

FyreWrap® Elite® 1.5 Duct Insulation – Grease Duct ASTM E 2336 System

Introduction

Unifrax's FyreWrap® Elite® 1.5 Duct Insulation is a two-layer flexible enclosure for one- and two-hour rated commercial kitchen grease ducts. FyreWrap Elite 1.5 Duct Insulation is tested per ASTM E 2336 and is acceptable as an alternate to a traditional fire-rated shaft. Installed as a two-layer system, FyreWrap Elite 1.5 complies with AC101 and the 2006 and 2009 Editions of the International Mechanical Code (IMC) and Uniform Mechanical Code (UMC). FyreWrap Elite 1.5 Duct Insulation offers the following product features:

- 2-hour fire-resistance rating
- Alternate to shaft enclosure
- Complies with 2006 and 2009 IMC and UMC
- Tested per ASTM E 2336
- Two-layer system; inner layer utilizes butt joint
- High-temperature, biosoluble insulation
- Zero clearance to combustibles, at any location
- GREENGUARD listed for Microbial Resistance

Typical Product Properties

ICC Evaluation Services	Evaluation Report ESR-2224
Intertek Laboratories (OPL) Listed, File 14870	Duct System: Design No. UNI/BI 120-02, UNI/WA 120-01
ASTM E 2336 (AC101)	Passes all tests
ASTM E 2336 (AC101) Internal Grease Duct Test.....	Zero Clearance to Combustibles at all locations on wrap
ASTM E 119 Full Scale Engulfment Test	2-hour Fire Resistance Rating
ASTM E 119 Vertical Wall Test	2-hour Fire Resistance Rating
ASTM E 84/UL 723, UL File No. R14514	Unfaced Blanket Encapsulated
Flame Spread/Smoke Developed Rating.....	Zero/Zero <25/<50
ASTM E 814 Firestop Test	Firestop System: UNI/FRD 120-19, UNI/BI 120-02
F-Rating = 2 Hrs., T-Rating = 2 Hrs.	
ASTM E 136 Non-Combustibility Test	Passes
ASTM C 518 Durability Test	Passes; R-Value = 4.8 per inch at 75°F
ASTM C 518 Thermal Resistance	R-Value of Elite 1.5 (1½") = 7.2
ASTM D 6329-03 Microbial Resistance.....	Resistant to Mold Growth
California State Fire Marshal Listing	No: 2440-1478:100

Complies with: NFPA 96 (all editions), 1997 ICBO Uniform Mechanical Code (UMC), 1997 ICBO Uniform Building Code (UBC), 2000, 2003, 2006 and 2009 International Mechanical Code (IMC), 2000, 2003, 2006 and 2009 IAPMO UMC (Uniform Mechanical Code), NFPA 90 A (2002).



FyreWrap® Elite® 1.5 Duct Insulation

Product Components

Core Material: FyreWrap Elite 1.5 incorporates Insulfrax® Thermal Insulation as its core material. Insulfrax is a high-temperature insulation made from a calcia, magnesia, silica chemistry designed to enhance biosolubility. It provides excellent insulation in a noncombustible blanket product form.

Encapsulating Material: The core insulation blanket is completely encapsulated in an aluminum foil fiberglass reinforced scrim covering. This scrim provides additional handling strength as well as protection from moisture absorption and tearing.



Complies
with:



Typical Product Parameters

Thickness	1.5"
Nominal Density	6pcf
Standard Product Form	Scrim Encapsulated
Product Availability	24"w x 25LF
	48"w x 25LF

Installation

The FyreWrap Elite 1.5 Duct Insulation ASTM E 2336 System consists of a fully encapsulated, two-layer system applied directly to the duct surface. The insulation system may be installed at zero clearance to combustibles at any point. To minimize waste, FyreWrap Elite 1.5 should be rolled out tautly before measuring and making any material cuts.

Butt Joint Both Layers Wrap Option (For ducts 24" x 24" or less)

For ducts 24" x 24" or less, both layers of wrap can be installed with transverse (perimeter) joints butted and minimum 3" longitudinal overlaps located on the topside of horizontal ducts. Stagger transverse butt joints by 12" between the first and second layers of wrap. Both layers of wrap can be temporarily secured with 1" wide filament tape. After the second layer of wrap is installed, place carbon or stainless steel bands (min. 1/2" wide, .015" thick) on both sides of all transverse butt joints 2 1/2" on center from the joint and in the field area between the butt joints 9" on center. Tighten banding to firmly hold the wrap system in place but not so tight as to cut or damage the blanket and secure with minimum 1" long steel crimp clips. Seal all second layer

transverse butt joints and exposed blanket edges with minimum 3" wide aluminum foil tape. Pins are NOT required when utilizing this installation method.

