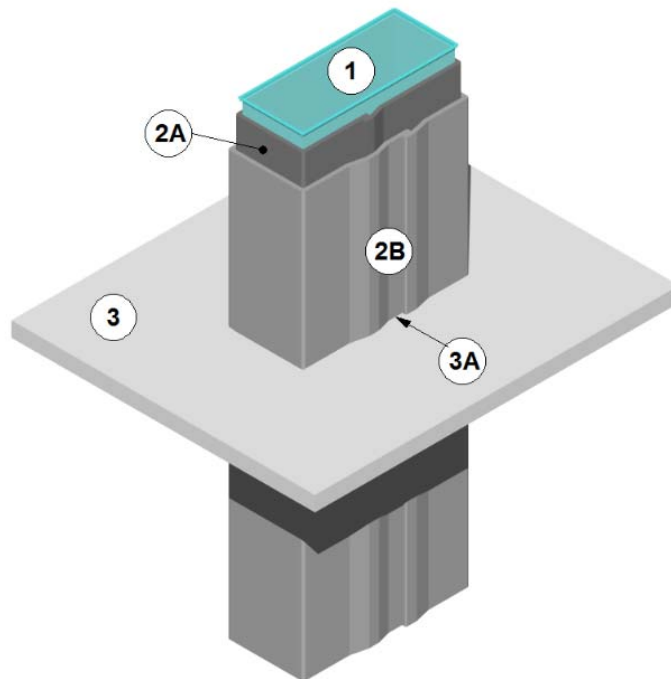


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**Design Number UNI/DI 180-02  
FIRE RESISTANT DUCT  
(VERTICAL VENTILATION DUCT)**

Unifrax I LLC  
FyreWrap® Elite® 1.5 Duct Insulation  
**ISO 6944 (1985) Duct A**  
**Fire Resistance Rating – 3 hours**  
Stability – 3 hours  
Insulation – 3 hours  
Integrity – 3 hours

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**Figure 1 – Vertical Ventilation Duct**

1. VENTILATION DUCT: Install a vertically oriented, continuous, air-tight, duct system constructed per SMACNA HVAC Duct Construction Standards, Metal and Flexible, Third Edition – 2005 or DW/144, Specification for Sheet Metal Ductwork, Low, Medium and High Pressure/Velocity Air Systems, 1998 and the requirements for Rectangular Ducts (Item 1A) or Circular Ducts (Item 1B). Position the duct assembly concentrically or eccentrically in the floor assembly's (Item 4) opening. Annular space range min. 12.7 mm (0.5 in.) to max. 76 mm (3 in.). When required, equip the ventilation duct with transition fittings, e.g. elbows, tees, reducers, etcetera.
  - A. Rectangular Ducts
    - i. Max. cross sectional area: 0.84 m<sup>2</sup> (1296 in.<sup>2</sup>).
    - ii. Max. width: 1372 mm (54 in.)
    - iii. Sheet Steel: Use min. 0.71mm (22 GA) galvanized-sheet steel; increase steel GA as needed to meet min. SMACNA or DW/144 requirements for the pressure class and size.
    - iv. Duct Reinforcement: Use min. reinforcement requirements for 500Pa (2 in. water GA) under pressure; increase as needed to meet min. SMACNA or DW/144 requirements for higher pressure

class. Use max. spacing of 1250mm (49 in.) between joint reinforcements and/or intermediate reinforcements. For transverse joint reinforcements other than bolted companion angles (rolled steel angle-flanged joints), use a min. of one (1) intermediate reinforcement spaced max. 3 in. from the joint.

B. Circular Ducts

- i. Max. cross sectional area: 0.84 m<sup>2</sup> (1296 in.<sup>2</sup>).
- ii. Max. Diameter: 1032 mm (40.62 in.)
- iii. Sheet Steel: Use min. 0.71mm (22 GA) galvanized-sheet steel; increase steel GA as needed to meet min. SMACNA or DW/144 requirements for the pressure class and size.
- iv. Duct Reinforcement: Use bolted companion angles (rolled steel angle-flanged joints) for transverse joint reinforcements and intermediate reinforcement angles. Use max. spacing of 1250 mm (49 in.) between joint reinforcements and/or intermediate reinforcements.

C. Alternative constructions may be designed by a registered design professional to withstand the weight of the system including the Insulation when exposed to the time-temperature curve as defined by ISO 6944.

