Design Number 3MU/PFB 120-30
PERIMETER FIRE BARRIER SYSTEMS
3M Company
FireDam™ Spray 200, Fire Barrier 1000 NS Silicone Sealant and
Fire Barrier 1003 SL Silicone Sealant
ASTM E 2307-04
T-Rating: 0 Hr
F-Rating: 2 hr
ASTM E 2307/ASTM E 1399 Cycling
Class I: 500 cycles @ 1 cpm

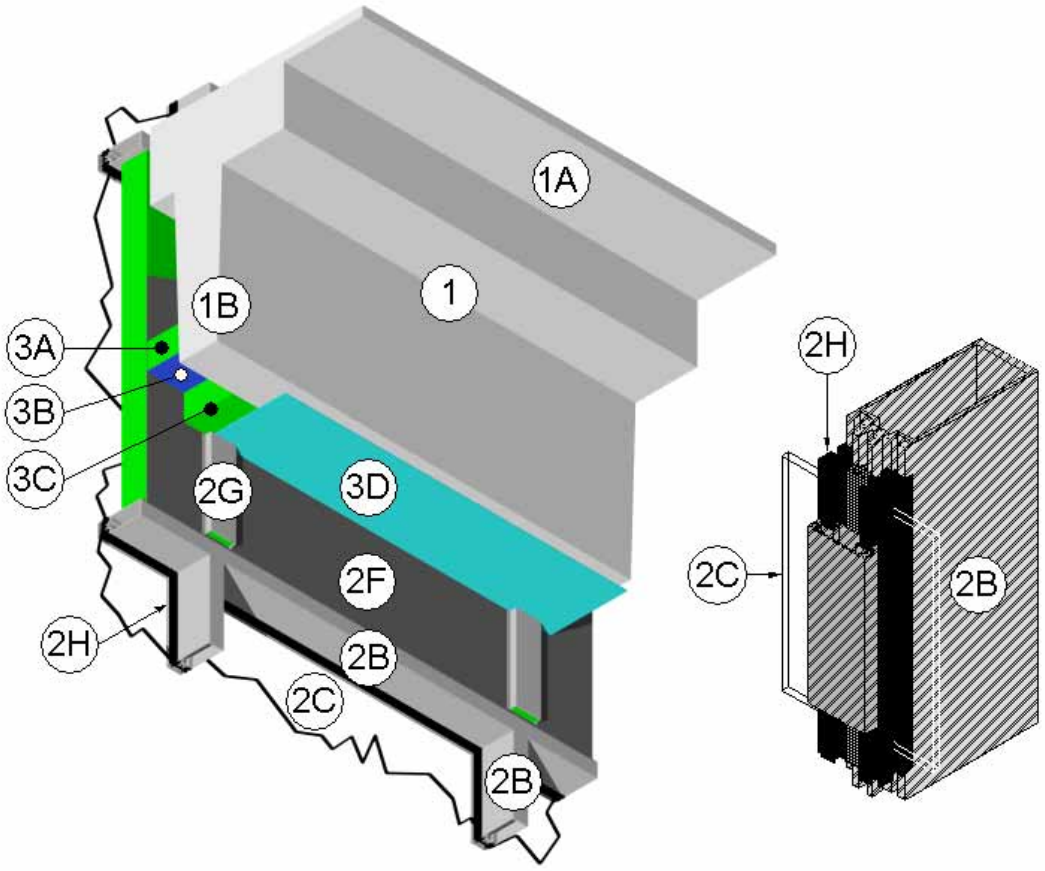

Figure 1 – Lower Left Wall Assembly Isometric and Aluminum Framing Extrusion Assembly (Transoms & Mullions) Isometric

1. CONCRETE FLOOR ASSEMBLY: Refer to Figure 1. Minimum 2-hour rated monolithic concrete floor assembly made from either lightweight or normal weight concrete with a density of 100 to 150-pcf density. When a longitudinal recess (blockout) is required to contain an architectural joint system, increase concrete floor assembly thickness to maintain a minimum thickness of 4-1/2

inches and accommodate depth of blockout formed in the concrete: blockout width unrestricted.

A. Concrete Floor: Minimum 2-hour rated, nominal 4-1/2-inch thick, reinforced, slab increasing to nominal 16 inches thick at joint face (slab edge) created by cast-in-place technique integral with concrete beam (Item 1B).

