Design Number UNI/BI 180-01
FIRE RESISTANT VENTILATION AIR DUCT
Unifrax I LLC
FyreWrap® Elite® 1.5 Duct Insulation
AS 1530.4 Section 9 External Fire Exposure
Fire Resistance Rating Structural Adequacy – 180 Minutes
Fire Resistance Rating Integrity – 180 Minutes
Fire Resistance Rating Insulation – 180 Minutes

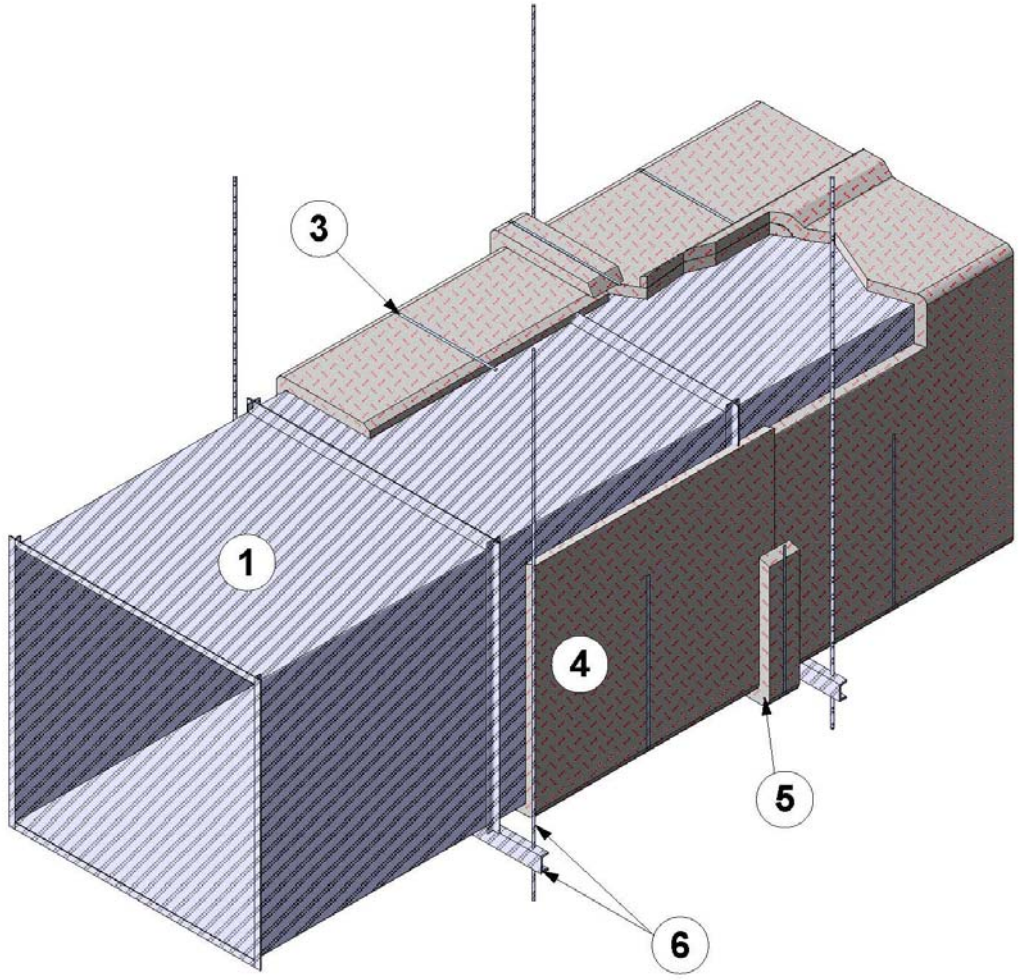

Figure 1

1. VENTILATION AIR DUCT: Use a max. 1219mm (48 in.) wide by 1219mm (48 in.) square duct 22 GA sheet steel with a max. 1.49m^2 (2304 in.^{2}) area and max. length of individual duct sections of 1250mm (49-1/4 in.) Reinforce the ventilation air duct with the min. required reinforcements described below, designed to carry the weight of the ventilation air duct assembly covered with one layer of duct insulation (Item 4) under a fire load equivalent to that of the AS 1540.3 time-temperature curve.

