

Product Data & Installation Guide

1. Product Description

Thermal Ceramics Duct Wrap 2x2+ is a foil-encapsulated, non-combustible, inorganic, flexible fireproofing wraps specifically tested and designed to provide a 1 or 2 hour fire rated enclosure for commercial kitchen grease ducts in compliance with AC 101 (ASTM E2336) grease duct test standard. Duct Wrap 2x2+ is in compliance with the:

- Uniform Mechanical Code
- International Mechanical Code
- Uniform Building Code

for zero clearance to combustibles and shaft alternative. Duct Wrap 2x2+ is a low biopersistence alkaline-earth silicate wool. Duct Wrap 2x2+ materials are classified by Omega Point Laboratories and Underwriter's Laboratories Listing and Follow-up Service Program to ensure uniform thickness and density specifications, thus providing required fire ratings as tested. Thermal Ceramics Duct Wrap 2x2+ is a proven performance alternative through extensive testing to 1 and 2-hour fire-resistance rated shaft enclosures. With its excellent insulating capability of withstanding fire temperatures up to 2000°F, it protects combustible constructions at zero clearance for commercial kitchen grease ducts in tight congested areas. When the duct penetrates fire rated walls and floors, an approved silicone firestop sealant used in combination with Duct Wrap 2x2+ provides an alternate means of protection to rigid shafts by maintaining the integrity of the 1 or 2 hour floor or wall assembly. Duct Wrap 2x2+ is resistant to mold growth in test conditions at 75-95% relative humidity (ASTM D6329).

Product Features

- Completely inorganic
- Low biopersistent insulation
- Does not contain low temperature fiberglass or mineral wool
- Shaft alternative to rigid board systems
- Zero clearance to combustibles protection throughout the entire enclosure system
- Lightweight, flexible wrap saves labor
- Totally foil encapsulated system for protection against material degradation, potential fire hazards and allows easy installation.
- Passive fire proof material does not shrink, become brittle, or lose fire fighting capabilities with age
- Product markings on foil ensure proper material identification for easy inspections
- Wide variety of through-penetration systems
- Resistant to mold growth

2. Applications

- 1 or 2 Hour Commercial Kitchen Grease Duct Enclosure

3. Physical Characteristics

Duct FireMaster Fire Protection Product	Unit	Size	Units/Ctn.	Wt./Ctn.
Duct Wrap 2x2+	Roll	2" x 24" x 20'	1	52 lbs.
Duct Wrap 2x2+	Roll	2" x 48" x 20'	1	104 lbs.
Duct Wrap 2x2+ Collar	Roll	2" x 6" x 20'	4	52 lbs.
Color	White blanket with silver foil encapsulation			



4. Specifications

This specification guide covers the application of Thermal Ceramics Duct Wrap 2x2, Duct Wrap 2x2+ Duct FireMaster Fire Protection Product, and an approved silicone firestop sealant.

Application	Fire Resistive Rating	Enclosure System	Through Penetration System
Grease Ducts	1 or 2 hours	2 layers, 2" Duct Wrap 2x2+ perimeter and longitudinal overlap, 3", GD 509 F and UL G-18	UL C-AJ-7119

5. Performance

A. Duct Wrap 2x2+

Flammability (ASTM # 84/UL 723)		
Foil:	Flame spread	5
	Smoke developed	5
Blanket:	Flame spread	0
	Smoke developed	0
Thermal Resistance	R value per ASTM C 518 4.15 per inch at 70°F (21°C)	

B. Fire Stop Sealants

Tremco Inc.	Fyre Sil sealant or Fyre-Sil S/L Sealant (for floor assemblies only)
Specified Technologies Inc.	Pensil 300
Rectoseal	835+ Sealant
HILTI Construction Chemicals, Division of HILTI Inc.	FS One Sealant

6. Listings

Agency	Reference Standard/ File No.
Underwriter's Laboratories	Grease Duct Enclosures (HNKT): G-18; Through Penetration Firestop System (XHEZ): C-AJ-7119
Omega Point Laboratories	11660-2, 11660-4
International Code Council	ESR-2213
NFPA 96	Section 4.3.1, 2004 Edition (TIA-04-2)
International Mechanical Code	Section 506 Commercial Kitchen Grease Ducts and Exhaust Equipment, Section 507 Commercial Kitchen Hoods, 2006 Edition
California State Fire Marshal	2440-1361:104
City of Los Angeles	RR8425

7. Installation

The Duct Wrap 2x2+ products shall be installed by a qualified contractor in accordance with manufacturer's instructions and referenced standards. See figures 1 to 4 for complete details.

