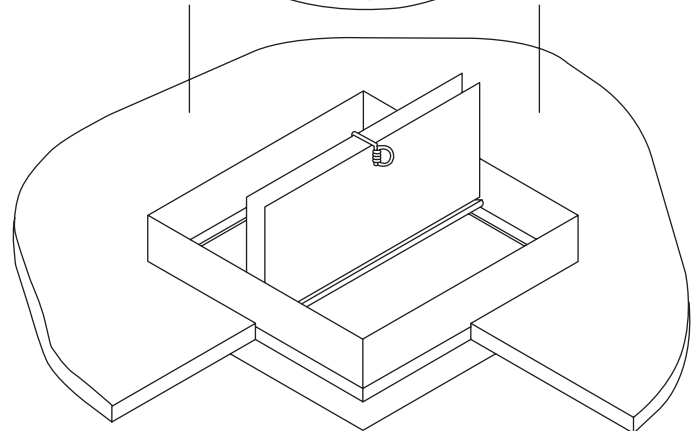
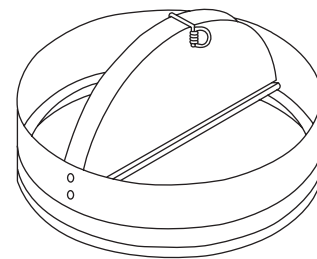
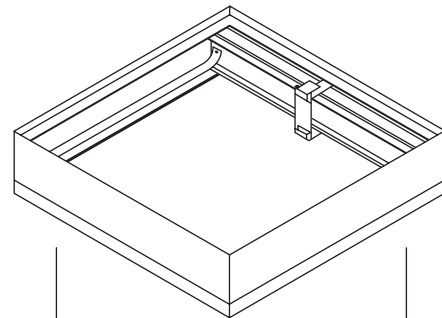
### Round Connections Notes:

Fasteners for round connections shall be a minimum of 3 evenly spaced around the diameter up to a maximum of 6" on center using any of the above approved fasteners. The connection of the damper and grille can be such that the damper slides over the neck of the grille or inside the throat of the grille.

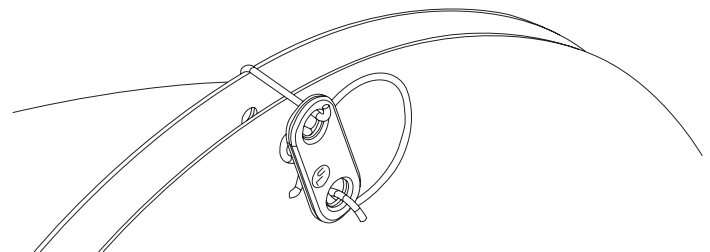
### Thermal Blanket:

In those installations where the opening in the ceiling membrane is larger than the ceiling damper (more than 1" in any dimension), a Thermal Insulating Blanket CK-2000-1 or CK-2000-1-B must be installed by laying over the exposed surface of the air inlet or outlet device. The Thermal Blanket rests upon and protects exposed portions of the air device and may fit inside adjacent Tee Bars (if any), or overhang the tee bar as with model CFSX.

**Detail A**



**Detail B**



### Fusible Link:

All butterfly type ceiling damper models are shipped from the factory with the blades closed. The fusible link must be installed at time of installation such that the blades are held open as shown in Detail B.

**DAMPERS SUPPORTED BY A CEILING GRID SYSTEM**

**Application:**

Exposed Tee bar ceiling grid systems often use "Lay In" supply and return grilles. With attention to the following requirements, the ceiling grid system provides all required support for installation of "Lay In" style ceiling dampers and the grilles.

Ceiling openings up to a 24"x24" (576 sq. in.) maximum are allowable. Maximum size limits of each individual ceiling damper model must be observed (refer to Table 1 on Page 2 for Max. and Min. sizes of all CVS's Ceiling Dampers).

