Thermal Ceramics, Inc.
Design No. TC/BI 120-08
Fire Resistant Ventilation Air Duct
FireMaster® FastWrap® XL Duct Insulation
FireMaster® FastWrap® XLS Duct Insulation
Pyroscat® Duct Wrap XL

	ISO 6944:1985	ASTM E814		CAN/ULC-S115
Duct	**Rating**	**F-Rating**	**T-Rating**	**F, FT, FH, FTH Rating**
Duct A (Horizontal)	120-minutes	120-minutes	120-minutes	120-minutes
Duct A (Vertical)	120-minutes	120-minutes	120-minutes	120-minutes

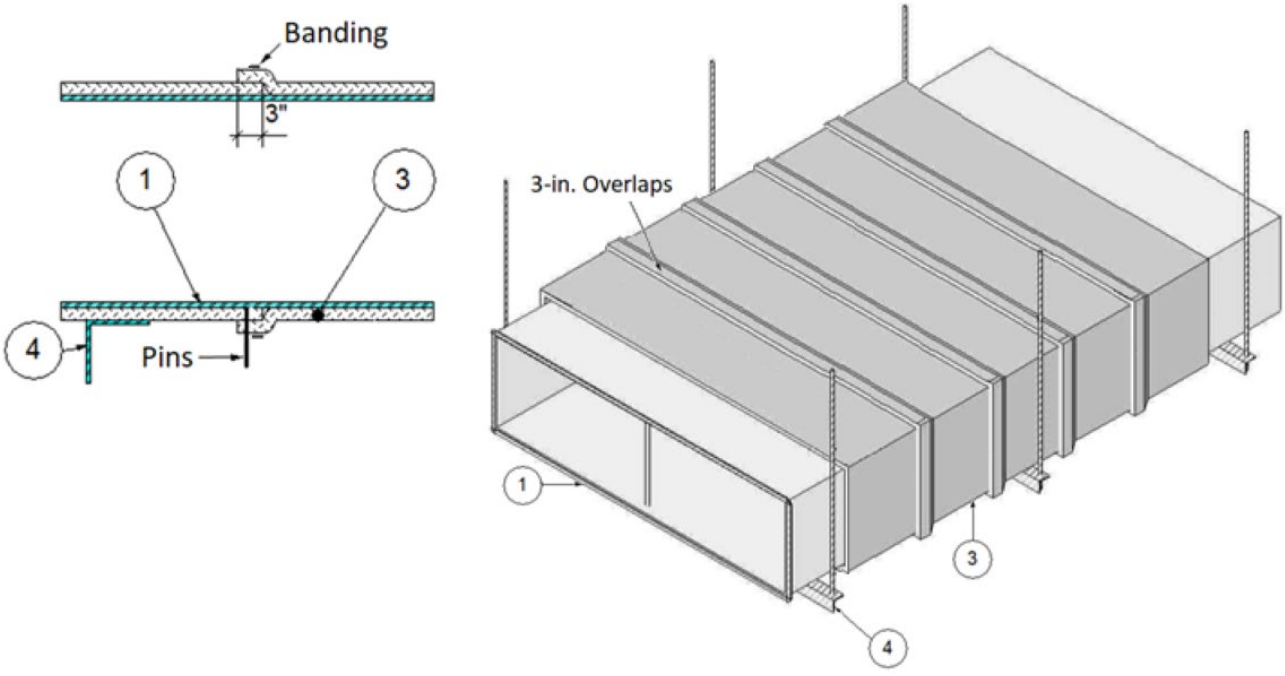

Figure 1. Horizontal Duct A

1. **VENTILATION AIR DUCT:** Use a min. 22 GA steel duct constructed to SMACNA HVAC Duct Construction Standard, minimum 1-in. H_2O-pressure class. Use rectangular duct, with a maximum cross-sectional area of 2040 in.^{2} with no single dimension exceeding 85 in. or a round duct with maximum 50-in. diameter Apply silicone sealant to joints between duct sections.

2. **PINS AND BANDING:**

   A. **PINS:** Refer to Figure 1. Install pins on bottom side only for horizontal ducts or one of the wider sides only for vertical ducts. For round ducts, this represents the bottom 120° for horizontal ducts or any 120° section for vertical ducts. Use minimum 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 7D) by a minimum of 1 in. without compression. Weld the pins to the ventilation air duct (Item 1). Space pins longitudinally at maximum 21 in. oc. and centered on duct insulation (Item 3) overlaps and 1-1/2-in. from collar edges. Locate pins transversely maximum 12 in. oc with a row of pins centered on each duct insulation (Item 3) overlap. Secure insulation on pins with 2-1/2- × 2-1/2-in. × 0.016-in, galvanized steel clip washers. Pins not required for duct sizes less than or equal to 24-in. x 24-in., or less than or equal to 24-in. diameter.

