

# **IMPROPER FIRE DAMPER INSTALLATION**

## **Background**

Contractors are increasingly being required to provide certain aspects of fire damper and combination fire/smoke damper installations which are technically unnecessary, potentially detrimental to the installation, and which could result in voiding the UL listing of the damper. Specifically these are:

1. Sealing the retaining angles to the wall, floor, etc.
2. Placing materials such as mineral wool, ceramic fiber or firestopping caulks in the clearance space required on all fire damper installations.

This paper will discuss each of these issues and provide guidance to all parties concerned with the proper and approved methods of fire damper installation. Note that this discussion applies only to fire dampers and combination fire/smoke dampers. It is not intended to address smoke dampers which are used for smoke management/control only and are not used as fire separation protection.

## **Discussion**

A general diagram of a standard fire damper installation is shown in Figure 1. While there are other elements of an approved damper installation this figure will represent the elements in this discussion.

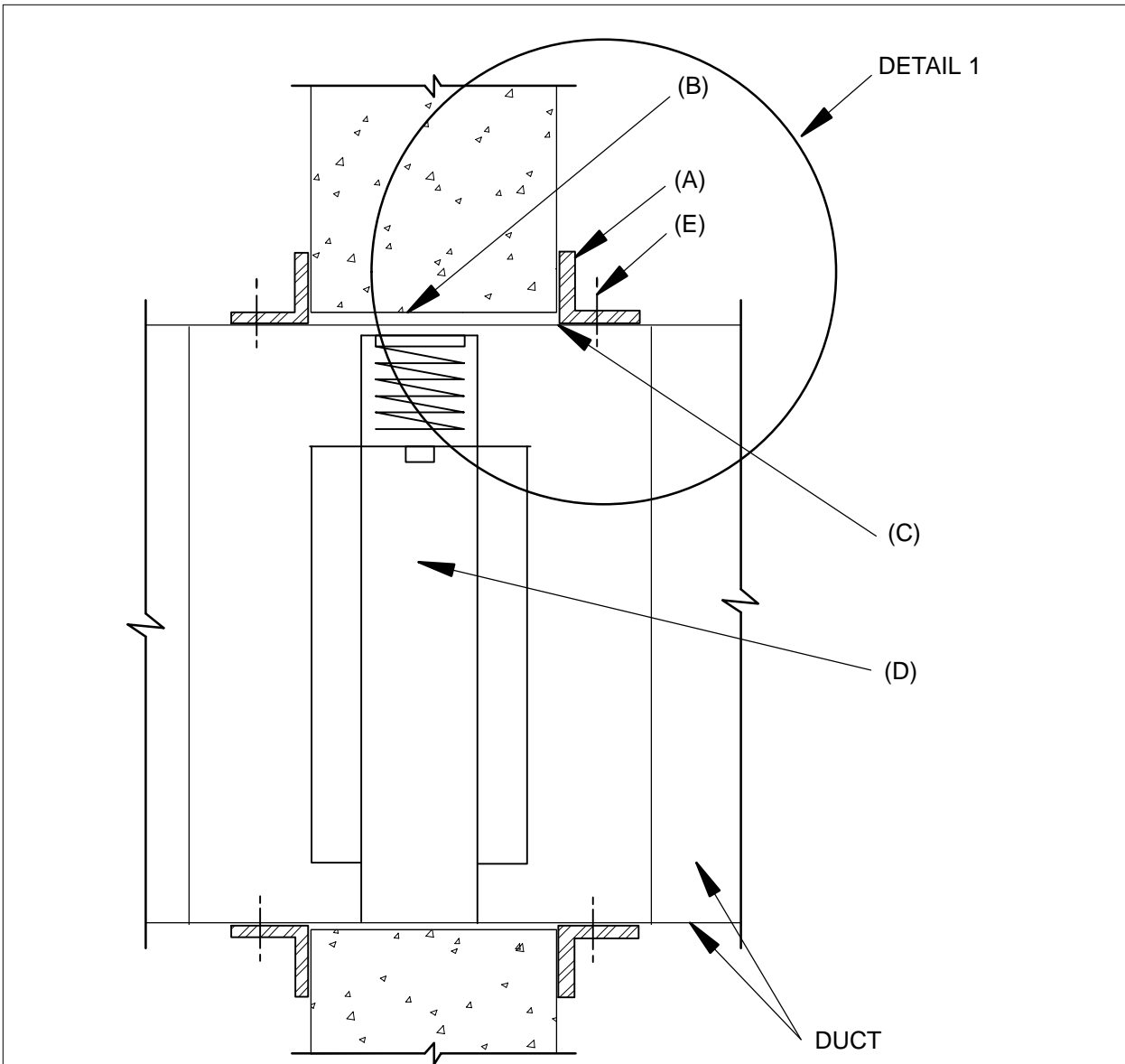
All UL listed dampers are tested according to UL Test Standards. UL 555 is the test standard for fire dampers; UL 555S is the test standard for smoke dampers. Combination fire/smoke dampers must meet the test requirements for both UL test standards. Based on these tests, dampers are then given a fire rating, leakage rating or both for combination dampers.

