Unifrax I LLC
Design No. UNI/BI 120-18
Fire Resistant Ventilation Air Duct
FyreWrap® Elite® 1.5 Duct Insulation
ISO 6944-1:2008
Fire Resistance Rating Vertical Duct B
Integrity – 2 Hour
Insulation – 2 Hour

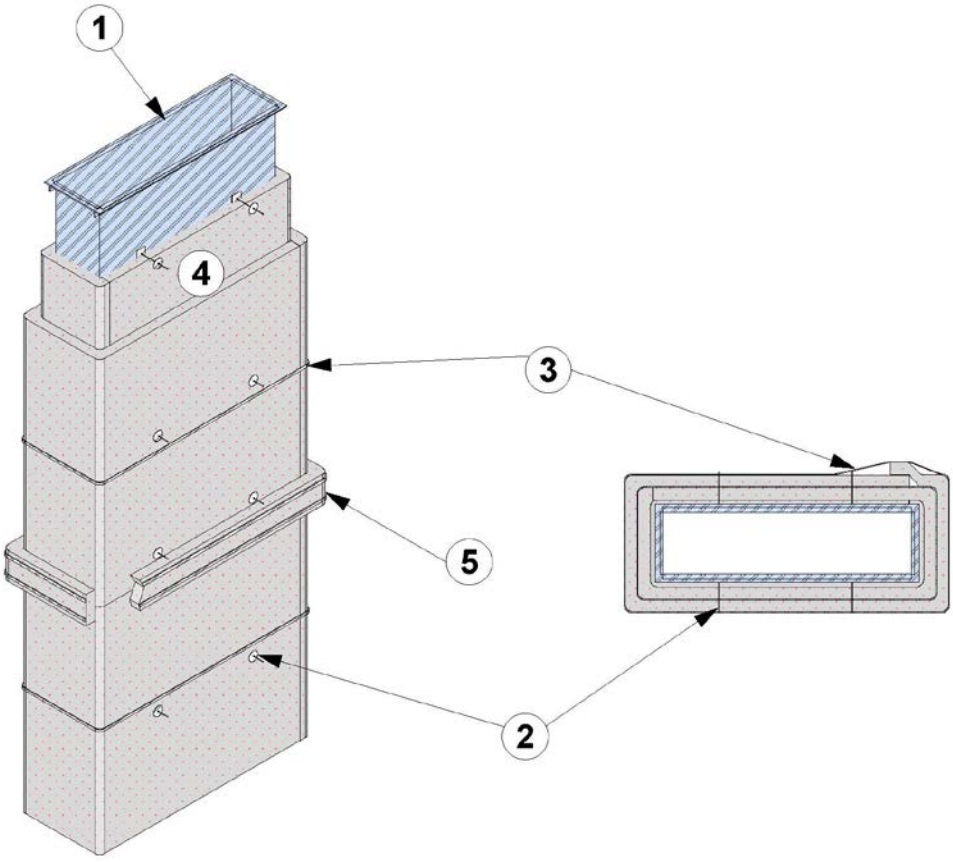

Figure 1

1. **VENTILATION AIR DUCT:** Use a max. 1250mm (49.2 in.) wide × 1000mm (39.4 in.) duct, 0.8mm (0.03 in.) thick galvanized sheet steel with a max. 1.25 m^2 (13.5 ft^2) area. Reinforce the ventilation air duct to HVCA DW/144 requirements and the min. 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 ISO 834-1 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 min. 32mm (1-1/4 in.) × 32mm (1-1/4 in.) × 5mm (3/16 in.) steel angles with the duct ends turned up a min. of 13mm (1/2 in.). Angles are stitch-welded to ducts with a min. of 38mm (1-1/2 in.) long welds spaced 203mm (8 in.) on center (oc). Cross joint flanges are connected with min. M8 bolts (or equivalent) at each corner and spaced max. 250mm (9.8 in.) oc. When a side of the duct is shorter than the max. oc spacing of the bolts a min. of one bolt must be used at the center of the duct side.

C. CROSS JOINT GASKET – Use a min. 25mm (1 in.) wide × 3mm (0.12 in.) thick Unifrax FyreWrap IG Tape. Gasket centered over the cross joint (Item B) angles.

D. REINFORCEMENT AT SUPPORTING CONSTRUCTION – Install 30mm (1-1/8 in.) × 30mm (1-1/8 in.) × 5mm (3/16 in.) angle around duct centered in the supporting wall. Attach vertical angles to horizontal angles using M8 bolts (or equivalent). Attach reinforcement angles to duct with 4mm (5/32 in.) diameter pop rivet spaced max. 152mm (6 in.) oc.

E. Rigidly support the ventilation air duct in accordance with the applicable regulating building codes.

2. **PINS:** Use min.12 GA, 165mm (6-1/2 in.) long, steel insulation pins with nominal 50mm (2 in.) × 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 max. 550mm (21-1/2 in.) longitudinally in the field of the duct.