The four corners of the tee bar containing the air device (or the midpoint of the adjacent cross-tees) shall be directly supported from the structural members of the floor or roof above it by 12 SWG minimum vertical hanger wires (see Figure 1). When the duct extends over the intersections of the grid members, 16 ga. x 1-1/2" steel channels with 9/16" minimum flanges shall be used to ensure that the grid is supported from structural members by 12 SWG hanger wires. All UL Classified ceiling assemblies require lay-in ceiling panels be cut to fill the remainder of hole openings larger than 24"x24" and shall provide a minimum of 3/8" bearing on the ceiling grid members.

**Lay-In Diffuser Non-Ducted or Flex Duct Applications:**

Lay-In diffuser installs directly into exposed tee bar grid system. The ceiling damper attaches to diffuser neck (see Figure 1). A Thermal Blanket may be required (see "Thermal Blanket" section on page 3).

If flexible duct is used it shall be fastened to the diffuser neck with a steel clamp or #16 SWG minimum wire and follow these guidelines:

1. The flexible air duct shall not rest on the back surface of the ceiling grid or panels (provide a minimum of 4" of clearance).
2. The flexible air duct shall not interfere with the closing of the ceiling damper.

**Lay-In Diffuser with Steel Duct Drop:**

Lay-In Diffuser with steel duct drop installs directly into exposed tee bar grid system. Thermal Blanket is required (see "Thermal Blanket" section on page 3).

The connection of the ceiling damper, diffuser neck and steel duct drop (see "Connection Notes" section on page 3) may be satisfied in two ways:

1. The ceiling damper and diffuser neck may be directly connected to the steel duct drop (see Figure 3 - Detail C).
2. The ceiling damper may be connected directly to the diffuser neck and then the duct drop connected to the damper (see Detail D).

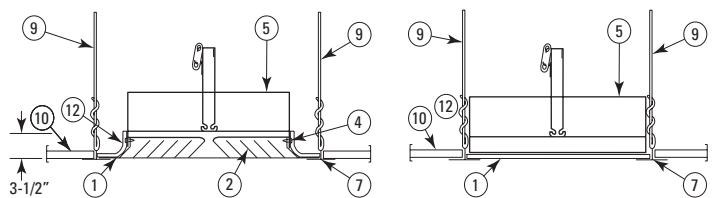
**For Models C/FSX:**

The damper is supported directly by the grid system and may lay on top of perforated metal (or similar) grille core material. Skirt material must overhang the tee bars around the perimeter of the damper (see Item 12 on Figure 2).

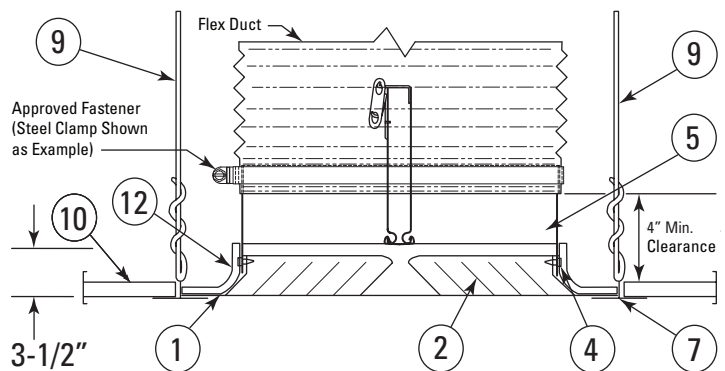
**Figure Key:**

1. Grill Frame (Steel)
2. Diffuser or Grille Core (Metallic or Non-Metallic)
3. Sheet Metal Duct
4. #8 Sheet Metal Duct
5. Ceiling Damper
6. 16 MSG x 1-1/2" Channel
7. Ceiling Grid (UL Classified)
8. Duct Drop
9. 12 SWG Steel Wire
10. Acoustical Lay-In Panels (UL Classified)
11. Rigid Gypsum/Drywall Wall Board Ceiling (UL Classified)
12. Thermal Blanket (CK-2000-1 (-B))