Overlap Techniques

The first layer can be installed with transverse (perimeter) joints butted and minimum 3" longitudinal overlaps on the topside of horizontal ducts. All overlaps for the second, or outer layer, are required to be a minimum of 3". For the second layer, transverse (perimeter) overlaps of adjacent blankets may be installed using one of the following three methods and as shown in Figure 2.

Telescoping Overlap Wrap Technique:

This wrap technique is the most common method of installing FyreWrap Elite 1.5 where each adjacent blanket has one edge exposed and one edge covered by the next blanket, to form a 3" overlap.

Cut the first piece of inner layer insulation to a length sufficient to wrap around the duct and provide a 3" longitudinal overlap on the topside of the duct. Install the adjacent inner layer piece so that the blanket edge is butted against the preceding piece, forming a tight perimeter joint. This piece also requires a 3" longitudinal overlap on the topside of the duct. Space the starting edge of the outer layer a maximum 3" from the exposed edge of the inner layer. All joints on the second layer require a minimum 3" overlap. Ends of the outer overlaps occur on the topside of the horizontal section and backside of the vertical section of the duct, alternating nominal 8" on either side of the longitudinal centerline with each successive wrap piece. All cut edges shall be sealed with aluminum foil tape.

Figure 1. Butt Joint Wrap Option

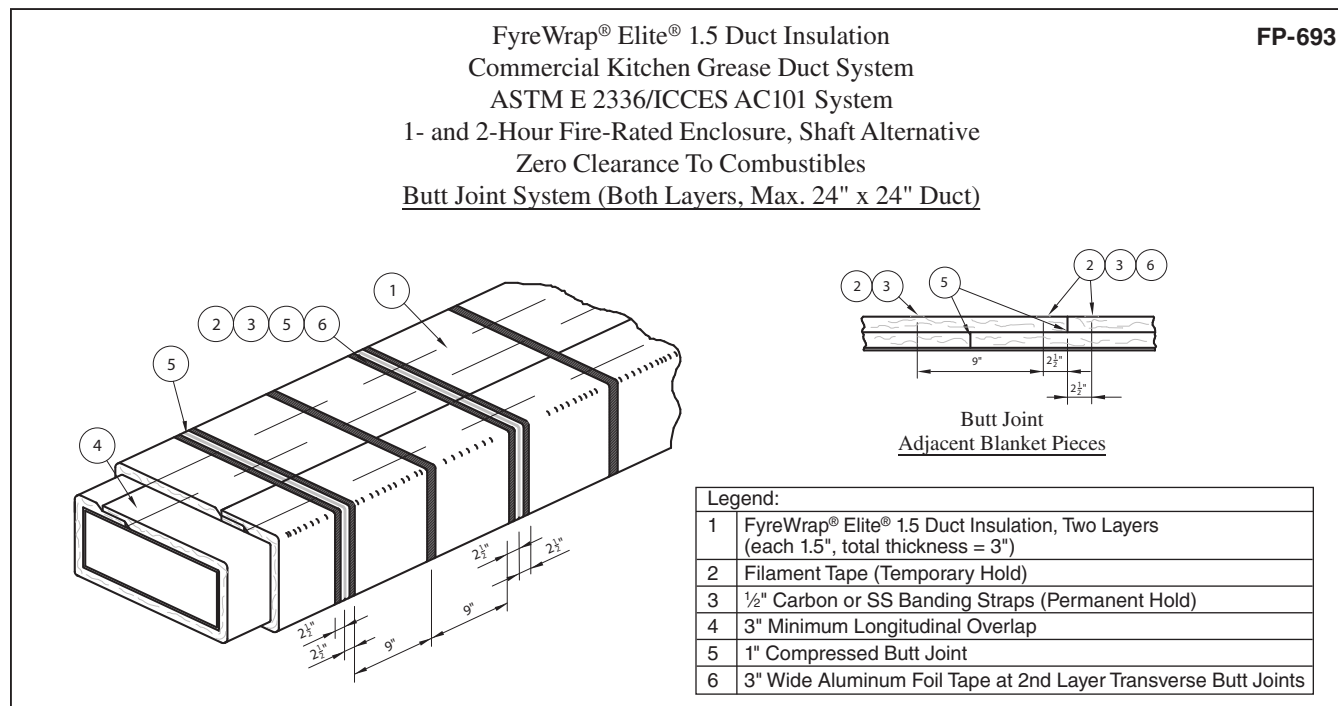
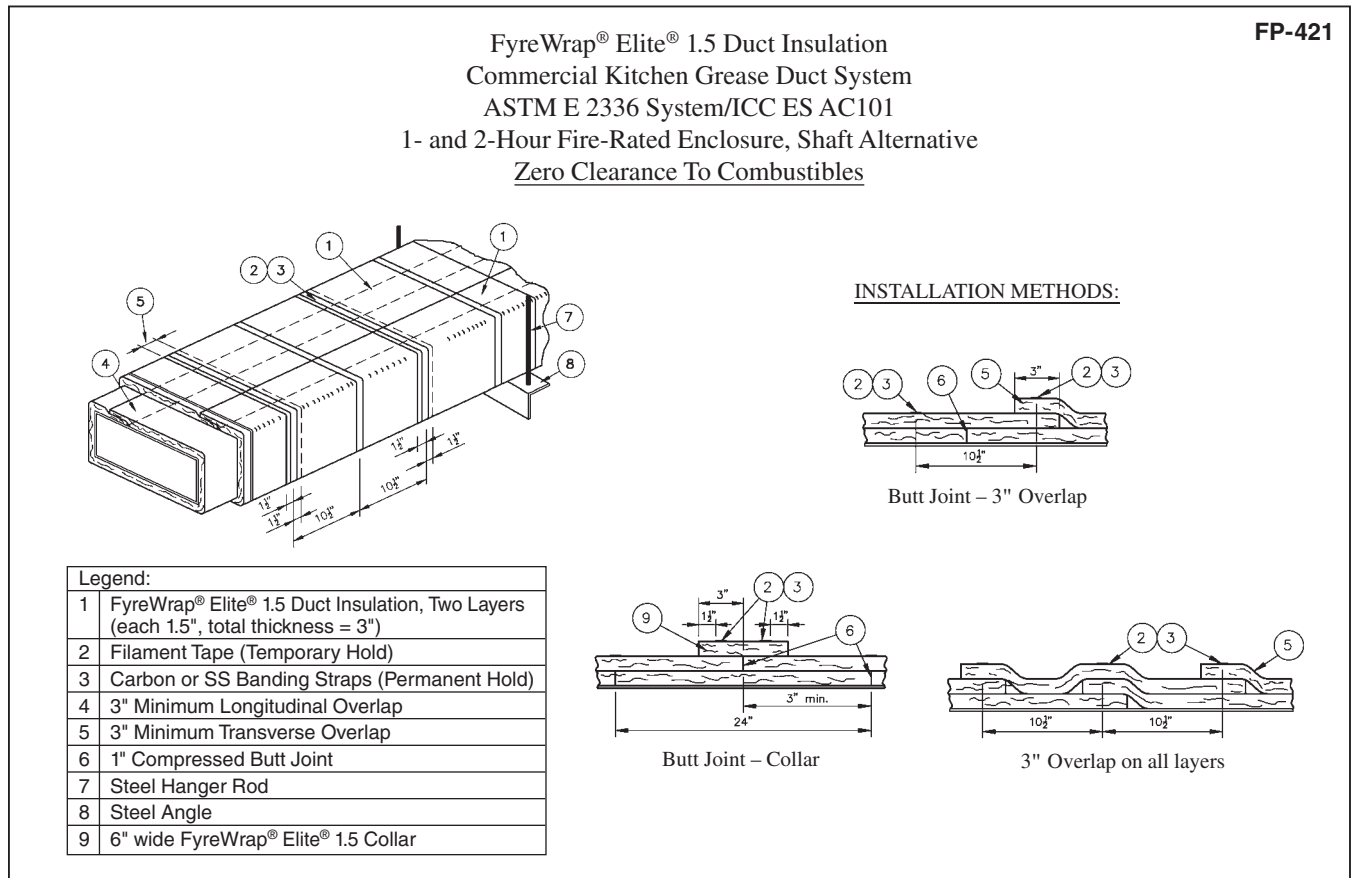


Figure 2. 2-layer detail



Checkerboard Overlap Wrap Technique:

This installation uses a 3" overlap pattern with both edges of each alternating blanket covered by each adjacent blanket whose edges are exposed. The overlap joints in alternate layers of blanket resemble a checkerboard pattern in the completed installation. This technique is often utilized when a small section of duct wrap must be repaired.

Butt Splice with Collar Wrap Technique:

This wrap technique permits installation with the blanket edges butted together and a 6" wide collar of blanket that is centered over the butt splice, overlapping each adjacent blanket 3". The collar can be field fabricated from FyreWrap Elite 1.5 Duct Insulation rolls or purchased separately.

