Unifrax I LLC
Design No. UNI/BI 120-16
Fire Resistant Ventilation Air Duct
FyreWrap® Elite® 1.5 Duct Insulation
ISO 6944-1:2008
Fire Resistance Rating Horizontal Duct B
Integrity – 2 Hour
Insulation – 2 Hour

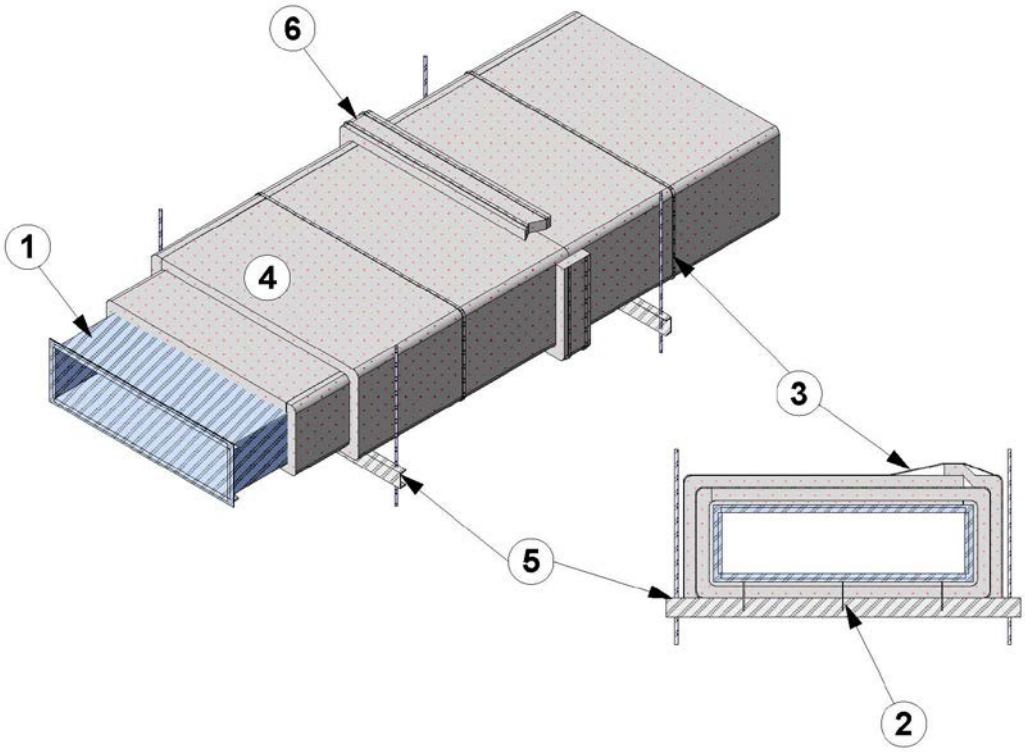

Figure 1

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 1B) angles.

D. REINFORCEMENT AT SUPPORTING CONSTRUCTION – See Reinforcement Cage (Item 8A).

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

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 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 330mm (13 in.) oc across the duct. Pins shall be spaced nominal 152 (6 in.) from all duct joints and 483mm (19 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 top corner of the duct. Longitudinal butt joints of the second outer layer shall be located at or near the top corner of the duct opposite 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 longitudinal 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.

5. **CERTIFIED COMPANY:** Unifrax I LLC

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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 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 joint.

6. **SUPPORTS:** Support the horizontal portion of the insulated ventilation air duct (Item 1) using an un-insulated "trapeze" system composed of a 76mm × 36mm (C3 × 5) steel channel as the trapeze cross-member and two 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 EN 1363-1 exposure and time-temperature curve for the rated period. Place one 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.

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

   A. GYPSUM PLASTERBOARD WALL ASSEMBLY – Symmetrical two-hour rated gypsum plasterboard wall assembly constructed of the following:

      i. STEEL STUDS – Min. 18 GA galvanized steel studs measuring 92mm (3-5/8 in.) wide with 82mm (1-1/4 in.) legs spaced max. 610mm (24 in.) oc. Attach studs with min. 3.5 × 9.5mm (#6 × 3/8 in.) steel stud framing screws to floor and ceiling tracks.

      ii. TRACKS – Channel U-shaped floor and ceiling runners measuring 12.7mm (1/2 in.) deep × 92mm (3-5/8 in.) wide, which are secured to floor and ceiling with 25.4mm (1 in.) long fasteners suitable for the mounting to substrate and spaced max. 457mm (18 in.) oc.

