



ICC-ES Evaluation Report ESR-2224

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This report is subject to renewal August 2024.

DIVISION: 07 00 00—THERMAL AND MOISTURE PROTECTION

Section: 07 21 00—Thermal Protection

Section: 07 21 16—Blanket Insulation

Section: 07 81 33—Mineral-Fiber Fireproofing

REPORT HOLDER:

UNIFRAX I LLC

EVALUATION SUBJECT:

FYREWAP® ELITE 1.5 GREASE DUCT ENCLOSURE ASSEMBLIES

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2021, 2018, 2015, 2012 and 2009 *International Building Code®* (IBC)
- 2021, 2018, 2015, 2012 and 2009 *International Mechanical Code®* (IMC)
- 2021, 2018, 2015, 2012 and 2009 IAPMO *Uniform Mechanical Code* (IAPMO UMC)
- 2013 *Abu Dhabi International Building Code* (ADIBC)[†]

[†]The ADIBC is based on the 2009 IBC. 2009 IBC code sections referenced in this report are the same sections in the ADIBC.

- Other Codes (see Section 8.0)

Properties evaluated:

- Durability
- Fire resistance
- Noncombustibility
- Surface-burning characteristics

2.0 USES

FyreWrap Elite 1.5 duct insulation is a flexible blanket used to construct zero-clearance, fire-resistance-rated grease duct enclosure assemblies serving Type I kitchen hoods. The systems described in this report comply with 2021, 2018, 2015 and 2012 IMC Section 506.3.11.2 (2009 IMC Section 506.3.10.2) and 2021 and 2018 IAPMO UMC Sections 507.4.5 and 507.4.6 [2015 IAPMO UMC Sections 507.2.5 and 507.3.6, 2012 IAPMO UMC Section 507.2.5

and 507.2.6 2009 IAPMO UMC Sections 507.2.6 and 510.7.3.1] and are an alternative to the one- and two-hour fire-resistance-rated enclosure requirements of 2021, 2018, 2015, 2012 IBC Section 713.4 (2009 IBC Section 708.4) and with the exception to 2021, 2018, 2015 and 2012 IAPMO UMC Section 510.7 (2009 IAPMO UMC Section 510.7.1) when installed in accordance with Section 4.0.

3.0 DESCRIPTION

3.1 FyreWrap Duct Insulation:

3.1.1 FyreWrap Elite 1.5: The FyreWrap Elite 1.5 duct insulation is a calcia, magnesia, silica material. The insulation is provided unfaced, faced on one side or totally encapsulated in a fiberglass-reinforced aluminum foil scrim. The insulation is nominally 1½ (38 mm) inches thick and is delivered to the jobsite in rolls 25 feet (7.75 m) long and either 2 or 4 feet (610 or 1219 mm) wide. The insulation has a nominal density of 6 pcf and have a flame-spread index of 25 or less and a smoke-developed index of 50 or less when tested in accordance with ASTM E84.

3.2 Duct System:

Grease ducts serving Type 1 hoods must be constructed of minimum 0.055-inch-thick (1.40 mm) (No. 16 gage) carbon steel or stainless steel at least 0.044 inch thick (1.10 mm) (No. 18 gage). Joints and seams of grease ducts must comply with IMC Section 506.3.2, or 2021, 2018 and 2015 IAPMO UMC Section 510.5.3 [2012 and 2009 IAPMO UMC Section 510.5.2], as applicable. Duct supports must comply with IMC Section 506.3.3, or 2021, 2018, 2015 and 2012 IAPMO UMC Sections 510.1.6 and 510.5.1 (2009 IAPMO UMC Section 510.1.7 and 510.5.1), as applicable, and Section 4.2.3 of this report. Maximum duct size is 49 inches by 49 inches (1244 mm by 1244 mm). Under IMC Section 506.3.2.5 or 2021, 2018 and 2015 IAPMO UMC Section 510.5.3.1, prior to use or concealment of any portion of the grease duct system, a leakage test must be performed to determine that all welded joints and seams are liquid tight.

3.3 Duct Wrap Tape:

3.3.1 Aluminum Foil Tape: Pressure-sensitive aluminum foil tape having a nominal width of 2 or 4 inches is used to seal all cut insulation edges.

3.3.2 Filament Tape: Fiberglass-reinforced filament tape having a nominal width of 1 inch is used to temporarily hold the interior and exterior layers of the duct insulation in position.

3.4 Banding Material:

Banding material must be minimum 1/2-inch-wide (12.7 mm), 0.015-inch-thick (0.38 mm), Type 304 stainless steel strap, or minimum 1/2-inch-wide (12.7 mm), 0.020-inch-thick (0.51 mm) carbon steel strap.

3.5 Penetration Packing Material and Sealants:

3.5.1 Packing Material:

3.5.2 Mineral Wool: Mineral wool insulation used to pack the annular space of penetrations surrounding the duct must have a minimum nominal density of 4 pcf.

3.5.3 Sealants:

3.5.3.1 GE Silicone Pensil 300: GE Silicone Pensil 300, used to seal the penetration, is a one-compound silicone elastomeric that cures upon exposure to atmospheric humidity. The sealant is supplied in tubes and pails and has a shelf life of twelve months when stored at temperatures between 40°F and 90°F (4.4°C and 32.2°C).

3.5.3.2 STI SpecSeal SSS: STI SpecSeal SSS Sealant is a one-component, latex-based, high-solids, intumescent firestop compound, that is for use on horizontal and vertical assemblies. Installation temperatures must be between 35°F and 100°F (1.7°C to 37.8°C) and the sealant must be allowed to dry 24 hours before exposure to moisture. It is supplied in tubes and pails.

3.5.3.3 Tremco Fyre-Sil: Tremco Fyre-Sil is a single-component, neutral cure, silicone elastomeric firestop sealant. It has an application temperature range of 40°F to 110°F (5°C to 43°C) and a cure time of seven to fourteen days. The material is supplied in tubes, pails and sausages.

3.5.3.4 3M FireBarrier 1000NS: 3M FireBarrier 1000NS is a ready-to-use, one-component, silicone elastomer firestop sealant, which cures upon exposure to atmospheric humidity to form a flexible seal. The sealant has a shelf life of 12 months from date of packaging when stored in a clean, dry area at temperatures between 40°F and 90°F (4°C and 32°C).