B. Concrete Beam: Nominal, 31-inch deep, 12-inch wide, 2-hour rated, pre-cast or cast-in-place reinforced concrete spandrel beam integral with concrete floor (Item 1A).

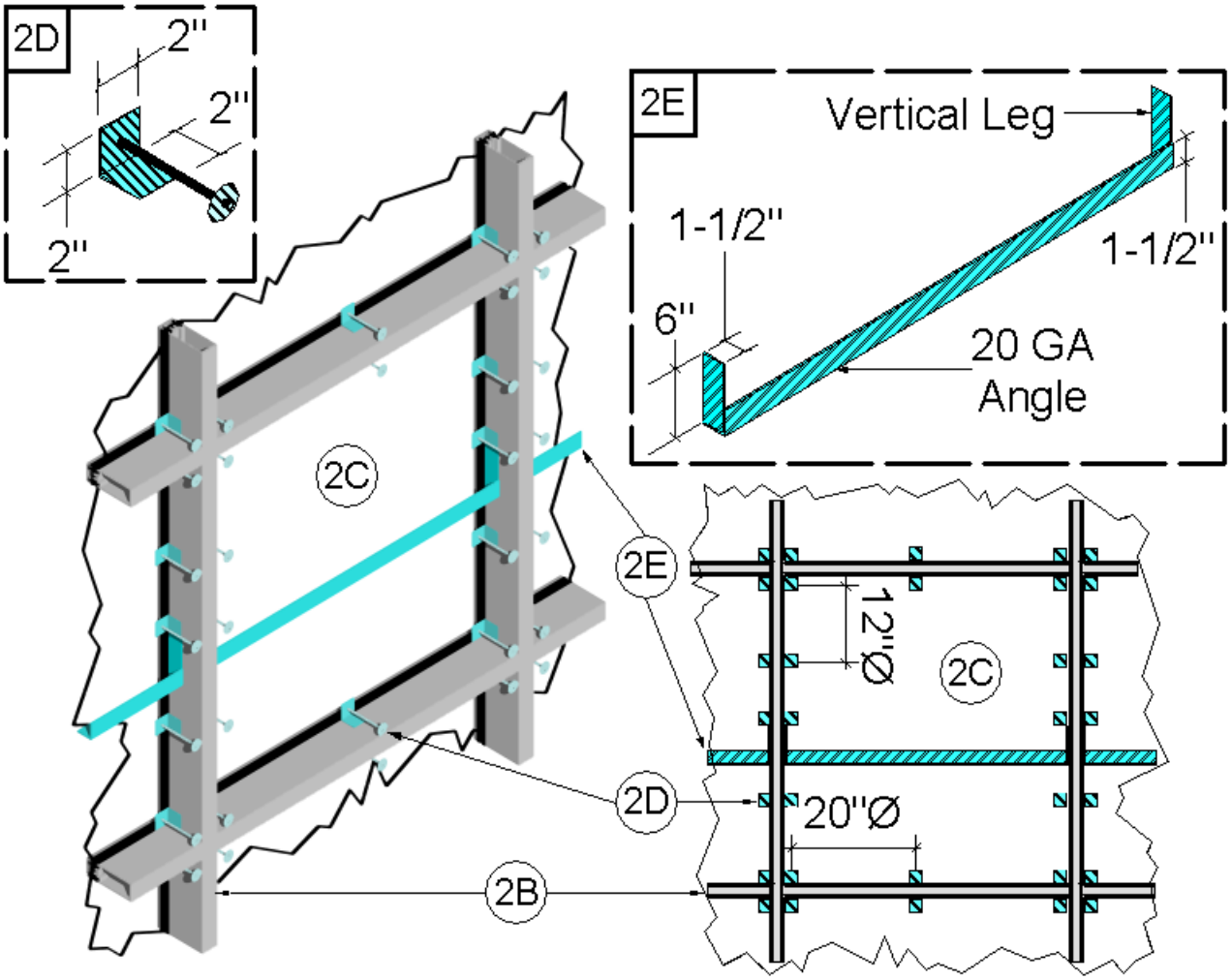

Figure 2 – Aluminum Framing Isometric, Aluminum Framing Elevation, Impaling Pin Isometric, and Reinforcement Angle Isometric

2. CURTAIN WALL ASSEMBLY: Refer to Figures 1 and 2. Incorporate the following construction features:

A. Mounting Attachment: (Not shown) Attach aluminum framing (Item 2B) to the structural framing according to the curtain wall manufacturer's instructions. When required, connect the mounting attachments to the joint face of the concrete floor assembly (Item 1) according to the curtain wall manufacturer's instructions. Limit distance between mounting attachments to maximum 120 inches.