Materials and Equipment

- Duct Wrap 2x2+ blanket, 2" thick, 24" or 48" wide, 7 pcf density, 20' long rolls. 48" wide blanket helps to minimize waste
- Aluminum foil tape
- Minimum ½" wide filament tape (optional)
- Carbon steel or stainless steel banding material, minimum ½" wide, minimum 0.015" thick, with steel banding clips
- Hand banding tensioner and crimping tool
- Minimum 12 gage steel insulation pins; galvanized steel speed clips, minimum 1½" x 1½" square or 1½" dia., or equivalent sized cuphead pins; capacitor discharge stud gun
- Access door hardware: four galvanized steel threaded rods, ¼" diameter by 4½" to 5" long with ¼" wing nuts and ¼" washers; 4" long steel tubing to fit threaded rods
- Tremco Fyre-Sil silicone firestop sealant

Storage:

The Duct Wrap 2x2+, and approved silicone sealant must be stored in a dry warehouse environment on pallets. Pallets should not be stacked.

Preparatory Work:

Duct Wrap 2x2+ is installed with common tools, such as knives, banders and capacitor discharge guns for applying insulation pins. In order to install the duct fire stop system, the surfaces of all openings and penetrating items need to be clean, dry, frost free, and free of dust.

Installation techniques for Thermal Ceramics FireMaster Duct Wrap 2x2+ (figure 1):

- **3" Overlap Wrap Telescope** - Each blanket overlaps one adjacent blanket, and each blanket has one edge exposed and one edge covered by the next blanket as shown in figure 1. The visible edges of the longitudinal overlap all point in the same direction.
- **Butt Joint Overlap Pattern** - The edges of each interior layer blanket are firmly butted against each other. The exterior layer blankets are installed over the interior layer so that the exterior blankets overlap each other with a 3" overlap, and completely cover the butt joints of the interior blankets as shown in figure 1.
- **Butt Joint & Collar System** - The adjacent blankets of both interior and exterior layers are firmly butted together with the exterior joints located 12" away from the interior joints. A 6" wide collar made from Duct Wrap 2x2+ is centered over each exterior joint, overlapping each blanket by 3" as shown in figure 1. The collar overlaps itself with a 3" perimeter overlap.

• **2 & 3 Sided Wrap System** - When space does not allow for a full wrap enclosure on all four sides of the duct, the Duct Wrap 2x2+ may be installed on 2 or 3 sides of the duct and mechanically attached to a concrete or CMU assembly on the unexposed side of the duct.

General:

To minimize waste, Duct Wrap 2x2+ material should be rolled out tautly before measuring. Cut edges of the blanket shall be taped with aluminum foil tape to prevent exposed edges of the insulation from wicking moisture from condensation or grease from a compromised leaking duct joint into the material and causing degradation of the fire barrier. The Duct Wrap 2x2+ material may be installed with either a mechanical banding system or insulation pins and clips (see Mechanical Attachment Methods below and figures 1 and 2). When using the banding technique, caution shall be taken to ensure that the bands are not fitted too snug as which could result in cutting into the blanket. To prevent blanket sag on ducts with dimensions greater than or equal to 24", insulation pins, long enough to extend through the layers of blanket insulation, are welded to the duct in columns spaced 12" apart, between 6" and 12" from each edge and 10½" on center along the bottom horizontal and outside vertical duct runs as shown in figure 2. Insulation pins that extend beyond the blanket wrap shall be turned down to eliminate sharp points. Support hanger systems do not need to be wrapped provided that the hanger rods are at least a minimum of ⅜" (9.5mm) diameter and spaced a maximum of 60" on center along the length of the duct, and the angle iron is a minimum of 1½" x 1½" x ⅛" or SMACNA equivalent support system (SMACNA band strap support do not apply). Horizontal trapeze support system may be incorporated into the wrap enclosure.