3.5.3.5 Hilti FS-ONE: Hilti FS-ONE is a red-colored, water-based, acrylic intumescent firestop sealant with an application temperature of 41°F to 104°F (5°C to 40°C). The sealant must be stored in original packaging in a location protected from moisture at temperatures between 40°F and 86°F (5°C and 30°C).

3.6 Prefabricated Access Doors:

Ductmate Industries, Inc., Ultimate Door and F2-HT doors may be used in lieu of field-fabricated access doors when installed as described in Section 4.2.2.3. The doors and their components are provided as an assembly, are sized for the clean-out opening and are provided with threaded rods and wing nuts for securing the duct insulation. The door systems include an appropriately sized outer insulation plate and must use the Ductmate-supplied 2300°F gasket.

4.0 INSTALLATION

4.1 General:

The FyreWrap® Elite 1.5 duct insulation must be installed directly on the outer surface of ducts complying with Section 3.2 of this report, and may be installed with zero clearance from the insulating material to combustible construction. Grease ducts protected with FyreWrap Elite 1.5 may penetrate nonfire-resistance-rated wall, floor-ceiling and roof-ceiling assemblies, provided the duct is protected by the system continuously through the penetration or from the point of penetration in accordance with this report. The

system may also penetrate fire-resistance-rated assemblies when the through-penetration is protected in accordance with Section 4.3 of this report. The system complies with the requirements of IMC Section 602.2.1, and IAPMO UMC Section 602.2 for installation in plenums.

4.2 Two-hour Fire-resistance-rated Enclosure Assembly:

4.2.1 Enclosure Assembly: Two layers of FyreWrap Elite 1.5 duct insulation are installed around the grease duct. Each layer is cut to a length sufficient to wrap completely around the perimeter of the grease duct and provide a minimum 3-inch (76 mm) overlap. Adjacent insulation blankets on the first layer are either butted or overlapped 3 inches (76 mm). All overlaps on the second layer are required to be a minimum of 3 inches (76 mm). Aluminum foil tape is used to seal cut edges of the insulation blanket. All joints between layers must be staggered a minimum of 3 inches (76 mm). Each layer of blanket material is temporarily held in place with nominally 1-inch-wide filament tape, placed circumferentially 1 1/2 inches (38 mm) from the edges of each blanket and spaced 10 1/2 inches (267 mm) on center.

Banding is used to hold the outer layer of the duct insulation enclosure system in place. The bands are placed circumferentially 1 1/2 inches (38 mm) from the edges of the duct insulation and are spaced 10 1/2 inches (267 mm) on center. The tension of the banding material must be sufficient to firmly hold the duct insulation in place, but must not be so great as to cause any cutting or damage to the duct insulation. Banding is not required to hold the first layer of blanket in place. One-inch-wide (25.4 mm) filament tape may be used to aid installation of the first layer of duct insulation. See Figure 1 for details.

For duct width dimensions greater than 24 inches (610 mm) through 49 inches (1245 mm), No. 12 gage steel insulation pins, long enough to extend through the two layers of duct insulation, are located in columns spaced 12 inches (305 mm) apart, between 2 and 12 inches (51 mm and 305 mm) from each duct edge and 10 1/2 inches (267 mm) on center along the bottom of horizontal duct runs and along the outside of vertical duct runs, to prevent duct insulation sag. The insulation pins may be prewelded or cup-head style. The duct insulation layers are locked into place over the pins with 1 1/2-inch (38 mm) round or 2-inch-by-2-inch (51 mm by 51 mm) square galvanized steel speed clips. Methods of installing the two-layer system include overlap on all layers method, butt-joint/overlap method or butt-joint/collar method as illustrated in Figure 1. When two duct insulation layers are encapsulated in one bag, the butt-joint method must be used.

4.2.2 Grease Duct Access Doors:

4.2.2.1 General: Installation of grease duct access doors must comply with IMC Section 506.3.8, or IAPMO UMC Section 510.3, as applicable. Grease duct access doors must be protected with three layers of FyreWrap Elite 1.5 duct insulation.

4.2.2.2 Field-fabricated Access Doors: Each access door assembly has four threaded rods, one welded to each corner of the door opening. Each threaded rod measures 1/4 inch (6.4 mm) in diameter and a nominal 6 inches in length. Optionally, 4-inch-long (102 mm) hollow steel tubes may be fitted over the threaded rods to act as protective sleeves for the duct insulation when the door is fastened. A 0.5-inch-thick (12.7 mm) ceramic fiber gasket is installed between the duct and the door cover. Four steel insulation

pins, with a No. 12 gage diameter and a nominal length of 7 inches, are welded to the steel door panel, for duct insulation installation. Two layers of the duct insulation are installed over the welded insulation pins, with the second layer having a perimeter 1 inch (25.4 mm) wider than the first. The third layer of duct insulation is cut in a similar manner and installed over the second layer. Each subsequent layer must have a minimum overlap of 1 inch (25.4 mm) around the perimeter of the door and any previous duct insulation layers. The duct insulation layers are held in place with 1½-inch (38 mm) round or 2-inch-by-2-inch (51 mm by 51 mm) square galvanized steel speed clips, and washers and wing nuts for ¼-inch-diameter (6.4 mm) rod. Access door labels complying with 2021, 2018, 2015, 2012 IMC Section 506.3.12 (2009 IMC Section 506.3.11) or 2021, 2018, 2015, 2012 IAPMO UMC Section 510.1.5 (2009 IAPMO UMC Section 510.1.6), as applicable, must be applied to all access doors. See Figure 2 for details of protection for field-fabricated access doors.

4.2.2.3 Prefabricated Access Doors: Ductmate Ultimate and F2-HT prefabricated access doors must be installed in accordance with Ductmate Industries, Inc., installation instructions and the applicable code. The first layer of duct insulation is cut to the size of the door and each successive layer has an overlap of 1 inch (25.4 mm) over the lower layer. All edges of the duct insulation must be protected with aluminum tape. A No. 16 [0.055 inch (1.4 mm)] gage outer plate the same dimension as the outer layer of duct insulation is held in place over the insulation using threaded rod and wing nuts provided with the doors. See Figure 2 for assembly details.

4.2.3 Duct Support: Horizontal duct assemblies with maximum dimensions of 49 inches by 49 inches (1244.6 mm by 1244.6 mm) are supported with minimum ⅜-inch diameter (9.5 mm) all-thread steel rod and 1½ inch-by-1½-inch-by-⅛-inch (38 mm by 38 mm by 3.2 mm) steel angle, spaced a maximum of 60 inches (1524 mm) on center along the length of the duct. See Figure 3.

