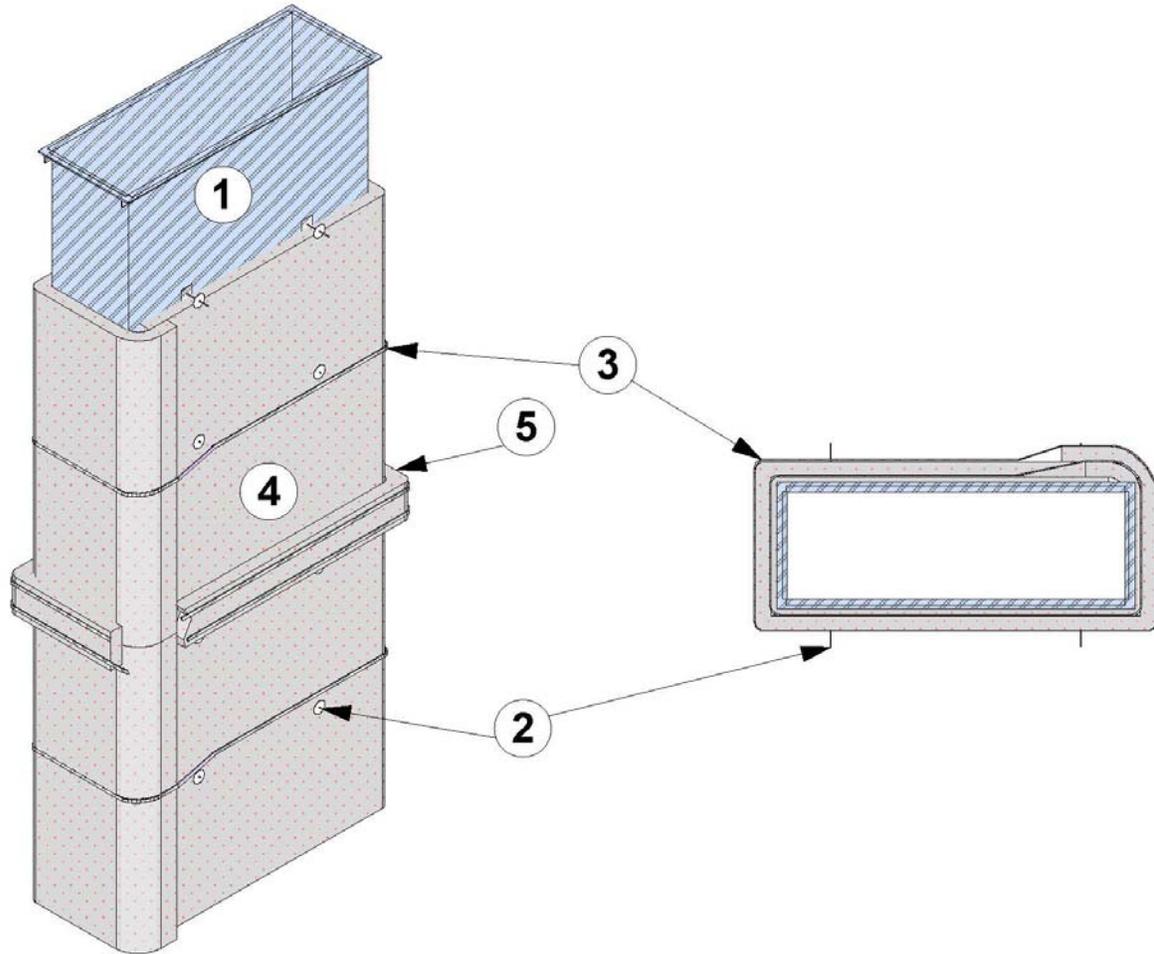


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Design Number UNI/BI 180-02  
**FIRE RESISTANT VENTILATION AIR DUCT**  
Unifrax I LLC  
FyreWrap® Elite® Blanket  
EN 1366-1 (1999)  
Fire Resistance Rating Vertical Duct A  
Integrity – 180 Minutes  
Insulation – 180 Minutes

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**Figure 1**

1. VENTILATION AIR DUCT: Use a maximum 1250mm wide by 1000mm duct 0.8mm (0.03 in.) sheet steel with a maximum 1.25 m<sup>2</sup> area. Reinforce the ventilation air duct to HVCA DW/144 requirements and the minimum required reinforcements described below, designed to carry the weight of the ventilation air duct assembly covered with two layers of duct insulation (Item 4) under a

fire load equivalent to that of the EN 1363-1 time-temperature curve. In addition the following reinforcements must be used.

