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3M™ Fire Barrier Duct Wrap 615+

Installation Guide: Commercial Kitchen Exhaust and Ventilation Air Ducts

CLASSIFIED C UL US

C ETL US LISTED Intertek

ICC ES C LISTED

NFPA 96 COMPLIANT

ULC LISTED

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Codes and Test Standards

3M™ Fire Barrier Duct Wrap 615+ has been tested in accordance with the following:

- CAN/ULC-S144 Standard Method of Fire Resistance Test – Grease Duct Assemblies
- CAN/ULC-S115 Standard Method of Fire Tests of Firestop Systems
- CAN/ULC-S102 Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies
- ASTM E136 Standard Test Method for Behaviour of Material in a Vertical Tube Furnace at 750°C (1382°F)
- ASTM C518 Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
- ASTM C1338 Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings
- ISO 6944-85 Fire Resistance Tests – Ventilation Ducts

3M™ Fire Barrier Duct Wrap 615+, when installed per CAN/ULC-S144 tested Grease Duct Designs, addresses the following Code requirements:

- National Building Code of Canada (NBC), 2015 Edition – Section *3.6.3.5*
- NFPA 96, Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations – Section(s) *4.2.1, 7.7.2.2*

3M™ Fire Barrier Duct Wrap 615+, when installed per ISO 6944 tested Ventilation Duct Designs, can help to satisfy the following standard requirements:

- NFPA 92, Standard for Smoke Control Systems, 2018 Edition – Section *6.6.2*
- NFPA 101® Life Safety Code®, 2006 Edition – Section(s) *8.6.7, 18.7.7*

General Information

Materials and Equipment

- 610 mm (24 in.) or 1220 mm (48 in.) wide[1] by 38 mm (1-1/2 in.) thick[2] by 7.62 m (25 ft.) standard length 3M™ Fire Barrier Duct Wrap 615+ blanket
- Minimum 102 mm (4 in.) wide pressure-sensitive aluminum foil tape (3M™ Venture Tape™ FSK Facing Tape 1525CW or equivalent)
- Minimum 19 mm (3/4 in.) wide filament tape (Scotch® Filament Tape 898 or equivalent)
- Stainless or carbon steel banding material, minimum 13 mm (1/2 in.) wide and minimum 0.38 mm (0.015 in.) thick with steel banding clips
- Hand banding tensioner, crimping tool and banding cutter
- Minimum 12 GA, 165 mm (6-1/2 in.) long copper-coated mild steel impaling pins or 12 GA, 165 mm (6-1/2 in.) long insulated cup-head steel pins
- 64 mm (2-1/2 in.) square galvanized speed clips over 3 mm (1/8 in.) diameter impaling or cup-head pins
- Capacitor discharge stud gun (when using cup-head pins)
- Access door hardware: four galvanized steel threaded rods, 6 mm (1/4 in.) diameter by minimum 152 mm (6 in.) long, 6 mm (1/4 in.) wing nuts, 6 mm (1/4 in.) washers and 102 mm (4 in.) long steel hollow tubing to fit threaded rods
- Minimum 64 kg/m3 (4 pcf) density mineral wool or scrap pieces of 3M™ Fire Barrier Duct Wrap 615+
- 3M™ Fire Barrier Sealants 1000 NS, 1003 SL, 3000 WT or CP 25WB+

1Note: 122 cm (48 in.) wide blanket helps to maximize coverage since the 76 mm (3 in.) perimeter overlaps occur less frequently.
2In accordance with the tolerances in ASTM C 892 Standard Specification for High-Temperature Fibre Blanket Thermal Insulation.

Preparatory Work

3M™ Fire Barrier Duct Wrap 615+ is installed with common tools, such as knives, banders and capacitor discharge guns for applying insulation pins. In order to install the duct firestop system, the surfaces of all the openings and penetrating items need to be clean, dry and free of dust and frost.

Grease Duct Installation Techniques

3M™ Fire Barrier Duct Wrap 615+ should be installed per an applicable grease duct design – ESL-1198 (International Code Council, ICC) or 3MU/BI 120-03 (Intertek) – and in accordance with the following basic installation instructions.

2-Layer Grease Duct Method (CAN/ULC-S144)

The following details installation of 610 mm (24 in.) wide 3M™ Fire Barrier Duct Wrap 615+, applied directly to a grease duct per the two-layer *Telescoping wrap* technique. To minimize waste, 3M™ Fire Barrier Duct Wrap 615+ material should be rolled out tautly prior to measuring. Maximum area of duct is 1.49 m^2 (2304 $in.^2$) and maximum size of 1220 mm (48 in.) by 1220 mm (48 in.).

First Layer

The first layer of 3M™ Fire Barrier Duct Wrap 615+ blanket is wrapped around the duct's perimeter and is cut to a length to overlap itself not less than 76 mm (3 in.). This is referred to as the *longitudinal* joint. The first layer *longitudinal* joint may also be tightly butted, as an alternative to the overlap method. The interface between adjacent blankets forms the *perimeter* joint (also referred to as *transverse* or *circumferential* joint). First layer perimeter joints can also be tightly butted, or they should overlap onto adjacent blankets with a minimum 76 mm (3 in.) overlap. Aluminum foil tape is used to seal all cut edges of the blanket and any tears in the foil scrim. This first layer is temporarily held in place using filament tape. The first layer does not require stainless steel banding.

Second Layer

The second layer is wrapped around the inner layer of 3M™ Fire Barrier Duct Wrap 615+, lapping itself (*longitudinal*) not less than 76 mm (3 in.). Outer layer *longitudinal* joints should be offset a minimum 76 mm (3 in.) from inner layer *longitudinal* joints. Offset outer layer *perimeter joints* by positioning the centreline of the second layer of blanket over the *perimeter* overlap (or butt joint) of the first layer, resulting in a 267 mm (10-1/2 in.) *perimeter* joint offset (aligned with the *Telescoping* technique). Outer layer *perimeter* joints require a 76 mm (3 in.) overlap.

The second layer of blanket may be temporarily held in place using filament tape, prior to permanent fastening with stainless steel banding and/or weld pins (impaling or cup-head style) based on duct dimensions. Navigate to the section titled Pinning for more information.

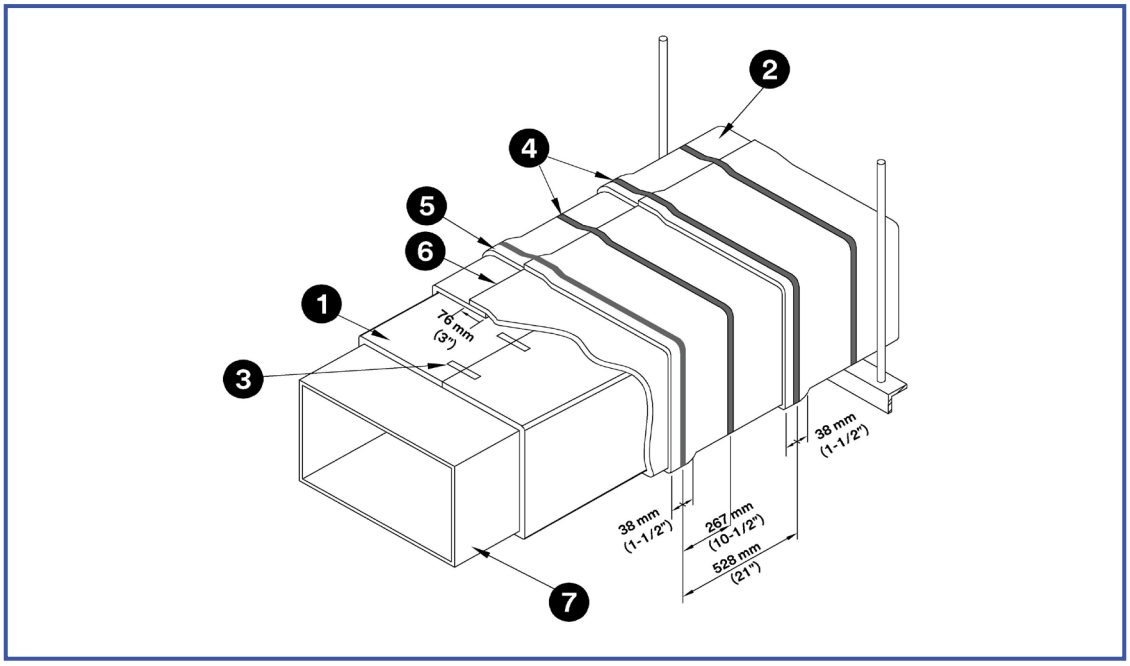

Figure 1 – 1- or 2-Hour shaft alternative with inner layer *longitudinal* and *perimeter* joints butted. Outer layer installed via telescoping wrap technique. Banding only for permanent fastening on ducts 610 mm (24 in.) or less. Navigate to the section titled **2A. Butt Joint Inner Layer with Telescoping Outer Layer** for a cross sectional view.

1. First layer 3M™ Fire Barrier Duct Wrap 615+

2. Second layer 3M™ Fire Barrier Duct Wrap 615+

3. 19 mm (3/4 in.) wide filament tape

4. Stainless steel banding 13 mm (1/2 in.) wide min. typical for permanent fastening. Placed 38 mm (1-1/2 in.) from edge of blanket and 267 mm (10-1/2 in.) on centre.

5. *Perimeter* joint butted on inner layer. Min. 76 mm (3 in.) overlap on outer layer.

6. *Longitudinal* joint butted on inner layer. Min. 76 mm (3 in.) overlap on outer layer.

7. Grease Duct

Ducts ≥ 610 mm (24 in.) wide require pinning on the bottom side of horizontal ducts and on a minimum of one of the wider sides of a vertical duct. Vertical ducts > 1220 mm (48 in.) require pinning on all sides.

Consult current independent testing laboratories (e.g. Intertek, UL) for design or system details. Note: System integrity is limited by quality of installation.

Grease Duct Installation Options: Cross Sectional View

Inner Layer Butt Joint with Telescoping Outer Layer

The inner layer blankets have tightly butted *perimeter* (between adjacent pieces) and *longitudinal* (where blanket meets itself when wrapped around the duct) joints. The outer layer follows the *Telescoping* technique; each blanket overlaps an adjacent blanket (exposed edge) and itself by 76 mm (3 in.), as shown in Figure 2a.

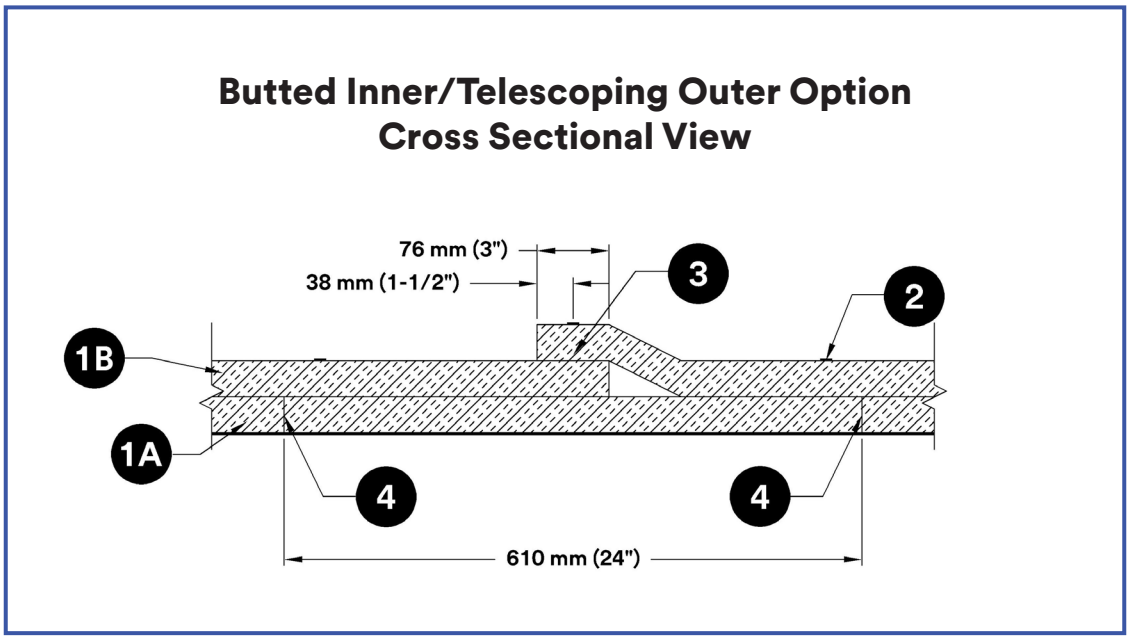

Figure 2a – Butt joint inner layer with telescoping outer layer installation method

1A. First layer of 3M™ Fire Barrier Duct Wrap 615+

1B. Second layer of 3M™ Fire Barrier Duct Wrap 615+

2. Stainless steel banding 13 mm (1/2 in.) wide min. typical

3. 76 mm (3 in.) min. *perimeter* overlap on outer layer

4. Firmly, *perimeter*-butted joint on inner layer

Telescoping 76 mm (3 in.) Overlap

Similar to the outer layer installation described in 2A. Butt Joint Inner Layer with Telescoping Outer Layer, the *Telescoping Overlap* wrap method requires each blanket to overlap one adjacent blanket (exposed edge) and itself by 76 mm (3 in.) for both the inner and outer layers, as shown in Figure 2b.

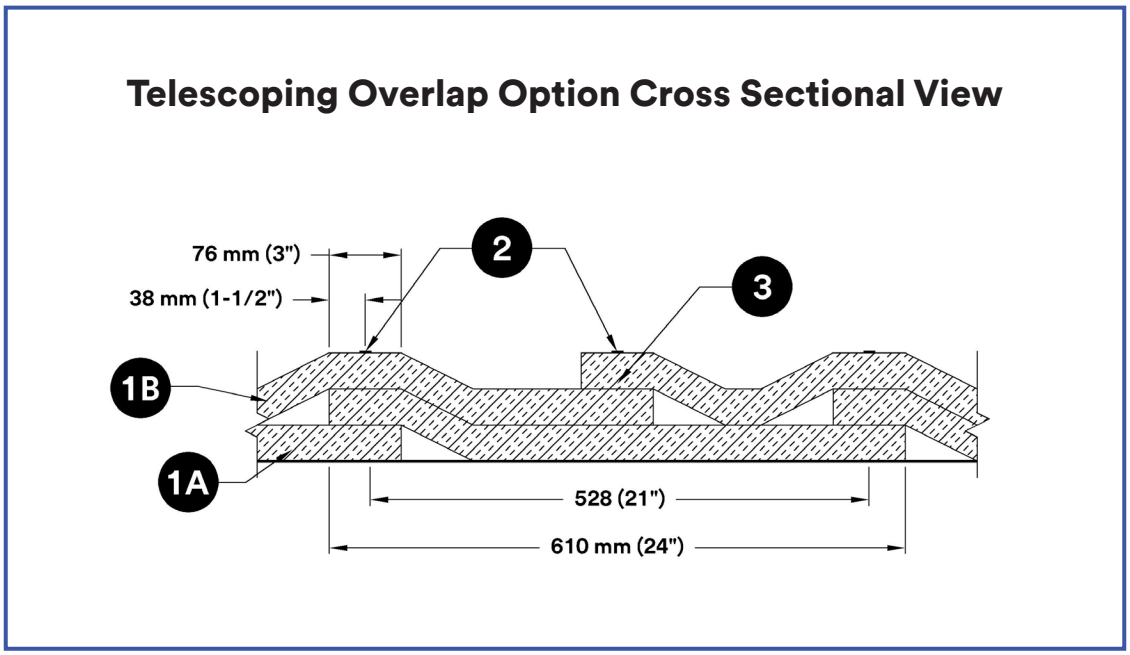

Figure 2b – Telescoping installation method with 76 mm (3 in.) overlaps

1A. First layer of 3M™ Fire Barrier Duct Wrap 615+

1B. Second layer of 3M™ Fire Barrier Duct Wrap 615+

2. Stainless steel banding 13 mm (1/2 in.) wide min. typical

3. 76 mm (3 in.) min. *perimeter overlap*

Checkerboard 76 mm (3 in.) Overlap

For the 76 mm (3 in.) *Checkerboard Overlap* wrap method, blankets with both edges exposed alternate with blankets that have both edges covered, as shown in Figure 2c.