For support spacing up to 72 inches on center, horizontal duct assemblies with maximum dimensions of 49 inches by 49 inches (1244.6 mm by 1244.6 mm) must be supported with minimum ½-inch-diameter (12.7 mm), all-thread steel rods and 2-inch-by-2-inch-by-¼-inch (51 mm by 51 mm by 6.4 mm) steel angles. A minimum clearance of 1 inch (25.4 mm) is required between the edge of the protected duct and the steel rod. See Figure 3.

Vertical duct assemblies with maximum dimensions of 49 inches by 49 inches (1244.6 mm by 1244.6 mm) are supported with minimum 1½-inch-by-1½-inch-by-¼-inch (38 mm by 38 mm by 6.4 mm) 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 must be established by structural calculations in accordance with the applicable code, that are submitted to the code official for approval.

4.3 Through-penetrations:

4.3.1 General: Where the system penetrates fire-resistance-rated assemblies, the through-penetration must be protected with an approved through-penetration firestop system. Section 4.3.2 describes two-hour F-rated through-penetration firestop assemblies for walls, and Section 4.3.3 describes two-hour F- and T-rated firestop assemblies for floors/ceilings. Where the grease duct enclosure system penetrates other than the concrete, concrete masonry or gypsum board assemblies described in those sections, the

through-penetration must be protected with a through-penetration firestop assembly complying with the applicable code provisions, and use of the firestop assembly must be approved by the code official.

4.3.2 Wall Assemblies: Two-hour F-Rated Through-penetration Firestop Assemblies:

4.3.2.1 Assembly 1: Where the grease duct protected with the FyreWrap Elite 1.5 enclosure assembly penetrates a fire-resistance-rated concrete or concrete masonry wall assembly or a gypsum board assembly complying with 2021, 2018, 2015, 2012 IBC Table 721.1(2) [2009 IBC Table 720.1(2)], and the penetration requires protection, the annular space of the penetration must be protected as illustrated in Figure 4 and as described below:

- Penetration opening: The maximum area of the opening in the fire-resistance-rated wall assembly is 3105 square inches (2.05 m²) with any one dimension a maximum of 57.5 inches (1460 mm).
- Duct insulation: The grease duct must be wrapped with the duct insulation material as described in Section 4.2.1.
- Packing material: The annular space is filled completely with unfaced duct insulation, or minimum 4 pcf (64 kg/m³), 4-inch-thick (102 mm) mineral wool, compressed 25 percent and recessed ⅜ inch (9.5 mm) from both surfaces of the wall, as required to accommodate the necessary depth of the sealant material.
- Sealant material: The recessed voids created by the packing material must be filled to a minimum depth of ⅜ inch (9.5 mm) with Tremco Fyre-Sil sealant described in Section 3.5. The sealant material must overlap onto the wall surface and the duct insulation a minimum of ½ inch (12.7 mm).

4.3.2.2 Assembly 2: Where the grease duct protected with the FyreWrap® Elite 1.5 enclosure assembly penetrates a fire-resistance-rated gypsum board wall assembly complying with 2021, 2018, 2015, 2012 IBC Table 721.1(2) [2009 IBC Table 720.1(2)], and the penetration requires protection, the annular space of the penetration must be protected as described in Figure 4 and described below:

- Penetration opening: The maximum area of the opening in the fire-resistance-rated wall assembly is 3393 square inches (2.17 m²) with any one dimension a maximum of 58¼ inches (1479 mm).
- FyreWrap® Elite 1.5 duct insulation: The grease duct must be wrapped with the duct insulation material as described in Section 4.2.1.
- Packing material: The annular space is filled completely with unfaced duct insulation, compressed 48 percent and recessed ⅝ inch (15.9 mm) from both surfaces of the wall, as required to accommodate the necessary depth of the sealant material.
- Sealant material: The recessed voids created by the packing material must be filled to a minimum depth of ⅝ inch (15.9 mm) with STI SpecSeal SSS intumescent sealant described in Section 3.5.3.2. The sealant material must overlap onto the gypsum wallboard and the duct insulation a minimum of ½ inch (12.7 mm).

4.3.3 Floor/Ceiling Assemblies: Two-hour F- and T-rated Through-penetration Firestop Assemblies:

4.3.3.1 Assembly 3: Where the grease duct protected with the FyreWrap® Elite 1.5 enclosure assembly described in Section 4.2.1 penetrates a minimum 4½-inch-thick

(114 mm) fire-resistance-rated concrete floor/ceiling assembly complying with 2021, 2018, 2015 and 2012 IBC Table 721.1(3) [2009 IBC Table 720.1(3)], the annular space of the penetration must be protected as illustrated in Figure 5 and as described below:

- a. Penetration opening: The maximum area of the opening in the fire-resistance-rated floor assembly is 3024 square inches (1.95 m²) with a maximum opening dimension of 56 inches (1422.4 mm).
- b. FyreWrap® Elite 1.5 duct insulation: The grease duct must be wrapped with the duct insulation as described in Section 4.2.1. As an additional installation option, the duct insulation is permitted to be terminated on each side of the floor/ceiling assembly.
- c. Packing material: The annular space is filled completely with unfaced duct wrap material, compressed 33 percent and recessed 1/4 inch (6.4 mm) from top surface of the floor, as required to accommodate the necessary depth of the sealant material.
- d. Sealant material: The recessed void created by the packing material must be filled to a minimum depth of 1/4 inch (6.4 mm) with STI SpecSeal SSS intumescent sealant described in Section 3.5.

4.3.3.2 Assembly 4: Where the grease duct protected with the FyreWrap Elite 1.5 enclosure assembly described in Section 4.2.1 penetrates a minimum 4 1/2-inch-thick (114 mm) fire-resistance-rated concrete floor/ceiling assembly complying with 2021, 2018, 2015 and 2012 IBC Table 721.1(3) [2009 IBC Table 720.1(3)], the annular space of the penetration must be protected as illustrated in Figure 6 and as described below:

- a. Penetration opening: The maximum area of the opening in the fire-resistance-rated floor assembly is 3105 square inches (2.05 m²) with a maximum opening dimension of 57.5 inches (1460 mm).
- b. FyreWrap® Elite 1.5 duct insulation: The grease duct must be wrapped with the duct insulation as described in Section 4.2.1.
- c. Packing material: The annular space is filled completely with unfaced duct wrap material, or minimum 4 pcf (64 kg/m³), 4-inch-thick (102 mm) mineral wool, compressed 25 percent and recessed 3/8 inch (9.5 mm) from top surface of the floor, as required to accommodate the necessary depth of the sealant material.
- d. Sealant material: The recessed void created by the packing material must be filled to a minimum depth of 3/8 inch (9.5 mm) with Tremco Fyre-Sil sealant described in Section 3.5. The sealant material must overlap onto the concrete and the duct insulation a minimum of 1/2 inch (12.7 mm).