Vertical Duct Runs

For vertical runs, the insulation can be applied to the duct in a continuous length applied parallel with the length of the duct as opposed to wrapping around the duct. All overlaps are to be maintained at a minimum 3" and are to occur a minimum of 6" from any corner of the duct. The second layer is to be centered over the overlapped seam of the first layer. Pins spaced a maximum 8" o.c. are to be placed at the centerline of all vertically oriented overlaps.

Attachment Options

Three attachment options are available for installers. Choices are limited by the duct width dimension. Details on each option are provided below.

Banding Only: For Duct Widths 24" or Less

To temporarily secure the insulation, optional use of filament tape is permitted. Place carbon steel or stainless steel bands (min. 1/2" wide, nom. 0.015" thick) 1 1/2" from each edge of each second layer blanket overlap. Place additional bands in the field area between the second layer overlaps on maximum 10 1/2" centers. Tighten banding to firmly hold the wrap system in place but not so tight as to cut or damage the blanket and secure with minimum 1" long steel crimp clips. Pins are NOT required when this banding technique is used.

Banding and Pins: For Duct Widths ≤ 49"

Weld 12-gauge steel insulation pins to the underside of horizontal runs and backside (side of duct having largest dimensions) of vertical runs. Place pins at maximum 12" rows and on maximum 10 1/2" centers. To temporarily secure the insulation, optional use of filament tape is permitted. Impale FyreWrap Elite 1.5 Duct Insulation over the pins and hold in

place with minimum 2½" square or 1.5" round galvanized steel speed clips (washers). Turn down or cut off exposed ends of pins to eliminate safety hazards. Locate carbon steel or stainless steel bands (min. ½" wide, nom. 0.015" thick) 1½" from each edge of second layer overlap joints. Locate a second band midpoint between the second layer overlapped joints, approximately 10½" on center. Tighten banding to firmly hold the wrap system in place but not so tight as to cut or damage the blanket and secure with minimum 1" long steel crimp clips. Cup head style pins are also permitted and shall be located at the same spacing as pre-welded pins.

Pins Only: For Duct Widths > 49"

Weld 12-gauge steel insulation pins on all sides of the duct. Place insulation pins in rows (perpendicular to the length of the duct) spaced maximum 10½" on center. Pins in each row are maximum 5" from each duct edge and maximum 8" on center. Locate insulation overlaps so they are centered on the pins. Impale FyreWrap Elite 1.5 Duct Insulation over the pins and hold in place with minimum 2½" square or 1½" round galvanized steel speed clips (washers) to keep the system from sagging. Turn down or cut off exposed ends of pins to eliminate safety hazards. Cup head style pins are also permitted and shall be located at the same spacing as pre-welded. The pins only attachment method can be used for duct widths less than 49", but is optional.


Access Door

Field fabricated and prefabricated grease duct access doors are permitted for use with FyreWrap Elite 1.5 Duct Insulation. Installation details are provided below and in Figure 3.

Field fabricated access doors are protected with three layers of FyreWrap Elite 1.5 Duct Insulation. A gasket of 0.5" thick unfaced FyreWrap or ceramic fiber blanket is initially installed between the duct and the access door cover. Weld threaded rod to each corner of the access door opening.

Cover with hollow steel tubes (optional) for easy removal of blanket. Weld at least four steel insulation pins to the outside of the door cover panel, 1" from each corner. Cut through the two layers of FyreWrap Elite 1.5 Duct Insulation already covering the duct and access door opening. Leave the interior piece in place. Cut back the outer layer to form an opening with perimeter dimensions that extend 1" beyond the inner layer. Cut a piece of FyreWrap Elite 1.5 Duct Insulation that matches the dimensions of the opening and install over pins to fit tightly within the existing material. Cut an additional piece of insulation with perimeter dimensions that extend 1" beyond the layer below. Install over the insulation pins. Throughout the installation process, seal all cut edges with aluminum foil tape. Secure with washers and bend over excess pin lengths to eliminate safety hazards. Place washers on threaded rod and secure with nuts. Do not install banding over this area. See Figure 3 for details.

Prefabricated – Ductmate Ultimate and Ductmate F2-HT prefabricated access doors are permitted and must be installed in accordance with Ductmate Industries, Inc. installation instructions and the applicable code. The prefabricated access door is protected with three layers of FyreWrap Elite 1.5 Duct Insulation. The first layer is cut to the size of the door. A successive layer (two additional layers) is sized to create an overlap of 1" beyond the layer immediately below. All edges of insulation blanket must be protected with aluminum foil tape. A No. 16 gauge outer plate the same dimension as the outer layer of insulation blanket is held in place over the insulation using threaded rod and wing nuts. The outer plate is supplied with the Ultimate door and F2-HT doors. Access doors are available from Ductmate Industries, Inc. Contact www.ductmate.com or 1-800-245-3188 for additional information or local distributors. Ask for the Access Door Product Line Manager.