A. Overlap Wrap Telescope Installation

Duct Wrap 2x2+ commercial kitchen grease duct 1 or 2 hour enclosure includes a two-layer wrap construction applied directly to all surfaces of the duct (see figure 1). The first or interior layer of Duct Wrap 2x2+ blanket is wrapped around the perimeter of the duct and is cut to a length with enough excess to overlap itself not less than 3". Adjacent blankets are placed to overlap the previous blanket not less than 3" The overlap made by adjacent blankets forms the "longitudinal" overlap. The overlap a blanket makes with itself is called the "perimeter" overlap. The longitudinal overlaps of the exterior layer are to be spaced 10½" away from those of the interior layer. The first layer may be held in place with filament tape 1½" from each blanket edge and in the center of the blanket. The second layer is wrapped around the perimeter of the first layer with the longitudinal overlaps of the exterior layer spaced 10½" away from those of the interior layer and may be held in place with filament tape 1½" from each blanket edge and in the center of the blanket until banding is in place or the pinning attachment is fully secured.

B. Butt Joint Overlap Wrap Installation

Duct Wrap 2x2+ is cut to completely wrap around the perimeter of the duct with enough excess to provide an overlap of not less than 3". The joints of the adjacent blankets on the first (interior) layer are firmly butted against each other and may be held in place with filament tape 1½" from each blanket edge and in the center of the blanket. The second layer of Duct Wrap 2x2+ is wrapped around the perimeter of the first layer using the Overlap Wrap Telescope technique construction described in paragraph "A" above with a minimum 3" overlap wrap. The second layer of Duct Wrap 2x2+ may be held into place with filament glass tape 1½" from each blanket edge and in the center of the blanket as a temporary hold until the mechanical banding or pinning and clip attachment method is in place. (figure 1)

C. Butt Joint / Collar Installation

Duct Wrap 2x2+ is installed in two layers with a tight butt joint construction and collar at the exterior layer joint. The butted joints of the exterior layer blankets are located 12" away from the butted joints of the interior layer blankets, and the blankets may be held in place

with filament tape 1½" from each edge of the blanket in the center as a temporary hold until the mechanical attachment system is secured. A Duct Wrap 2x2+ Collar is centered over the joints of the exterior layer and wrapped around the perimeter of the duct and cut to a length so that it overlaps itself not less than 3". The collar may be held in place with filament tape placed 1½" from each edge of the collar until the mechanical attachment is in place. Filament tape is used 1½" from each blanket edge and in the center of the blanket as a temporary hold until the mechanical attachment is in place. (figure 1)

D. 2 & 3 Sided Wrap Installation

When space does not allow for a complete wrap applied to the duct on all four sides, the Duct Wrap 2x2+ is approved for 2 or 3 sided installations with mechanical attachment to a concrete or CMU assembly. The Duct Wrap 2x2+ is installed on the 2 or 3 sides of the duct as described in one of the installation methods described above with the starting edge of the blanket attached to the concrete or CMU assembly and then wrapped around the duct until the other end can be affixed to the other concrete or CMU assembly, thus encapsulating the duct with insulation around all accessible sides. The blanket is to flange out onto the concrete or CMU assembly. It shall be secured to the adjoining assembly with min 3/16" diameter, 4" long concrete anchors, footed to a minimum 1½" wide x 3/16" thick steel strip/strap with pre-drilled holes spaced a maximum 10" on center. The steel strip is to be placed around the entire perimeter of the duct in the exposure area. The Duct Wrap 2x2+ insulation wrap is secured to the duct with minimum ½" wide banding 10½" centers. The ends of the banding are to loop into the steel strips/straps that foot the blanket to the concrete floor or wall, and tightened down. The trapeze support system may be incorporated within the wrap system.