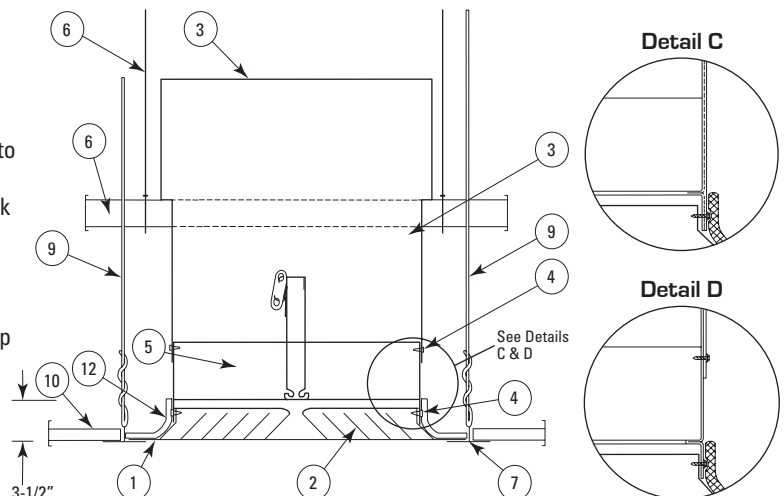
**Figure 1: Non-Ducted**



**Figure 2: Flex Duct**



**Figure 3: Steel Duct Drop**



**DAMPERS SUPPORTED BY DUCTWORK ABOVE**

**Application:**

When main ducts are supported by 16 ga. x 1-1/2" (38mm) steel channels (with 9/16" minimum flanges) located 1" to 3" from and on both sides of a steel duct drop and these channels are suspended by #12 SWG wire from structure above, the steel duct drop provides all required support for ceiling damper and grilles. Air device flange must overlap the ceiling membrane by a minimum of one inch (see Figure 4).

Follow guidelines on page 3 in this document when preparing the opening in the ceiling membrane and making connections.

**Surface Mount Grilles:**

The maximum permitted size of the opening equals the maximum size of the listed ceiling damper being installed (see Table 1 on page 2 for Max. and Min. Sizes of CVS's Ceiling Dampers).

The opening in the ceiling membrane may be up to one inch larger than the nominal size of the ceiling damper being installed (i.e. a 12"x12" (305x305) nominal ceiling damper could have a maximum ceiling membrane opening of 13"x13" (330x330)).

The connection of the ceiling damper, diffuser neck and steel duct drop (see "Connection Notes" section on page 3) may be satisfied in two ways:

1. The ceiling damper and grille may be directly connected to the duct drop (see Figure 4 - Detail C).
2. The ceiling damper may be connected directly to the grille and then the duct drop connected to the damper (see Figure 4 - Detail D).

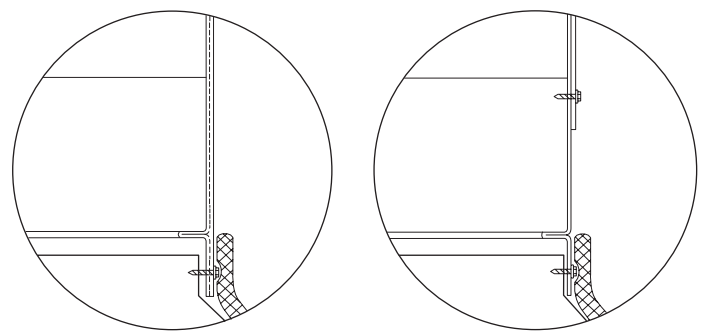
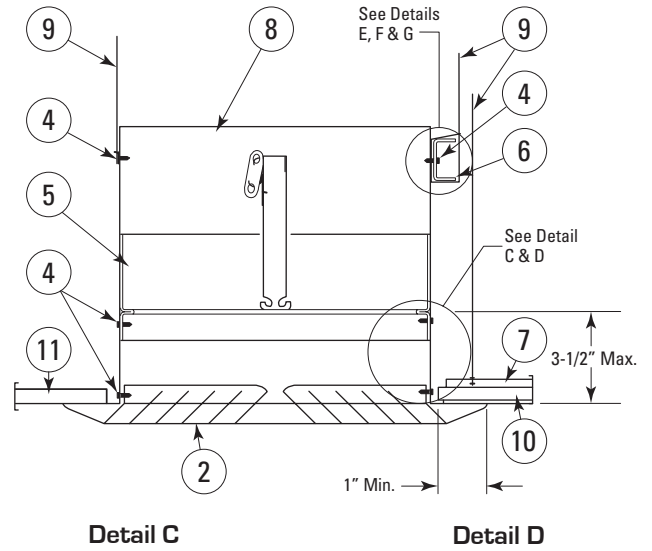
**Recess Mounted Grilles:**