Listed
W/N 14870
Reference
Directory of Listed
Building Products, Materials
& Assemblies
for Specifics


APPLIED FIRE PROTECTION

UNIFRAX I LLC
New Carlisle, IN

FyreWrap® Elite® 1.5 Duct Insulation
Nominal Density: 6 pcf

Tested Per:
ASTM E119 - Fire Resistance Rating: 2 hour
ANSI/ASTM E814 - T-Rating: 2 hr F-Rating: 2 hour
ASTM E2336
UL 1978 (June 2002) - Sec. 14 & 15 - Passed
UL 2221
AC 101 (Engulfment) - Passed
AC 101 (Internal) - Passed
ISO 6944 - Duct Type: A

For additional information about product performance or to identify the recommended product for your fire protection application, please contact Unifrax at 716-278-3800 and ask for Fire Protection Application Engineering.



FACED BATTS & BLANKETS

SURFACE BURNING CHARACTERISTICS

FLAME SPREAD	25
SMOKE DEVELOPED	50

Issue No: _____

R14514

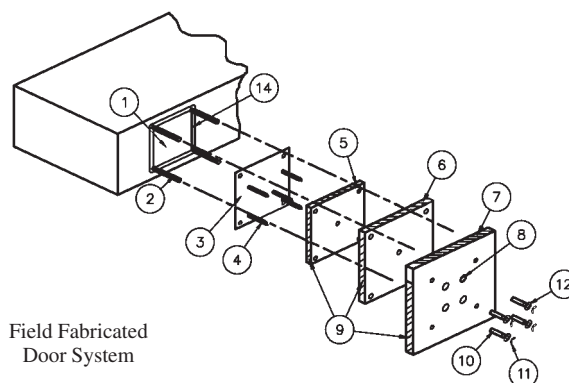
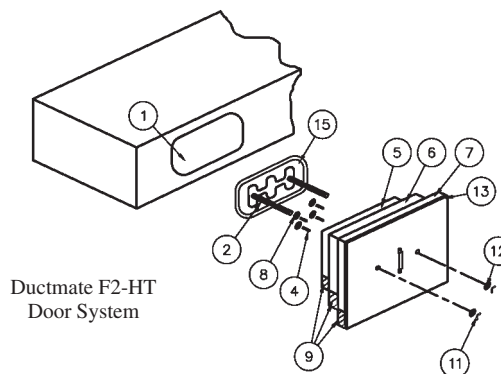
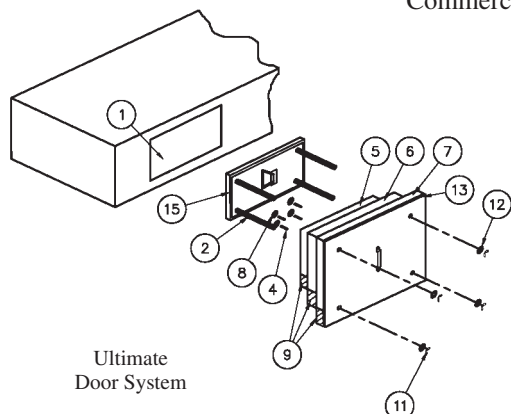
Refer to the product Material Safety Data Sheet (MSDS) for recommended work practices and other product safety information.



Figure 3. Access Door

FP-426

FyreWrap® Elite® 1.5 Duct Insulation
Commercial Kitchen Grease Duct System
Access Door Systems



Legend:	
1	Access Door Opening
2	All Thread Rods
3	Access Door Cover Panel 16 Gauge (field fab. only)
4	Insulation Pins – Welded to Cover
5	First Layer FyreWrap® Elite® 1.5
6	Second Layer FyreWrap® Elite® 1.5, 1" Overlap
7	Third Layer FyreWrap® Elite® 1.5, 1" Overlap
8	Speed Clips/Washers
9	Cut Edges Sealed With Aluminum Foil Tape
10	Spool pieces for threaded rods (optional field fab. only)
11	Wing Nuts
12	Washers
13	Insulation plate
14	Unfaced FyreWrap blanket or Ceramic fiber gasket, ½" thick
15	Prefabricated access door

