VENTILATION DUCT: Continuous, air-tight L-shaped rectangular duct system with horizontal and vertical shafts constructed of 22 GA sheet steel with a maximum 2040 inch² area and a maximum 85 inch dimension. When required, equip the duct with a reducer section.

A. Construct the duct using sections affixed to each other with seams.
B. Reinforce the duct to IMC, SMACNA or NFPA 90A requirements designed to carry the weight of the ventilation duct assembly covered with insulation (Item 4) under a fire load equivalent to ISO 834 time-temperature curve.
C. Rigidly support the duct in accordance with IMC, SMACNA or NFPA 90A requirements or as specified in Item 5.
D. Protect the annular space around the duct passing through a fire-rated wall assembly with an Intertek-certified, compatible, 3M penetration firestop system having the same fire rating as the wall assembly.

2. FASTENERS: Weld minimum 12 GA, 4-1/2-inch-long, copper-coated steel insulation pins or 12 GA insulated cup head pins to the ventilation duct (Item 1). Match fastener method with corresponding insulation (Item 4) method.

A. Compression Butt Joint: Locate pins at all blanket overlaps, on all sides of the ventilation duct (Item 1), and meet the following requirements.
   I. Space pins maximum 12 inches apart in rows across the width of ventilation duct (Item 1). Locate pins maximum 6-3/4 inches from the edges of the ventilation duct (Item 1). Refer to Section view A-A.
   II. Space the rows of pins maximum 10 inches apart along the length of the ventilation duct (Item 1). Where pieces of insulation (Item 4A) are butted together, space edge pins of the insulation (Item 4A) a maximum 2 inches apart. Refer to Section view B-B.
   III. After insulation (Item 4A) is installed, place minimum 2.5-in. x 2.5-in.-square, galvanized steel, self-locking washer clips onto all insulation pins.
   IV. After clips are installed, cut off or bend flush with insulation (Item 4B) pins that are too long.

B. Butt Joint with Collar: Locate pins at all blanket overlaps, on all sides of the ventilation duct (Item 1), and meet the following requirements.
   I. Space pins maximum 12 inches apart in rows across the width of ventilation duct (Item 1). Locate pins maximum 6-3/4 inches from the edges of the ventilation duct (Item 1). Refer to Section view A-A.
   II. Space the rows of pins maximum 10-1/2 inches apart along the length of the ventilation duct (Item 1). Where pieces of insulation (Item 4B) are overlapped, space pins a maximum 1-1/2 inches from the edge of the insulation. Refer to Section view B-B.
   III. After insulation (Item 4B) is installed, place minimum 2.5-in. x 2.5-in.-square, galvanized steel, self-locking washer clips onto all insulation pins.
   IV. After clips are installed, cut off or bend flush with insulation (Item 4B) pins that are too long.
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C. Single End Overlap (Telescope): Locate pins at all blanket overlaps, on all sides of the ventilation duct (Item 1), and meet the following requirements.

I. Space pins maximum 12 inches apart in rows across the width of ventilation duct (Item 1). Locate pins maximum 6-3/4 inches from the edges of the ventilation duct (Item 1). Refer to Section view A-A.

II. Space the rows of pins maximum 10-1/2 inches apart along the length of the ventilation duct (Item 1). Where pieces of insulation (Item 4C) are butted together, space pins a maximum 1-1/2 inches from the edge of the insulation. Refer to Section view B-B.

III. After insulation (Item 4C) is installed, place minimum 2.5-in. x 2.5-in.-square, galvanized steel, self-locking washer clips onto all insulation pins.

IV. After clips are installed, cut off or bend flush with insulation (Item 4C) pins that are too long.

D. Dual End Overlap (Checkerboard): Locate pins at all blanket overlaps, on all sides of the ventilation duct (Item 1), and meet the following requirements.

I. Space pins maximum 12 inches apart in rows across the width of ventilation duct (Item 1). Locate pins maximum 6-3/4 inches from the edges of the ventilation duct (Item 1). Refer to Section view A-A.

II. Space the rows of pins maximum 10-1/2 inches apart along the length of the ventilation duct (Item 1). Where pieces of insulation (Item 4D) are butted together, space pins a maximum 1-1/2 inches from the edge of the insulation. Refer to Section view B-B.

III. After insulation (Item 4D) is installed, place minimum 2.5-in. x 2.5-in.-square, galvanized steel, self-locking washer clips onto all insulation pins.

IV. After clips are installed, cut off or bend flush with insulation (Item 4D) pins that are too long.

3. BANDING: (Not Shown) Not applicable to Item 2A. Option to fasteners Items 2B, 2C and 2D. After insulation (Item 4) is installed, apply minimum 1/2-inch-wide, 0.015-inch-thick stainless steel bands and secured with minimum 1-inch-long stainless steel crimp clamps. When needed to ease installation, use filament tape as a temporary hold for the insulation (Item 4) prior to banding. Place banding a maximum 1-1/2 inches from all insulation (Item 4) edges and a maximum of 10-1/2 inches on center (O.C.). Tension the banding to hold the insulation (Item 4) in place without cutting or damaging the insulation (Item 4) or ventilation duct (Item 1).