2. CERTIFIED MANUFACTURER: Unifrax I LLC

CERTIFIED PRODUCT: Duct Insulation

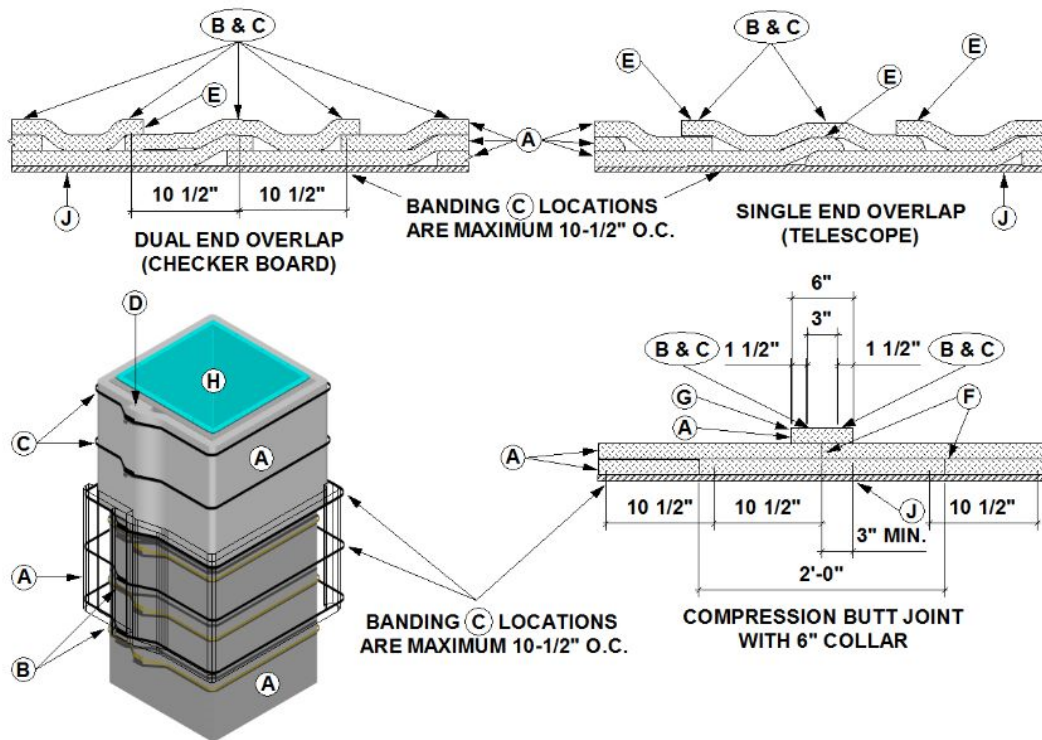
CERTIFIED MODEL: FyreWrap® Elite® 1.5 Duct Insulation

INSULATION: Use only the certified product cited and bearing Intertek's label. Install two layers of foil-encapsulated, nom. 96 kg/m<sup>3</sup> (6-pcf) density, nom. 38 mm (1-1/2 in.) thick, min 610 mm (24 in.) wide blanket. Use the same application method for both insulation layers. Refer to the manufacturer's instructions for details regarding the insulation's installation. Stagger the first insulation layer (Item 2A) and

second insulation layer (Item 2B) joints a min. of 267 mm (10-1/2 in.) Seal all cut edges with min. 76 mm (3 in.) wide pressure sensitive aluminum foil tape. Wrap the ventilation duct (Item 1) with two layers of insulation (Item 2) with 76 mm (3 in.) min. overlaps at all joints and min. nom. thickness of 76 mm (3 in.) at the transverse overlaps of completed wrapped ventilation duct (Item 1). Use the same insulation method for both layers. Refer to Figure 2. Install the longitudinal overlaps of adjacent blankets using one of the following three methods:

- Single End Overlap (Telescope): Each adjacent blanket has one edge overlapped 76 mm (3 in.) by the next blanket,
- Dual End Overlap (Checkerboard): Both edges of each alternating blanket are covered 76 mm (3 in.) by each adjacent blanket whose edges are exposed, or
- Butt Joint with Collar: All blankets are compressed min. 25.4 mm (1 in.) and butted together. Place and center a 152 mm (6 in.) wide collar of blanket over the butt joint and overlapping each adjacent blanket 76 mm (3 in.).