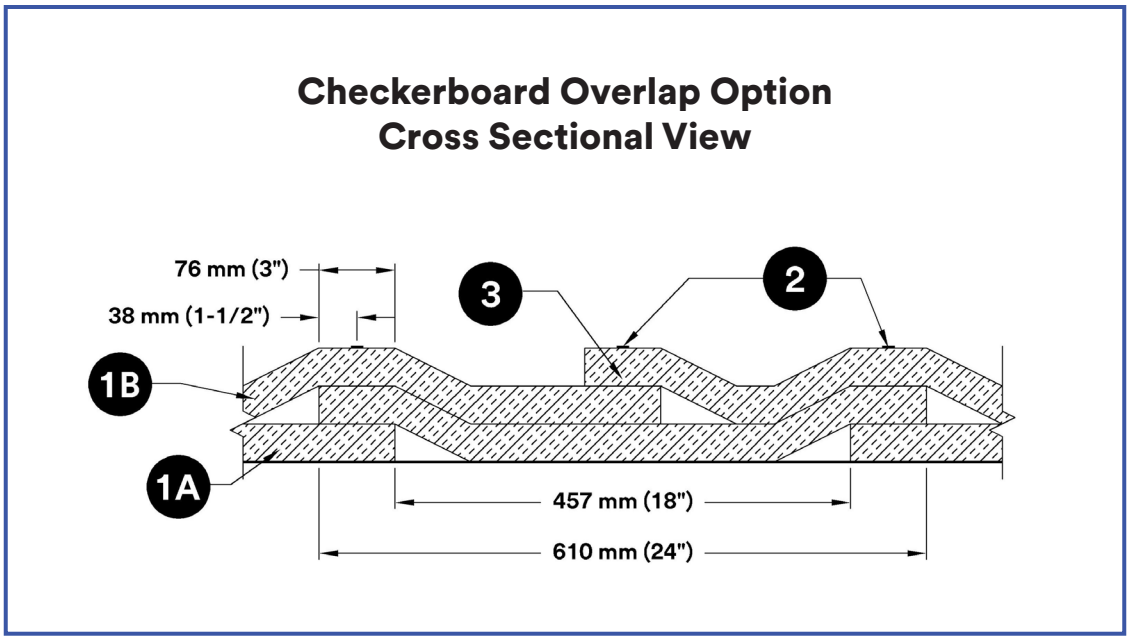

Figure 2c – Checkerboard installation method with 76 mm (3 in.) overlaps

1A. First layer of 3M™ Fire Barrier Duct Wrap 615+

1B. Second layer of 3M™ Fire Barrier Duct Wrap 615+

2. Stainless steel banding 13 mm (1/2 in.) wide min. typical

3. 76 mm (3 in.) min. *perimeter* overlap

Butt Joint with Collar

For the *Butt Joint* and *Collar* wrap method, adjacent blankets are butted tightly together and a 152 mm (6 in.) wide collar of duct wrap is centered over the joint, overlapping each blanket by 76 (3 in.) minimum as shown in Figure 2d.

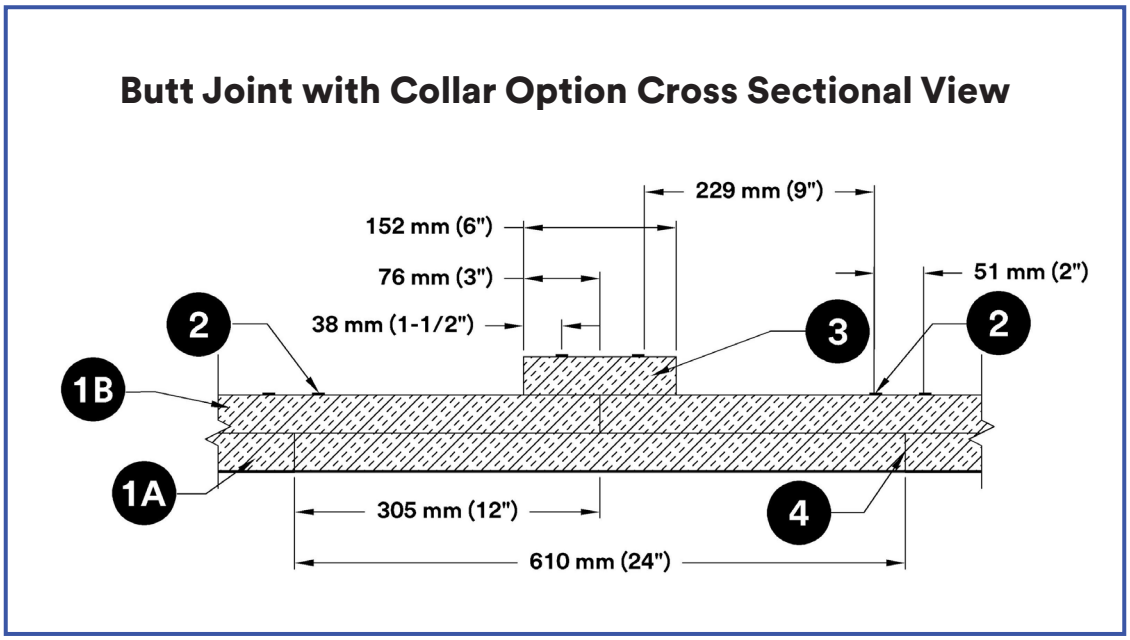

Figure 2d – Butt joint with collar installation method

1A. First layer of 3M™ Fire Barrier Duct Wrap 615+

1B. Second layer of 3M™ Fire Barrier Duct Wrap 615+

2. Stainless steel banding 13 mm (1/2 in.) wide min. typical

3. 152 mm (6 in.) min. wide Fire Barrier Duct Wrap 615+ collar

4. Firmly, *perimeter*-butted joint

Compression Butt Joint (Pinning Only)

For the *Compression Butt* Joint technique, both the inner and outer layer have compression-butted *perimeter* and *longitudinal* joints. Compress edges of each piece of insulation together by 25 mm (1 in.). After installation, each piece of installed insulation width is 51 mm (2 in.) less than insulation nominal width. In other words, each piece of nominal 610 mm (24 in.) wide insulation is 559 mm (22 in.) wide post-installation, as shown in Figure 2e. Installed with pinning only.

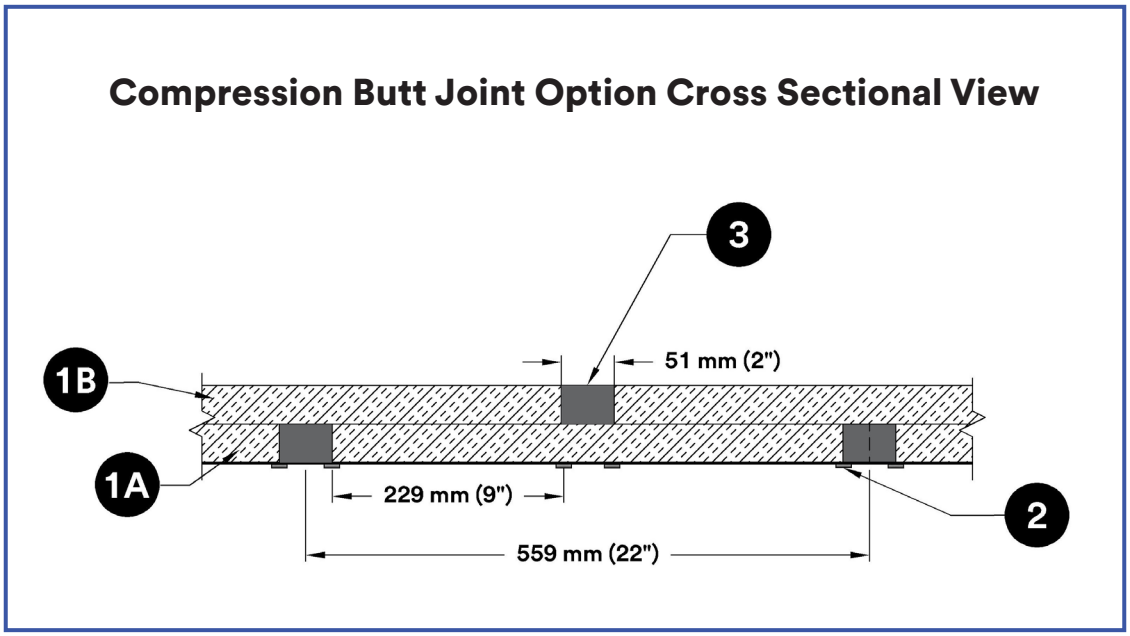

Figure 2e – Compression butt joint installation method

1A. First layer of 3M™ Fire Barrier Duct Wrap 615+

1B. Second layer of 3M™ Fire Barrier Duct Wrap 615+

2. Impaling or cup-head insulation pin

3. *Perimeter*-butted compression joint (grey shading indicates area of compression)

Access Door Installation

Field-Fabricated

When a specific item number is mentioned, it corresponds with numbered items in Figure 3. Mark a clean-out access opening location on the grease duct, with insulation at its mid-height along the horizontal section. Cut a 305 mm by 305 mm (12 in. by 12 in.) opening in the insulation. Remove and discard the cut insulation. Cut and centre a 254 mm by 254 mm (10 in. by 10 in.) opening into the side of the grease duct by maintaining a 25 mm (1 in.) clearance between the perimeter of the opening and cut insulation (Item 1). Remove and discard the cut steel. Weld four (4), minimum 102 mm (4 in.) long, 6 mm (1/4 in.) diameter, steel threaded rods to the grease duct (Item 2). Locate one (1) steel rod at each corner of the grease duct opening so that they are all 280 mm (11 in.) on centre and squared within the insulation opening.

Cut a 254 mm by 254 mm (12 in. by 12 in.), 16 GA steel plate, to be used as an access door (Item 3). Drill clearance holes in the access door to match the steel threaded rod pattern. Place the access door over the steel threaded rods. Seal the opening in the grease duct by overlapping the access door over the opening cut in the insulation by 25 mm (1 in.) on all sides. Weld four (4), minimum 165 mm (6-1/2 in.) long, 12 GA, copper-coated steel insulation pins to the access door corners so that the insulation pins are 229 mm (9 in.) on centre (Item 4).

Apply three (3) layers of insulation over the access door (Items 5, 6 and 7). Ensure foil tape is applied to cut edges of each successive layer prior to impaling over the welded pins (Item 4). Cut the first piece of access insulation (Item 5) into a 305 mm by 305 mm (12 in. by 12 in.) square and install it over the insulation pins and cover the access door. Cut the second piece of access insulation (Item 6) into a 356 mm by 356 mm (14 in. by 14 in.) square. Square it and install it over the insulation pins. Cover the first piece of access insulation so that a 25 mm (1 in.) overlap exists. Cut the third piece of access insulation (Item 7) into a 406 mm by 406 mm (16 in. by 16 in.) square. Square it and install it over the insulation pins. Cover the second piece of access insulation so that a 25 mm (1 in.) overlap exists. Secure access insulation to the insulation pins with 38 mm (1-1/2 in.) square or round, galvanized or stainless steel, speed clips (Item 8). Turn down or cut off insulation pins that extend beyond the second piece of access insulation. Place maximum 102 mm (4 in.) long, steel tubing over each steel threaded rod (Item 10) to act as protection for the 3M™ Fire Barrier Duct Wrap 615+ and to transfer the wing nut force to the access door when fastening. Apply washers and wing nuts over the steel threaded rods (Item 11). Secure the access door by tightening the wing nuts.

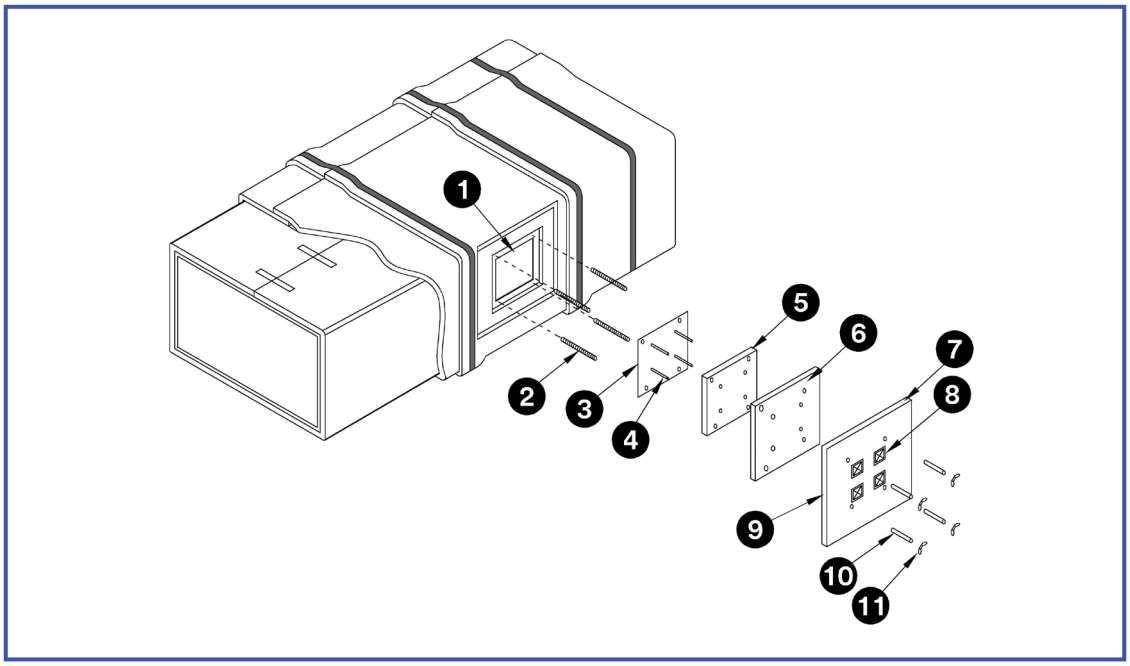

Figure 3 – Field-fabricated 1 or 2-hour access door for commercial kitchen exhaust duct systems

1. Access hole

2. 6 mm (1/4 in.) diameter steel threaded rods

3. Access door (16 GA steel plate)

4. Welded pins

5. First layer 3M™ Fire Barrier Duct Wrap 615+ cut same size as cover plate

6. Second Layer 3M™ Fire Barrier Duct Wrap 615+ with 25 mm (1 in.) overlap on all sides

7. Third layer 3M™ Fire Barrier Duct Wrap 615+ with 25 mm (1 in.) overlap on all sides

8. Speed clips

9. Aluminum tape covering all exposed edges

10. Steel tubing pieces for steel threaded rods

11. 6 mm (1/4 in.) diameter wing nuts

Note: System integrity is limited by quality of installation. Consult current independent testing laboratories (e.g. Intertek, UL) for Design or System Details. In all four overlap techniques the perimeter overlap can occur at any location on the duct.

Pre-Fabricated

When a specific item number is mentioned, it corresponds with numbered items in Figure 3a. Mark a clean-out access opening location on the grease duct with insulation at its mid-height along the horizontal section. Cut an opening max. 559 mm by 559 mm (22 in. by 22 in.) in the insulation, the same size as the outside dimension of the pre-fabricated access door (Ductmate ULtimate Door). Remove and discard the cut insulation. Cut an opening max. 508 mm by 508 mm opening (20 in. by 20 in.) into the side of the grease duct according to the manufacturer's instructions for the size of the pre-fabricated access door to be installed (Item 1). Install and tightly secure the pre-fabricated access door to the grease duct. Fit pre-fabricated access door with four (4), 9.5 mm (3/8 in.) diameter, corner-thumb bolts through the exterior face.

Remove the four (4), 9.5 mm (3/8 in.) diameter, corner-thumb bolts and replace them with four (4), 9.5 mm (3/8 in.) diameter, steel threaded rods extending from pre-fabricated access door (Item 2). Apply three (3) layers of access insulation over the pre-fabricated (Item 3) access door as follows (Items 5, 6 and 7). Cut the first piece of rectangular access insulation (Item 5) a minimum 6 mm (1/4 in.) larger than the clean-out access opening. Position, square, and impale the first piece of access insulation over the four (4), 9.5 mm (3/8 in.) diameter, steel threaded rods extending from pre-fabricated access door. Press the first piece of access insulation flush over the pre-fabricated access door. Compress and abut the cut edges of the first piece of the access insulation against the cut edges of opening in the insulation. Cut a second piece of access insulation (Item 6) the same size as the first piece of access insulation. Press the second piece of access insulation flush over the first piece of access insulation. Compress and abut the cut edges of the second piece of the access insulation against the cut edges of opening in the insulation. Cut a third piece of rectangular access insulation (Item 7) a minimum of 51 mm (2 in.) larger than the second piece of access insulation on all sides. Seal cut edges of the third piece of access insulation with nominal 102 mm (4 in.) wide aluminum foil tape. Position, square, and impale the third piece of the access insulation over the four (4), 9.5 mm (3/8 in.) diameter, steel threaded rods (Item 2) extending from the pre-fabricated access door. Press the third piece of access insulation flush over second piece of access insulation.