   A. Longitudinal Joints – Use a Pittsburgh lock seam.

B. Cross Joints – Cross joints shall be flanged with min. 32mm (1-1/4 in.) x 32mm (1-1/4 in.) x 5mm (3/16 in.) steel angles with the duct ends turned up a min. of 9.5mm (3/8 in.). Angles are stitch welded to ducts with a min. of 76mm (3 in.) long welds spaced 254mm (10 in.) on center (oc). Cross joint flanges are connected with min. M8 bolts (or equivalent) at each corner and spaced max. 254mm (10 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. Reinforcement at Concrete Wall Assembly – Install 25mm (1 in.) x 25mm (1 in.) x 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.

D. Rigidly support the ventilation air duct as specified in Item 5.

2. PINS (not shown): Use min. 12 GA, 102mm (4 in.) long, steel insulation pins with nominal 50mm (2 in.) x 50mm (2 in.) self adhering plate. Pins shall be riveted to the bottom of the ventilation air duct (Item 1) with 4mm (5/32 in.) diameter pop rivets. Pins shall be spaced nominally 152mm (6 in.) from edge of duct and 305mm (12 in.) oc in the field of the duct.

3. BANDING: Use min. 13mm (1/2 in.) wide, 0.38mm (0.015 in.) thick stainless steel bands secured with min. 25mm (1-in.) long stainless steel crimp clamps. Place banding a max. 76mm (3 in.) from all duct insulation (Item 4) edges and a max. of 610mm (24 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 one layer 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 duct insulation with transverse joints butted with a nominal 25mm (1 in.) compression of the duct insulation at the joints and longitudinal joints overlapped nominally 76mm (3 in.) Longitudinal joints shall be positioned on the top of the duct. Use blanket, available in various widths, that is fully encapsulated with a polypropylene-foil scrim. Cover all visually-exposed ends and edges of duct insulation and seal all joints with nominal 6 in. wide, pressure-sensitive, aluminum foil tape. Use 50mm (2 in.) diameter speed clips over the pins (Item 2) to attach duct insulation to the bottom of the ventilation air duct (Item 1)

5. CERTIFIED COMPANY: Unifrax I LLC

   CERTIFIED PRODUCT: Duct Insulation

   MODEL: FyreWrap® Elite® 1.5

   JOINT COLLAR: Place and center 6 in.-wide 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 on the top of the duct offset from the longitudinal joint in the duct insulation (Item 4A) and install with a nominal 76mm (3 in.) overlap.

6. SUPPORTS: Support the horizontal portion of the insulated ventilation air duct (Item 1) using a un-insulated “trapeze” system composed of a 76mm x 36mm (C3 x 5) steel channel as the trapeze cross-member and two (2), 13mm (1/2 in.) all-thread, steel rods connected using nuts and washers. Connect the all-thread steel rods to the bottom of the floor assembly using an attachment method designed to carry the weight of the ventilation air duct (Item 1) with duct insulation (Item 4) under a fire load equivalent to that of the AS 1530.4 exposure and time-temperature curve for the rated period. Place one (1) all-thread steel rod at each end of the trapeze cross-member. Center ventilation air duct (Item 1) with duct

insulation (Item 4) on trapeze cross-member. Space all-thread steel rods 152mm (6 in.) oc from surface of the ventilation air duct. Extend trapeze cross-member at least 50mm (2 in.) past each all-thread, steel rod.