Manufacturers test their dampers in accordance with specific mounting and installation requirements. These requirements are then listed in the manufacturer's installation instructions. If a damper is then installed on a project in accordance with those installation instructions it can be designated as an "approved" installation. Any deviation from the specifics of the manufacturer's installation instructions could render the installation "not approved" unless the deviation is approved or accepted by the manufacturer. In some cases, local authorities having jurisdiction can and have accepted installations which deviate from the specific requirements of the manufacturer. In those instances, the local authority then accepts the liability for the possibility of damper failure due to improper installation.

The issues in this discussion are explained by reference to Figure 1 and Detail 1. In a standard installation, the damper is mounted in the sleeve, the sleeve/damper assembly is mounted in the fire barrier and the assembly is held in position by retaining angles on both sides of the fire separation. The retaining angles are fastened to the sleeve but NOT TO THE WALL, FLOOR, ETC. A space between the sleeve and wall or floor is left to allow for thermal expansion in the event of heated airflow through the damper/sleeve assembly. This space is generally required to be  $\frac{1}{8}$  inch per lineal foot of damper dimension with  $\frac{1}{4}$  inch as a minimum. A damper installed in this manner will then be free to "float" with the wall/floor cavity and thermal expansion will not impair operation of the damper.

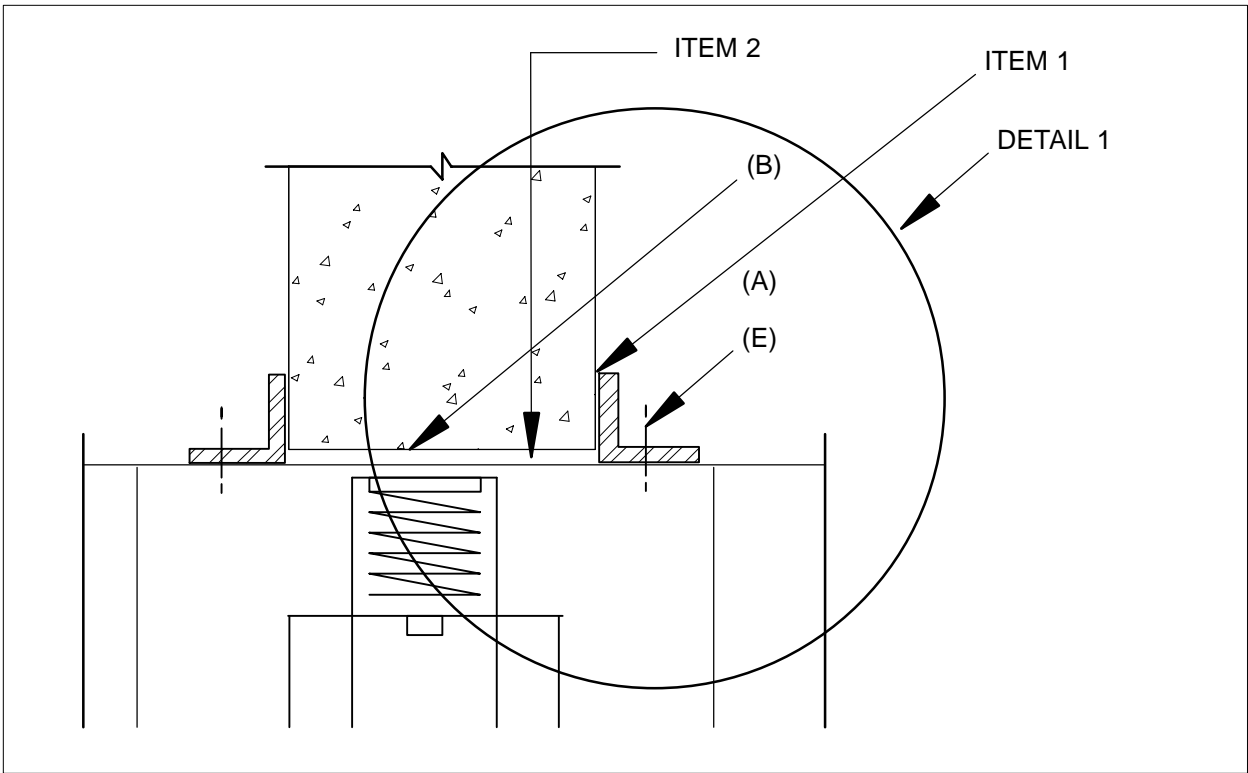
Item 1 on Detail 1 deals with the issue of providing sealant around the retaining angles at the juncture with the wall/floor. Sealing the retaining angles IS NOT a requirement for an approved damper installation. Building officials sometimes require sealing the angles as a measure to prevent smoke movement across the protected barrier. The potential for significant movement of smoke behind the angles to the opposite side of the protected opening is minimal. However in those instances where the sealing is mandated by the local authority, only SPECIFIC SEALANTS which have been tested by the manufacturer and listed in their installation instructions may be used. Any deviation from those listed sealants could render the damper inoperable and could void the UL listing of the damper. It should be noted that each manufacturer lists specific sealants and those sealants vary by manufacturer. UNDER NO CONDITIONS MAY THROUGH-PENETRATION FIRESTOP CAULKS OR PUTTYS BE USED TO SEAL DAMPER RETAINING ANGLES unless SPECIFICALLY APPROVED by the damper manufacturer. We do not know of any manufacturer who has tested or approved sealing retaining angles with Firestop products.