Cut a cover plate (Item 12) to the same dimensions as the third piece of access insulation using a minimum 16 GA steel sheet. Drill holes in the cover plate that match the location of the four (4), 9.5 mm (3/8 in.) diameter, steel threaded rods and locate the holes so that the cover plate is squared to the third piece of access insulation. After all three (3) layers of access insulation are impaled over the four (4), 9.5 mm (3/8 in.) diameter, steel threaded rods, install the cover plate. Place maximum 102 mm (4 in.) long, steel tubing over each steel threaded rods (Item 10) to act as protection for the 3M™ Fire Barrier Duct Wrap 615+ and to transfer the wing nut force to the access door when fastening. Apply washers and wing nuts over the steel threaded rods (Item 11). Secure the access door by tightening the wing nuts.

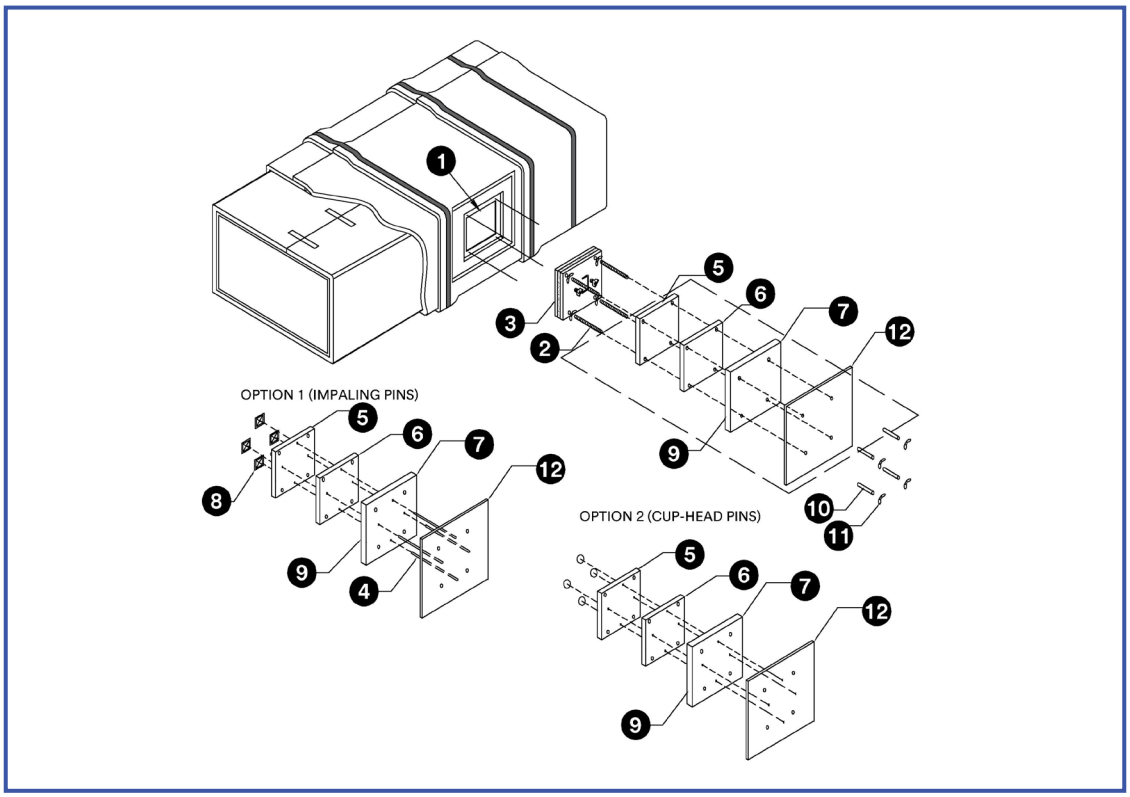

Figure 3a – Pre-fabricated 1 or 2-hour access door for commercial kitchen exhaust duct systems

1. Access hole

2. 6 mm (1/4 in.) diameter steel threaded rods

3. Ductmate ULtimate Door™

4. Welded pins

5. First layer 3M™ Fire Barrier Duct Wrap 615+ cut same size as cover

6. Second Layer 3M™ Fire Barrier Duct Wrap 615+ with 25 mm (1 in.) overlap on all sides

7. Third layer 3M™ Fire Barrier Duct Wrap 615+ with 25 mm (1 in.) overlap on all sides

8. Speed clips

9. Aluminum tape covering all exposed edges

10. Steel tubing pieces for steel threaded rods

11. 6 mm (1/4 in.) diameter wing nuts

12. Cover plate (16 GA steel plate)

Note: System integrity is limited by quality of installation. Consult current independent testing laboratories (e.g. Intertek, UL) for Design or System Details. In all four overlap techniques the perimeter overlap can occur at any location on the duct.

Roof Clearances

Per NFPA 96 guidelines, considerations need to be taken when a kitchen exhaust duct penetrates through a rated wall, floor / ceiling or roof assembly, or even a non-rated assembly. The kitchen exhaust duct needs to be wrapped continuously through any given assembly for two reasons: comply with NFPA 96 clearance requirements, and to ensure the assembly is shielded from the extreme heat that will be radiated from an unwrapped duct in the event of an internal grease fire. Assembly construction – combustible, limited combustible or non-combustible – dictates the clearance required.

NFPA 96 *Clause* 4.2 states that a 457 mm (18 in.) clearance to combustibles required. Since most rooves consist of combustible materials, extending 3M™ Fire Barrier Duct Wrap 615+ above the roof maintains clearance requirements, as depicted in Figure 4.

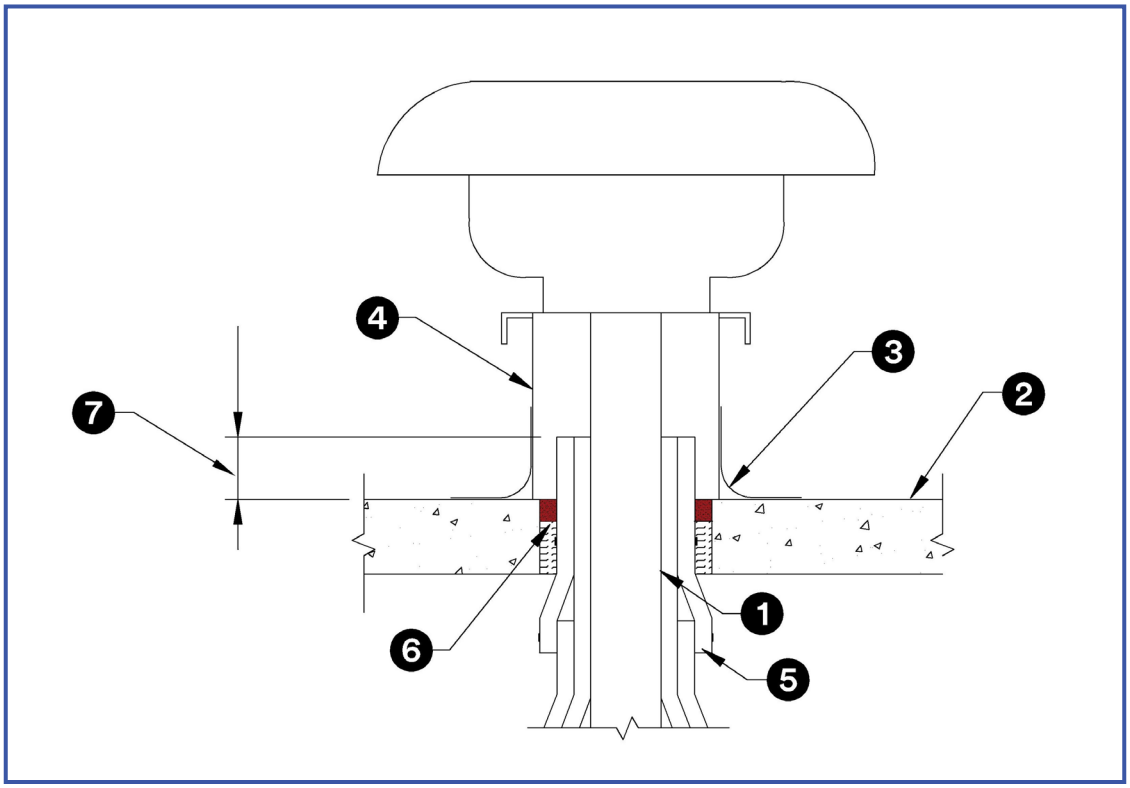

Figure 4 – Clearance to combustible roof assemblies maintained via 3M™ Fire Barrier Duct Wrap 615+

1. Grease duct

2. Roof assembly

3. Roof flashing

4. Vent flashing

5. Two layers 3M™ Fire Barrier Duct Wrap 615+

6. Firestopping system for **rated** roof assemblies

7. Extend wrap above roof assembly to maintain clearance to combustibles (distance prescribed by NFPA 96: 457 mm or 18 in.)

Note: System integrity is limited by quality of installation. Consult current independent testing laboratories (e.g. Intertek, UL) for Design or System Details. In all four overlap techniques the perimeter overlap can occur at any location on the duct.

Hood Considerations

NFPA 96 guidelines clearly indicate acceptable hood types and associated requirements. Please see Chapters 5 to 10 of NFPA 96 for more details.

Free-standing Hood Installation

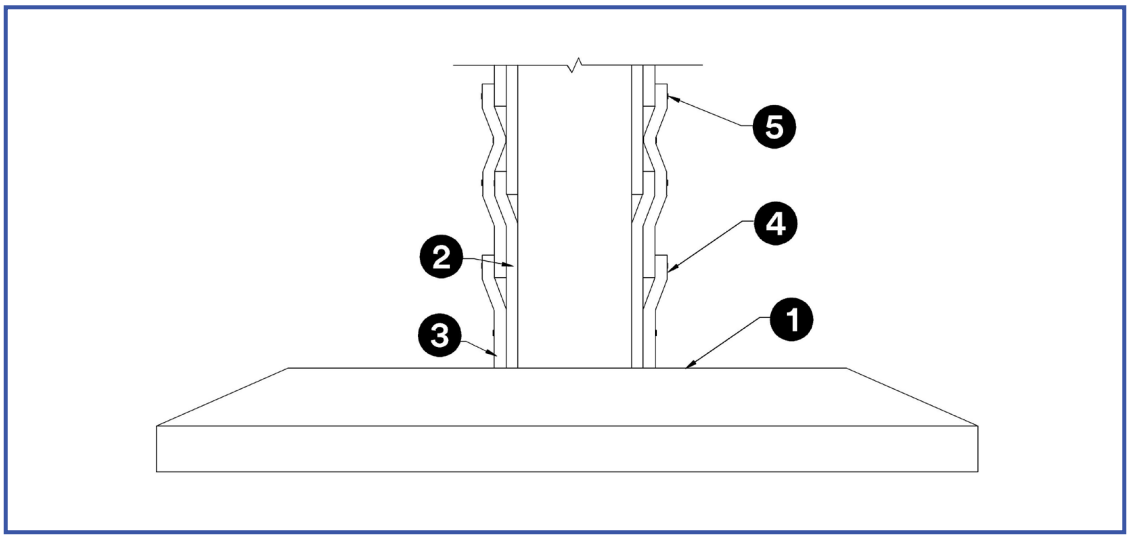

Figure 5 – Suggested Free-standing Hood Installation

1. Hood

2. First layer 3M™ Fire Barrier Duct Wrap 615+

3. Second layer 3M™ Fire Barrier Duct Wrap 615+

4. 76 mm (3 in.) perimeter overlap

5. Stainless steel banding 13 mm (1/2 in.) wide min. typical for permanent fastening. Spaced 38 mm (1-1/2 in.) from edge of blanket.

Note: System integrity is limited by quality of installation. Consult current independent testing laboratories (e.g. Intertek, UL) for Design or System Details. In all four overlap techniques the perimeter overlap can occur at any location on the duct.

Grease Hood Installation

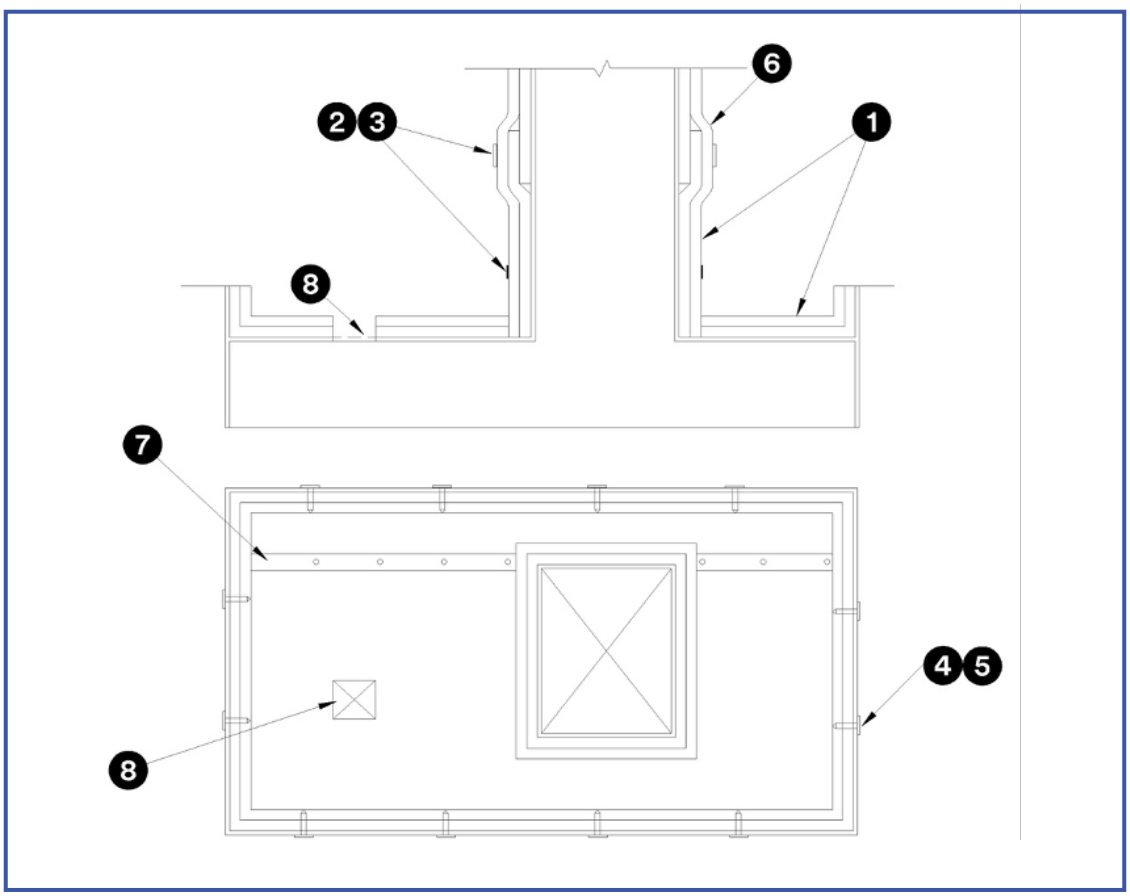

Figure 6 – Suggested Grease Hood Installation

1. Two layers of 3M™ Fire Barrier Duct Wrap 615+
2. Scotch® Filament Tape 898 (or similar) for temporary hold
3. Steel banding 13 mm (1/2 in.) wide min. typical for permanent fastening
4. 165 mm (6-1/2 in.) long, 12 GA copper-coated insulation pins with speed clips

— OR —

5. 12 GA cup-head pins
6. 76 mm (3 in.) min. *perimeter* overlap
7. 76 mm (3 in.) min. seam overlap
8. Cut-out duct wrap around junction boxes or fan louvres

Note: System integrity is limited by quality of installation. Consult current independent testing laboratories (e.g. Intertek, UL) for Design or System Details. In all four overlap techniques the perimeter overlap can occur at any location on the duct.

Ventilation Air Duct Installation Techniques

3M™ Fire Barrier Duct Wrap 615+ should be installed per an applicable ventilation duct design – V-20, V-27 and V-31 (UL) or 3MU/DI 60-01 and 3MU/DI 120-01 (Intertek) – and in accordance with the following basic installation instructions.

1-Layer Ventilation Duct Method (ISO 6944 Type A)

The following instructions describe a one-layer Telescoping wrap installation of 610 mm (24 in.) wide 3M™ Fire Barrier Duct Wrap 615+ blanket, applied directly to a ventilation duct. To minimize waste, the 3M™ Fire Barrier Duct Wrap 615+ material should be rolled out tautly before measuring. Maximum area of duct is 1.32 m^2 (2040 $in.^2$) and maximum dimension of 2159 mm (85 in.).