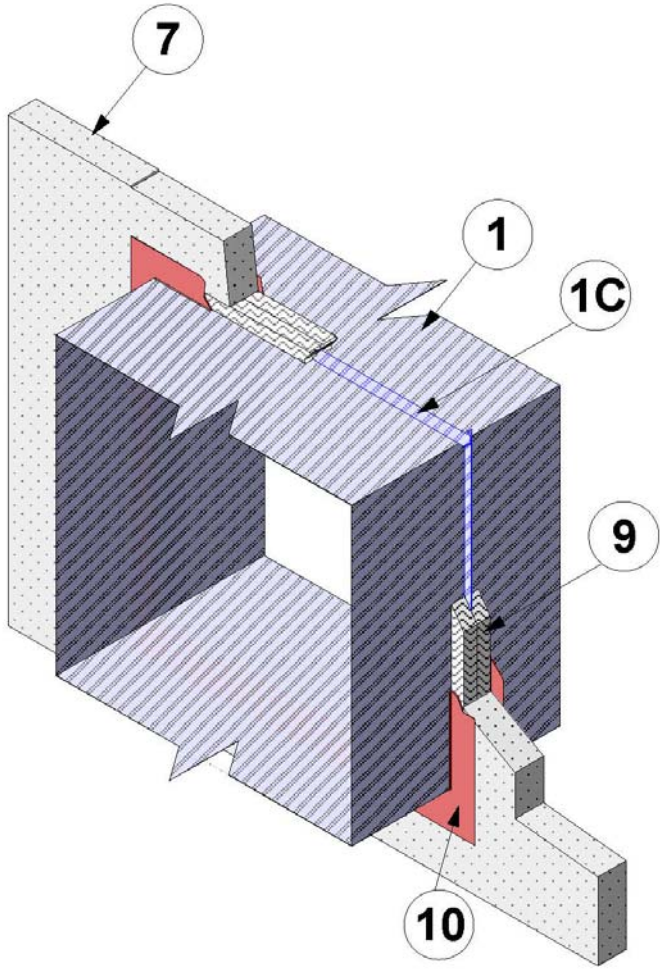

Figure 2 – Penetration Firestops for Wall Supporting Constructions

7. CONCRETE WALL ASSEMBLY: Use a symmetrical, three-hour rated, solid concrete, wall assembly made from reinforced lightweight or normal weight (1600-2400 kg/m^3 or 100-150 pcf 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 145mm (5.7 in.);

    ii. sand-lightweight concrete is 145mm (5.7 in.);

    iii. carbonate aggregate concrete is 145mm (5.7 in.); and

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

8. 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. 102mm (4 in.) Min. annular spacing must allow insertion of reinforcement at supporting construction (Item 1C). Establish an opening designed to house the ventilation air duct (Item 1) without duct insulation (Item 4) and the desired annular space but not exceeding a cross-sectional area of max. 1.81m^2 (2808 $in.^2$) and a max. dimension of 1372mm (54 in.).

9. CERTIFIED COMPANY: Unifrax I LLC

   CERTIFIED PRODUCT: Duct Insulation

   MODEL: FyreWrap® Elite® 1.5

   PACKING MATERIAL: Fill the entire annular space's width with certified duct insulation without the encapsulation (foil scrim). Install packing material, min. half the thickness of the concrete wall assembly (Item 6) from both sides of the concrete wall assembly. Packing material shall be cut so that it is compressed nominally 25% in width when inserted into the annular space. Packing material shall be recessed min. 1/8 in. from each face of the concrete wall assembly.

10. CERTIFIED COMPANY: Specified Technologies Incorporated (STI)

    CERTIFIED PRODUCT: Sealant

    MODEL: SpecSeal® LCI

    FILL, VOID OR CAVITY MATERIAL: Install min. 3mm (1/8 in.) of fill, void, or cavity material into the recess over the entire surface of the packing material (Item 8). Screed the fill, void, or cavity material flush with the surface of the concrete wall assembly (Item 7). Overlap a min. of 50mm (1/2 in.), the fill, void or cavity material onto face of ventilation air duct (Item 1) and concrete wall assembly (Item 7).