4.3.3.3 Assembly 5: Where the grease duct protected with the FyreWrap Elite 1.5 enclosure assembly described in Section 4.2.1 penetrates a minimum 4 1/2-inch-thick (114 mm) fire-resistive concrete floor/ceiling assembly complying with 2021, 2018, 2015 and 2012 IBC Table 721.1(3) [2009 IBC Table 720.1(3)], the annular space of the penetration must be protected as illustrated in Figure 6 and as described below:

- a. Penetration opening: The maximum area of the opening in the fire-resistance-rated floor assembly is 1792 square inches (1.16 m²) with a maximum opening dimension of 56 inches (1422.4 mm).

- b. FyreWrap® Elite 1.5 duct insulation: The grease duct must be wrapped with the duct insulation material as described in Section 4.2.1.
- c. Packing material: The annular space is filled completely with nominally 4 pcf mineral wool, cut into strips approximately 1/2 inch (12.7 mm) thick, rolled tightly and inserted lengthwise into the annular space. The mineral wool is recessed 1/4 inch (6.4 mm) from top surface of the floor, as required to accommodate the necessary depth of the sealant material.
- d. Sealant material: The recessed void created by the packing material must be filled to a minimum depth of 1/4 inch (6.4 mm) with GE Silicone Pensil 300 sealant described in Section 3.5.3.1.

4.3.3.4 Assembly 6: Where the grease duct protected with the FyreWrap® Elite 1.5 enclosure assembly described in Section 4.2.1 penetrates a minimum 4 1/2-inch-thick (114 mm) fire-resistance-rated concrete floor/ceiling assembly complying with 2021, 2018, 2015 and 2012 IBC Table 721.1(3) [2009 IBC Table 720.1(3)], the annular space of the penetration must be protected as illustrated in Figure 7 and as described below:

- a. Penetration opening: The maximum area of the opening in the fire-resistance-rated floor assembly is 3481 square inches (2.25 m²) with a maximum opening dimension of 59 inches (1498.6 mm).
- b. FyreWrap® Elite 1.5 duct insulation: The grease duct must be wrapped with the duct insulation as described in Section 4.2.1. As an additional installation option, the duct insulation is permitted to be terminated on each side of the floor/ceiling assembly.
- c. Packing material: The annular space is filled completely with unfaced duct wrap material, compressed 33 percent and recessed 3/8 inch (9.5 mm) from the top surface of the floor, as required to accommodate the necessary depth of the sealant material.
- d. Sealant material: The recessed void created by the packing material must be filled to a minimum depth of 3/8 inch (9.5 mm) with 3M FireBarrier 1000NS, Hilti FS-ONE, STI SpecSeal SSS or Tremco Fyre-Sil, as described in Section 3.5.3.4, Section 3.5.3.5, Section 3.5.3.2 or Section 3.5.3.3, respectively.

5.0 CONDITIONS OF USE

The FyreWrap Elite 1.5 grease duct enclosure assemblies described in this report comply with, or are suitable alternatives to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

- 5.1** The enclosure system must be constructed and installed in accordance with this report, the manufacturer's published installation instructions and the applicable code. In the event of a conflict between this report and the manufacturer's installation instructions, this report governs.
- 5.2** The FyreWrap® Elite 1.5 duct insulation is manufactured in New Carlisle, Indiana, under a quality control program with inspections by ICC-ES.

6.0 EVIDENCE SUBMITTED

- 6.1** Data in accordance with the ICC-ES Acceptance Criteria for Field-applied Grease Duct Enclosure Assemblies (AC101.1), dated December 2012 (editorially revised August 2023).
- 6.2** Data in accordance with ASTM E2336.

7.0 IDENTIFICATION

- 7.1 The ICC-ES mark of conformity, electronic labeling, or the evaluation report number (ICC-ES ESR-2224) along with the name, registered trademark, or glistered logo of the report holder must be included in the product label.
- 7.2 In addition, the FyreWrap® Elite 1.5 duct insulation is labeled with the product name, Unifrax I LLC name and address, clearances to combustibles in accordance with applicable code, and the evaluation report number (ESR-2224). the FyreWrap® Elite 1.5 duct insulation is packaged in boxes bearing the product name, the company name (Unifrax I LLC) and address, the surface-burning characteristics, and the evaluation report number (ESR-2224). The wording "FyreWrap" and "Fire-resistive Enclosure, Do Not Remove" and the evaluation report number (ESR-2224) are printed on duct insulation at approximate 4-foot (1219 mm) intervals. Sealants used for through-penetration firestops are labeled with the manufacturer's name and

the product name. Prefabricated access doors are labeled with the DuctMate Industries, Inc., name, the product name and the model number.

- 7.3 The FyreWrap® Elite 1.5 duct insulation material covering access opening panels shall be labeled with the wording "ACCESS PANEL. DO NOT OBSTRUCT." As an alternative to labeling the insulation material, a sign including "ACCESS PANEL. DO NOT OBSTRUCT." must be installed in the field over the insulation material covering the access opening panels.
- 7.4 The report holder's contact information is the following:

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600 RIVERWALK PARKWAY, SUITE 120
TONAWANDA, NEW YORK 14150
(716) 768-6500
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mkerrison@alkegen.com