Duct Support

Horizontal duct support systems do not require FyreWrap insulation when constructed using a minimum $\frac{3}{8}$ " diameter uninsulated all-thread steel rod and $1\frac{1}{2}$ " x $1\frac{1}{2}$ " x $\frac{1}{8}$ " uninsulated steel angle spaced a maximum 60" on center along the length of the duct. A minimum clearance of 1" is required between the protected duct and the steel rod. To increase hanger spacing to 72" on center, $\frac{1}{2}$ " all-thread steel rod and 2" x 2" x $\frac{1}{4}$ " steel angle are required. Vertical duct support systems do not require FyreWrap insulation when constructed using minimum $1\frac{1}{2}$ " x $1\frac{1}{2}$ " x $\frac{1}{4}$ " steel angle brackets located on opposite sides of the duct, on the top and bottom of each floor-ceiling assembly. The supports are attached to the duct with welds. Maximum spacing between vertical supports shall be established by structural calculations in accordance with the applicable code, that are submitted to the building official for approval. See Figure 4 for details. For all other duct support configurations, please contact Unifrax at 716-278-3800 and ask for Fire Protection Application Engineering.

Firestop Systems

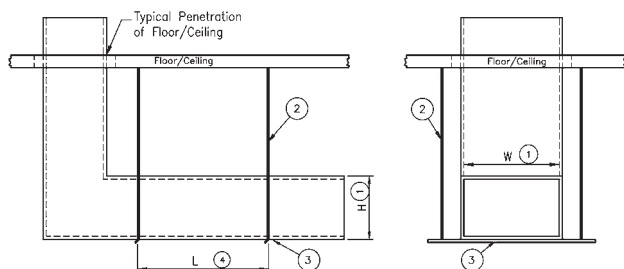
Where ducts insulated with FyreWrap Elite 1.5 Duct Insulation pass through fire-rated walls and floors, the penetration opening shall be firestopped to maintain the fire rating of the assembly. Firestop Systems acceptable for use with FyreWrap Elite 1.5 Duct Insulation ASTM E 2336 System at the time of printing are detailed below. See Figures 5-7 for details. Additional firestop systems may be developed and available for use. Contact Unifrax at 716-278-3800 and ask for Fire Protection Application Engineering for additional details and assistance or visit the test lab web site for the latest documentation.

Figure 4. Firestop Installation

FP-625

**FyreWrap® Elite® 1.5 Duct Insulation
Typical Duct Support Details**

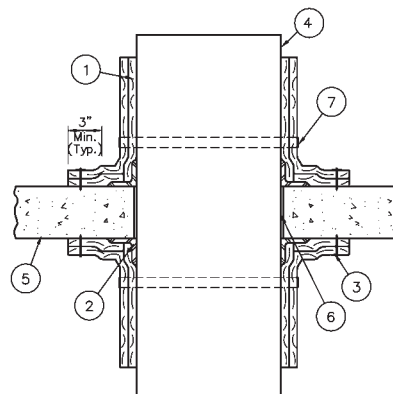
TYPICAL HORIZONTAL DUCT SUPPORT DETAILS



Legend:

1	Max. Duct Size (HxW)	49" x 49"	49" x 49"
2	Steel Threaded Rod	3/8" diameter	1/2" diameter
3	Steel Angle	1 1/2" x 1 1/2" x 1/8"	2" x 2" x 1/4"
4	Support System Spacing (L)	60"	72"

TYPICAL VERTICAL DUCT SUPPORT DETAILS



Legend:

1	FyreWrap® Elite® 1.5 Duct Insulation, Two Layers
2	Duct Support Mechanism
3	Mechanical Fasteners & Washers
4	Grease Duct
5	Fire Resistant Concrete Floor/Ceiling Assembly
6	Firestop System
7	Steel Banding and Clips

Figure 5. Firestop Installation

FP-429

**FyreWrap® Elite® 1.5 Duct Insulation
Through Penetration Wall System
Intertek (OPL) Design No. UNI/FRD 120-19
2-Hour Fire Resistance Rating
F-Rating = 2 Hrs. T-Rating = 2 Hrs.**

Legend:

1	Grease Duct, max. 4900 in ² area, 70" max width
2	FyreWrap® Elite® 1.5 Duct Insulation, Two Layers
3	Unfaced FyreWrap® Elite® 1.5 (3 3/8", compressed 48%)
4	STI Spec Seal SSS, 5/8" depth
5	Fire-Resistive Gypsum Wall Assembly
6	Annular Space 0" to 3 1/2"