Single Layer

A single layer of 3M™ Fire Barrier Duct Wrap 615+ blanket is wrapped around the circumference of the duct and is cut to a length to overlap itself not less than 76 mm (3 in.). This is referred to as the longitudinal joint. The interface between adjacent blankets forms the perimeter joint (also referred to as *transverse* or *circumferential* joint). *Perimeter* joints should overlap onto adjacent blankets with a minimum 76 mm (3 in.) overlap. Aluminum foil tape is used to seal all cut edges of the blanket and any tears in the foil scrim.

The 3M™ Fire Barrier Duct Wrap 615+ may be temporarily held in place using filament tape, prior to permanent fastening with carbon steel banding and weld pins (impaling or cup-head style, if required based on duct dimensions. Navigate to the section titled Pinning for more information).

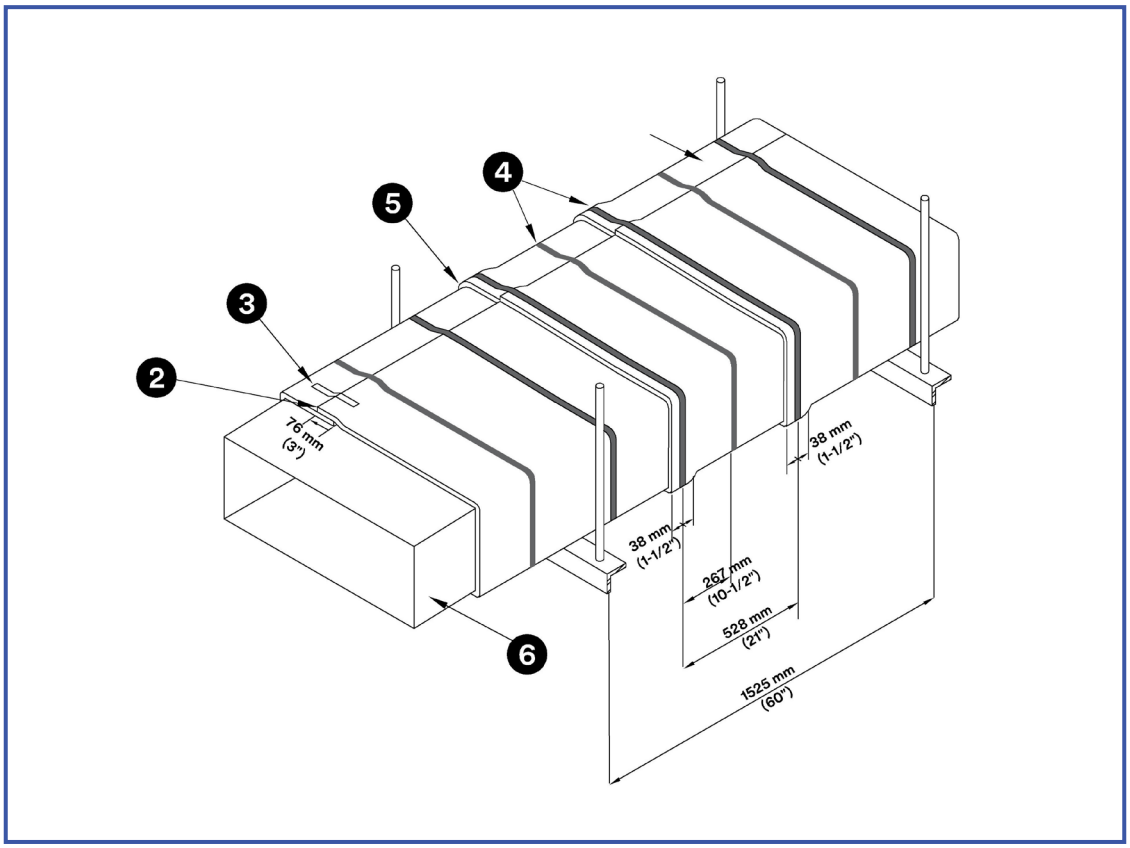

Figure 7 – 1- or 2-Hour shaft alternative telescoping wrap technique with banding for ducts 2159 mm (85 inches) or less

1. Single layer 3M™ Fire Barrier Duct Wrap 615+

2. *Longitudinal* joint min. 76 mm (3 in.) overlap

3. 19 mm (3/4 in.) wide filament tape

4. Stainless or carbon steel banding 13 mm (1/2 in.) wide min. typical for permanent fastening

5. *Perimeter* joint min. 76 mm (3 in.) overlap

6. Metallic ventilation duct

Ventilation Duct Installation Options: Cross Sectional View

Telescoping 76 mm (3 in.) Overlap

For the *Telescoping* overlap technique, each blanket overlaps one adjacent blanket (*perimeter* joint). The exposed edge is covered by the next blanket, as shown in Figure 8a.

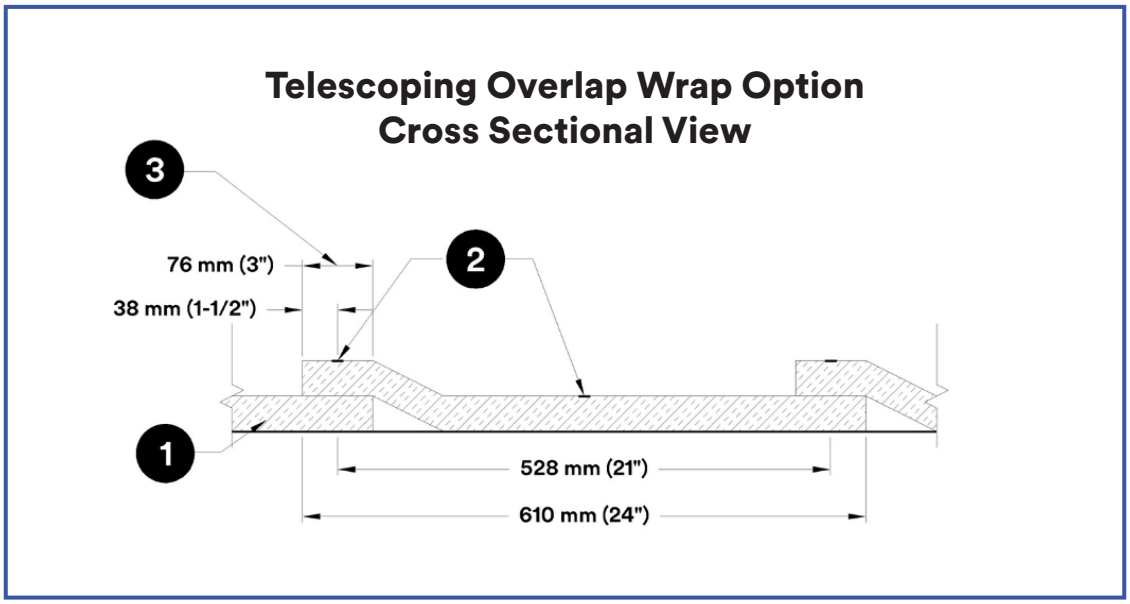

Figure 8a – Telescoping installation method with 76 mm (3 in.) overlaps

1. Single of 3M™ Fire Barrier Duct Wrap 615+
2. Carbon steel banding 13 mm (1/2 in.) wide min. typical
3. 76 mm (3 in.) min. *perimeter* overlap

Checkerboard 76 mm (3 in.) Overlap

For the 76 mm (3 in.) *Checkerboard Overlap* wrap method, blankets with both edges exposed alternate with blankets that have both edges covered, as shown in Figure 8b.

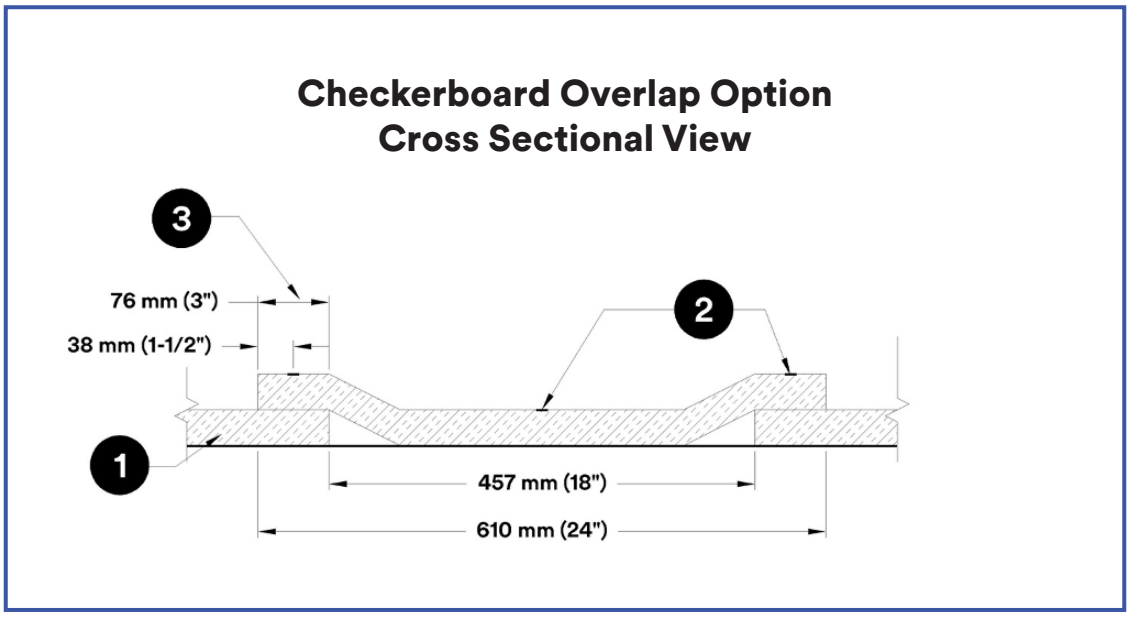

Figure 8b – Checkerboard installation method with 76 mm (3 in.) overlaps

1. Single of 3M™ Fire Barrier Duct Wrap 615+
2. Carbon steel banding 13 mm (1/2 in.) wide min. typical
3. 76 mm (3 in.) min. *perimeter* overlap

Butt Joint with Collar

For the *Butt Joint* and *Collar* method, adjacent blankets are butted tightly together and a 152 mm (6 in.) wide collar of duct wrap is centered over the joint, overlapping each blanket by 76 (3 in.) minimum as shown in Figure 8c.

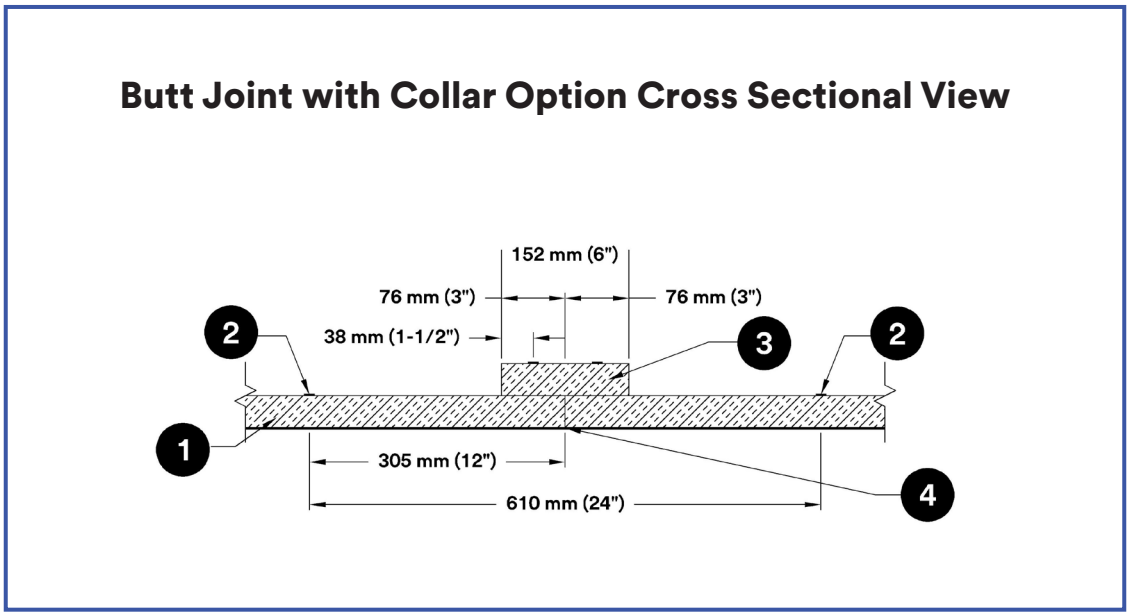

Figure 8c – Butt joint with collar installation method

1. Single layer of 3M™ Fire Barrier Duct Wrap 615+
2. Carbon steel banding 13 mm (1/2 in.) wide min. typical
3. 152 mm (6 in.) min. wide Fire Barrier Duct Wrap 615+ collar
4. Firmly, *perimeter*-butted joint

Compression Butt Joint (Pinning Only)

Both *perimeter* and *longitudinal* joints are compression-butted for the *Compression butt joint* technique. Compress edges of each piece of insulation together 25 mm (1 in.) on each side. After installation, each piece of installed insulation width is 51 mm (2 in.) less than insulation nominal width. In other words, each piece of nominal 610 mm (24 in.) wide insulation when installed is 559 mm (22 in.) wide, as shown in Figure 8d. Must be installed with pinning only.

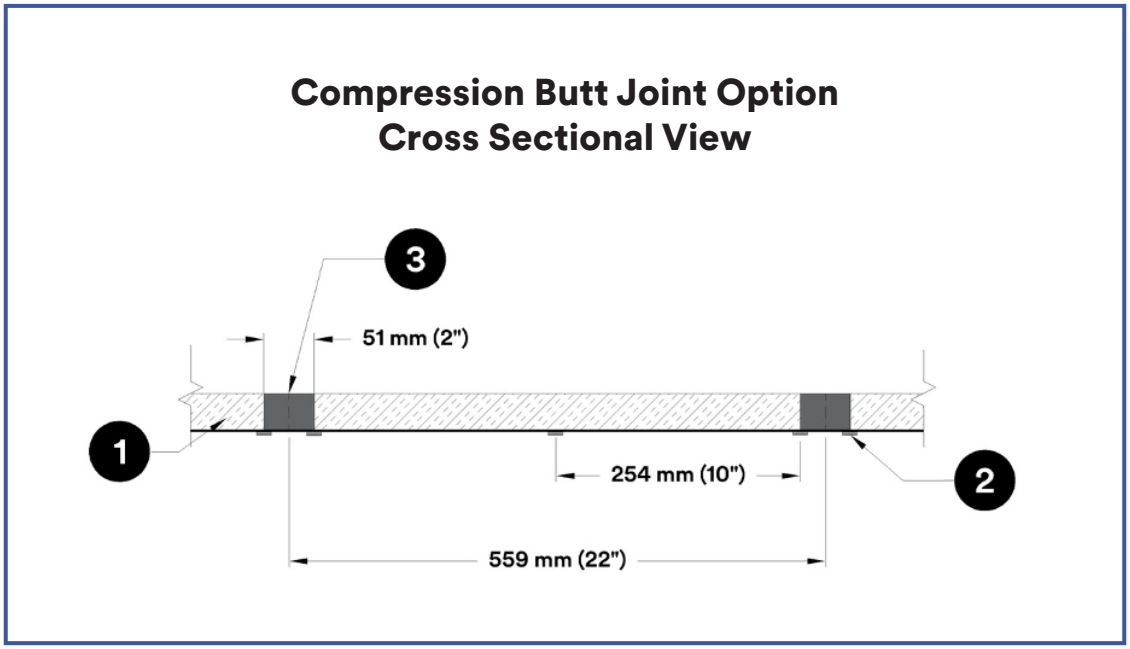

Figure 8d – Compression butt joint installation method

1. Single layer of 3M™ Fire Barrier Duct Wrap 615+

2. Impaling or cup-head insulation pin

3. *Perimeter*-butted compression joint (grey shading indicates area of compression)

Two and Three-sided Installation

The following instructions describe a one-layer *Telescoping* wrap installation of 3M™ Fire Barrier Duct Wrap 615+ blanket, applied directly to a ventilation duct. A single layer of 3M™ Fire Barrier Duct Wrap 615+ blanket shall be installed around the duct with *perimeter* joints overlapped min. 76 mm (3 in.). Position wrap on the duct's underside, covering cradle supports and around the vertical side(s) of the duct. Ensure 3M™ Fire Barrier Duct Wrap 615+ overlaps min. 76 mm (3 in.) onto the underside of floor slab or to the wall, to allow for installation of clamping bars.