Mechanical Attachment Methods for Insulation Wrap

1. Banding - ½" wide carbon steel or stainless steel banding, 0.015" thick, is placed around the entire perimeter of the insulated duct with maximum 10½" spacing centers and 1½" from each blanket edge or 1½" from each collar edge when using the butt joint and collar method. When banding, filament tape can be used to temporarily hold the blanket in place until the banding is applied. The banding is placed around the material and tightened so as to firmly hold the Duct Wrap 2x2+ in place against the duct, but not cause any cutting or damage to the blanket. (figure 1)

2. Pinning - For duct spans 24" or larger, min. 12 gage, 5" long steel insulation pins are welded to the duct in columns spaced 12" apart, 6" - 12" from each edge and on 10½" centers along bottom horizontal and outside vertical runs to prevent blanket sag (see fig. 2). Pins are also required 1" from the end of a duct and 1" from any edge near a 90° bend, spaced on 6" centers. Pins are locked into place with 1½" diameter round or square, galvanized steel, speed clips or cup head pins. Pins that extend beyond outer blanket wrap layer shall be turned down to eliminate sharp edges or the excess length cut off.

Grease Duct Access Door Installation (see figure 3)

Four galvanized steel threaded rods, ¼" diameter by 4½" to 5" long are welded to the duct at the corners of the door opening. Four 4" long steel tubes fit over the threaded rods to hold the door to the duct and protect the wrap from damage as the door is removed. Four 5" long 12 gage insulation pins are welded to the door panel for installation of the blanket. Three layers of Duct Wrap 2x2+ are impaled over the 12 gage insulation pins on the 16 gauge door panel. The first layer is cut and impaled over the insulation pins with a minimum 1" overlap. When the door is installed, this first layer is compressed and fitted against the wrap surrounding the door opening to form a tight butt joint. The second layer is cut to overlap the first layer by no less than 1", and the third layer is cut to overlap the second by no less than 1". It is essential that these layers fit tightly against the

wrap surrounding the access door opening with no overlapping. The three layers are impaled over the pins and are locked in place with speed clips. Pins that extend beyond the outer layer of Duct Wrap 2x2+ shall be turned down to avoid sharp points on the door. The steel tubes are placed over the threaded rods. The insulated door panel is placed over the threaded rods covered by the steel tubes and held in place with washers and wing nuts. The details are shown in figure 3.

Through-Penetration Fire Stop System

When the duct penetrates a fire rated wall, ceiling, or floor, an approved fire stop system must be employed. Duct Wrap 2x2+ approved fire stop systems is listed in Section 4, Specifications and in figure 4.

One 10½" wide strip and one 2¼" wide strip of Duct Wrap 2x2+ blanket are required. The narrower strip is placed on top of the wider strip, aligned with one edge. The wider strip is then folded over the narrower strip to create a three-layer, 6" thick by 4¼" wide strip. The blanket is then compressed to a minimum of 50 percent of the original thickness, and placed in the annular space, flush with the lower surface of the concrete slab and recessed a minimum of ¼" from the upper surface. Install a minimum of ¼" of Tremco Fyre-Sil silicone firestop sealant into the opening. Alternatively, when there is no room in the remaining annular space to wrap the duct with Duct Wrap 2x2+ material, the enclosure may terminate above and below the floor/ceiling or wall assembly as shown in figure 4 by mechanically attaching the FireMaster to the termination point above and below the termination area with bands or pins.

8. Maintenance

No maintenance is required when installed in accordance with Thermal Ceramics installation instructions. Once installed, if any section that is greater than 8" x 8" is damaged or if the overlap area is damaged, the following procedures will apply:

