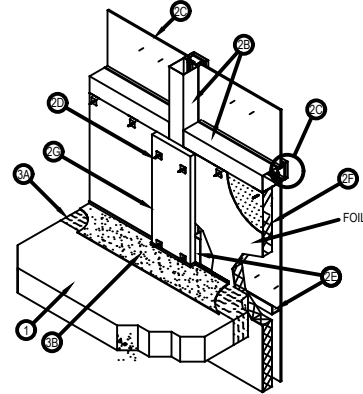


**Design No. CEJ 127 P (HI/JS 120-05)**  
**PERIMETER FIRE BARRIER SYSTEM**

Hilti, Inc.  
**ASTM E 2307**  
**Table 1**

	FIRESTOP JOINT SPRAY CFS-SP WB	SILICONE JOINT SPRAY CFS-SP SIL
F-RATING	2-HR.	2-HR.
T-RATING	2-HR.	2-HR.
APPLICATION THICKNESS	1/8" WET FILM (1/16" DRY)	2mm (0.079") WET FILM
CYCLING (%)	NONE	NONE
HORIZONTAL VERTICAL SEE ITEM 3A	±6.25 (25% COMPRESSION)	±6.25 (25% COMPRESSION)



- CONCRETE FLOOR ASSEMBLY:** Max. two-hour rated concrete floor assembly made from either lightweight or normal weight concrete with a density of 100-150 pcf, with a min. thickness of 4-1/2 in. at the joint face. Overall slab thickness may vary to accommodate various breakout depths (longitudinal recesses) formed in the concrete, to house the architectural cover plate. The breakout width may also vary without restriction.
- CURTAIN WALL ASSEMBLY:** Incorporate the following features:
  - Mounting Attachment:** (Not shown) Attach the curtain wall framing to the structural framing in accordance to the curtain wall manufacturer's instructions. When required, connect the mounting attachments to the joint face of the floor slab, in accordance to the curtain wall manufacturer's instructions. Max. distance between mounting attachments is 10 ft.
  - Aluminum Framing:** Size rectangular aluminum tubing mullions and transoms according to the curtain wall system manufacturer's guidelines. Min. overall dimensions of framing required is 0.100 in. thick aluminum with a min. 3-3/4 in. height and a min. of 2-1/2 in. width of the extrusion. Mullion and Transom covers are added to the external side of the framing, giving the framing system a total mullion depth of nom. 5-1/4 in. (with cover plate). Mullions are to be spaced a min. 60 in. on center (oc) and spandrel transoms are to be spaced a min. 45 in. oc. Spandrel transoms are to be located at a min. height 20 in. above the top surface of the concrete floor assembly (as measured from the bottom of the transom).
  - Glass Panels:** Size and install glass panels to curtain wall framing according to the curtain wall system manufacturer's guidelines. Use min. 1/4 in. thick clear, heat-strengthened (HS) glass with a max. width and height less than the aluminum framing o.c. spacing, which allows the glass to be secured between the notched shoulder of the aluminum framing and pressure bar. Secure panels with a thermal break (rubber extrusion), pressure bar (aluminum extrusion), min. 1/4-20 x 5/8 in. long screws, and a snap face (aluminum extrusion).
  - Impaling Pins:** Size and install min. 12 GA steel pins according to the curtain wall system manufacturer's guidelines, or be a min. 1/2 in. longer than the thickness of the curtain wall insulation. Attach pins to clip angles with typical clip dimensions of: nom. 2 in. by 2 in., constructed with 20 GA galvanized sheet steel. Secure the clips to the aluminum framing with No. 10 self-tapping sheet metal screws. Install a min. of 1 screw per clip angle. Space pins max. of 12 in. oc on the vertical framing members and a max. of 20 in. oc on the horizontal framing member above the slab. The interior face of the curtain wall insulation is to be installed so that it is flush with the interior face of the framing.
  - Reinforcing Angle:** Mount a min. 1-1/2 in. x 1-1/2 in. x 20 GA galvanized steel angle to the inside of the vertical framing members so that the vertical leg serves as a backer to the exterior face of the curtain wall insulation and the horizontal leg extends away from the curtain wall insulation. Locate the reinforcing angle at the elevation of the centerline of the perimeter joint treatment. Size the angle 12 in. longer than the span between the interior edges of the vertical framing members and form the angle so that it has a 6 in. vertical leg on each end. Secure the 6 in. leg to the framing member on each side with three No. 10 steel self-tapping sheet metal screws placed in a triangular fashion with a max. spacing of 2 in. oc.
  - Curtain Wall Insulation:** Install nom. 2 in. 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. Secure with angle clips and impaling pins (Item 2D). Seal all meeting edges of insulation with nom. 4 in. wide pressure sensitive aluminum foil faced tape centered over the junction so that approx. 2 in. of tape covers each edge of the adjacent insulation. The interior face of the batt insulation is, if required compressed, flush with the interior face of the curtain wall framing creating a min. 1 in. air space between the insulation and the glass.
- PERIMETER JOINT PROTECTION:** The perimeter joint (linear opening) is not to exceed nom. 6 in. joint width (joint width at installation). Incorporate the following construction features:
  - Packing Material:** Install min. 4 in. thick, 4 pcf density, mineral wool batt insulation\*\* with the fibers running parallel to the slab edge and curtain wall. Compress the packing material 25% in the nominal joint width. Compress the batt insulation into the perimeter joint such that the top surface of the batt insulation is flush with the top surface of the concrete floor slab and its mid depth is compressed against the interior surface of the curtain wall insulation (Item 2F) which is supported by the 20 GA steel reinforcing angle (Item 2E). Splices (butt joints) in the lengths of mineral wool batt insulation are to be tightly compressed together.
  - Listed Manufacturer:** Only Intertek Certified Mineral Wool Manufacturer's product meeting the above min. requirements.
  - CERTIFIED MANUFACTURER:** Hilti, Inc.  
 CERTIFIED PRODUCT: Joint Spray or Sealant  
 MODEL: Firestop Joint Spray CFS-SP WB or Silicone Joint Spray CFS-SP SIL  
 Fill, Void or Cavity Material: To be applied (sprayed, brushed, or troweled) to cover the top exposed surface of the mineral wool installed in the perimeter joint. Apply at the thickness specified in Table 1 and overlap the material a min. 1/2 in. onto the adjacent curtain wall assembly and concrete floor slab assembly. If spraying process is stopped and the applied material cures to an elastomeric film before the process is restarted, then overlap the edge of the cured material at least 1/8 in. with the spray.