B. Aluminum Framing: Use hollow rectangular aluminum extruded tubing with minimum overall dimensions of 0.100-inches thick, 5-1/2-inches high and 2-1/2-inches wide. Locate mullions (vertical aluminum framing) nominally 85.5 inches on center and locate transoms (horizontal aluminum framing) a maximum 30-1/2 inches on center. For the spandrel region, locate the upper transom (horizontal aluminum framing) a minimum 20 inches above the perimeter joint protection (Item 3) as measured from the top surface of the packing material (Item 3A) to the underside of the transom (horizontal aluminum framing).

C. Glass Panels: Sized and installed into aluminum framing (Item 2B) according to the curtain wall system manufacturer's guidelines. Use minimum 1/4-inch thick clear, heat strengthened (HS) glass or tempered glass with a maximum width and height less than the aluminum framing (Item 2B) on center spacing, which allows the glass to be secured between the notched shoulder of the aluminum framing (Item 2B) and pressure bar. Secure glass panels with a thermal break (rubber extrusion), pressure bar (aluminum extrusion), minimum 1/4-20 x 5/8-inch long screws, and a snap face (aluminum extrusion).

D. Impaling Pins: Use with curtain wall insulation (Item 2E) and framing covers (Item 2F), locate, size and install impaling pins according to the curtain wall system manufacturer's guidelines, or be a minimum 4-1/2-inch long, 12 GA pin attached to one of the following: a nominal 2-inch by 2-inch plate; a nominal 2-inch by 2-inch by 2-inch long angle; or can be directly attached to the aluminum framing (Item 2B) using a stud gun. Cap all pins using a nominal 1-inch diameter speed washer. Space impaling pins a maximum of 12 inches on center vertically and 20 inches on center horizontally. Install impaling pins around the periphery of the curtain wall insulation (Item 2F) so that its interior face is flush with the interior face of the aluminum framing (Item 2B).

E. Reinforcing Angle: Locate reinforcing angle at all horizontal butt joints of the curtain wall insulation (Item 2F) in the field of the glass spandrel panels (Item 2C) and at the mid height of the packing material (Item 3A). Mount a minimum 1-1/2 x 7/8-inch, 20 gauge, galvanized-steel angle to the vertical aluminum framing, mullions, (Item 2B) so that the vertical leg serves as a backer to the exterior face of the curtain wall insulation (Item 2F) and the horizontal leg extends away from the curtain wall insulation and is located at the centerline of the packing material (Item 3A). Size the angle 12 inches longer than the span between the interior edges of the vertical aluminum framing, mullions, (Item 2B) and form the angle so that it has a 6-inch vertical leg on each end. Secure the 6-inch vertical leg on each end to the vertical aluminum framing, mullions, (Item 2B) on each side with two No. 10 steel self-tapping sheet metal screws placed in a stable fashion with a maximum spacing of 2-inches on center, or fastening method of equal strength and stability.

F. Curtain Wall Insulation: Use only Intertek certified products meeting following minimum requirements. Use nominal 24-inch wide, 4-inch thick, 4-pcf density, 3-inch thick, 6-pcf density, or 2-inch thick, 8-pcf density, mineral wool batt insulation faced on one side with aluminum foil scrim (vapor retarder), which is exposed to the room interior and installed in the stud cavity. Install curtain wall insulation between aluminum framing (Item 2B). Secure curtain wall insulation with impaling pins (Item 2D) attached to aluminum framing (Item 2B). Seal all meeting edges of curtain wall insulation with nominal 3-inch wide, pressure

sensitive, aluminum-foil-faced tape centered over the junction so that approximately 1-1/2 inches of tape covers each edge of the adjacent curtain wall insulation. Apply pressure sensitive aluminum foil faced tape over all meeting edges of curtain wall insulation and framing covers (Item 2F) so that approximately 2 inches covers each edge of the adjacent material. Install