FyreWrap® Elite® 1.5 Duct Insulation

Installation Methods

1 or 2 Hour Fire Rated Enclosure, Shaft Alternative

Zero Clearance To Combustibles

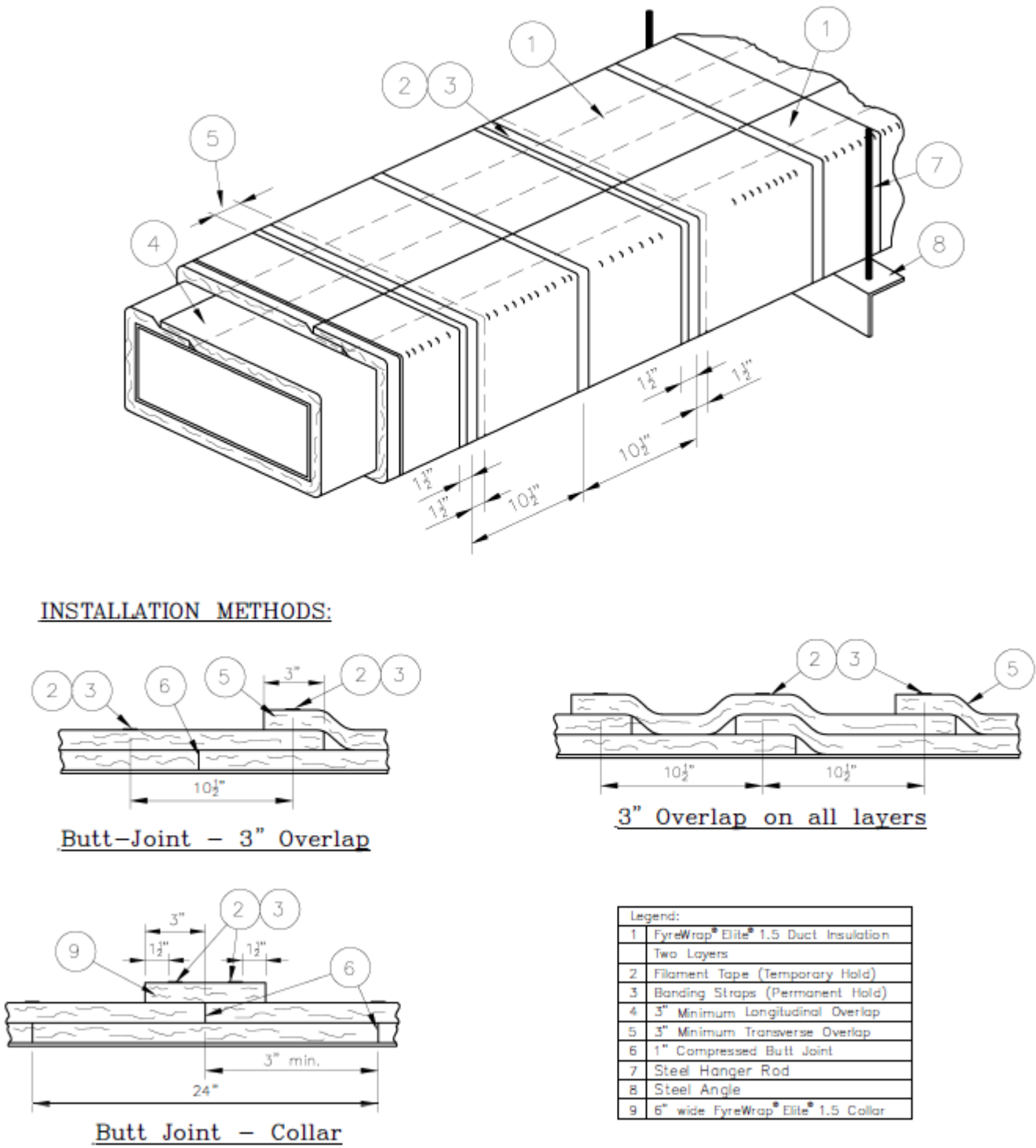
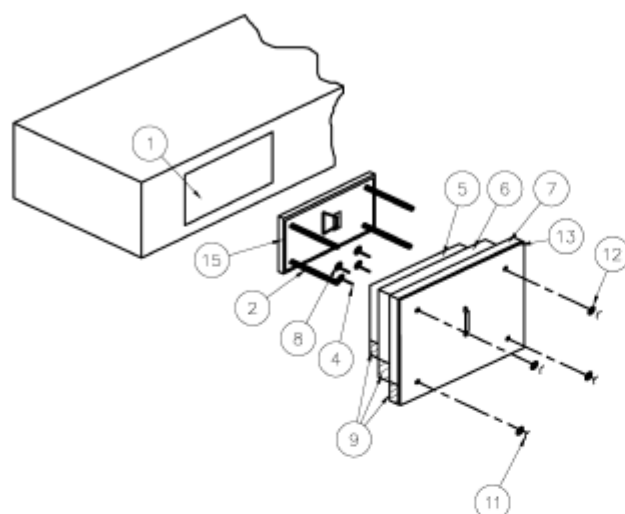
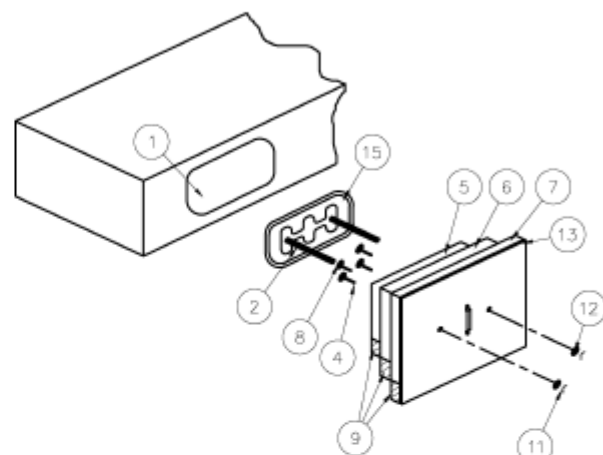