- A. Longitudinal Joints – Use a Pittsburgh lock seam. No Sealant is required in longitudinal joints
- B. Cross Joints – Cross joints shall be flanged with minimum 32mm (1-1/4 in.)

- x 32mm (1-1/4 in.) x 3/16 in. (5mm) steel angles with the duct ends turned up a minimum of 13mm (1/2 in.). Angles are stitch welded to ducts with a minimum of 38mm (1-1/2 in.) long welds spaced 203mm (8 in.) on center (OC). Cross joint flanges are connected with minimum M8 bolts (or equivalent) at each corner and spaced maximum 250mm (9.8 in.) OC. When a side of the duct is shorter than the maximum OC spacing of the bolts a minimum of one bolt must be used at the center of the duct side.
- C. Cross Joint Gasket – Use a minimum 25mm (1 in.) wide by 3mm (0.12 in.) thick Unifrax FyreWrap IG Tape. Gasket centered over the cross joint (Item 1B) angles.
- D. Reinforcement at Concrete Floor Assembly– Install 30mm (1-1/8 in.) x 30mm (1-1/8 in.) x 5mm (3/16 in.) angle around duct centered in the floor assembly (Item 7). Attach angles at ventilation air duct (Item 1) corners using M8 bolts (or equivalent). Attach reinforcement angles to duct with 4mm (5/32 in.) diameter pop rivet spaced maximum 152mm (6 in.) OC.
- E. Rigidly support the ventilation air duct in accordance with the applicable .regulating building codes.
2. PINS: Use minimum 12 GA, 165mm (6-1/2 in.) long, steel insulation pins with nominal 50mm (2 in.) x 50mm (2 in.) self adhering plate. Pins shall be riveted to the two opposing, largest, sides of the ventilation air duct (Item 1) with 4mm (5/32 in.) diameter pop rivets. Two pins shall be spaced nominally 230mm (9 in.) from edge of duct. Pins shall be spaced nominal 350mm (13-3/4 in.) from all duct joints and 550mm (21-1/2 in.) longitudinally in the field of the duct.
3. BANDING: Use minimum 12.7 mm (1/2 in.) wide, 0.38mm (0.015-in.) thick stainless steel bands or minimum 12.7mm (1/2 in.) wide, 0.38mm (0.015-in.) thick carbon steel bands and secured with minimum 25mm (1-in.) long stainless or carbon steel crimp

clamps to be used with corresponding banding type. When needed to ease installation, use filament tape as a temporary hold for the duct insulation (Item 4) prior to banding. Place banding a maximum 38mm (1-1/2 in.) from all duct insulation (Item 4) edges, 76mm (3 in.) from joint collars (Item 5) and a maximum of 305mm (12 in.) OC. Tension the banding to hold the duct insulation (Item 4) in place without cutting or damaging the duct insulation (Item 4) or ventilation air duct (Item 1).

4. CERTIFIED COMPANY: Unifrax I LLC  
CERTIFIED PRODUCT: Duct Insulation  
MODEL: FyreWrap® Elite®

DUCT INSULATION: Apply one layer of the nominal 50mm (2 in.) thick, 101 kg/m<sup>3</sup> (6-pcf) density duct insulation over the entire surface of the ventilation air duct (Item 1). Apply the duct insulation with transverse joints butted with a nominal 25mm (1 in.) compression of the duct insulation at the joints. Longitudinal joints shall be overlap joints with a nominal 75mm (3 in.) joint. Use blanket, available in various widths, that is fully encapsulated with polypropylene-foil scrim. Cover all visually-exposed ends and edges of duct insulation with nominal 152mm (6 in.) wide, pressure-sensitive, aluminum foil tape. Install nominal 50mm (2 in.) diameter steel speed clips over the pins (Item 2) to attach insulation to the ventilation air duct (Item 1).