      iii. INSULATION (Not Shown) – Nominal 70mm (2.75 in.) thick, 105 kg/m^3 mineral fiber insulation fitted in stud cavities.

      iv. GYPSUM PLASTERBOARD – Cover studs and runners with two layers of 15mm (5/8 in.) thick, Gypsum plasterboard on each face. Fasten base layer of gypsum plasterboard to steel studs with 3.5 × 28mm (#6 1-1/8 in.) bugle-head Phillips I screws spaced max. 305mm (12 in.) oc. Fasten face layer of gypsum plasterboard with 3.5 × 41mm (#6 × 1-5/8 in.) long bugle Phillips screws spaced max. 203mm (8 in.) oc. Apply vinyl or casein, dry or premixed joint compound to face layers of gypsum plasterboard in two coats to all exposed screw heads and gypsum plasterboard joints. Embed min. 51mm (2 in.) wide paper, plastic or fiberglass tape in first layer of joint compound over joints in gypsum plasterboard. Min. wall assembly thickness is 152mm (6 in.) measured from face layer of gypsum plasterboard to opposite face layer of gypsum plasterboard.

   B. CONCRETE WALL ASSEMBLY (Not Shown) – Concrete wall assembly min. 152mm (6 in.) thick with a as an alternate to the Gypsum Plasterboard Wall Assembly (Item 7A).

   C. MASONRY WALL ASSEMBLY (Not Shown) – A wall assembly constructed from blocks, bonded with mortar or adhesive, min. 152mm (6 in.) thick with a min. fire

resistance rating of two hours may be used as an alternate to the Gypsum Plasterboard Wall Assembly (Item 7A).

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. 75mm (3 in.). Establish an opening designed to house the ventilation air duct (Item 1) without duct insulation (Item 4).