If the opening in the ceiling membrane is more than one inch larger than the nominal size in either width or height of the ceiling damper, a Thermal Blanket is required (i.e. if the ceiling damper is 12"x12" (305x305) (nominal), and the opening is larger than 13"x13" (330x330) a Thermal Blanket is required) (see Figure 5 - #12).

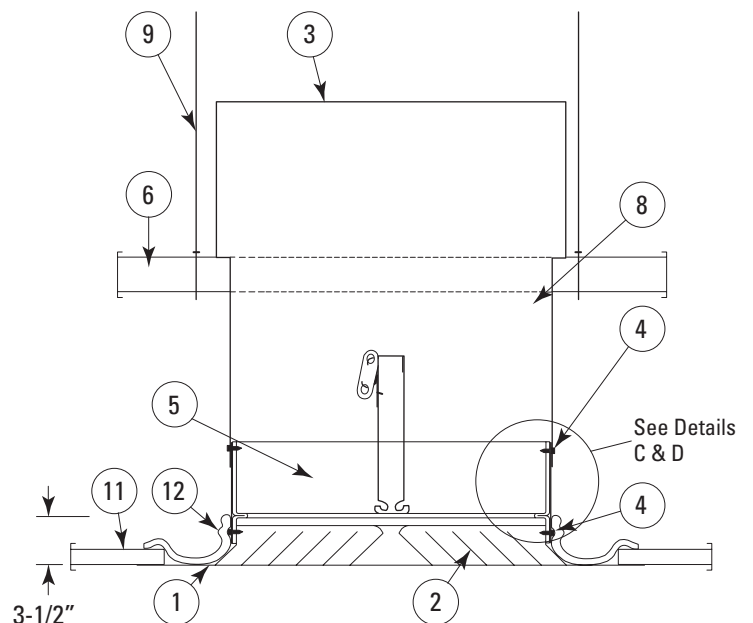
The connection of the ceiling damper and grille (see "Connection Notes" section on page 3) may be satisfied in two ways:

1. The ceiling damper and grille may be directly connected to the duct drop (see Figure 4 - Detail C).
2. The ceiling damper may be connected directly to the grille and then the duct drop connected to the damper (see Figure 4 - Detail D).

**Figure 4: Supported by Ductwork Above**



**Figure 5: Recess Mounted Grilles**



**DAMPERS SUPPORTED DIRECTLY FROM STRUCTURE ABOVE**

**Application:**

Ceiling dampers and grilles may also be supported directly from the structure above using one or more of the methods described in Figures 6 and 7. When channels are to be used as support, they must be 16 ga. x 1-1/2" (38mm) steel channels with 9/16" (14mm) minimum flanges (2 required per damper on opposite sides). Grille flange must overlap the ceiling membrane by a minimum of one inch.

Follow guidelines on page 3 in this document when preparing the opening in the ceiling membrane and making connections.

**Ducted & Ductless Surface Mounted Grilles:**

The maximum permitted size of the opening equals the maximum size of the listed ceiling damper being installed (see Table 1 for Max and Min Sizes of CVS's Ceiling Dampers).