   B. **BANDING:** Refer to Figure 1. Use minimum 1/2-in. wide by 0.015-in. thick carbon steel or stainless-steel banding and minimum 1-in. long crimp clips of same material. Locate and install the bands at the center of each duct insulation (Item 3) transverse overlap. Tighten the bands securely at all locations.

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   DUCT INSULATION: Apply one (1) layer of nominal 1-1/2-in. thick, duct insulation over the entire surface of the ventilation air duct (Item 1). Apply with transverse and longitudinal joints overlapping a minimum of 3 in. When pins are required, center the transverse and longitudinal overlapping joints on rows of pins (Item 2A). Duct insulation is installed with 1-in. compression at wall and floor/ceiling penetrations. Finish exposed ends of insulation with code compliant foil tape.

4. **SUPPORTS:** Support the horizontal portion of the insulated ventilation air duct (Item 1) using an un-insulated “trapeze” system composed of minimum 2-in. × 2-in. × 3/16-in. steel angle as the cross-member, and two (2), minimum 1/2-in. all-thread, steel rods connected using nuts and washers. In the case of round ducts, use 2-in. x 2-in. x 3/16-in. steel angle half-rings. The horizontal supports shall be spaced a maximum of 30 in. from the face of the supporting wall construction (Item 5), and a maximum of 60 in. oc between supports. Reduce the spacing if needed to not exceed a maximum combined load of the ventilation air duct (Item 1) and duct insulation (Item 3) of 309 lb. per horizontal support. Connect the all-thread steel rods to the underside of the floor/ceiling assembly using an attachment method designed to carry the system weight under a fire exposure condition equivalent to the exposure corresponding to the listed 2-hr fire rating. Place one (1) all-thread steel rod at each end of the trapeze cross-member. Center ventilation air duct (Item 1) covered by duct insulation (Item 3) on trapeze cross-member. Space all-thread steel rods a minimum of 1 in.

and maximum 6 in. from surface of the insulated ventilation air duct. Extend trapeze cross-member at least 2 in. past each all-thread rod. Where ventilation air duct (Item 1) penetrates a fire rated floor/ceiling assembly, 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.

