Thermal Ceramics, Inc.
Design No. TC/BI 180-01
Fire Resistant Ventilation Air Duct
FireMaster® FastWrap® XLS Duct Insulation

	ASTM E2816	ASTM E814	
Duct	**Rating**	**F-Rating**	**T-Rating**
Condition B (Vertical)	180 minutes	180 minutes	180 minutes

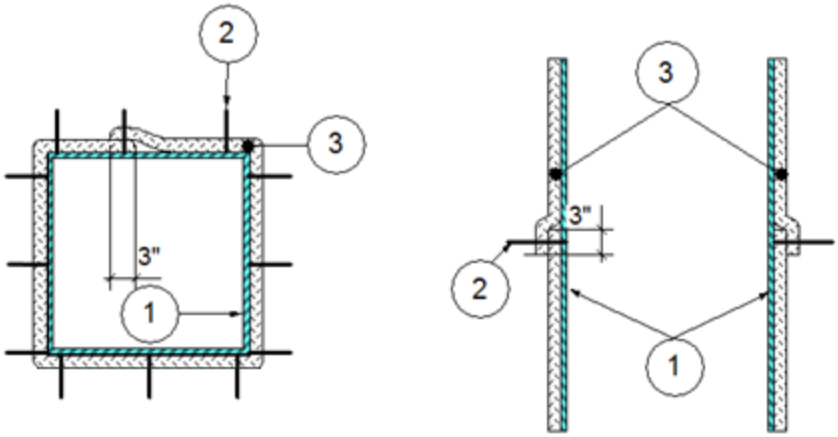

Figure 1. Cross-Sections - Vertical Duct Condition B

1. **VENTILATION AIR DUCT:** Use a vertical duct constructed to SMACNA HVAC Duct Construction Standard, min. 2 in. H_2O-pressure class, rectangular duct, with a max. cross-sectional area of 2040 in.^{2} with no single dimension exceeding 85 in. Apply silicone sealant to joints and seams.

2. **PINS:** Refer to Figure 1. Use min. 12 GA steel impaling pins to secure the duct insulation (Item 3). Select pin length as required to penetrate all layers of duct insulation (Item 3) and penetration firestop insulation collars (Item 7C) by a min. of 1 in. without compression. Weld the pins to the ventilation air duct (Item 1). Space pins longitudinally at max. 21 in. oc. and centered on duct insulation (Item 3) overlaps or collars. Locate pins transversely max. 12 in. on center (oc) on all sides of the ventilation air duct (Item 1) with a row of pins centered on the duct insulation (Item 3) overlap. Secure insulation on pins with 2-1/2 × 2-1/2 in. × 12 GA, galvanized steel clip washers.

3. **DUCT INSULATION: Intertek-Certified, Thermal Ceramics Inc., FireMaster® FastWrap® XLS Duct Insulation.**

Apply one (1) layer of nominal 1-1/2 in. thick, nominal 4.4 pcf density duct insulation over the entire surface of the ventilation air duct (Item 1). Apply with transverse and longitudinal joints overlapping a min. of 3 in. The overlapping joint running the length of the duct shall be located at one of the ventilation air duct (Item 1) corners. Duct insulation is installed with 1 in. compression at floor/ceiling penetrations. As an option, notch the duct insulation corners where multiple overlaps align in order to maintain maximum of two layers of duct insulation. Finish exposed ends of insulation and tape all overlap joints with finish/seal tape (Item 8).

4. **SUPPORTS:** Where ventilation air duct (Item 1) penetrates a fire rated floor/ceiling assembly (Item 5), install a riser support frame prior to installing duct insulation (Item 3). Use a supporting steel frame designed and constructed to meet the requirements of the International Mechanical Code.

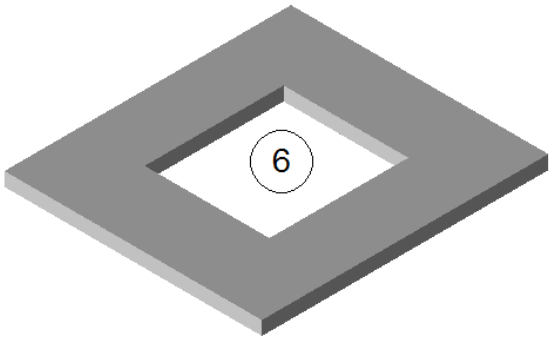

Figure 2. Supporting Construction – Concrete Floor/Ceiling

5. **SUPPORTING CONSTRUCTION:** Refer to Figure 2. Use a symmetrical, min. 2 hr rated solid concrete floor/ceiling assembly made from reinforced lightweight or normal weight concrete (100-150-pcf) with a min. thickness measured from exposed face to exposed face using one of the following:

   - Lightweight concrete at 4.6 in.
   - Sand-lightweight concrete at 4.6 in.
   - Carbonate aggregate concrete at 4.6 in.
   - Siliceous aggregate concrete at 5.0 in.

6. **OPENING:** Create an opening in the supporting construction (Item 5). The opening shall be sized to house the ventilation air duct (Item 1) without duct insulation (Item 3). Position the ventilation air duct (Item 1) concentrically in the opening such that there is a 2-1/2 in. annular space on all sides.