The opening in the ceiling membrane may be up to one inch larger than the nominal size of the ceiling damper being installed (i.e. a 12"x12" (305x305) nominal ceiling damper could have a maximum ceiling membrane opening of 13"x13" (330x330)).

The connection of the ceiling damper, diffuser neck and steel duct drop (see "Connection Notes" section on page 3) may be satisfied in three ways:

1. The ceiling damper may be connected directly to the grille and supported by steel channel (see Figure 6 - Detail G).
2. The ceiling damper may be connected directly to the grille and supported by hanger straps (see Figure 6 - Detail E).
3. The ceiling damper may be connected directly to the grille and supported by direct suspension with wires looped around screws through holes in the damper frame before tying (see Figure 6-Detail F).

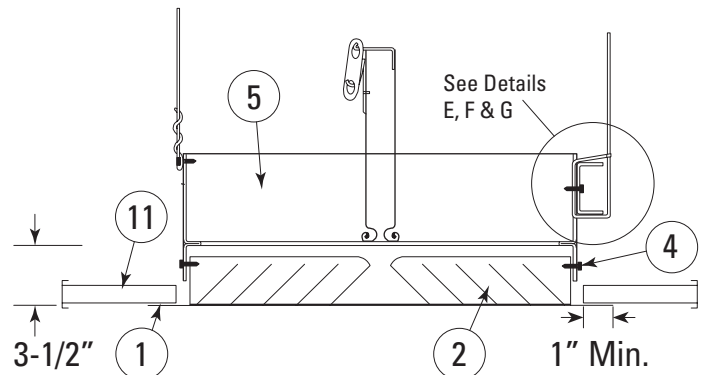
**Ducted & Ductless Recess Mounted Grilles:**

If the opening in the ceiling membrane is more than one inch larger than the nominal size of the ceiling damper, a Thermal Blanket is required - see "Thermal Blanket" section on page 3 (i.e. if the ceiling damper is 12"x12" (305x305) (nominal), and the opening is larger than 13"x13" (330x330) a Thermal Blanket is required). The maximum size of the opening is 24"x24" (610x610) (576 sq. in.) (14.6 sq. m).

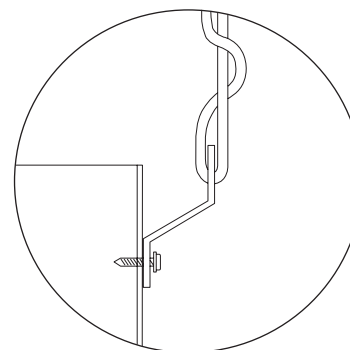
The connection of the ceiling damper and air device neck (see "Connection Notes" section on page 3) may be satisfied in three ways:

1. The ceiling damper may be connected directly to the grille and supported by steel channel (see Detail G).
2. The ceiling damper may be connected directly to the grille and supported by hanger straps (see Detail E).
3. The ceiling damper may be connected directly to the grille and supported by direct suspension with wires looped around screws through holes in the damper frame before tying (see Detail F).

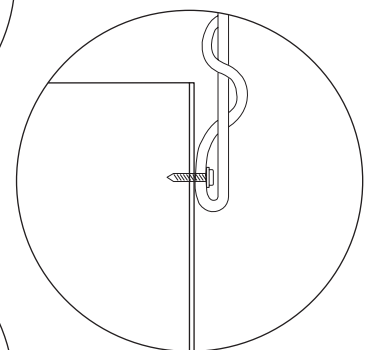
**Figure 6: Support from Structure Above**