- The damaged section should be removed by cutting the steel banding or removing the clips holding it in place
- A new section of the same dimension should be cut from a roll of Duct Wrap 2x2+, either 24" or 48" wide. Cut edges of the blanket shall be taped to prevent exposed edges of the insulation from wicking moisture or grease into the material and degradation of the fire barrier
- The new section should be placed per Thermal Ceramics manufacturer's Installation Instructions ensuring the same overlap that existed previously
- The steel banding should be placed around the material and tensioned so as to sufficiently hold the Duct Wrap 2x2+ in place without cutting the blanket
- If the blanket has not been damaged but the foil has ripped, seal the opening with aluminum foil tape For damaged areas less than or equal to 8" X 8" the following procedure may be used.
- The damaged section should be removed by cutting out a square or rectangular that includes the damaged area and does not exceed 8" in width or length.
- A repair section should be cut from a section of Duct Wrap 2x2+ that is 1" wider and 1" longer than the damaged area that has been removed. Cut edges of the blanket shall be taped to prevent the exposed edges of the insulation from wicking moisture or grease into the material.
- A single min. 12 gauge insulation pin min. 3". long should be welded to the grease duct in the center of the repair area. (Note: Cup head pins may also be used.)
- The repair section is to be centered on the opening and impaled upon the insulation pins. All overlaps should be tucked into the repair opening to provide a tight fitting joint. Insulation is held in place with a 1½" square or round galvanized or stainless steel speed clip or a minimum 1" diameter cup head pin. The excess portion of the pin shall be cut off and/or turned down to eliminate sharp edges.

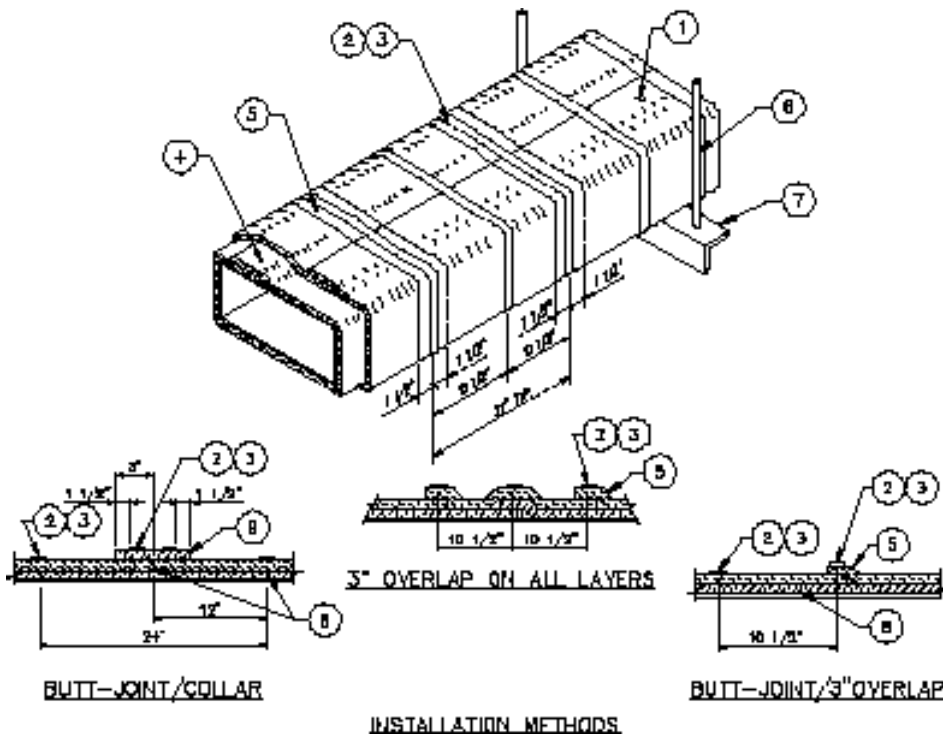
The joint should be sealed using aluminum foil tape.

9. Limitations

- Thermal Ceramics Duct Wrap 2x2+ shall be installed in accordance with the installation instructions
- Multiple steel ducts in a single enclosure are not permitted for commercial kitchen grease ducts
- Minimum 3/8" diameter all thread steel rods do not have to be insulated
- The integrity of Duct Wrap 2x2+ systems is limited to the quality of the installation

**For personal protective equipment recommendations see the MSDS.
 Thermal Ceramics is a trademark of Morgan Crucible Company plc. FireMaster is a trademark of Thermal Ceramics Inc. Duct Wrap 2x2 products are manufactured by Thermal Ceramics Inc. FireMaster Duct Systems are distributed by authorized distributors and no longer by 3M. Tremco and Fyre-Sil are trademarks of Tremco Inc.*