3. **BANDING:** Use min. 12.7mm (1/2 in.) wide, 0.38mm (0.015 in.) thick stainless steel bands or min. 12.7mm (1/2 in.) wide, 0.38mm (0.015 in). thick carbon steel bands and secured with min. 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 max. 38mm (1-1/2 in.) from all duct insulation (Item 4) edges, 76mm (3 in.) from joint collars (Item 5) and a max. 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® 1.5

DUCT INSULATION: Apply two layers of the nominal 38mm (1-1/2 in.) thick, 96 kg/m^3 (6 pcf) density duct insulation over the entire surface of the ventilation air duct (Item 1). Apply the first layer of duct insulation with transverse and longitudinal joints butted with a nominal 25mm (1 in.) compression of the duct insulation at the joints. Longitudinal butt joint shall be positioned on the top of the duct at or near the corner of the duct. Longitudinal butt joints of the second outer layer shall be located at or near the opposite corner of the longitudinal joint of the first layer. Use blanket, available in various widths, that is fully encapsulated or single faced with a polypropylene-foil scrim.

Stagger the transverse overlap location so that no two consecutive adjacent overlaps align. Cover all visually-exposed ends and edges of duct insulation with nominal 152mm (6 in.) wide, pressure-sensitive, aluminum foil tape.

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   JOINT COLLAR: Place and center 152mm (6 in.) wide, 38mm (1-1/2 in.) thick, 96 kg/m^3 (6 pcf) density collar of duct insulation over the 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 min. two-hour rated solid concrete floor assembly made from reinforced lightweight or normal weight (100-150 pcf density or 1600-2400 kg/m^3 density) concrete constructed of solid concrete with a min. 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 supporting construction (Item 7). Position the ventilation air duct (Item 1) concentrically or eccentrically in the opening so that the annular space is a max. 75mm (3 in.). Establish an opening designed to house the ventilation air duct (Item 1) without duct insulation (Item 4).

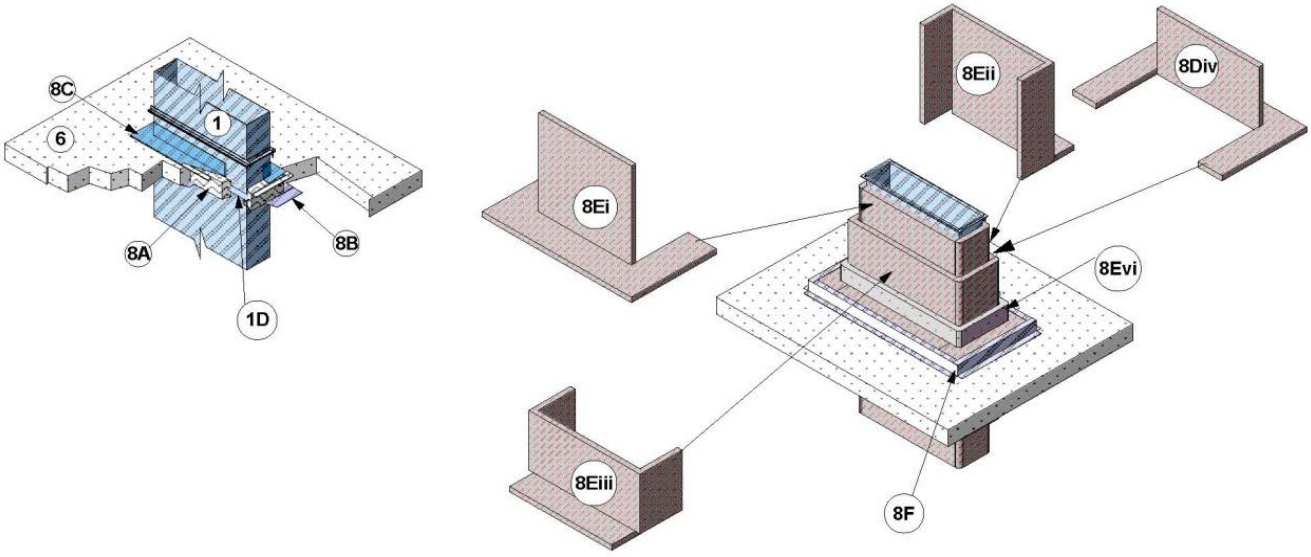

Figure 2

8. **PENETRATION FIRESTOP:** Install the 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

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

B. BOTTOM FIRESTOP FLASHING – Install 1mm (0.04 in.) thick, 175mm (6.9 in.) × 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 min. 75mm (3 in.) overlap. Attach flashing with appropriate fastening hardware equivalent to 4.8mm (3/8 in.) diameter, 38mm (1-1/2 in.) long tapcon screws (or equivalent).

C. TOP FIRESTOP FLASHING – Install 3mm (1/8 in.) thick, 150mm (6 in.) × 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 × 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 min. 12GA 165mm (6-1/2 in.) pins with a nominal 50mm (2 in.) × 50mm (2 in.) 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

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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 min. 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 min. 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 min. 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.