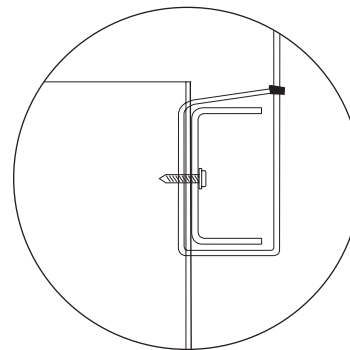
**Detail E**



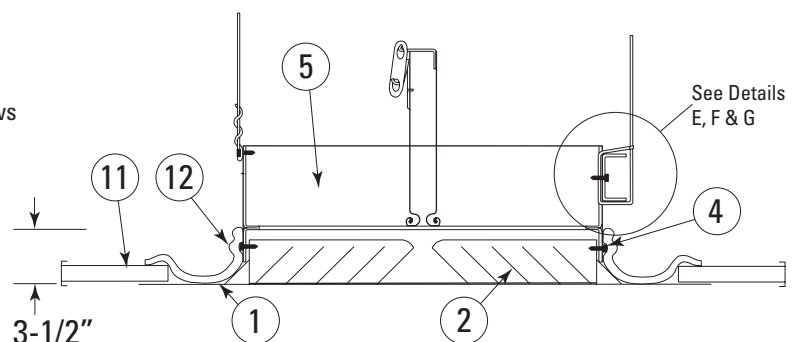
**Detail F**



**Detail G**



**Figure 7: Support from Structure Above**



## CEILING DAMPER OPTIONS & SPECIAL APPLICATIONS

### Adjustable Control Volume Damper Option (-A):

When the adjustable volume control damper option is added as an accessory to the damper (Butterfly Type only), then special consideration needs to be given to the distance between the damper lower frame and the grille it is being mounted to. There needs to be a minimum of 1/2" distance between the ceiling damper frame and the grille center core (see Figure 8).

Before installing damper in ceiling, check for clearances and freedom of movement of adjustable feature when damper is placed on grille. Also check to see that the sides are free to fall to the side and allow the damper blades to close (i.e. there is nothing impeding the movement of the blades).

### Special Applications:

When it is necessary to install the ceiling damper more than 3-3/4" from the finished ceiling, an additional application of CK-2000-1-B Thermal Blanket is recommended. A strip of CK-2000-1-B Thermal Blanket should be wrapped around the duct drop or damper frame (overlapping a minimum of one inch) to completely insulate the additional exposed metal surface, this additional CK-2000-1-B material must be held in place with a suitable steel clamp or 16 SWG steel wire.

## DAMPER OPERATION, TESTING & MAINTENANCE

The procedures discussed here are intended to insure that nothing interferes with a damper's proper operation and to identify and eliminate a number of potential situations that could occur and interfere with said operation.

### Ceiling Damper Operation:

All CVS dampers are operated at the factory, however pre-installation testing of its operation can be completed by temporarily removing the fusible link. Place the damper in the horizontal position and allow the blade(s) to close shut.

**WARNING:** During any operating, inspection or testing of spring operated dampers, CVS recommends the following:

1. Caution is advised when a fusible link is suddenly released. Gravity or spring operated dampers may slam closed causing an abrupt interruption of airflow. As this could cause damage to ductwork, consideration should be given to conducting these tests without system airflow.
2. When removing the fusible link to check damper operation, be sure to keep fingers, hands and any other body parts out of the blade travel path to prevent injury.

### Ceiling Damper Testing:

All ceiling dampers and their fusible links shall be visually inspected and cycled at specific time intervals in accordance with the local building codes or the latest editions of NFPA 90A, 92A and UL 864.

### Ceiling Damper Maintenance:

Life-Safety related dampers that are properly applied, equipped with the appropriate UL labels, appropriately installed, and demonstrated to function as intended through a building commissioning process should require no specific preventive maintenance. However, CVS recommends that obstructions, dirt build up, and any rust or corrosion be removed using mild solvents or detergents. No lubrication is required, however if it is desired, damper tracks and blade hinges may be lubricated using a dry lubricant.

*Never use a petroleum based lubricant as it will attract dust and eventually impede a damper's operation.*

### Message from CVS:

This installation, operation and maintenance instruction document has been reviewed and approved by the Underwriter's Laboratories. As a part of CVS's continuous improvement program, CVS reserves the right to make further improvements or changes without notice.

**Figure 8: Adjustable Control Volume Option**