Use min. 12 GA, 165 mm (6-1/2 in.) long, steel insulation pins with nominal 50 mm (2 in.) x 50 mm (2 in.) self adhering plate. Pins shall be welded or riveted to the two opposing, largest, sides of the ventilation air duct (Item 1) with 4 mm (5/32 in.) diameter pop rivets. Two pins shall be spaced nominally 230 mm (9 in.) from edge of duct. Pins shall be spaced nominal 350 mm (13-3/4 in.) from all duct joints and 550 mm (21-1/2 in.) longitudinally in the field of the duct. Secure insulation (Item 2) to the ventilation duct (Item 1) using nom. 1/2 in. wide steel bands. Use min. three bands on each blanket. Place a band approximately 38 mm from each edge of the blanket with an additional steel band a max. 584 mm (23 in.) between each blanket edge. Use nom. 50 mm (2 in.) diameter steel speed clips over insulation pins to secure insulation to ventilation duct.



**Drawing Legend:**

- A – Insulation (Item 2) – FyreWrap® Elite® 1.5
- B – Filament Tape (Temporary Hold)
- C – Carbon or Stainless Steel Straps (Permanent Hold)
- D – 3 in. Minimum Longitudinal Overlap
- E – 3 in. Minimum Transverse Overlap
- F – 1 in. Compression Butt Joint
- G – 6 in. Wide Collar – FyreWrap® Elite® 1.5
- H – Ventilation Duct (Item 1)

\*Use 1 in. = 25.4 mm to convert to metric

**Figure 2 – Insulation Installation Methods**

3. SUPPORTS: Not Shown – Support the vertical ventilation duct (Item 1) using one of the following:

A. Rectangular Duct: Use min. 25.4 mm (1 in.) x 25.4 mm (1 in.) x 3 mm (1/8 in.) RSA (steel angles) forming an “H-shape” attached to the vertical ventilation duct (Item 1) around its perimeter at each floor/ceiling assembly (Item 4). Use min. 9.5 mm (3/8 in.) dia. bolts, washers and nuts to attach the steel angles to the ventilation duct (Item 1). Space fasteners max. 203 mm (8 in.) on center (oc). Two parallel steel angles shall extend beyond the annular space of the opening and bear upon the

surface of the floor/ceiling assembly (Item 4).

B. Circular Ducts: Use min. 25.4 mm (1 in.) x 25.4 mm (1 in.) x 3 mm (1/8 in.) RSA (steel angles) pieces forming a continuous ring around the vertical ventilation duct (Item 1) perimeter at each floor/ceiling assembly (Item 4). Use min. 9.5 mm (3/8 in.) dia. bolts, washers and nuts to attach the steel angles to the ventilation duct (Item 1). Space fasteners max. 203 mm (8 in.) oc. Two parallel portions of the steel angle ring shall extend beyond the annular space of the opening and bear

upon the surface of the floor/ceiling assembly (Item 4).

4. FLOOR/CEILING ASSEMBLY: Use min. 145 mm (5.7 in.) thick normal weight or min. 112 mm (4.4 in.) thick lightweight (1600 to 2400 kg/m<sup>3</sup> (100 to 150 pcf)) reinforced concrete.
  - A. Create an opening in the floor/ceiling assembly compatible with the ventilation duct (Item 1) dimensions and an annular space between 12.7 mm (0.5 in.) and 76 mm (3 in.). Max. opening 736.5 mm (29 in.) x 1498.5 mm (59 in.) for max. ventilation duct (Item 1) dimensions and annular space.
5. FIRESTOP SYSTEM: Protect the annular space when the ventilation duct (Item 1) passes through a fire-resistance rated floor/ceiling assembly. Install additional perimeter steel reinforcement ((min. 25.4 mm (1 in.) x 25.4 mm (1 in.) x 3 mm (1/8 in.) min. 76 mm (3 in.) from both sides of the floor/ceiling assembly, and

secured to ventilation duct (Item 1) 305 mm (12 in.) oc with 51 mm (2 in.) x 6.5mm (1/4 in.) hex head bolts, nuts, and washers, positioned with nuts and washers installed from the inside of the duct after the fill, void, or cavity material has cured. Alternatively the additional reinforcement may be attached to the ventilation duct (Item 1) using 4mm (0.157 in.) diameter steel pop rivets and/or M4 x .07, 12.7 mm long (#8, 0.5 in. long) self-drilling Phillips truss head screws spaced 152 mm (6 in.) oc. Use one of the following firestop system's methods:

- A. ASTM E814 Firestop System: Not Shown – Use and follow details of Intertek Design Number UNI/PF 180-02 for details.
- B. ISO 6944 Firestop System: Not Shown – Use and follow details of the penetration firestop specification section of Intertek Design Number UNI/BI 180-02 for details.