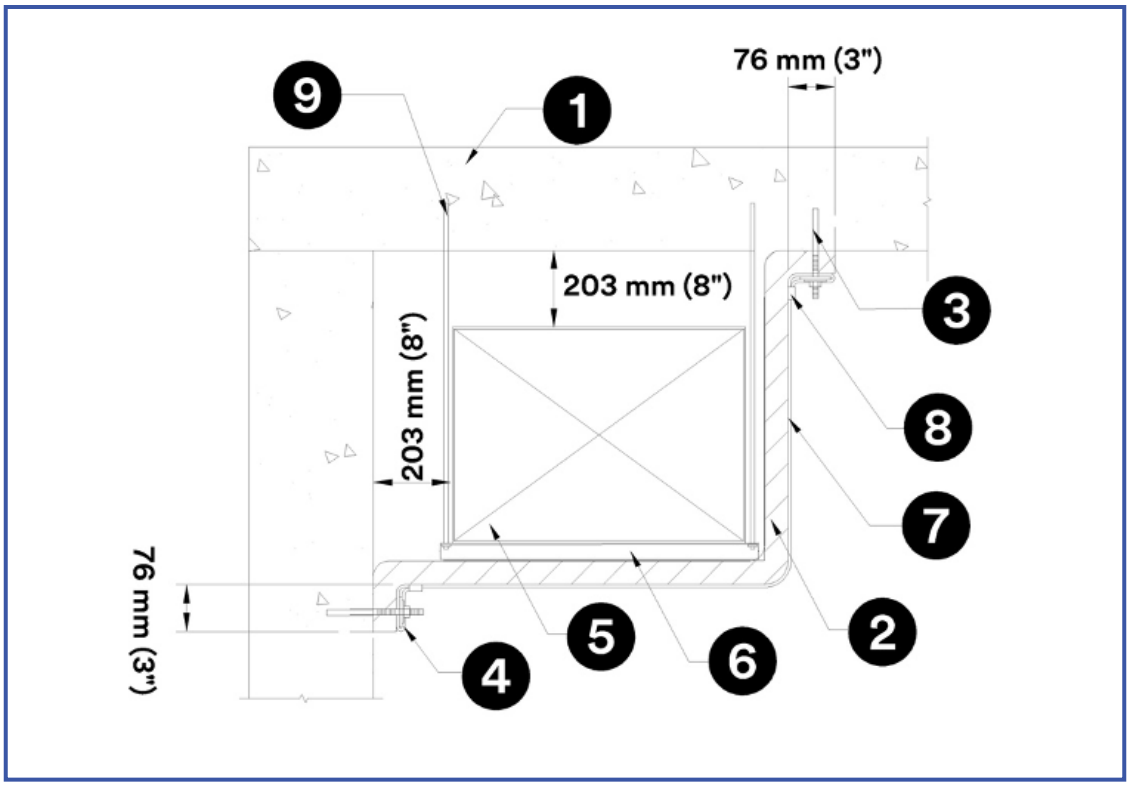

Figure 9a – Suggested two-sided ventilation air duct installation

1. Concrete slab

2. 1-layer of 3M™ Fire Barrier Duct Wrap 615+

3. Min. 6 mm (1/4 in.) diameter steel concrete anchors

4. 3 mm (1/8 in.) thick by 51 mm to 76 mm (2 in. to 3 in.) wide bar stock perforated 305 mm (12 in.) on centre

5. Ventilation duct

6. Cradle

7. Steel banding 13 mm (1/2 in.) wide min. typical for permanent fastening

8. Banding clips

9. Steel threaded rod

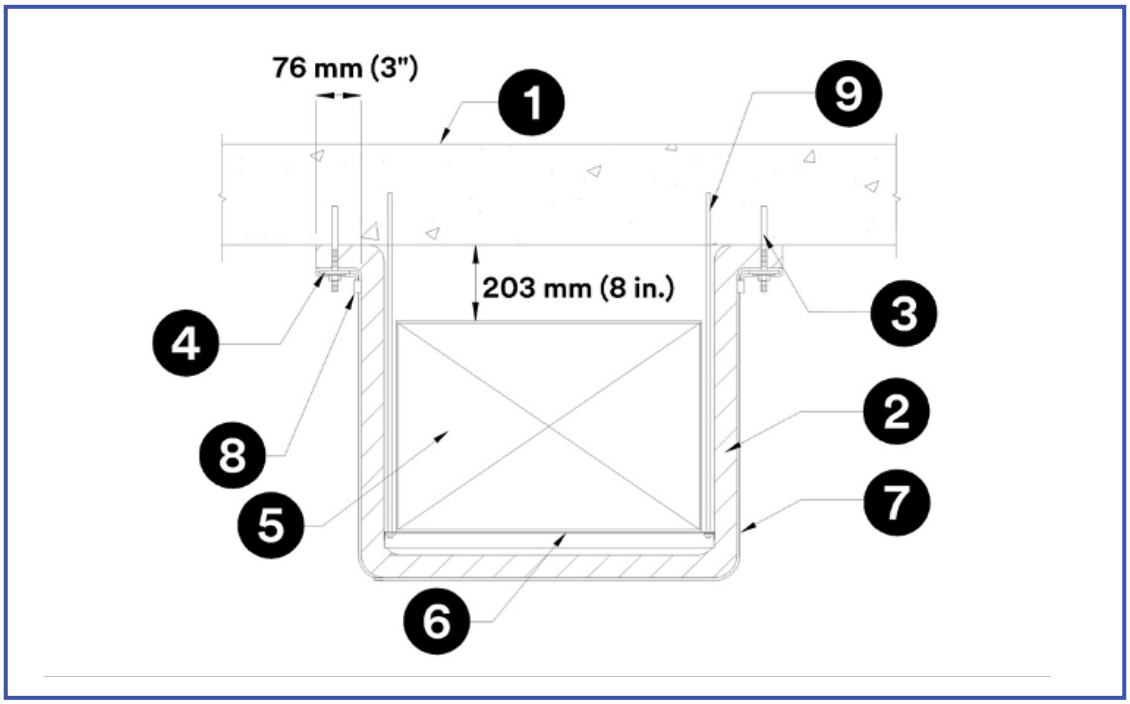

Figure 9b – Suggested three-sided ventilation air duct installation

1. Concrete slab

2. 1-layer of 3M™ Fire Barrier Duct Wrap 615+

3. Min. 6 mm (1/4 in.) diameter steel concrete anchors

4. 3 mm (1/8 in.) thick by 51 mm to 76 mm (2 in. to 3 in.) wide bar stock perforated 305 mm (12 in.) on centre

5. Ventilation duct

6. Cradle

7. Steel banding 13 mm (1/2 in.) wide min. typical for permanent fastening

8. Banding clips

9. Steel threaded rod

Grease Duct and Ventilation Air Duct Installation Techniques

Fastener Requirements

Banding

Banding material must be minimum 13 mm (1/2 in.) wide, 0.38 mm (0.0015 in.) stainless steel (grease duct) or carbon steel (ventilation duct) strap. Do not use banding when installing per compression-butted options (2E grease and 8D ventilation). Pinning must be used to ensure compression-butted joints remain in place. Ducts that are ≤ 610 mm (24 in.) may have insulation fastened with banding only (installation methods: 2A to 2D grease and 8A to 8C ventilation).

When needed to ease installation, use filament tape as a temporary hold prior to banding. Place banding max. 38 mm (1-1/2 in.) from all insulation edges and max. 267 mm (10-1/2 in.) on centre (typical). The banding is placed and tightened to hold the 3M™ Fire Barrier Duct Wrap 615+ in place. Ensure to not over-tighten, as this may cause the foil scrim to tear. If the scrim does tear, use tape (3M™ Venture Tape™ FSK Facing Tape 1525CW or equivalent) to seal the opening.

Pinning

Ducts that are 610 mm (24 in.) up to 1220 mm (48 in.) wide (grease) or up to 2160 mm (85 in.) (ventilation) require pinning on the bottom horizontal surface or widest (outside) face of a vertical duct to prevent sagging of the duct wrap. For each install method, pins must be spaced max. 38 mm (1-1/2 in.) from the edge of insulation (where *longitudinal* and *perimeter* joints form). For standard installation techniques (2A to 2C and 8A & 8B), space pins max. 267 mm (10-1/2 in.) along the length of the duct (forms a column). Columns of pins are spaced 305 mm (12 in.) apart across the duct width. Pins must be spaced max. 171 mm (6-3/4 in.) from the edge of the duct. See Table 1 and Figure 10 for more detail.

Note: Either apply min. 12 GA copper-coated impaling pins to the bare duct using a capacitor discharge gun or apply min. 12 GA cup-head pins after the duct wrap is installed.

Table 1 – Grease and ventilation duct assemblies: pinning guide

Install Option	Row Spacing Along Length of Duct	Row Spacing Across Width of Duct	Additional Information
2A: Butt/Overlap (Grease Only)	267 mm (10-1/2 in)	305 mm (12 in.)	171 mm (6-3/4 in.) from edge of duct
2B and 8A: Telescoping			
2C and BB: Checkerboard			
2D and 8C: Butt/Collar	229 mm (9 in.) then 76 mm (3in.) (alternating)		
2E: Compression Butted (Grease)	229 mm (9 in.) then 51 mm (2 in.) (alternating)		
8D: Compression Butted (Ventillation)	254 mm (10 in.) then 51 mm (2 in.) (alternating)		

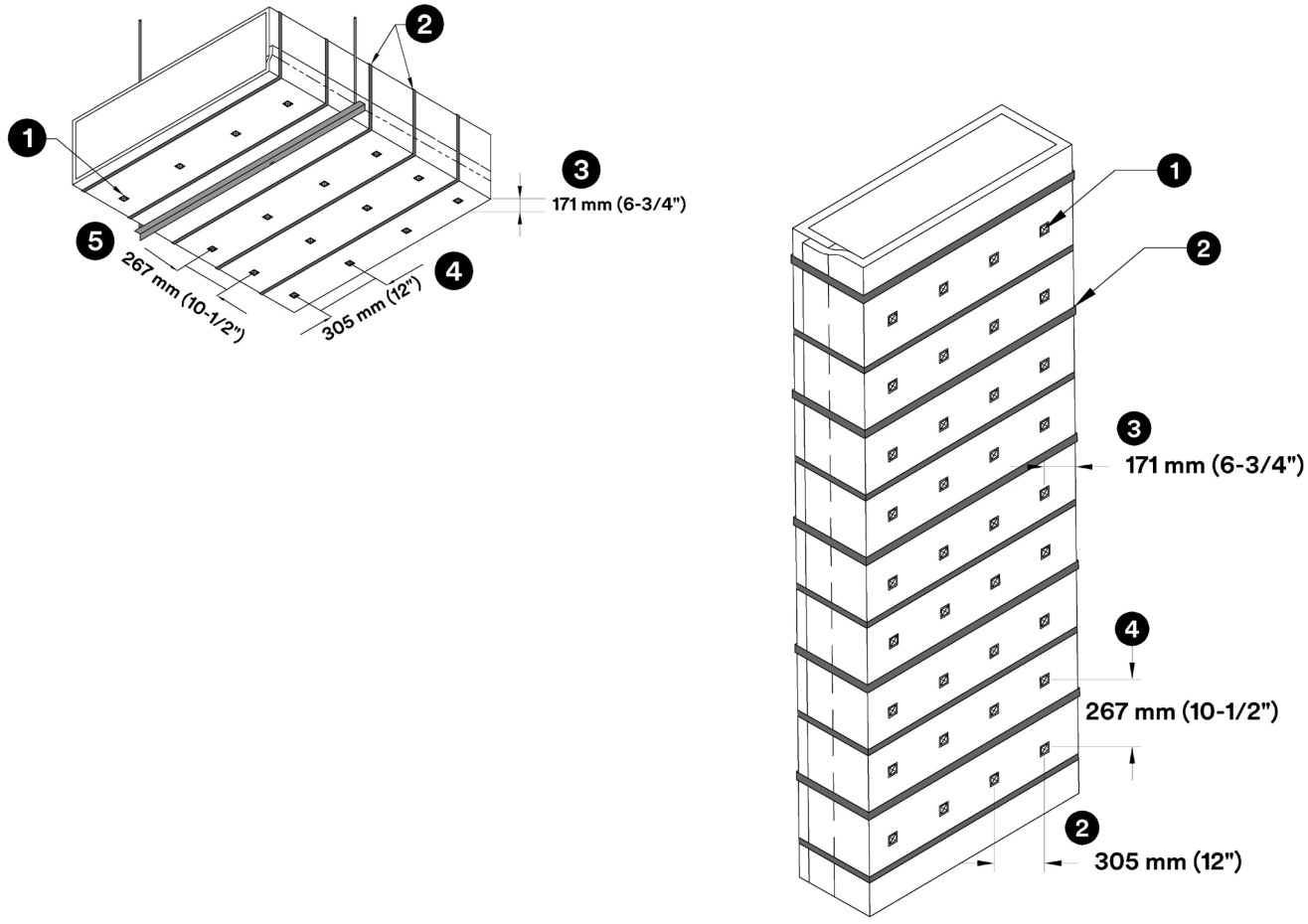

Figure 10 – Horizontal and vertical duct pinning and banding techniques for the *Telescoping* install technique

1. Min. 12 GA copper-coated steel insulation pins used with min. 64 mm (2-1/2 in.) square galvanized steel or stainless speed clips, or 38 mm (1-1/2 in.) diameter equivalent sized insulated cup-head pins

2. 13 mm (1/2 in.) carbon (ventilation duct) or stainless (grease duct) steel banding material, spaced 267 mm (10-1/2 in.) on centre

3. Locate pins max. 171 mm (6-3/4 in.) from edges of rectangular ducts

4. Space pins max. 305 mm (12 in.) apart in rows across the width of the duct

5. Space rows of pins max. 267 mm (10-1/2 in.) apart along the length of the duct

Duct Support

Grease and ventilation duct assemblies with max. dimensions of 610 mm by 610 mm (24 in. by 24 in.) must be supported with a *trapeze* system composed of min. 51 mm by 51 mm by 3 mm (2 in. by 2 in. by 1/8 in.) steel angle as the trapeze cross-member and two (2), min. 10 mm (3/8 in.) diameter, steel threaded rods connected using nuts and washers.

Grease duct assemblies with max. dimensions of 1220mm by 1220 mm (48 in. by 48 in.) or ventilation duct assemblies with max. dimensions of 2160 mm by 610 mm (85 in. by 24 in.) must be supported with a trapeze system composed of min. 51 mm by 51 mm by 6 mm (2 in. by 2 in. by 1/4 in.) steel angle as the trapeze cross-member and two (2), min. 16 mm (5/8 in.) diameter steel threaded rods for grease duct assemblies and 13 mm (1/2 in.) for ventilation duct assemblies. Please reference Table 2 and Table 3 for a summary of support requirements (grease and ventilation duct, respectively).

Vertical ducts must be supported at every floor line on the top of the slab.

Table 2 – Summary of grease duct assembly support requirements

Grease Duct System: Support Summary		
Support Spacing	1525 mm (60 in.) maximum	
Duct Perimeter Size	≤ 2235 mm (96 in.)	Max. 4880 mm (192 in.)
Duct Dimensions	≤ 610 mm by 610 mm (24 in. by 24 in.)	Max. 1220 mm by 1220 mm (48 in. by 48 in.)
Trapeze System	**Steel Angle Dimensions**	
	51 mm x 51 mm x 3 mm (2 in. by 2 in. by 1/8 in.)	51 mm x 51 mm x 6 mm (2 in. by 2 in. by 1/4 in.)
	Steel Threaded Rod Diameter	
	10 mm (3/8 in.)	16 mm (5/8 in.)

Table 3 – Summary of ventilation duct assembly support requirements

Ventillation Duct System: Support Summary		
Support Spacing	1525 mm (60 in.) maximum	
Duct Perimeter Size	≤ 3660 mm (144 in.)	Max. 5.54 m (218 in.)
Duct Dimensions	≤ 610 mm by 1220 mm (24 in. by 48 in.)	Max. 610 mm by 2160 mm (24 in. by 85 in.)
Trapeze System	**Steel Angle Dimensions**	
	51 mm x 51 mm x 3 mm (2 in. by 2 in. by 1/8 in.)	51 mm x 51 mm x 6 mm (2 in. by 2 in. by 1/4 in.)
	Steel Threaded Rod Diameter	
	10 mm (3/8 in.)	16 mm (5/8 in.)

Regardless of duct dimension, steel threaded rods must be spaced max. 1525 mm (60 in.) on centre. Place one (1) steel threaded rod at each end of trapeze cross-members. Centre duct with insulation on trapeze cross-member. Space steel threaded rods a max. 152 mm (6 in.) from the surface of a two (2) layer insulated grease duct, or max. 102 mm (4 in.) from the surface of a one (1) layer insulated ventilation duct. Steel threaded rods may contact the insulation, if required. Extend trapeze cross-member at least 51 mm (2 in.) past each steel threaded rod.