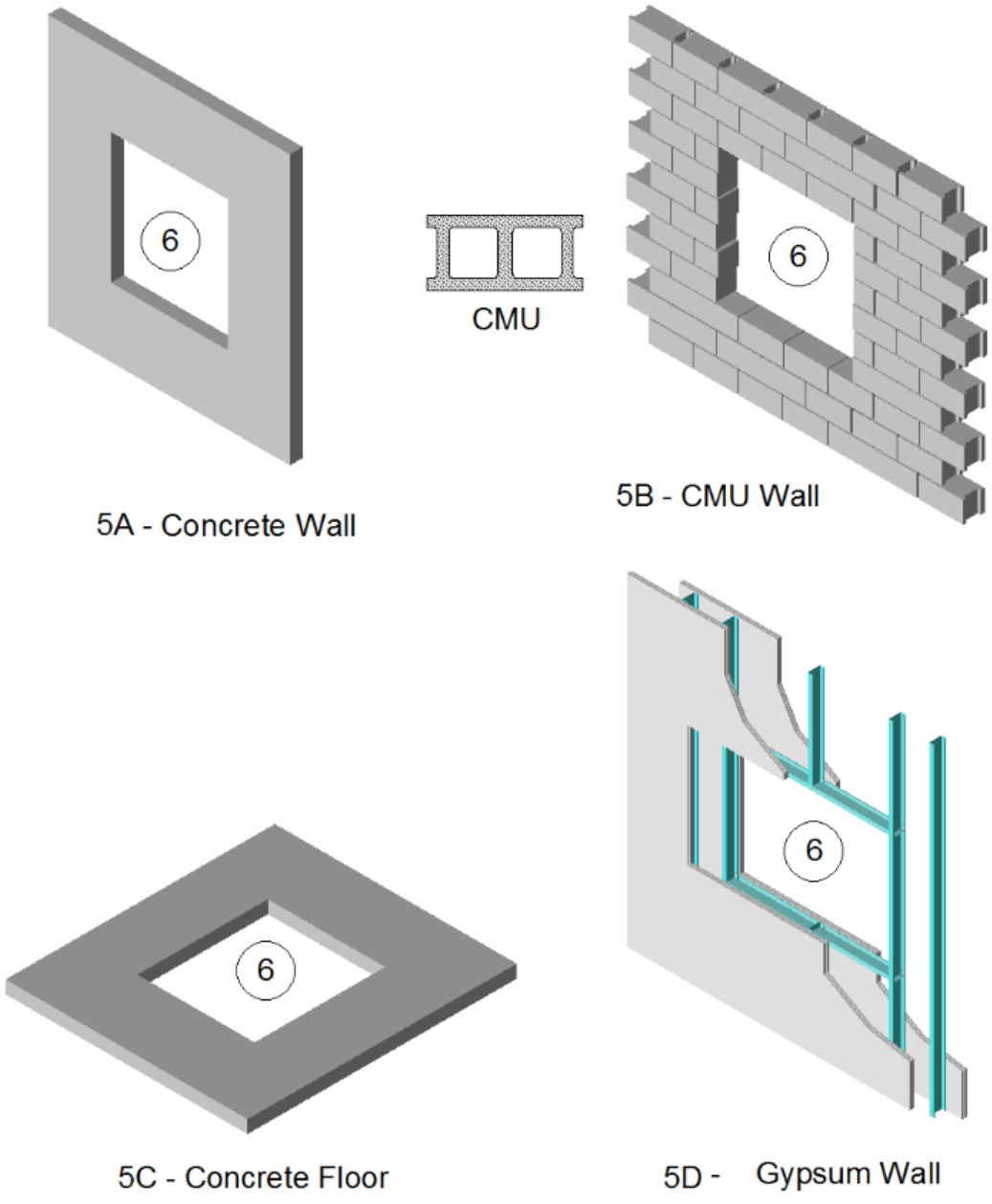

Figure 2. Supporting Construction.

5. **SUPPORTING CONSTRUCTION:** Refer to Figure 2. Use one of the following wall or floor/ceiling assemblies:

   A. **CONCRETE WALL ASSEMBLY:** Use a symmetrical, minimum 2-hr rated, solid, steel-reinforced concrete wall assembly made from reinforced lightweight or normal weight (100-150 pcf) concrete constructed of solid concrete with a minimum concrete thickness measured from exposed face to exposed face using one of the following:

      i. Lightweight concrete at 4.6 in.

      ii. Sand-lightweight concrete at 4.6 in.

      iii. Carbonate, aggregate concrete at 4.6 in.

      iv. Siliceous aggregate concrete at 5.0 in.

   B. **MASONRY WALL ASSEMBLY (FOR RECTANGULAR DUCTS ONLY):** Use a symmetrical, minimum 2-hour rated, nominal 8 × 8 × 16-in. concrete masonry unit (CMU) wall assembly.

   C. **CONCRETE FLOOR/CEILING ASSEMBLY:** Use a symmetrical, minimum 2-hour rated solid concrete floor/ceiling assembly made from reinforced lightweight or normal weight concrete (100-150-pcf) with a minimum thickness measured from exposed face to exposed face using one of the following:

      i. Lightweight concrete at 4.6 in.

      ii. Sand-lightweight concrete at 4.6 in.

      iii. Carbonate aggregate concrete at 4.6 in.

      iv. Siliceous aggregate concrete at 5.0 in.

   D. **STEEL FRAMED GYPSUM WALL ASSEMBLY (FOR RECTANGULAR DUCTS ONLY):** Use a symmetrical, minimum 2-hour rated, steel framed gypsum wall assembly meeting the following minimum requirements and constructed in accordance with the corresponding listed design.

      i. Steel Framing: Minimum 25 GA Steel studs and track, with minimum 3-5/8-in. depth

      ii. Gypsum Board: Two layers on each side of wall assembly of minimum 5/8-in. thick Type X gypsum board.

6. **OPENING:** Create an opening in the supporting construction (Item 5). For steel framed supporting construction, frame the openings with the specified steel studs. The opening shall be rectangular for rectangular ducts and round for round ducts (round ducts approved in solid, steel-reinforced concrete assemblies only). The opening shall have a solid perimeter face for masonry wall construction. The opening shall be sized to house the ventilation air duct (Item 1) without duct insulation (Item 3). For rectangular ducts, position the ventilation air duct (Item 1) in the opening concentrically or eccentrically such that there is a 1-in. to 3-in. annular space on all sides. For round ducts, position the ventilation air duct in the opening concentrically with an annular space of 1-in to 3-in.