Item 2 on Detail 1 deals with the issue of placing products such as mineral wool, ceramic fiber or firestopping products within the expansion space. Once again the rationale for this by building officials is to limit smoke migration. SMACNA has reviewed this issue with all major damper manufacturers. To our knowledge NO DAMPER MANUFACTURER HAS TESTED OR WILL APPROVE A DAMPER INSTALLATION WHERE MATERIALS OF ANY TYPE ARE INTRODUCED INTO THE EXPANSION SPACE! To do so could render the damper inoperable if the provision for thermal expansion is compromised. See attached.



- A – RETAINING ANGLES
- B – EXPANSION SPACE
- C – DAMPER SLEEVE
- D – FIRE DAMPER
- E – RETAINING ANGLES FASTENED TO SLEEVE

**FIGURE 1**



**DETAIL 1**

## **Conclusions**

### 1. Item 1

Sealing of fire damper retaining angles is not a requirement for an approved damper installation. This detail is seldom specified by system designers and is virtually never included in the contractor's pricing for the dampers on a project. If the local authority having jurisdiction mandates that the angles be sealed contractors should issue a Request For Information (RFI) to the design professional such that the proper approved sealants be used. IN NO CASE should a contractor seal the retaining angles with any product not approved by the damper manufacturer including Through Penetration Firestop products. If a situation arises where the contractor is forced to use an unapproved product, he should advise all concerned parties that doing so is a violation of the damper manufacturer's conditions of test and listing, could void the UL listing of the damper and could render the damper inoperable.

### 2. Item 2

Introduction of any materials including mineral wool, ceramic fiber or sealants of any kind into the required expansion space between the damper sleeve and fire partition has not been tested, has not been approved and is not permitted by damper manufacturers. Again in doing so is a violation of the manufacturer's conditions of test and listing, could void the UL listing of the damper and could render the damper inoperable. If ultimately required to do so, contractors should take action as noted in Item 1 above.

Indiscriminate and unnecessary deviations from standard fire damper installations should be avoided. Unless a deviation is specifically approved by the damper manufacturer, it could compromise the function for which the damper was ultimately installed.



air balance inc.

July 6, 2000

SMACNA  
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Chantilly, VA 20151-1209

Subject: Firestop Materials in the Annular Space  
Around Fire or Fire/Smoke Dampers

The question regarding the use of firestop materials to fill the void between a fire damper and the opening construction (often referred to as the annular space) is often asked. Filling the annular space is quite common when ductwork without fire damper protection passes through walls, floors or partitions that are required to have a fire resistance rating. At least two documents address the use of firestop materials in annular spaces that surround fire dampers. Both the National Fire Protection Association Standard 90A (Paragraph 3-4.6.4 "Exception" and the Underwriters Laboratories, Inc. description of fire dampers in their Building Materials Directory are quite clear on this issue. The NFPA Standard states, "When fire dampers are installed, proper clearance for expansion shall be maintained." The UL Building Materials Directory states that, "Unless otherwise indicated in the installation instructions, the annular space between the damper sleeve and the wall opening shall not be filled with firestop materials such as fill, void, or cavity materials."

Air Balance, Inc. has not tested any of its dampers with firestop materials in the annular space; and to my knowledge, neither have any other damper manufacturers. We, as well as a few other damper manufacturers, have specialty fire dampers that do not require any expansion clearance (annular) space; however, standard fire dampers require expansion clearance and this annular space is not to be filled with firestop materials.

I trust that this information is helpful.

Sincerely,

Roger A. Lichtenwald  
Vice President - Engineering

RAL/dc



# **RUSKIN**

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July 5, 2000

SMACNA  
4201 Lafayette Ctr Dr  
Chantilly, VA 20151-1209

Subject: Fire Stopping Fire Dampers

Fire stopping the space between the fire damper sleeve and the wall openings is not allowed on our standard U.L. installation instruction.


All codes and U.L. standards require that the fire dampers must be installed in accordance with manufactures installation instructions, which are approved by U.L.

To my knowledge no fire damper manufacturer has U.L. approval to fill the space between the fire damper sleeve and the wall openings on standard fire damper angle installations, although we do have a system approved where clip angles hold the damper in the wall and fire stopping can be applied in that installation, but that does not apply to standard installations with retaining angles.

If you have any questions please don't hesitate to contact me.

Sincerely,

RUSKIN



Robert Van Becelaere  
Vice President Engineering

RVB/tst