To facilitate the application of 3M™ Fire Barrier Duct Wrap 615+ so that the steel threaded rods and trapeze hangers are outside the wrap envelope, the dimensions indicated in Table 4 and Figure 11 are recommended.

Table 4 – Suggested clearance between *trapeze* system and ventilation duct

Dimension	1-Layer	2-Layer
1. Rod to bare duct clearance (Y)	102 mm (4 in.)	152 mm (6 in.)
2. Added rod length (X)	51 mm (2 in.)	102 mm (4 in.)

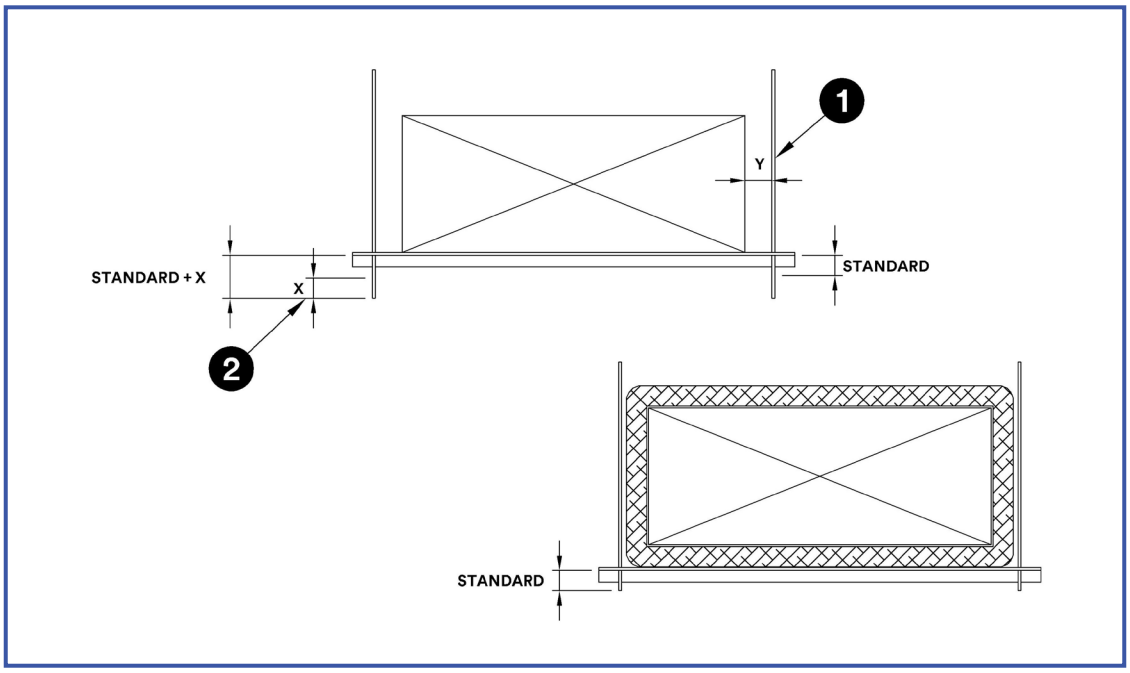

Figure 11 – Hanging support details for fire-resistance rated ductwork

Wrap Envelope Penetrations

As an option, the cradle assembly can be encased within the duct wrap (cocoon wrap) during installation of 3M™ Fire Barrier Duct Wrap 615+ on ventilation duct systems only. Although optional, wrapping around the cradle, support rods or other elements is not the preferred installation technique, and should be avoided when possible.

To encase the cradle support, the duct wrap is slit maximum 152 mm (6 in.) to allow for the threaded rod. A generous application of 3M™ Fire Barrier Sealant CP 25WB+ or 3000WT is applied along the seam. The seam is taped over with 76 mm (3 in.) wide aluminum tape. Additional material is installed such that a crown of sealant minimum 13 mm (1/2 in.) is formed around the circumference of the threaded rod. Details are provided in Figure 12 and Figure 13.

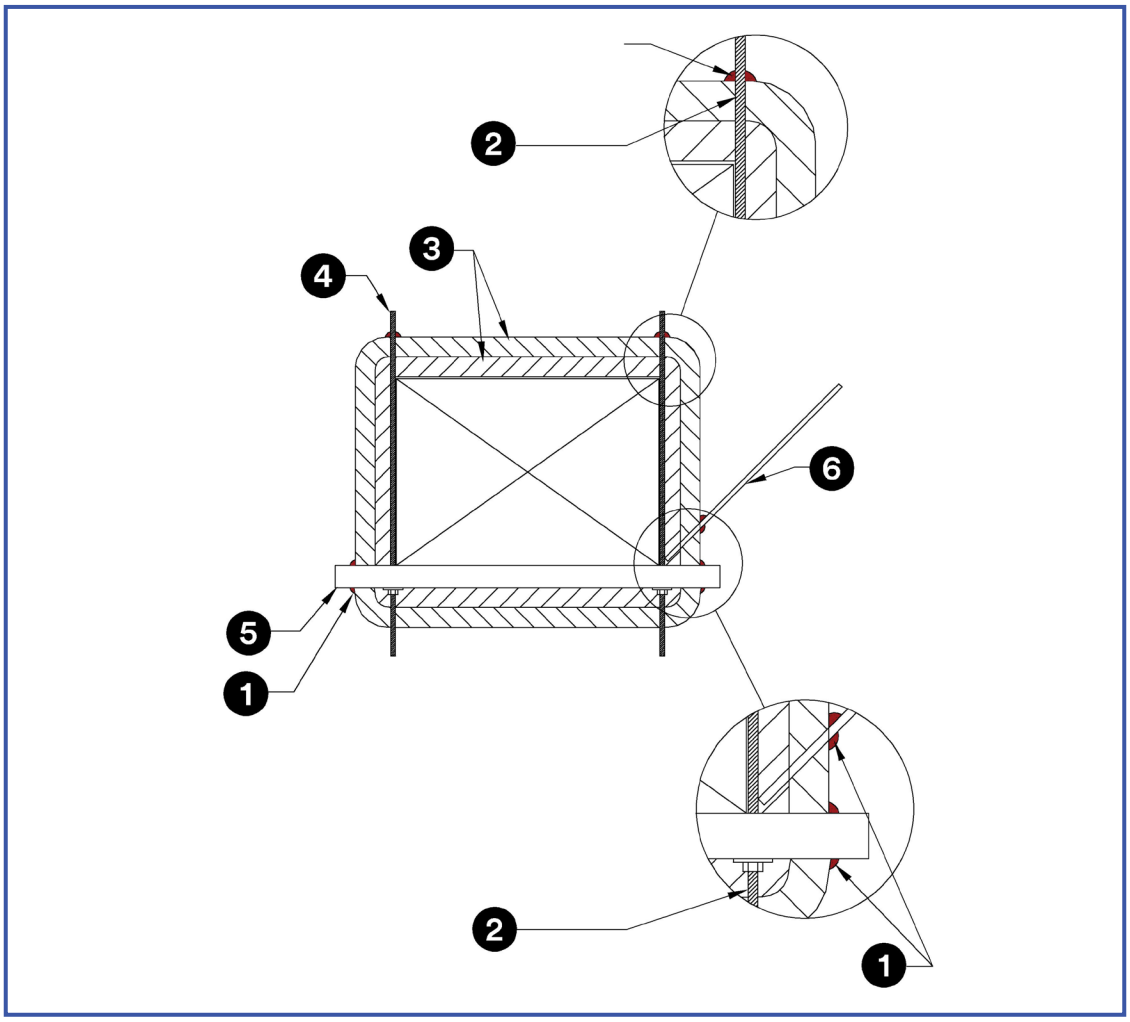

Figure 12 – Hanger penetrations of wrap envelope for ventilation duct systems

1. Min. 13 mm (1/2 in.) crown of 3M™ Fire Barrier Sealant CP 25WB+ or 3000WT

2. Tape around opening with 76 mm (3 in.) wide aluminum tape, such as 3M™ Venture Tape™ FSK Facing Tape 1525CW (or equivalent)

3. 1 or 2 layers of 3M™ Fire Barrier Duct Wrap 615+ (ventilation or grease duct, respectively)

4. & 5. Trapeze system: steel threaded rod and steel C channel angle support (or Unistrut)

6. Seismic bracing wire

Note: The inclusion of metallic items penetrating through the wrap envelope may diminish the enclosure's T rating. Create an opening in the wrap that closely follows contours of the penetrating cradle and support rods, and seal per Figure 12.

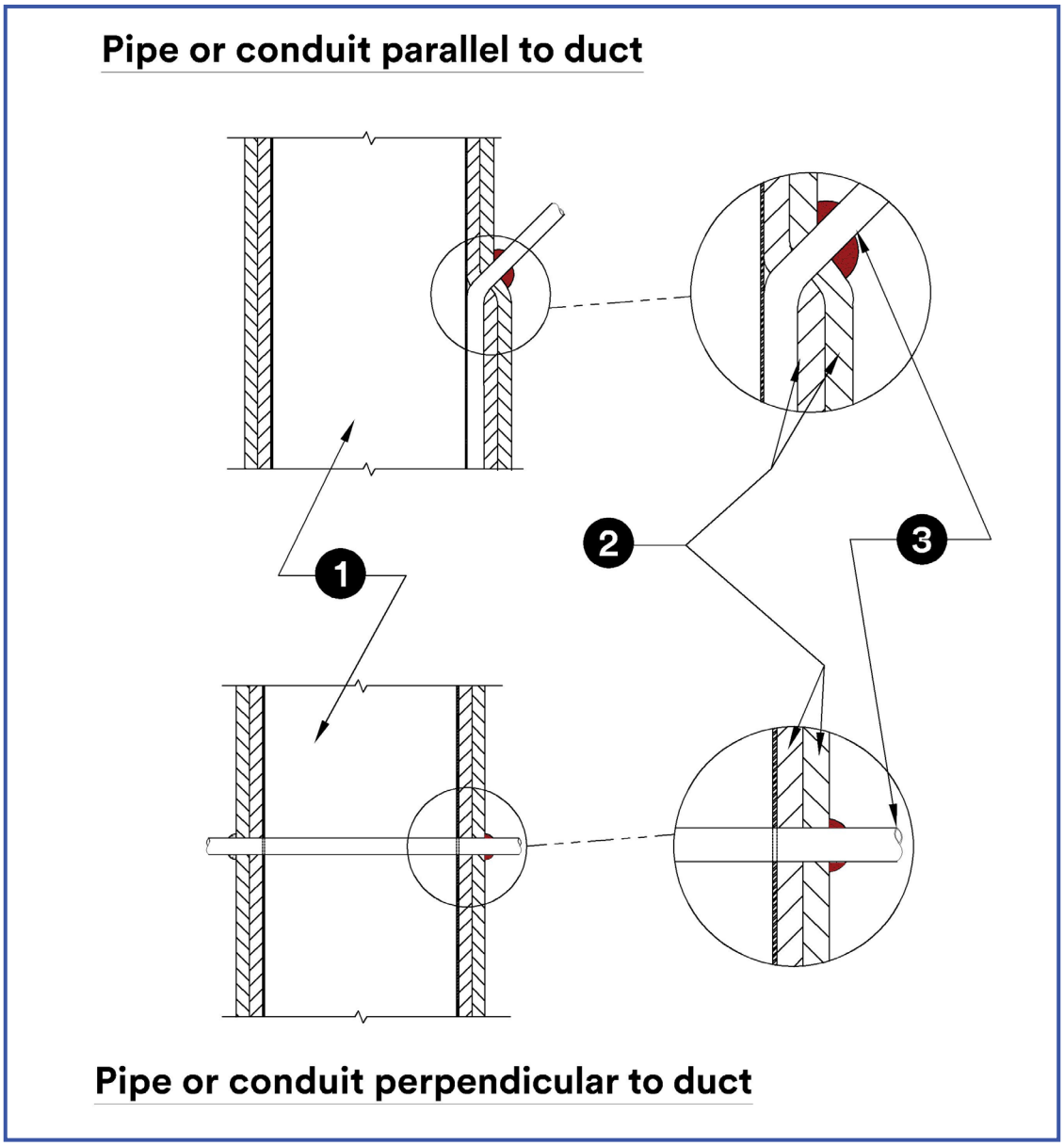

Figure 13 – Conduit penetrations of wrap envelope for ventilation duct systems

1. Ventilation duct

2. 1 layer of 3M™ Fire Barrier Duct Wrap 615+

3. Min. 13 mm (1/2 in.) crown of 3M™ Fire Barrier Sealant CP 25WB+ or 3000WT

Note: The inclusion of metallic items penetrating through the wrap envelope may diminish the enclosure's T rating. Create an opening in the wrap that closely follows contours of the penetrating cradle and support rods, and seal per Figure 13.

Branch and Elbow Installation

The following details suggested installation of 3M™ Fire Barrier Duct Wrap 615+ and carbon or stainless steel banding around elbows (transition from horizontal to vertical).

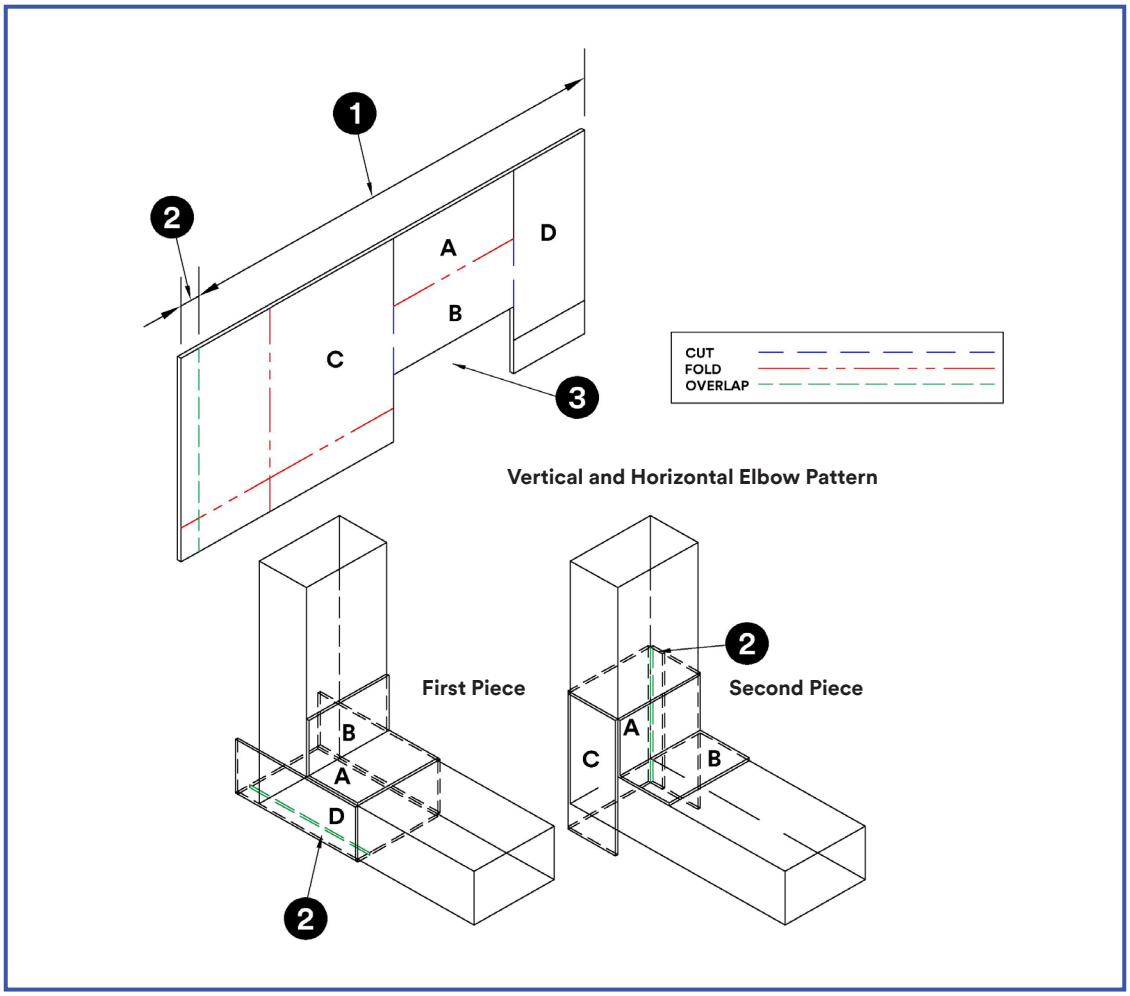

Figure 14 – Suggested elbow pattern installation

1. Length of 3M™ Fire Barrier Duct Wrap 615+ piece wraps around duct perimeter
2. Location of 76 mm (3 in.) overlap
3. Cut opening to duct dimensions