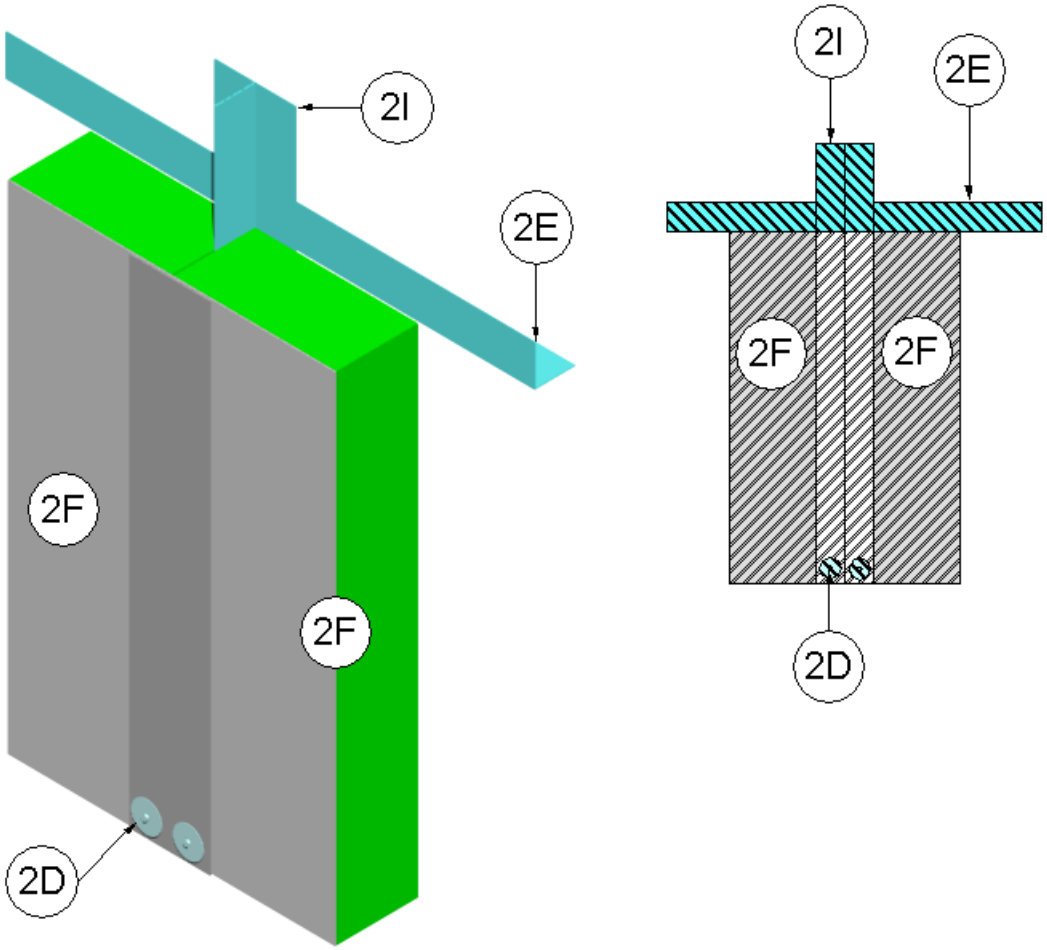

Figure 3 – Curtain Wall Insulation Vertical Butt Joint Isometric and Elevation

curtain wall insulation flush with the interior face of the aluminum framing (Item 2B). Install 24-inch wide curtain wall insulation spanning the full length and height between aluminum framing (Item 2B). Refer to Figure 3. For vertical insulation butt joints, first install back-to-back angles created from minimum, 20 GA, steel having minimum 2-inch legs. Position back-to-back angles in front of reinforcing angle (Item 2E). Mechanically fasten ends of steel back-to-back angles to horizontal framing (Item 2B). Locate horizontal seams in the curtain wall insulation at least 6 inches from the top surface of the perimeter joint protection (Item 3). Maintain 1-1/4-inch air cavity between curtain wall insulation and glass panels (Item 2C). Option – in lieu of filling the full depth of the stud cavity with 4-inch thick, 4-pcf density curtain wall insulation, use minimum 2-inch thick, 8-pcf density or 3-inch thick, 6-pcf density curtain wall insulation mechanically secured (do not secure by friction fit) and use additional horizontal support angle (not

shown). Locate a horizontal support angle consisting of a minimum 20 GA steel angle, having 1.5 x 1.5-inch legs horizontally at the mid height of the packing material (Item 3A) and attached to each mullion of aluminum framing (Item 2B) using minimum #6, 1/2-inch long self-tapping sheet metal screws.