FIGURE 1

FyreWrap® Elite® 1.5 Duct Insulation Access Door Systems

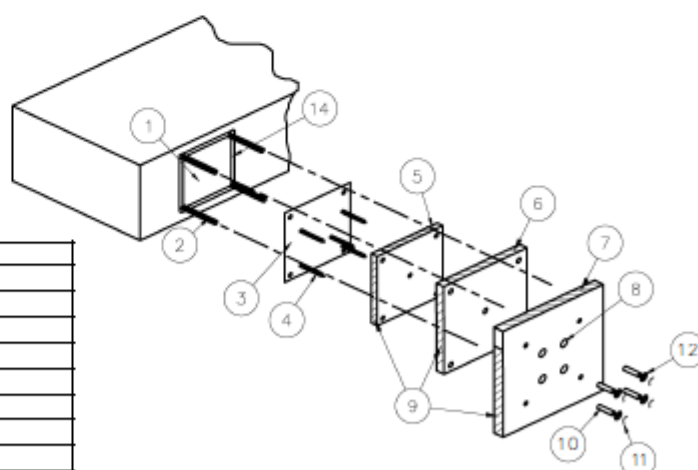


Ductmate Ultimate Door System



Ductmate F2-HT Door System

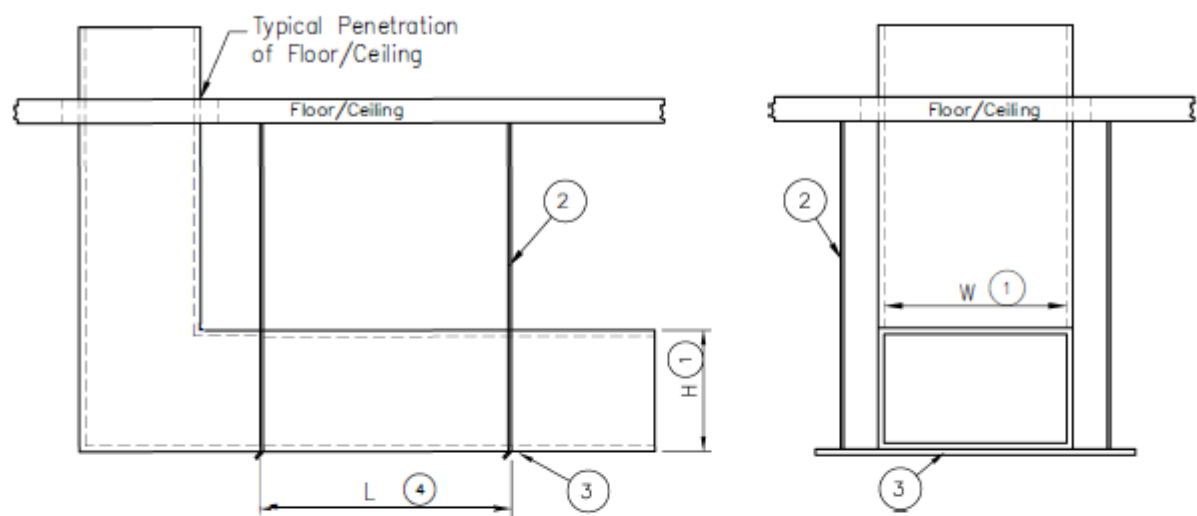
Legend:	
1	Access Door Opening
2	All Thread Rods
3	Access Door Cover Panel 16 Gauge (field fab. only)
4	Insulation Pins - Welded to Cover
5	First Layer FyreWrap® Elite® 1.5
6	Second Layer FyreWrap® Elite® 1.5, 1" Compression
7	Third Layer FyreWrap® Elite® 1.5, 1" Compression
8	Speed Clips/Washers
9	Cut 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	Ceramic fiber or Unfaced FyreWrap® gasket, 1/2" thick
15	Pre-fabricated access door



Field Fabricated Door System

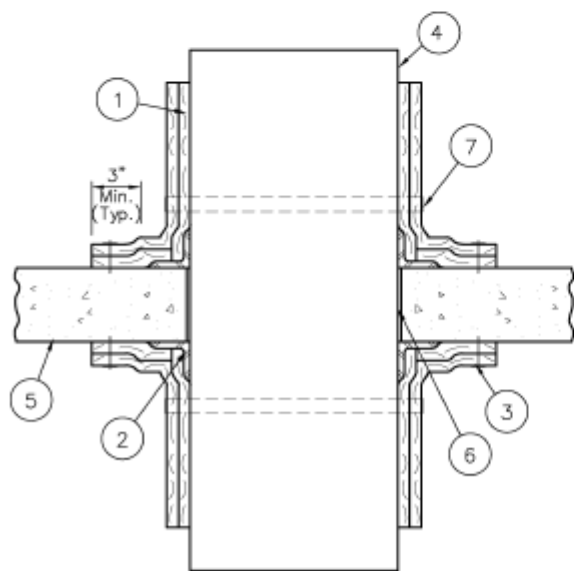
FIGURE 2

FyreWrap® Elite® 1.5 Duct Insulation
Typical Duct Support Details



Typical Horizontal Duct Support Details

Legend:			
1	Max. Duct Size (HxW)	49"x49"	49"x49"
2	Steel Threaded Rod	$\frac{3}{8}$ " diameter	$\frac{1}{2}$ " diameter
3	Steel Angle	$1\frac{1}{2}$ "x $1\frac{1}{2}$ "x $\frac{1}{8}$ "	2"x2"x $\frac{1}{4}$ "
4	Support System Spacing (L)	60"	72"