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

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PACKING MATERIAL: Fill the entire annular space with certified duct insulation without the encapsulation (foil scrim). Pack the insulation into the annular space with minimum 50% compression and 1/4-in. recess from both sides of the supporting construction (Item 5).

Alternatively, for rectangular ducts sized maximum 40 in. wide by maximum 10 in., or round ducts sized at maximum 24-in. diameter, pack the insulation into the annular space with minimum 50% compression and 1/4-in. recess from both sides of the vertical supporting construction or 1/4-in. from the top side of horizontal supporting construction (Item 5).

A. FILL, VOID, AND CAVITY MATERIAL: Apply Intertek Certified, Specified Technologies Inc. LCI 300 Intumescent Sealant to fill the 1/4-in. recesses on both sides of the supporting construction (Item 5).

Alternatively, for rectangular ducts sized maximum 40 in. wide by maximum 10 in., or round ducts sized at maximum 24-in. diameter, apply one of the following sealants to fill the 1/4-in. recesses on both sides of the vertical supporting construction or the top side of horizontal supporting construction:

i. Intertek Certified, 3M Fire Barrier® 2000+ Silicone Sealant

ii. Intertek Certified, 3M Fire Barrier® 1000 N/S Silicone Sealant

iii. Intertek Certified, 3M Fire Barrier® 1003 S/L Silicone Sealant (for use in horizontal supporting construction only)

B. FIRESTOP ANGLE: Use minimum 2-in. x 2-in. x 1/8-in. steel angle for rectangular ducts and 2-in. x 2-in. x 1/8-in. angle rings for round ducts. Install angle or angle rings around the perimeter of the duct on both sides of the firestop with one leg of each angle tight against the firestop sealant and the other leg of each angle tight against the duct. Secure the angles to the duct with 3/8-in. diameter bolts, nuts and washers, or minimum No. 10 sheet metal screws spaced 6 in. oc around the duct.

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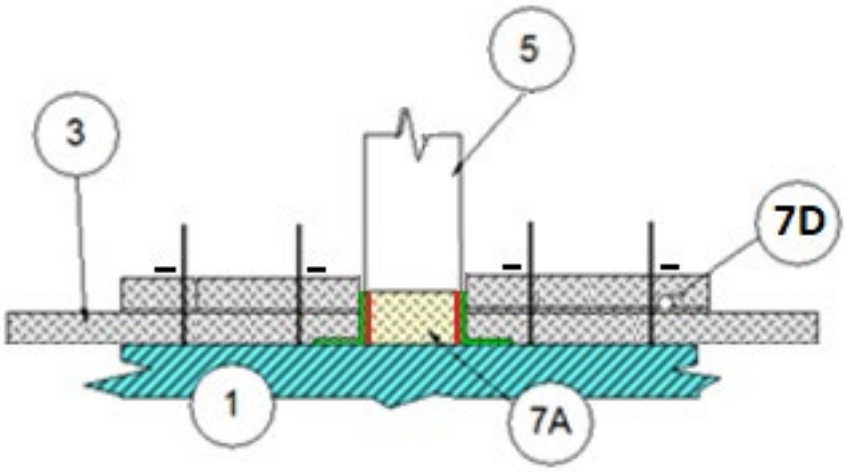
FIRESTOP COLLAR: Install a 12-in. wide duct insulation collars at the penetration on both sides of the supporting construction (Item 5). Secure the collars with two minimum 1/2-in. wide by 0.015-in. thick carbon steel or stainless-steel bands (Item 2B) fastened with minimum 1-in. long crimp clips of the same material. Locate each band 1-1/2-in. from opposite edges of the collar. For

vertical ducts, use two rows of pins (Item 2A) adjacent to the bands and spaced maximum 12 in. oc on the two wider and opposite sides of the duct. Use a 3-in. overlap for collar ends and finish cut edges with code-compliant foil tape.



Note 1: Pins required on the two wider sides as shown for vertical ducts only.
Note 2: For max. 40-in. x 10-in. ducts or max. 24-in. diameter ducts in horizontal supporting construction, apply sealant from top side only.

Figure 3. Penetration Assembly