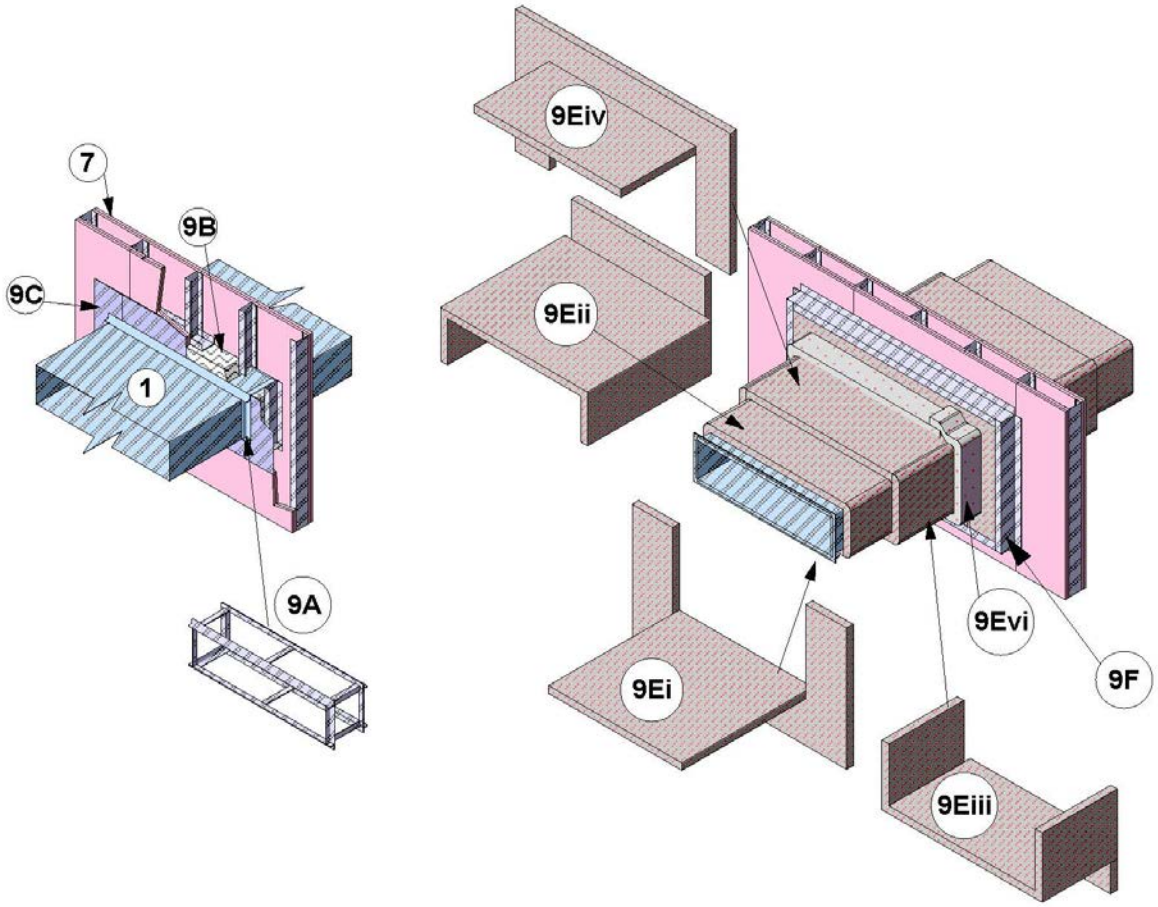

Figure 2

9. **PENETRATION FIRESTOP:** Install the firestop between the supporting construction (Item 6) and the un-insulated ventilation air duct (Item 1). Use a firestop system constructed of the following components.

   A. REINFORCEMENT CAGE – Install a reinforcement cage made from 32mm (1.25 in.) × 32mm (1.25 in.) × 5mm (3/16 in.) angle and 32mm (1.25 in.) × 5mm (3/16 in.) flat stock as shown in Figure 2. Bolt the two sides of the reinforcement cage with M8 (or equivalent) bolts. Center reinforcement cage in the supporting construction. Once centered, bolt the reinforcement cage to the Ventilation Air Duct (Item 1) using M8 bolts (or equivalent) spaced max. 203mm (8 in.) oc with a min. of one bolt on each side.

B. CERTIFIED COMPANY – Unifrax I LLC

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MODEL – FyreWrap® Elite® 1.5

PACKING MATERIAL – Fill the entire annular space width with certified duct insulation with a min. density of 96 kg/m^3 (6 pcf) density without the encapsulation (foil scrim). Pack duct insulation into the annular space to achieve a min. 33% compression of the duct insulation.

C. FIRESTOP FLASHING – Install 1mm (0.04 in.) thick, 175mm (6.9 in.) wide, galvanized steel flashing over the packing material. Install top and bottom flashing so that the flashing is butted against the reinforcement cage (Item 8A) and flush against the supporting construction (Item 6). Install side flashing over top and bottom flashing with a min. 75mm (3 in.) overlap. Attach flashing with appropriate fastening hardware equivalent to 3.5 × 41mm (#6 × 1-5/8 in.) long bugle Phillips screws.

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 the pins to the firestop flashing (Item 8C) at each corner of the firestop flashing and space nominally 305mm (12 in.) oc.

E. CERTIFIED COMPANY – Unifrax I LLC

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FIRESTOP DUCT INSULATION – At the supporting construction (Item 6) install min. 38mm (1-1/2 in.), 96 kg/m^3 (6 pcf) density firestop duct insulation as follows. Seal all joints and open ends of the firestop duct insulation with nominal 152mm (6 in.)

i. Install duct insulation so that the insulation covers a nominal 975mm (38 in.) of the bottom of the duct, a min. of 305mm (12 in.) of the wall below the duct and the wall along the sides of the duct extended 305mm (12 in.) above the duct.

ii. Install duct insulation so that the insulation covers a nominal 975mm (38 in.) of the top of the duct, the side of the duct extended to be 25mm (1 in.) below the bottom insulation and the a min. of 305mm (12 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 top of the first layer of the firestop duct insulation, the first layer of the firestop duct insulation above the duct, and the first layer of firestop duct insulation along the sides of the duct 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 top of the duct, the side of the duct extended to be 25mm (1 in.) below the bottom insulation and extended to be even with the first layer of the firestop duct insulation on the supporting construction.

v. Place nominal 50mm (2 in.) steel speed clips over all pins on bottom of duct and on wall.

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 with nominal 152mm (6 in.) wide, pressure-sensitive, aluminum foil tape.

F. WALL 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 supporting construction. Cut and fold top and bottom flashing nominal 50mm (2 in.) and rivet to side flashing to create a frame. Attach flashing to supporting construction using appropriate fasteners equivalent to 3.5 × 41mm (#6 × 1-5/8 in.) long bugle Phillips screws.