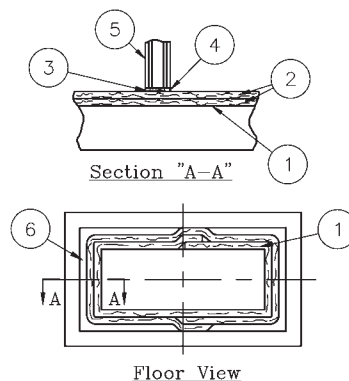
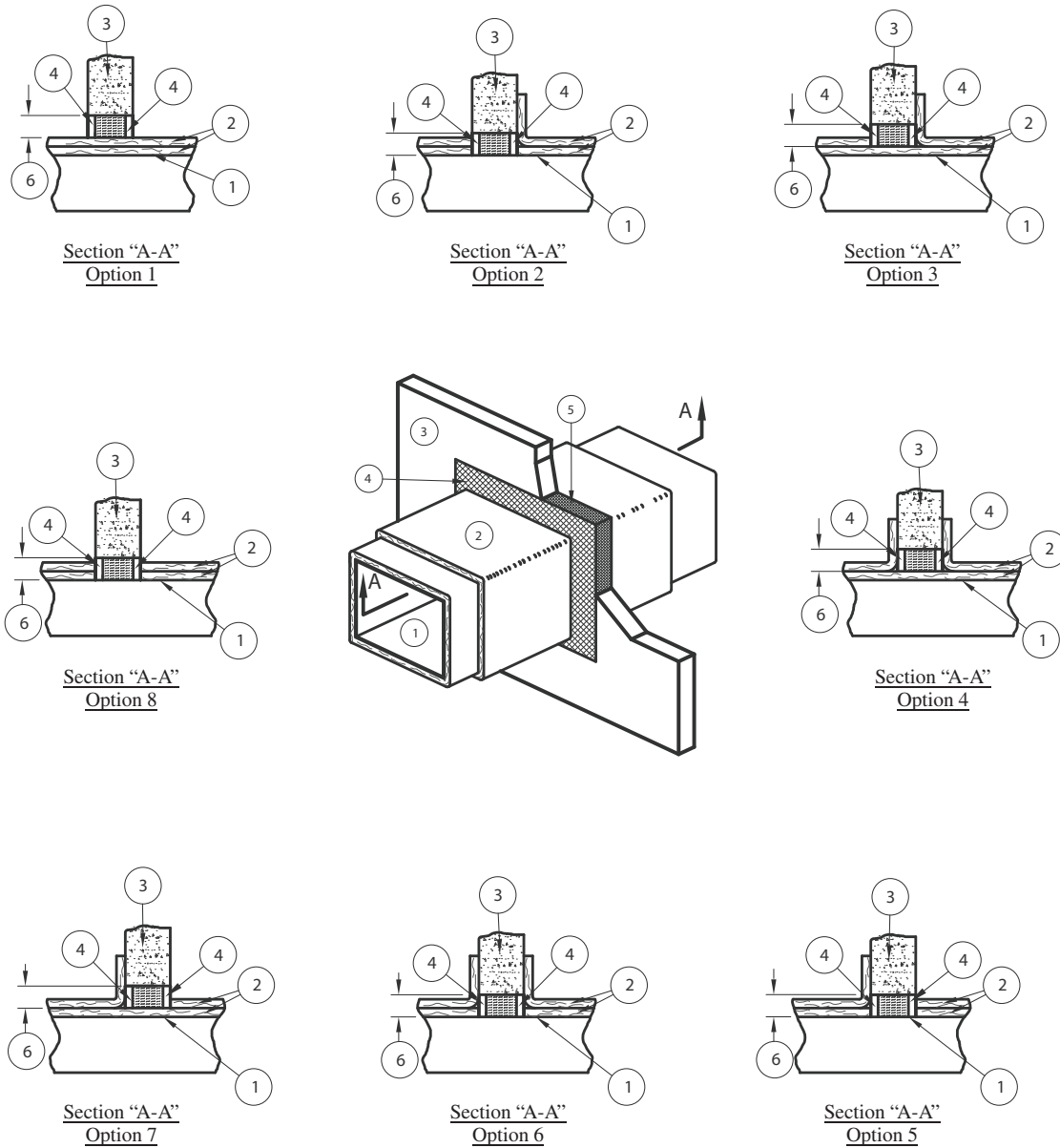


Figure 6. Firestop Installation

FyreWrap® Elite® 1.5 Duct Insulation Through Penetration Firestops Wall
Intertek Design No. UNI/BI 120-02 F-Rating = 2 Hrs. T-Rating = 2 Hrs.