**Thermal Ceramics
 Duct Wrap 2x2+
 Commercial Kitchen Grease Duct System 1 or 2 Hour Shaft Alternative
 Zero Clearance to Combustible (Overlap Wrap Technique)**



OPL No. GD 509F Figure 1 UL System No. R14229, UL G-18		Drawing# FMDW2001-0	
1	Two layers Duct Wrap 2x2+	6	Minimum 3/8" minimum diameter hanger rod
2	Filament tape	7	1 1/2" x 1 1/2" x 1/8" angle
3	Steel banding 1/2" wide minimum	8	Firmly Butted joint
4	Minimum 3" perimeter overlap	9	6" wide Duct Wrap 2x2+ collar
5	Minimum 3" longitudinal overlap		

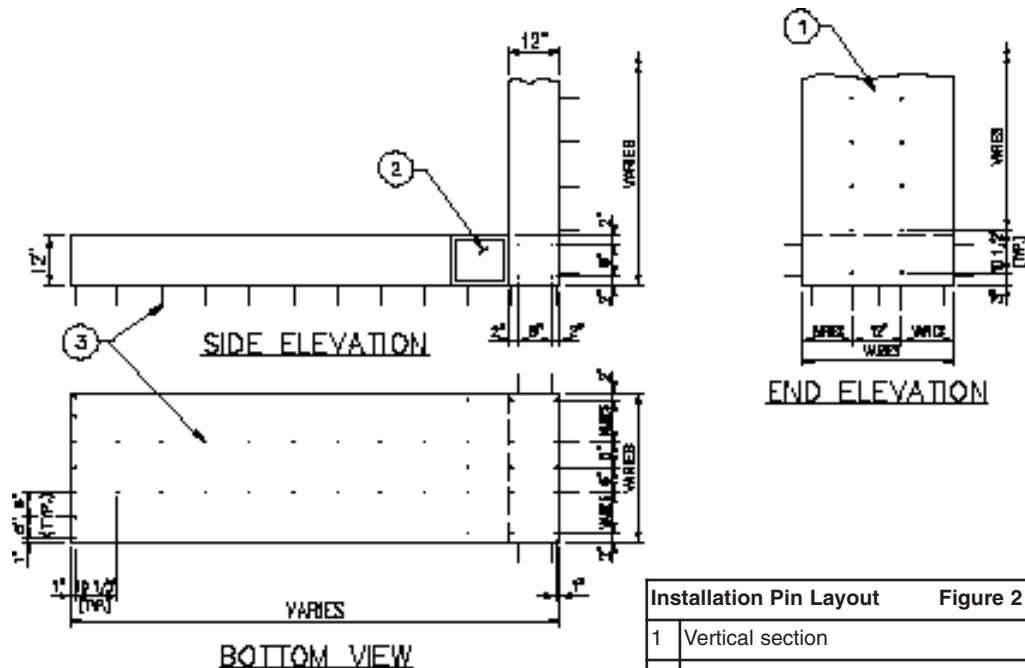
Note: The integrity of Duct FireMaster Product is limited to the quality of the installation.

Thermal Ceramics

Duct Wrap 2x2+

Typical Insulation Pin Layout

For Duct Spans $\geq 24"$ Wide To Prevent Blanket Sag



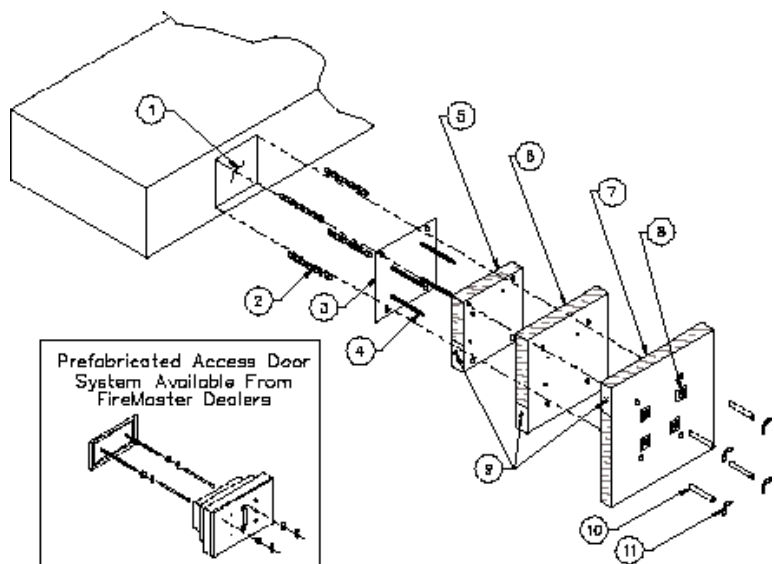
Installation Pin Layout		Figure 2 Drawing # FMDW2004-0
1	Vertical section	
2	Access door	
3	10 or 12 gauge steel insulation pins	