G. Framing Covers: Make from strips of minimum 1-inch thick by minimum 4-inch wide, 8-pcf density, mineral wool batt insulation faced on one side with aluminum foil scrim (vapor retarder), which is exposed to the room interior. Center framing covers over all aluminum framing (Item 2B) and secure using impaling pins or cup-head weld pins (Item 2D). Do not pass framing covers through the perimeter joint protection (Item 3). Allow framing covers to abut top and bottom surfaces of the perimeter joint protection (Item 3) provided that no deformation occurs. Use only Intertek certified products meeting the above minimum requirements.

H. Thermal Break Assembly: Secure panels with a thermal break (thermal-set rubber extrusion), pressure bar (aluminum extrusion), 1/4-20 x 5/8-inch long screws, and a snap face (aluminum extrusion). Protect spandrel panels according to Item 2F.

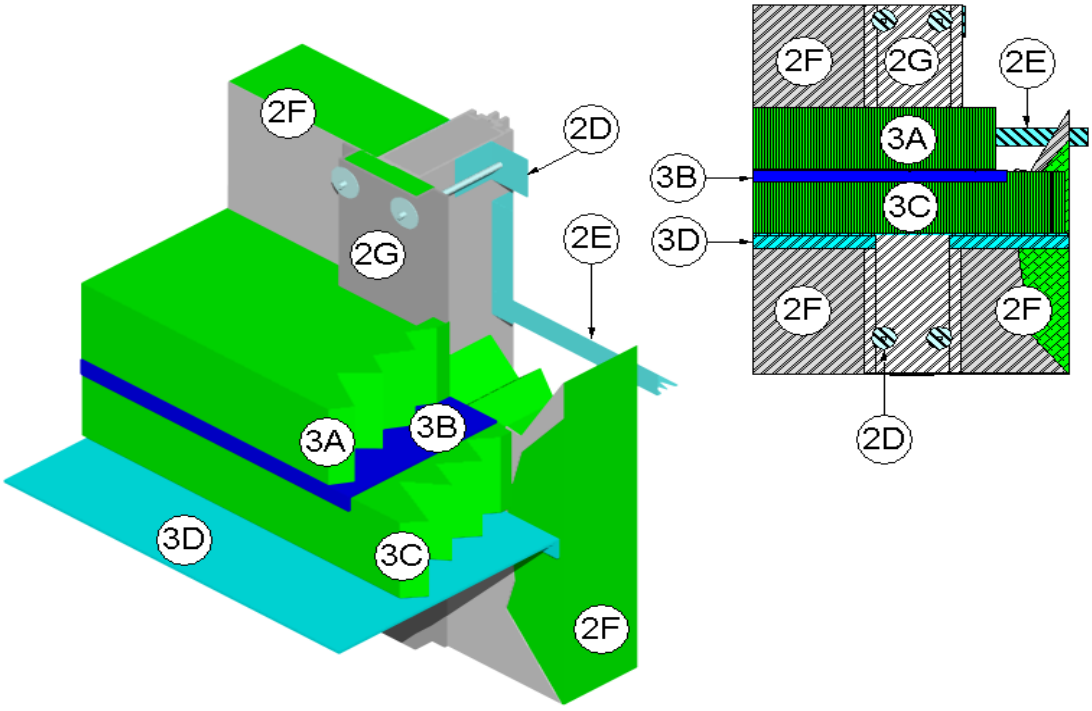

Figure 4 – Perimeter Joint Protection Isometric and Elevation

3. PERIMETER JOINT PROTECTION: Refer to Figures 1 and 4. Install impaling pins (Item 2D), reinforcement angle (Item 2E), and protect spandrel panels using curtain wall insulation (Item 2F) before installing perimeter joint protection. Do not install framing covers (Item 2G) until after perimeter joint protection. Do not exceed a 12-inch nominal joint width (joint width at installation). Install perimeter joint protection from bottom of concrete floor assembly (Item 1). Sandwich the fill, void or cavity material (Item 3B) between two pieces of packing material (Item 3A and Item 3C). Incorporate the following construction features for the

perimeter joint protection (also known as perimeter fire barrier system):