FP-690



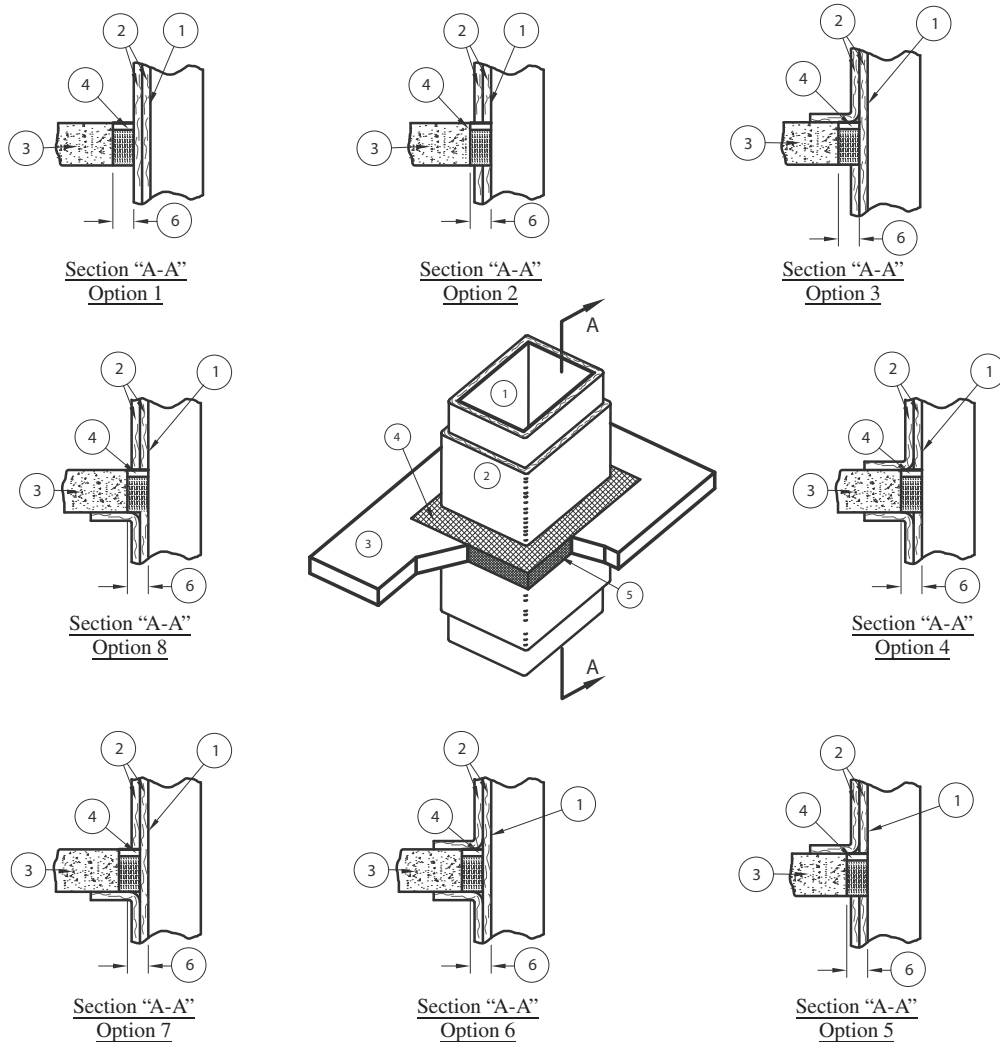
Legend:	
1	Grease Duct, max. 2401 in ² area, 49" max width
2	FyreWrap® Elite® 1.5 Duct Insulation, Two Layers
3	Fire-Resistive Concrete, Gypsum, or SMU block wall assembly, 2 hr. rated
4	Firestop Sealant, 5/8" depth, overlapping on wall and duct min. 1/2"
5	Unfaced FyreWrap® Elite® 1.5 or 4 PCF Mineral Wool compressed 50% option 1 and 33% options 2-8, recessed 5/8" from both sides of wall
6	Annular space, 1/2" to 4 1/2"

FyreWrap

Figure 7. Firestop Installation

FyreWrap® Elite® 1.5 Duct Insulation Through Penetration Firestops Floor
Intertek Design No. UNI/BI 120-02 F-Rating = 2 Hrs. T-Rating = 2 Hrs.

FP-691



Legend:

1	Grease Duct, max. 2401 in ² area, 49" max width
2	FyreWrap® Elite® 1.5 Duct Insulation, Two Layers
3	Fire-Resistive Concrete Floor assembly, 2 hr. rated
4	Firestop Sealant, 3/8" depth, overlapping on floor and duct min. 1/2"
5	Unfaced FyreWrap® Elite® 1.5 or 4 PCF Mineral Wool compressed 50% option 1 and 33% options 2-8, recessed 3/8" from top side of floor
6	Annular space, 1/2" to 4 1/2"