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

Typical Vertical Duct Support Details

FIGURE 3

**FyreWrap® Elite®1.5 Duct Insulation
Through Penetration Wall Systems,
F Rating = 2 hrs. T Rating = 2 hrs.**

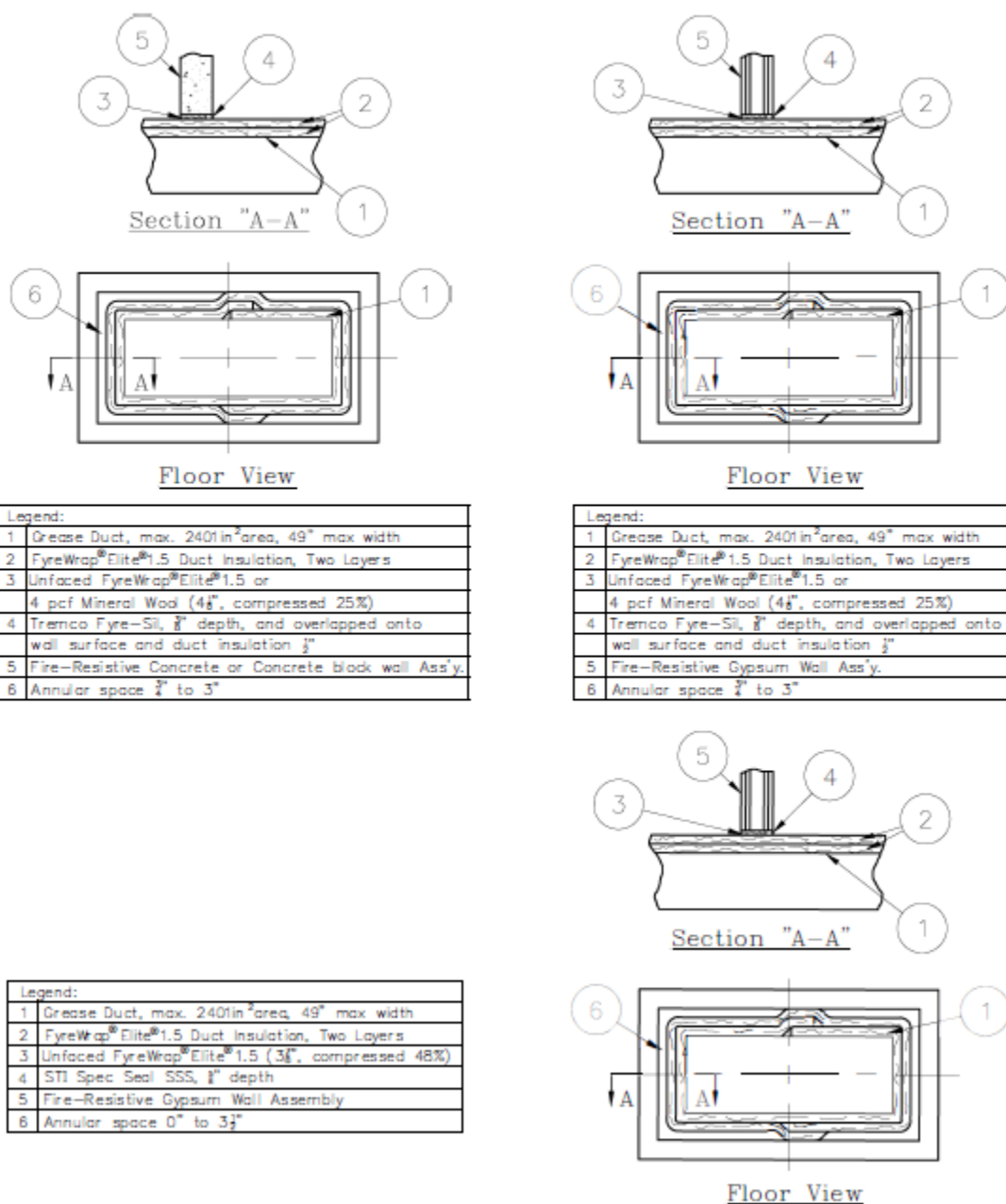
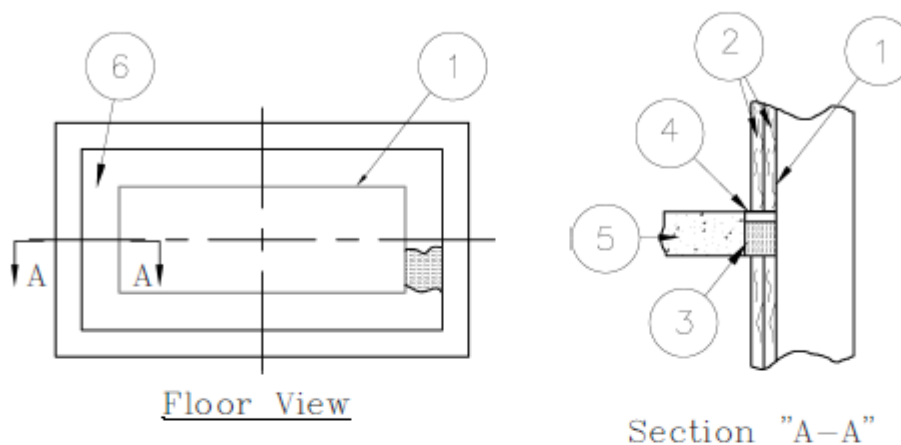
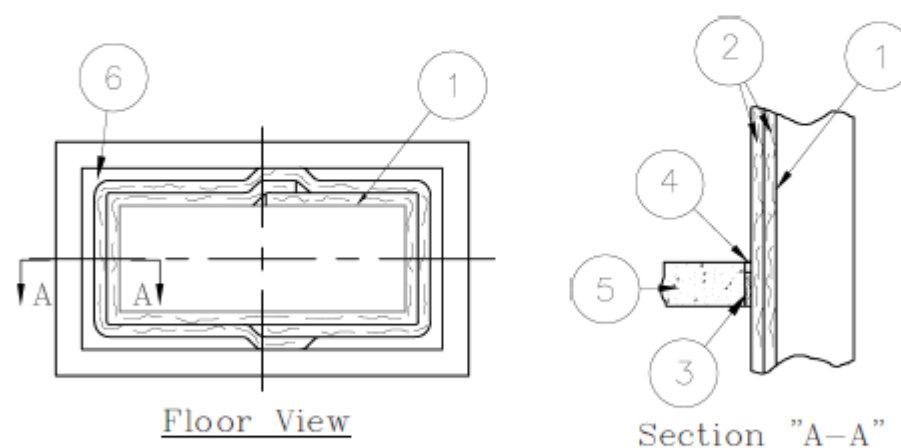


FIGURE 4

FyreWrap® Elite® 1.5 Duct Insulation
Through Penetration Floor/Ceiling Systems,
F Rating = 2 hrs. T Rating = 2 hrs.