4. CERTIFIED MANUFACTURER: 3M Company

CERTIFIED PRODUCT: 3M Fire Barrier™ Duct Wrap

MODEL: 615

INSULATION: Apply one layer of nominal 1-1/2-in.-thick, 6-pcf blanket, made of calcium-, silica-, magnesium-oxide (CSM) fibers, encapsulated or single-faced with a polypropylene/foil scrim. Expose the foil faced side of insulation to view. Wrap one layer of insulation around the ventilation duct (Item 1) perimeter so that each terminating end of insulation overlaps onto the starting end of insulation a minimum of 3 inches at all transverse joints. Alternate the transverse overlap location so that no two consecutive adjacent overlaps align. Refer to Section view A-A for transverse overlap section view. Cover all visually exposed ends and edges of insulation with nominal 4-inch-wide pressure-sensitive aluminum foil tape.

A. Compression Butt Joint: Refer to 4A section view B-B. Wrap the ventilation duct (Item 1) with one layer of insulation installed with compression butt joints at all longitudinal joints. Compress each end of each piece of insulation together and butt to preceding edge of insulation. Each piece of installed insulation width is 2 inches less than insulation nominal width. (Example: each piece of nominal 24-inch-wide insulation when installed is 22 inches wide.) Install insulation with zero clearance at the surface and mating edges, or in the field between overlaps. Verify all insulation butt joints are a minimum 1-1/2 inches in overall thickness at compression butt joints.

B. Butt Joint with Collar: Refer to 4B section view B-B. Wrap the ventilation duct (Item 1) with one layer of insulation installed with butt joints at all longitudinal joints. Butt each end of each piece of insulation together with preceding edge of insulation. Each piece of installed insulation width is its nominal width. (Example: each piece of nominal 24-inch-wide insulation when installed is 24 inches wide.) Install insulation with zero clearance at the overlaps, or in the field between overlaps. Place and center 6-inch-wide collar of insulation over the butt joint. Overlap 6-inch-wide collar onto each adjacent insulation 3 inches. Verify all insulation butt joints with collars are a minimum 3 inches in overall thickness.

C. Single End Overlap (Telescope): Refer to 4C section view B-B. Wrap the ventilation duct (Item 1) with one layer of insulation installed with 3-inch-minimum overlaps at all longitudinal joints. Install insulation with zero clearance at the overlaps, or in the field between overlaps. Verify all insulation overlaps are nominally 3 inches in overall thickness.

I. Starting at one end of the ventilation duct (Item 1), apply the first piece of insulation around the ventilation duct (Item 1) to overlap fasteners (Item 2C). Refer section view A-A.

II. Position and overlap the leading edge of the second piece of insulation nominally 3 inches over the flush edge of the first piece of insulation. Place the opposite edge of the second piece of insulation flush against the surface of the ventilation duct (Item 1). An “S-shaped” cross section of the insulation is created. Refer to 4C section view B-B.

III. Apply all additional pieces of insulation as “S-shaped” cross section of the insulation in compliance with Item 4CII.

D. Dual End Overlap (Checkerboard): Refer to 4D section view B-B. Wrap the ventilation duct (Item 1) with one layer of insulation installed with 3-inch-minimum overlaps at all longitudinal joints. Install insulation with zero clearance at the overlaps, or in the field between overlaps. Verify all insulation overlaps are a minimum 3 inches in overall thickness. Do not align two consecutive insulation end overlaps.

I. Wrap the first piece of insulation around the ventilation duct (Item 1) so that the insulation is flush against the surface of the ventilation duct (Item 1). Position the starting end of the insulation to overlap pins (Item 2A) a minimum of 1-1/2 inches while the edges of the insulation overlap the rows of pins (Item 2B) a minimum of 1-1/2 inches.

II. Position the second piece of insulation nominally 18 inches from the edge of the first piece of insulation. Install the second piece in the same manner as the first.
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III. Cover the ventilation duct (Item 1) that is exposed between the edges of the first two pieces of insulation with another piece of insulation. Position the starting end of the insulation to overlap pins (Item 2A) a minimum of 1-1/2 inches while the edges of the insulation overlap the adjacent edges of the two pieces installed insulation a minimum of 1-1/2 inches.

5. SUPPORTS: Support the ventilation duct (Item 1) covered with insulation (Item 4) using a “trapeze” hanger system designed to carry the weight of the ventilation duct (Item 1) covered with insulation (Item 4) under a fire load equivalent to ISO 6944 time-temperature curve. Use minimum 3/8-inch all-thread steel rods bolted to minimum 2 x 2 x 1/2-inch steel angle to assemble the trapeze hanger supports. Connect all-thread steel rods to the trapeze cross-member (steel angle) using nuts and washers. Center ventilation duct (Item 1) with insulation (Item 4) on trapeze hanger supports so that rods are placed against the insulation (Item 4) or have a maximum 6-inch space exists between insulation (Item 4) and rods. Trapeze hanger supports do not need to be wrapped. Attach rods through concrete ceiling and secure using appropriate size washers and nuts or secure threaded rods using appropriate size steel in expansion type masonry anchors. Extend trapeze cross-member (steel angle) minimum 2 inches past the rods on each side of insulation (Item 4). Place trapeze hanger supports starting at the center of the vertical rise portion. Space trapeze hanger supports a maximum 60 inches on-center with a maximum 400-pound load between trapeze hanger supports.

A. One alternate insulation (Item 4) method for trapeze hanger supports includes encapsulating (sometimes called a cocoon wrap) the trapeze cross-member (steel angle) and the all-thread steel rods up to the top of the duct system at which point the all-thread rods exit the insulation (Item 4) and are un-insulated.

B. Another alternate method would be for the all-thread rods to penetrate the insulation (Item 4) applied to the ventilation duct (Item 1). After the all-thread rods exit the insulation (Item 4), the all-thread rods are un-insulated.