5. CERTIFIED COMPANY: Unifrax I LLC  
CERTIFIED PRODUCT: Duct Insulation  
MODEL: FyreWrap® Elite®

JOINT COLLAR: Place and center 6 in. wide collar of duct insulation over the transverse butt joint. Overlap 152mm (6 in.) wide collar onto each adjacent duct insulation 76mm (3 in.) Locate joints in the collar offset from the longitudinal joint in the duct insulation (Item 4) and install with a nominal 76mm (3 in.) overlap joint.

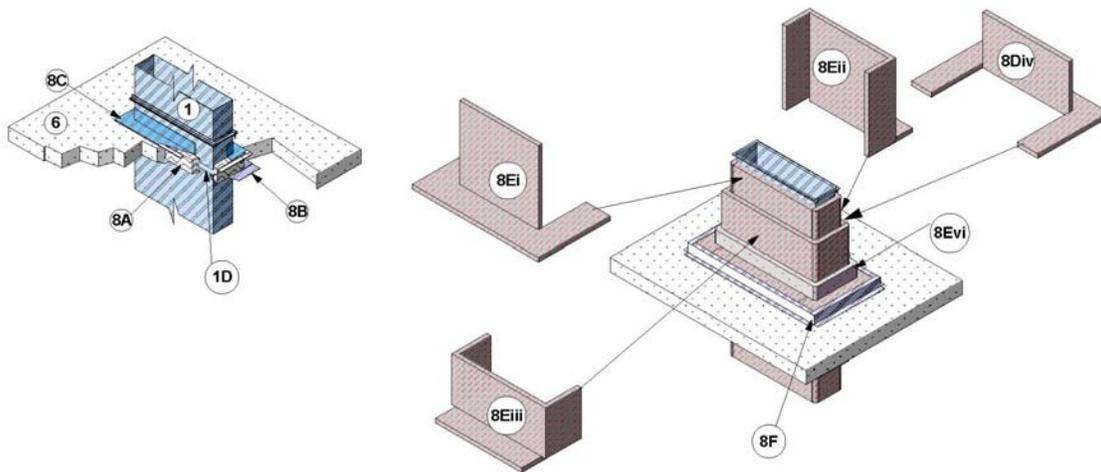
6. CONCRETE FLOOR ASSEMBLY: Symmetrical minimum two-hour rated solid concrete floor assembly made from

reinforced lightweight or normal weight (100-150-pcf density or 1600-2400 kg/m<sup>3</sup> density) 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 is 152 mm(6 in.);
- ii. sand-lightweight concrete is 152 mm (6 in.);
- iii. carbonate aggregate concrete is 152mm (6 in.); and

iv. siliceous aggregate concrete is 158mm (6.2 in.)

- 7. OPENING – Create an opening in the concrete floor assembly (Item 6). Position the ventilation air duct (Item 1) concentrically or eccentrically in the opening so that the annular space is a maximum 75mm (3 in.). Establish an opening designed to house the ventilation air duct (Item 1) without duct insulation (Item 4).



**Figure 2**

- 8. PENETRATION FIRESTOP: Install three-hour, fire-resistant, EN1366-3-compliant, firestop system. Install firestop between the concrete floor assembly (Item 6) and the un-insulated ventilation air duct (Item 1). Use a firestop system constructed of the following components.

A. CERTIFIED COMPANY: Unifrax I LLC

CERTIFIED PRODUCT: Duct Insulation

MODEL: FyreWrap® Elite®

PACKING MATERIAL: Fill the entire annular space's width with certified duct insulation without the encapsulation (foil scrim). Pack duct insulation into the annular space to achieve a minimum 33% compression of the duct insulation.

- B. BOTTOM FIRESTOP FLASHING – Install 1mm (0.04 in.) thick, 175mm (6.9 in.) by 38mm (1-1/2 in.) galvanized steel angle flashing to the bottom of the concrete floor assembly (Item 6) to cover the packing material. Install bottom flashing so that the flashing is flush against the ventilation air duct (Item 1) and flush against the concrete floor assembly (Item 6) on all four sides of the ventilation air duct (Item 1). Overlap two opposing sides of flashing over the adjacent flashing with a minimum 75mm (3 in.) overlap. Attach flashing with appropriate fastening hardware equivalent to 4.8mm (3/8 in.) diameter, 38mm (1.5 in.) long tapcon screws (or equivalent).