7. **PENETRATION FIRESTOP:** Install the firestop between the supporting construction (Item 5) and the insulated ventilation air duct (Item 1). Use a firestop system with the following minimum requirements:

   A. PACKING MATERIAL: Intertek-Certified, Thermal Ceramics Inc., FireMaster® FastWrap® XLS Duct Insulation.

Fill the entire annular space with certified duct insulation without the encapsulation (foil scrim). Cut nominal 1-1/2 in. thick core insulation into strips to a min. 4 in. width. Pack a minimum of three layers of core insulation into the annular space such that the min. 4 in. width is compressed to fit in the 2-1/2 in. annular space dimension. Install additional layers of packing material for supporting construction greater than 4-1/2 in. thick as required to fill the space.

B. STEEL FLASHING: Use min. 18 GA steel flashing bent at a 90-degree angle with a 1 in. and a 4-1/2 in. leg. Butt the 1 in. leg of the flashing to the ventilation air duct (Item 1) with min. 1/4 in. bead of 100% silicone sealant between the flashing and the ventilation air duct (Item 1). Secure the 1 in. leg of the flashing to the ventilation air duct (Item 1) with #10, 1 in., self-tapping screws. Locate screws 1 in. from either end of the flashing and space remaining fasteners max. 8 in. oc. Butt the 4-1/2 in. leg of the flashing to supporting construction with two, min. 1/4 in. beads of 100% silicone sealant between the flashing and the supporting construction. Attach the 4-1/2 in. leg to the supporting construction using 1/4 in. by 1-1/4 in. long, Tapcon concrete anchors, spaced 1 in. from the ends and min. 8 in. oc in between. Use steel flashing on the top and bottom sides of floor-ceiling assembly (Figure 4).

C. FIRESTOP COLLAR: Intertek-Certified, Thermal Ceramics Inc., FireMaster® FastWrap® XLS Duct Insulation.

Install two (2) 6 in. wide duct insulation strips to form collars at the penetration on both sides of the supporting construction (Item 5). Secure the collars with a row of pins (Item 2) centered on the collars. Space pins (Item 2) max. 12 in. around the perimeter of the ventilation air duct (Item 1). Use a compressed butt joint installation method for collar ends and finish the compressed butt joint with finish/seal tape (Item 8). Tape the outer collar to the 18 GA steel flashing (Item 7B) along the entire perimeter with aluminum or aluminum foil/scrim finish/seal tape (Item 8).

8. FINISH/SEAL TAPE: Finish and seal exposed ends of insulation with tape that complies with one of the following requirements:

- Tape certified to UL181A or UL181B
- Aluminum or aluminum foil/scrim tape certified to ASTM E84 or UL 723 with a Flame Spread Index of 25 or less, and a Smoke Developed Index of 50 or less.

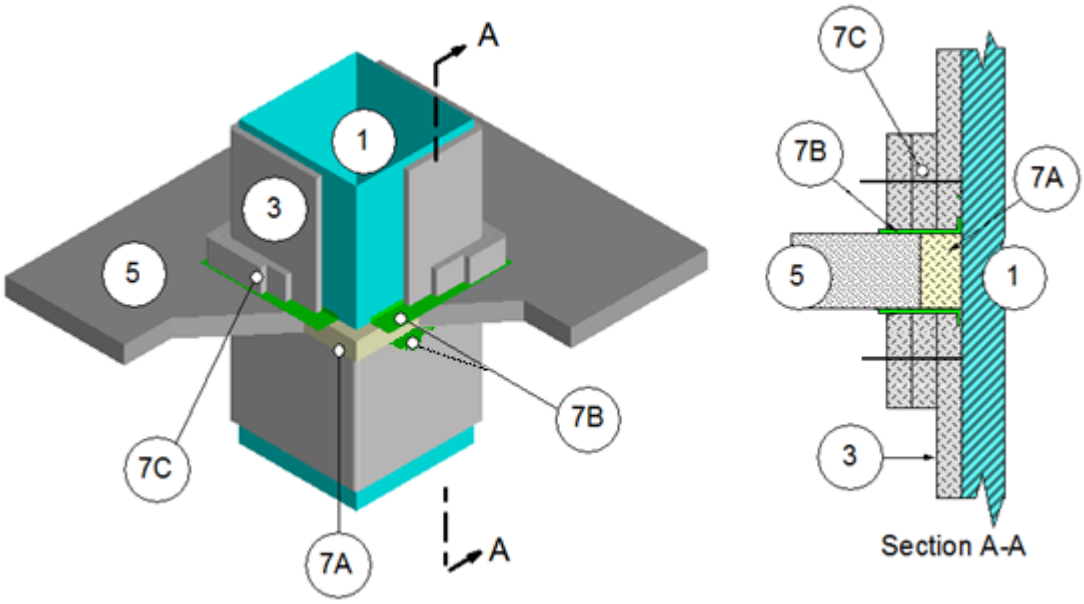

Figure 4. Penetration Assembly, Duct Through Floor/Ceiling

Consult the listing report on the Directory of Building Products (https://bpdirectory.intertek.com) for the edition of the standard(s) evaluated.