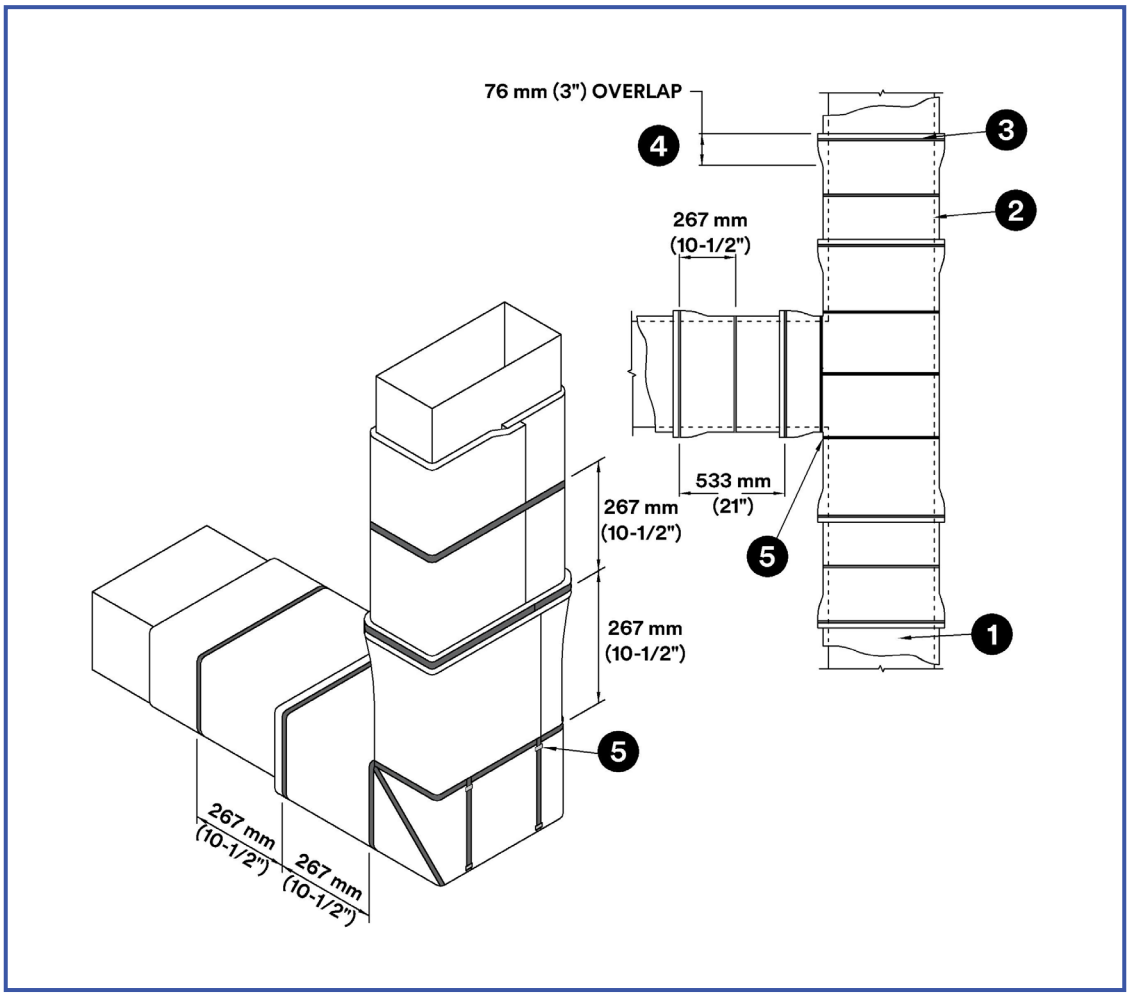

Figure 15 – Suggested banding pattern installation

1. Grease or ventilation duct

2. 1 or 2 layers of 3M™ Fire Barrier Duct Wrap 615+ (ventilation or grease, respectively)

3. Carbon or stainless steel banding 13 mm (1/2 in.) wide min. typical for permanent fastening with max. 267 mm (10-1/2 in.) spacing

4. 76 mm (3 in.) *perimeter* overlap (*Telescoping* wrap technique)

5. Choker bands added on all sides to secure wrap when 267 mm (10-1/2 in.) spacing cannot be maintained

6. 76 mm (3 in.) *longitudinal* overlap (not shown)

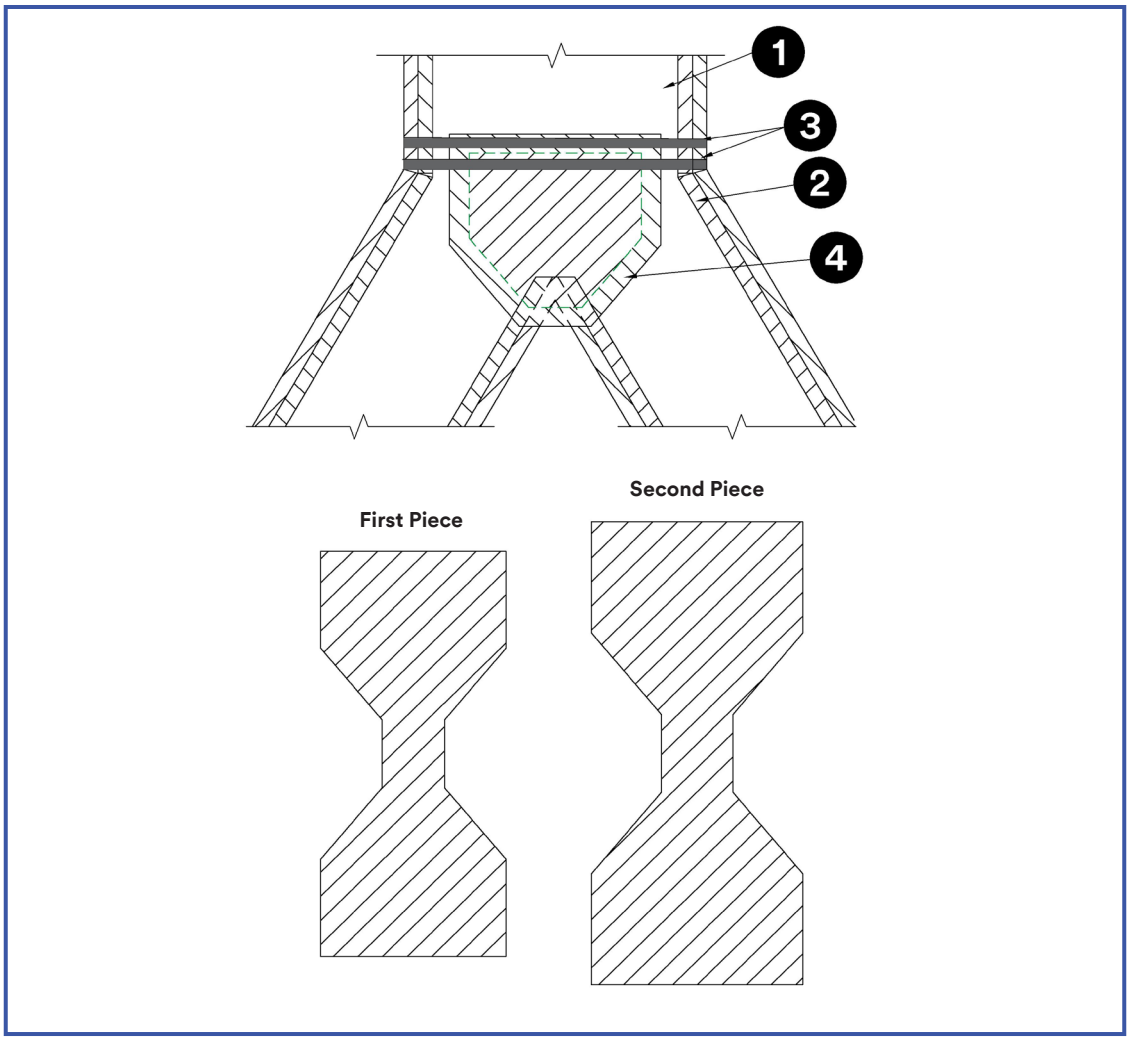

Figure 16 – Suggested branching duct details

1. Grease or ventilation duct

2. Full width pieces of 1 or 2 layers of 3M™ Fire Barrier Duct Wrap 615+ (ventilation or grease, respectively)

3. Steel banding 13 mm (1/2 in.) wide min. typical for permanent fastening

4. 3M™ Fire Barrier Duct Wrap 615+ (field cut), min. 76 mm (3 in.) overlap[1]

[1]Install first piece onto the inside of the inner duct area; next, install adjacent pieces so they overlap at the edges a min. of 76 mm (3 in.). When an application requires a second layer of duct wrap, install the second piece over the first piece and overlap at the edges a min. of 76. mm (3-in.)

Wrap Termination into a Shaft

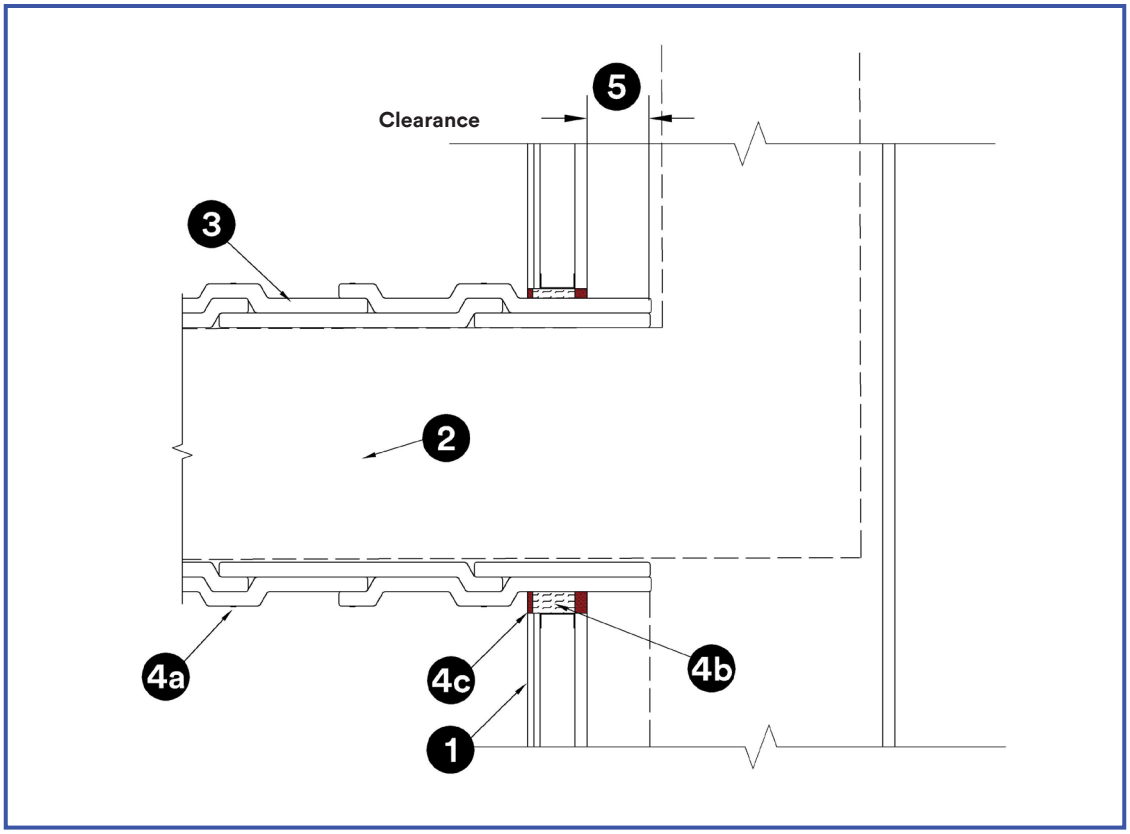

Figure 17 – Suggested transition from Duct Wrap 615+ enclosure to gypsum shaftwall enclosure for grease duct applications

1. Gypsum shaftwall assembly

2. Grease duct

3. Two layers of 3M™ Fire Barrier Duct Wrap 615+

4A. Stainless steel banding 13 mm (1/2 in.) wide min. typical for permanent fastening with max. 267 mm (10-1/2 in.) spacing (*Telescoping* install technique)

4B. Packing material – min. 4 pcf mineral wool or unfaced scrap duct wrap material

4C. 3M™ Fire Barrier Water Tight Sealants (1000 NS, 1003 SL or 3000 WT) or 3M™ Fire Barrier Sealant CP 25WB+

5. Extend wrap into shaft the distance prescribed by NFPA 96: **Section 7.7.2.2 Enclosure Clearance** requires 457 mm (18 in.) to combustible construction and 152 mm (6 in.) to limited-combustible or non-combustible construction

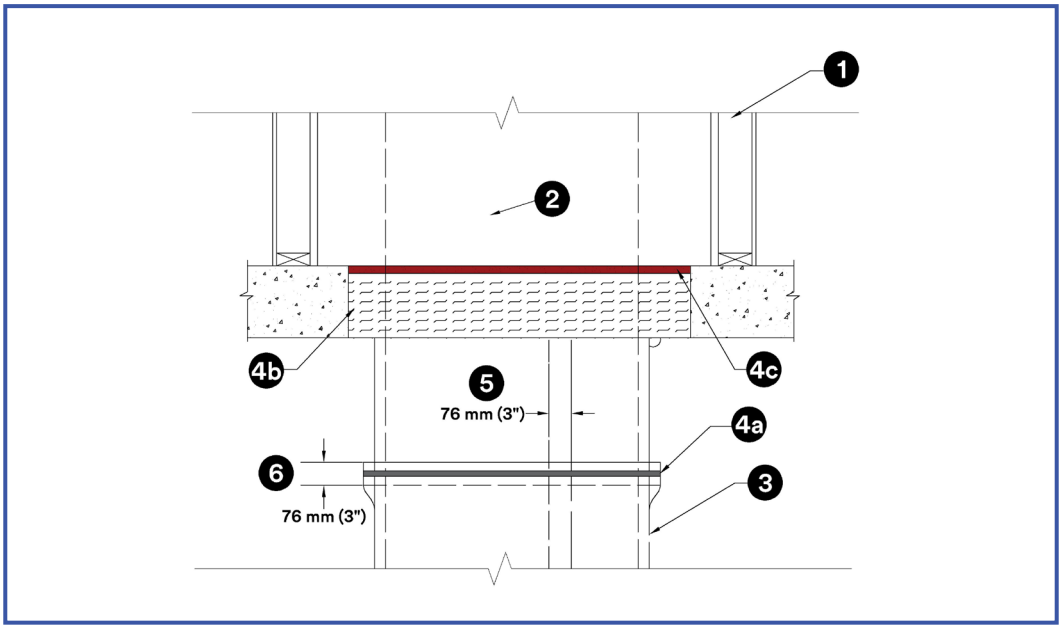

Figure 18 – Suggested ventilation duct wrap enclosure transition into a gypsum shaft

1. Gypsum shaftwall assembly

2. Ventilation duct

3. One layer of 3M™ Fire Barrier Duct Wrap 615+

4A. Carbon steel banding 13 mm (1/2 in.) wide min. typical for permanent fastening with max. 267 mm (10-1/2 in.) spacing (*Telescoping* install technique)

4B. Packing material – min. 4 pcf mineral wool or unfaced scrap duct wrap material

4C. 3M™ Fire Barrier Water Tight Sealants (1000 NS, 1003 SL or 3000 WT) or 3M™ Fire Barrier Sealant CP 25WB+

5. Min. 76 mm (3 in.) *longitudinal* overlap

6. Min. 76 mm (3 in.) *perimeter* overlap (*Telescoping* install technique)

Firestopping Requirements

When the duct penetrates a fire-resistance rated wall, ceiling or floor, an approved firestop system must be employed. Figure 19, Figure 20 and Figure 21 illustrate typical conditions. To firestop the wrapped duct, follow installation parameters detailed in ventilation (3MU/DI 60-01 and 3MU/DI 120-01) or grease duct (3MU/BI 120-03 and ESL-1198) protection designs.

Grease duct note: Through-penetration designs require the duct wrap to be continuous through any construction assembly. It is not appropriate for bare, uninsulated grease ducts to pass through assemblies due to NFPA 96 **Enclosure Clearance** requirements – 457 mm (18 in.) to combustible construction and 152 mm (6 in.) to limited-combustible or non-combustible construction.