A. Packing Material: Use a minimum 4-inch thick, 4-pcf density, mineral wool batt insulation installed with the fibers running parallel to the edge of concrete floor assembly (Item 1) and curtain wall assembly (Item 2). Cut packing material width to achieve required compression, refer below, when installed in the nominal joint width. Compress the packing material into the perimeter joint created between the curtain wall insulation (Item 2F) and the concrete spandrel beam (Item 1B). Create a recess at least 4-inches deep between the bottom of the packing material and the bottom surface of the concrete spandrel beam (Item 1B) to allow installation of the fill, void or cavity material (Item 3B) and the second piece of packing material (Item 3C). Tightly compress together splices (butt joints) in the lengths of packing material by using minimum 1/4-inch compression per piece of packing material. Use only Intertek certified products meeting the above minimum requirements.

   i. When horizontal movement of ±16.7% and vertical shear of ±6.25% is required, install packing material at 50% compression. Cut the width of the packing material 2 times wider than the nominal joint width.

   ii. When horizontal movement of ±5% is required, install packing material at 20% compression. Cut the width of the packing material 1.25 times wider than the nominal joint width.

B. CERTIFIED MANUFACTURER: 3M Company

   CERTIFIED PRODUCT: FireDam™ or Fire Barrier™

   MODEL: FD Spray 200 (Elastomeric, Sprayable) or FB 1000 N/S Silicone Sealant (Non-sag) or FB 1003 S/L (Self Leveling)

   Fill, Void or Cavity Material: Apply either spray coating or sealant over the bottom of the packing material (Item 3A) as follows:
   Spray Coating – Spray apply the liquid to cover the exposed bottom surface of the packing material (Item 3A) compressed and installed in the perimeter joint. Apply a minimum wet film thickness of 1/8 inch and overlap the spray coating a minimum 1/2 inch onto the adjacent curtain wall insulation (Item 2F) and concrete spandrel beam (Item 1B). When the spraying process is stopped and the applied spray coating cures to an elastomeric film before installation process is restarted, then overlap the edge of the cured spray coating at least 1/8 inch with the liquid spray coating.
   Sealant – Apply non-sag sealant to cover the bottom of the exposed surface of the packing material (Item 3A) compressed and installed in the perimeter joint. Apply minimum 1/4-inch thickness non-sag sealant over the bottom of the packing material (Item 3A) and finish flush against the adjacent curtain wall insulation (Item 2F) and concrete spandrel beam (Item 1B).

C. Secondary Packing Material: Install after the fill, void or cavity material (Item 3B) is cured. Use a minimum 4-inch thick, 4-pcf density, mineral wool batt insulation installed with the fibers running parallel to the edge of concrete floor assembly (Item 1) and curtain wall assembly (Item 2). Cut packing material width to achieve same compression as packing material (Item 3A). Compress the packing material into the perimeter joint created between the curtain wall insulation (Item 2F) and the concrete spandrel beam (Item 1B). Stagger butt joints of secondary packing material and packing material (Item 3A). Tightly compress together splices (butt

joints) in the lengths of packing material by using minimum 1/4-inch compression per piece of packing material. Verify finished installation flush with bottom of concrete spandrel beam (Item 1B). Use only Intertek certified products meeting the above minimum requirements.

D. Cover Plate: Install a minimum 18 GA, L-shaped, steel plate having a nominal 3-inch vertical leg and a horizontal leg sized to span the nominal joint width between the curtain wall insulation (Item 2F) and the concrete spandrel beam (Item 1B). Position the steel plate flush against bottom of concrete spandrel beam (Item 1B) and against the interior exposed vertical aluminum framing, mullions, (Item 2B). Attach the vertical leg of the L-shaped, steel plate to each vertical aluminum framing, mullion, (Item 2B) using minimum #10, self-tapping sheet metal screws nominally 2 inches below the horizontal leg. Space fasteners a maximum of 48-inches on center and attach the horizontal leg of the L-shaped, steel plate to the bottom of concrete spandrel beam (Item 1B) using Hilti XC-20 THP fasteners or equivalent pre-mounted, plastic top-head, concrete nails made of zinc-coated (5 to 13-µm thick), hardened steel having a nominal ¾-inch shank length, 0.138-inch diameter, cut point, and dome head configuration.