- C. TOP FIRESTOP FLASHING – Install 3mm (1/8 in.) thick, 150mm (6 in.) by 150mm (6 in.) stainless steel angle flashing to the top of the concrete floor assembly (Item 6) to cover the packing material. Install top flashing so that the flashing is flush against the ventilation air duct (Item 1) and flush against the concrete floor assembly (Item 6) on all four sides of the ventilation air duct (Item 1). Install 38mm (1-1/2 in.) wide by 6.35mm (1/4 in.) thick Unifrax FyreWrap IG Tape between the top firestop flashing and the concrete floor assembly. Bottom leg of the top firestop flashing shall be cut so that all of the packing material (Item 8A) is covered. Attach flashing to the ventilation air duct (Item 1) using M8 bolts (or equivalent). Bolts installed 229mm (9 in.) from each edge of the ventilation air duct and a nominal 305mm (12 in.) OC.
- D. FIRESTOP PINS (Not Shown) – Install minimum 12GA 165mm (6-1/2 in.) pins with a nominal 50mm x 50mm self adhering plate. Rivet (or equivalent attachment method) the pins to the bottom firestop flashing (Item 8C) at each corner of the bottom firestop flashing and space nominally 305mm (12 in.) OC.
- E. CERTIFIED COMPANY:  
Unifrax I LLC
- CERTIFIED PRODUCT:  
Duct Insulation
- MODEL: FyreWrap® Elite®
- FIRESTOP DUCT INSULATION – At the concrete floor assembly (Item 6) install the firestop duct insulation as follows to both sides of the opening (Item 7). Seal all joints and open ends of the firestop duct insulation with nominal 152mm (6 in.) pressure sensitive tape.
- i. Install duct insulation so that the insulation covers a nominal 975mm (38 in.) of the one of the sides of the duct (if duct is not square then apply to one of the larger sides), a minimum of 254mm (10 in.) of the concrete floor assembly (Item 6) on the side of the duct being covered and the wall along the sides of the duct extended 254mm (10 in.) beyond the opposite side of the duct.
  - ii. Install duct insulation so that the insulation covers a nominal 975mm (38 in.) of the opposite side of the duct that had Item 8Ei installed, the side of the duct extended to be 25mm (1 in.) past the insulation installed in Item 8Ei and the a minimum of 254mm (10 in.) of supporting construction above the duct.
  - iii. Install duct insulation over the first layer of the firestop duct insulation to cover a nominal 660mm (26 in.) of the first layer of the firestop duct insulation installed in Item 8Eii and the first layer of firestop duct insulation along the adjacent sides of the duct and the concrete floor assembly (Item 6) extended to be even with the first layer of the firestop duct insulation.
  - iv. Install duct insulation so that the insulation covers a nominal 660mm (26 in.) of the first layer of firestop duct insulation installed in Item 8Ei, the side of the duct extended to be 25mm (1 in.) past the opposing side insulation and the a minimum of 254mm (10 in.) of the concrete floor assembly (Item 6).
  - v. Place nominal 50mm (2 in.) steel speed clips over all pins on the duct and on the bottom of the floor.
  - vi. Install a 152mm (6 in.) Joint Collar tightly against the firestop duct insulation overlapped onto the wall with the same installation technique as described in Item 5.
  - vii. Seal all joints created in Item 8Ei through 8Eiv with nominal 152mm (6 in.) wide, pressure-sensitive, aluminum foil tape.
- F. FLOOR INSULATION FRAME – Install Z-shaped steel flashing with 75mm (3 in.) legs and 100mm (4 in.) height, 1mm (0.04 in.) thick around the firestop duct insulation on the concrete floor assembly. Cut and fold two opposing sides of the Z-shaped flashing nominal 50mm (2 in.) and rivet to adjacent Z-shaped flashing to create a frame.

Attach flashing to concrete floor using appropriate fasteners equivalent to

4.8mm (3/8 in.) diameter, 38mm (1.5 in.) long tapcon screws.