Duct Wrap Insulation Terminated at Floor

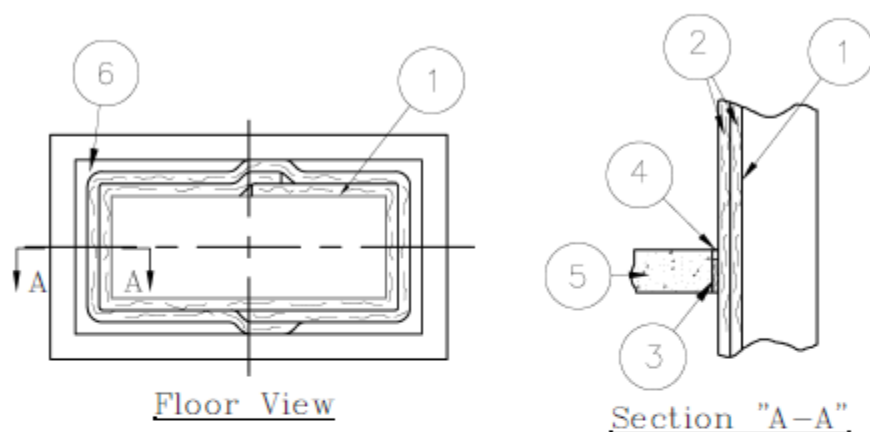


Duct Wrap Insulation continues Through Floor

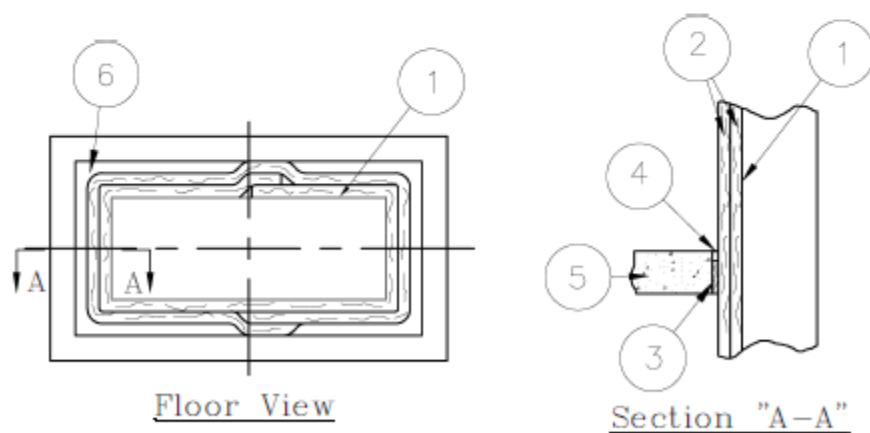
Legend:	
1	Grease Duct, max. 2401in ² area, 49" max width
2	FyreWrap® Elite® 1.5 Duct Insulation, Two Layers
3	Unfaced FyreWrap® Elite® 1.5 (4 1/4", compressed 33%)
4	STI Spec Seal SSS, 1/4" depth
5	Fire-Resistive Concrete Floor/Ceiling Assembly
6	Annular space, 1" to 2"

FIGURE 5

**FyreWrap® Elite® 1.5 Duct Insulation
Through Penetration Floor/Ceiling Systems,
F Rating = 2 hrs. T Rating = 2 hrs.**



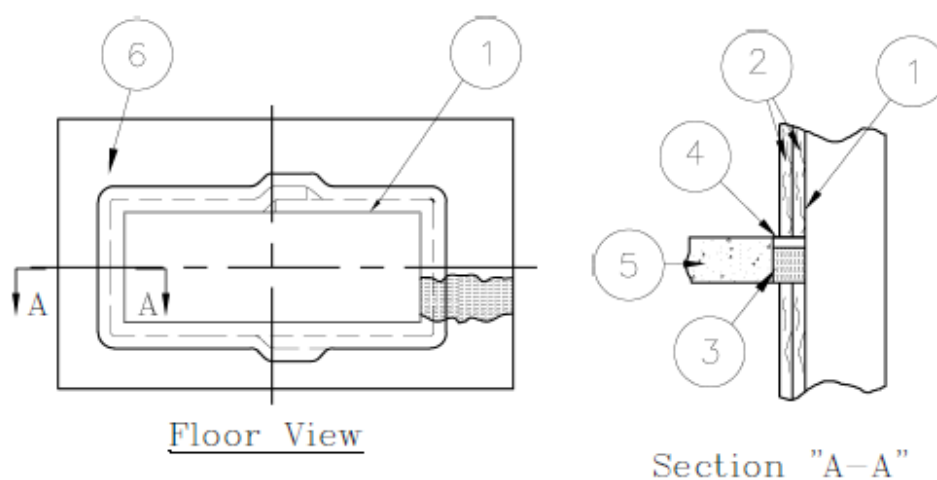
Legend:	
1	Grease Duct, max. 240in ² area, 49" max width
2	FyreWrap® Elite® 1.5 Duct Insulation, Two Layers
3	Unfaced FyreWrap® Elite® 1.5 or 4 pcf Mineral Wool (4", compressed 25%)
4	Tremco Fyre-Sil, 1/2" depth, and overlapped onto concrete and duct insulation 3"
5	Fire-Resistive Concrete Floor/Ceiling Ass'y.
6	Annular space 1" to 5"



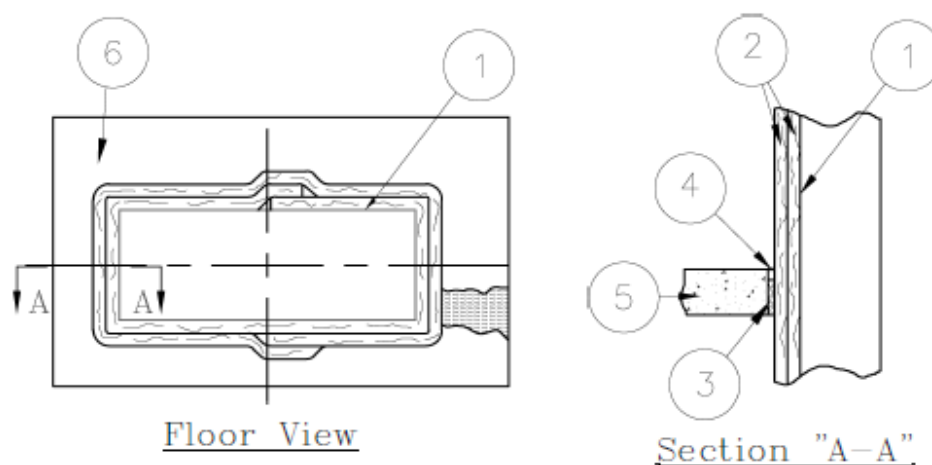
Legend:	
1	Grease Duct, max. 1152 in ² area, 48" max width
2	FyreWrap® Elite® 1.5 Duct Insulation, Two Layers
3	Mineral Wool, 4 pcf, tightly packed
4	STI Pensil 300, 1/2" depth
5	Fire-Resistive Concrete Floor/Ceiling Ass'y.
6	Annular space, maximum 1"

FIGURE 6

**FyreWrap® Elite® 1.5 Duct Insulation
Through Penetration Floor/Ceiling Systems,
F Rating = 2 hrs. T Rating = 2 hrs.**



Duct Wrap Insulation Terminated at Floor



Duct Wrap Insulation continues Through Floor

Legend:	
1	Grease Duct, max. 240in ² area, 49" max width
2	FyreWrap® Elite® 1.5 Duct Insulation, Two Layers
3	Unfaced FyreWrap® Elite® 1.5 (4", compressed 33%)
4	Firestop Sealant, 3/8" depth, 3M Fire Barrier 1000NS or Hilti FS-ONE or STI SpecSeal SSS or Tremco FyreSil
5	Fire-Resistive Concrete Floor/Ceiling Assembly
6	Annular space, 1" to 3"

FIGURE 7