Note: The integrity of Duct FireMaster Product is limited to the quality of the installation.

Thermal Ceramics

Duct Wrap 2x2+

Access Door System Commercial Kitchen Grease Duct



OPL No. GD 509F Figure 3 Drawing# FMDW2002-0

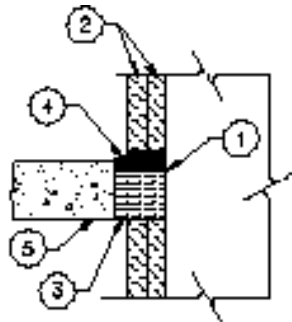
1	Door hole
2	1/4" diameter all threaded rods
3	Access cover - 16 gauge
4	Insulation pins - welded
5	One layer Duct Wrap 2x2+
6	One layer Duct Wrap 2x2+ 1" overlap
7	One layer Duct Wrap 2x2+ 1" overlap
8	Speed clips
9	Aluminum tape at edges
10	Spool pieces for threaded rods
11	1/4" diameter wing nuts

Note: The integrity of Duct FireMaster Product is limited to the quality of the installation.

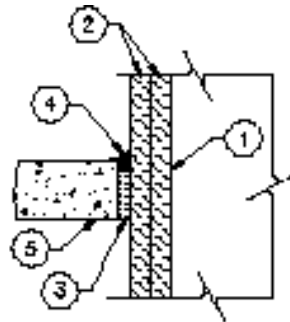
Thermal Ceramics

Duct Wrap 2x2+

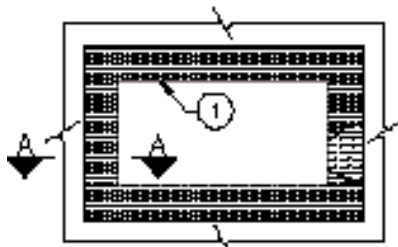
Through Penetration System 1 or 2 Hour Grease Duct



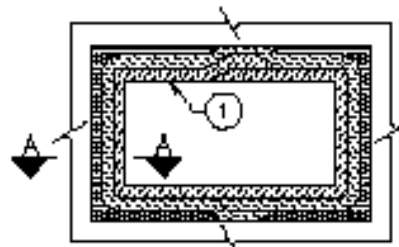
SECTION A-A



SECTION A-A



FLOOR VIEW



FLOOR VIEW

Duct Wrap 2x2 Or Duct Wrap 2x3+
Terminated At The Top And Bottom
Surface Of The Floor/Celling Assembly

Duct Wrap 2x2 Or Duct Wrap 2x3+
Continuous Through
The Floor/Celling Assembly

Per ICBO ER-4975; Testing per ASTM E 814 Figure 4A Drawing # RB0100510	
1	Duct
2	Two layers Duct Wrap 2x2+
3	Scrap pieces of Duct Wrap 2x2+
4	Approved Through Penetration FireStop System
5	Rated floor or wall

Per ICBO ER-4975; Testing per ASTM E 814 Figure 4B Drawing # RB0100510	
1	Duct
2	Two layers Duct Wrap 2x2+
3	Scrap pieces of Duct Wrap 2x2+
4	Approved Through Penetration FireStop System
5	Rated floor or wall

Note: The integrity of FireMaster Duct System is limited to the quality of the installation.

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