Ventilation duct note 1: Through-penetration designs in which the duct wrap is terminated at a non-combustible or limited-combustible construction (e.g. concrete slab and masonry or gypsum wall assemblies) are appropriate for ventilation duct scenarios only. The duct wrap must be continuous through combustible, wood-framed floor / ceiling assemblies.

Ventilation duct note 2: Once any dimension is greater than 1525 mm (60 in.), through-penetration designs in which the duct wrap is continuous or terminated at wall constructions require a 610 mm (24 in.) wide collar applied over the duct wrap envelope, adjacent to both sides of the wall (to maintain symmetrical firestop).

Ventilation duct note 3: Ducts greater than 762 mm (30 in.) in dimension must be secured to the face of the opening with minimum 16 GA galvanized steel angles. Steel angles must be sized to lap duct a minimum of 51 mm (2 in.). They must also lap the top surface of the floor, or both surfaces of the wall by a minimum of 25 mm (1 in.). Angles should be attached to the duct with minimum 13 mm (1/2 in.) long No. 10 sheet metal screws, spaced a max of 25 mm (1 in.) from each end of the duct, and spaced maximum 152 mm (6 in.) on centre.

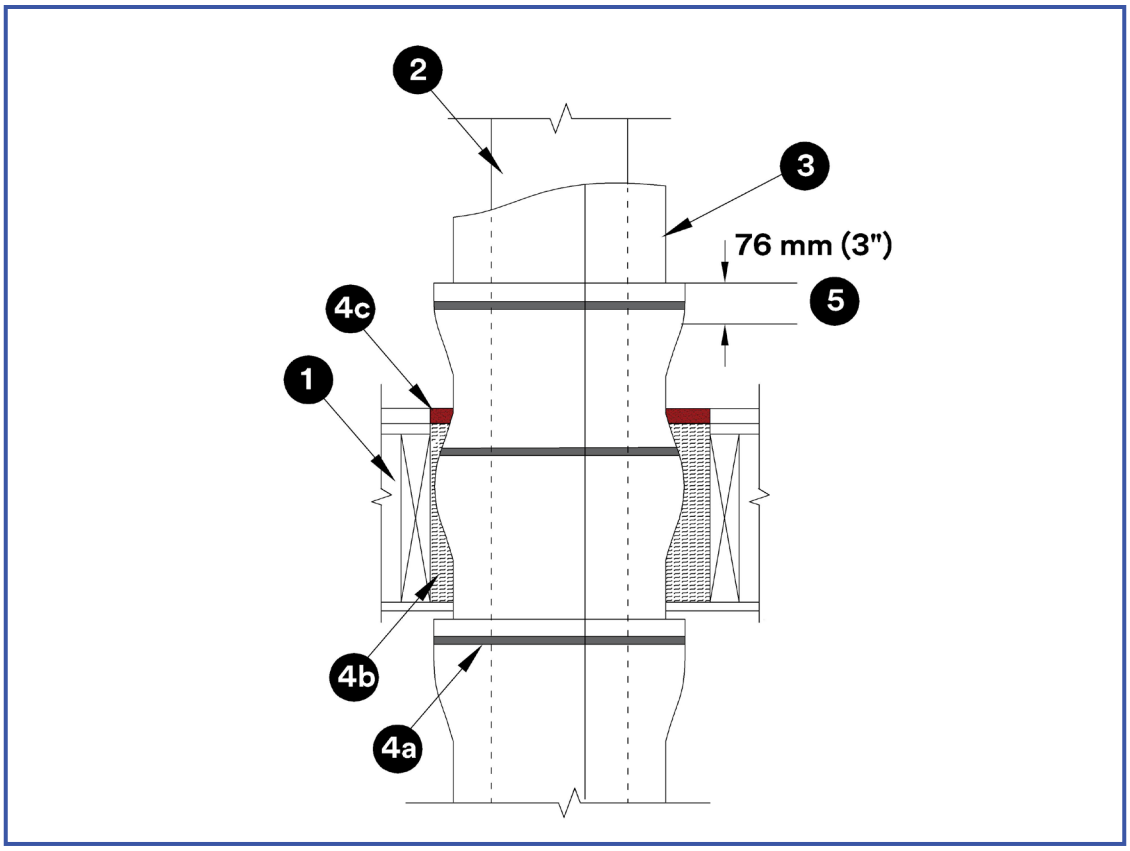

Figure 19 – 3M™ Fire Barrier Duct Wrap 615+ continuous through 1-hour fire-resistance rated wood-framed floor / ceiling assembly

1. Wood-framed floor / ceiling assembly

2. Grease or ventilation duct

3. One or two layers of 3M™ Fire Barrier Duct Wrap 615+ (application dependent)

4A. Stainless (grease) or carbon (ventilation) steel banding 13 mm (1/2 in.) wide min. typical for permanent fastening with max. 267 mm (10-1/2 in.) spacing (*Telescoping* install technique)

4B. Packing material – min. 4 pcf mineral wool or unfaced scrap duct wrap material

4C. 3M™ Fire Barrier Water Tight Sealants (1000 NS, 1003 SL or 3000 WT) or 3M™ Fire Barrier Sealant CP 25WB+

5. Min. 76 mm (3 in.) *perimeter* overlap (*Telescoping* install technique)

6. Min. 76 mm (3 in.) *longitudinal* overlap (not shown)

Note: Sealant must be applied at min. 16 mm (5/8 in.) depth

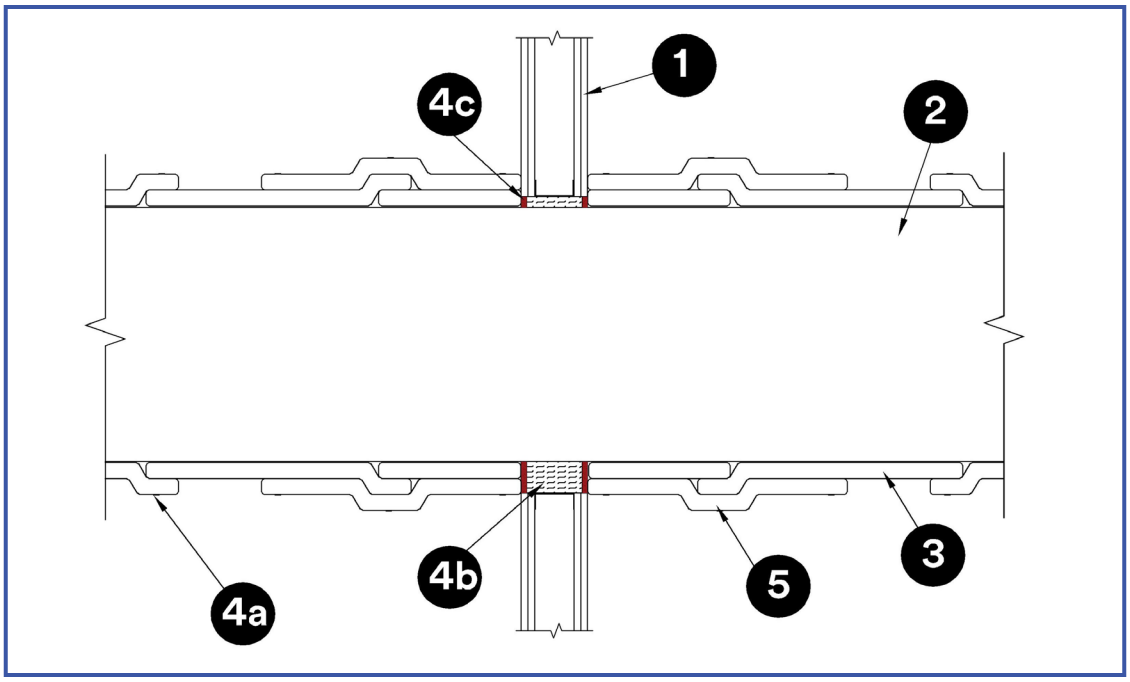

Figure 20 – 3M™ Fire Barrier Duct Wrap 615+ terminated at 1 or 2-hour fire-resistance rated gypsum wallboard assembly with symmetric collar (for ducts with dimension greater than 1525 mm or 60 in.)

1. Gypsum wallboard assembly

2. Ventilation duct

3. One layer of 3M™ Fire Barrier Duct Wrap 615+ (*Telescoping* install technique)

4a. Carbon steel banding 13 mm (1/2 in.) wide min. typical for permanent fastening with max. 267 mm (10-1/2 in.) spacing (*Telescoping* install technique)

4b. Packing material – min. 4 pcf mineral wool or unfaced scrap duct wrap material

4c. 3M™ Fire Barrier Water Tight Sealants (1000 NS, 1003 SL or 3000 WT) or 3M™ Fire Barrier Sealant CP 25WB+

5. 610 mm (24 in.) wide collar of 3M™ Fire Barrier Duct Wrap 615+

Note: Sealant must be applied at min. 16 mm (5/8 in.) depth

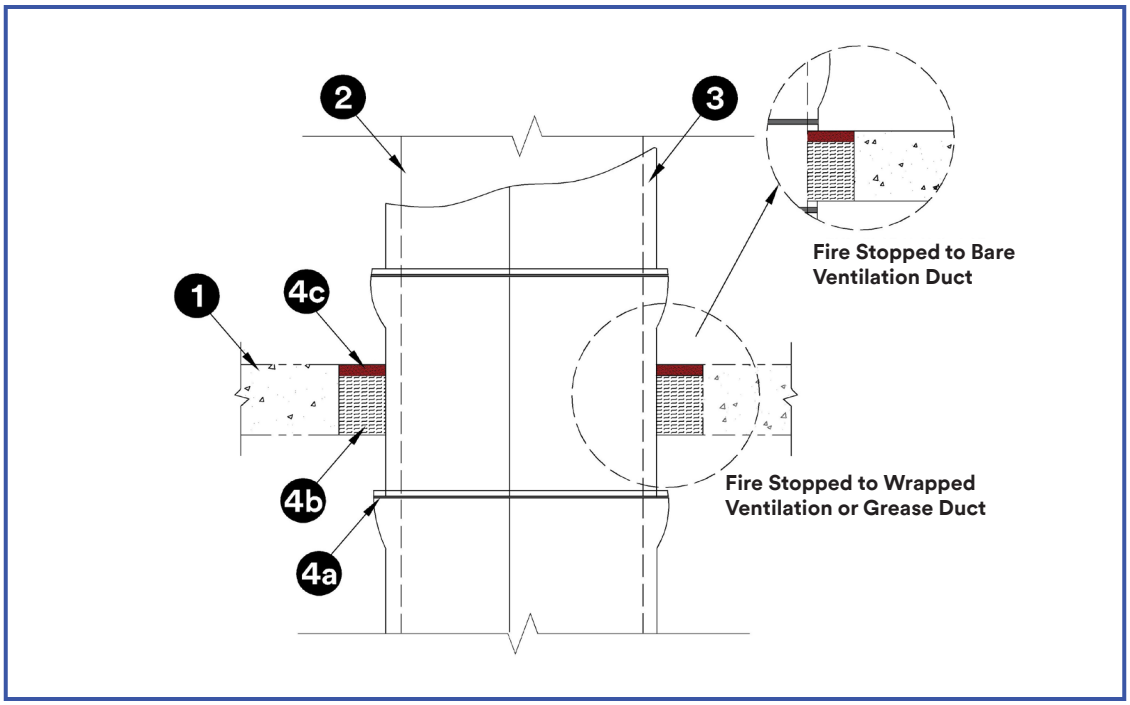

Figure 21 – 3M™ Fire Barrier Duct Wrap 615+ continuous (and terminated) through a 1 or 2-hour fire-resistance rated concrete slab / wall assembly

1. Concrete slab / wall assembly

2. Grease or ventilation duct

3. One or two layers of 3M™ Fire Barrier Duct Wrap 615+ (application dependent)

4a. Stainless (grease) or carbon (ventilation) steel banding 13 mm (1/2 in.) wide min. typical for permanent fastening with max. 267 mm (10-1/2 in.) spacing (*Telescoping* install technique)

4b. Packing material – min. 4 pcf mineral wool or unfaced scrap duct wrap material

4c. 3M™ Fire Barrier Sealants 1000 NS, 1003 SL, 3000 WT or CP 25WB+
Damper Considerations

Per the NBC, Section *3.1.9.1(5) Fire Stops*, dampers may penetrate a fire separation required to have a fire-resistance rating without being firestopped. However, smoke dampers may be installed outside of the separation to a max. 610 mm (24 in.) away along the length of the duct. There must not be any openings between the partition and damper.

During installation of 3M™ Fire Barrier Duct Wrap 615+ on a 1- or 2-hour fire-resistance rated ventilation duct system that contains a damper outside of the fire separation, ensure that the wrap does not cover the damper. It should simply extend from the fire separation and abut to the fire damper. Per the section Firestopping Requirements, once any dimension is greater than 1525 mm (60 in.), through-penetration designs require a 610 mm (24 in.) wide collar applied over the duct wrap envelope, adjacent to both sides of the wall (to maintain symmetrical firestop).

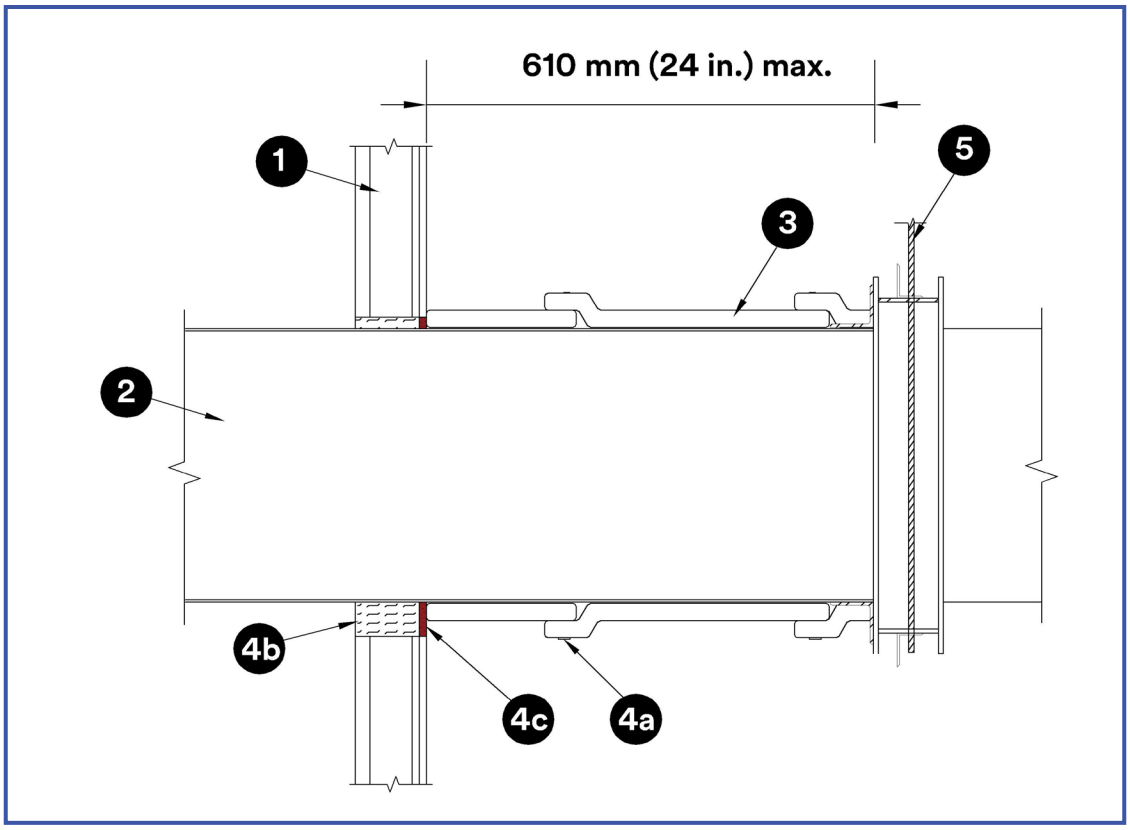

Figure 22 – 3M™ Fire Barrier Duct Wrap 615+ installation to a damper

1. Gypsum shaft wall assembly

2. Ventilation duct

3. One layer of 3M™ Fire Barrier Duct Wrap 615+

4a. Carbon steel banding or pinning (dependent on installation preference / duct dimensions)

4b. Packing material – min. 4 pcf mineral wool or unfaced scrap duct wrap material

4c. 3M™ Fire Barrier Sealants 1000 NS, 1003 SL, 3000 WT or CP 25WB+

5. Damper support

Note: please contact the damper manufacturer to maintain installation compliance

This is only a partial list of design listings. For the latest information go to www.3M.ca/firestop or speak to your authorized 3M distributor or sales representative at 1 (800)-364-3577.

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