\*\* Before testing, the test specimen was cycled 500 times at 30 cpm in accordance to ASTM E 1399.



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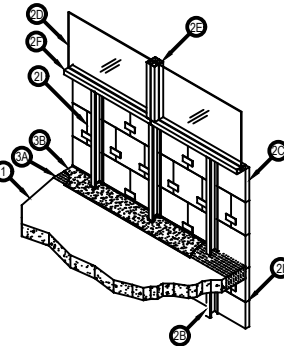


**Design No. CEJ 245 P (HI/BP 135-01)**  
**PERIMETER FIRE BARRIER SYSTEM**

Hilti, Inc.  
**ASTM E 2307**  
**Table 1**

	FIRESTOP JOINT SPRAY CFS-SP WB	SILICONE JOINT SPRAY CFS-SP SIL
F-RATING	2 1/4-HR.	2 1/4-HR.
T-RATING	2 1/4-HR.	2 1/4-HR.
APPLICATION THICKNESS	1/8" WET FILM (1/16" DRY)	2mm (0.079") WET FILM
CYCLING (%)	NONE	NONE
HORIZONTAL VERTICAL SEE NOTE 1	±12.5 ±5	±7.5 ±5

L-Rating N/A



- CONCRETE FLOOR ASSEMBLY:** Two hour rated concrete floor assembly made from either lightweight or normal weight concrete with a density of 100-150 pcf, with a min. thickness of 4-1/2 in. at the joint face. Overall slab thickness may vary to accommodate various breakout depths (longitudinal recesses) formed in the concrete, to house the architectural cover plate. The breakout width may also vary without restriction.
- CURTAIN WALL ASSEMBLY:** The concrete curtain wall assembly shall incorporate the following construction features:
  - Mounting Attachment:** (Not Shown) Attachment of the curtain wall framing to the structural framing shall be according to the curtain wall manufacturer's instructions. If required, mounting attachments to the floor slab shall be connected to the joint face of the floor slab. Max. distance between mounting attachments shall be 10ft.
  - Steel-Stud Framing:** Vertical framing members shall be a min. 3-5/8 in. by 1-5/8 in., 18 GA steel "C" studs. Attachment shall be according to the curtain wall system manufacturer's guidelines. Vertical framing not to exceed a spacing of 56 in. on center and shall be completely covered by the concrete panels. If required, horizontal framing members shall be installed according to the curtain wall system manufacturer's guidelines.
  - Concrete Panels:** Any non-combustible exterior concrete based panel. Panels shall not be less than 1-1/2 in. thick, 12 in. high or 12 in. long. Attachment to the framing shall be according to the curtain wall system manufacturer's guidelines.
  - Glass Vision Panels:** Glass vision panels shall be at least 35-1/2 in. above the top surface of the floor assembly. Glass vision panels shall be installed to curtain wall framing according to the curtain wall system manufacturer's guidelines. Use a min. 1/4 in. thick, clear tempered glass with a max. width of 59 in. and height of 71 in.
  - Window Gaskets:** Secure glass vision panels with a thermal break (thermal-set rubber extrusion).
  - Window Framing:** Steel framing members shall be a min. 3-5/8 in. by 1-5/8 in., 18 GA steel "U" channel or similar construction that is compatible with steel-stud framing (2b). Locate window framing at least 35 in. above the top surface of the floor assembly.
  - Impaling Pins:** (Not Shown - Optional) When required by insulation manufacturer, use with insulation. The pins shall be located, sized and installed according to the curtain wall system manufacturer's guidelines.
  - Curtain Wall Insulation:** (Not Shown - Optional) When curtain wall insulation is used, the perimeter joint treatment must be installed before the insulation. Insulation may be butted to top and bottom of perimeter joint treatment but not deferring the perimeter joint treatment. Either mineral wool\*\* or fiberglass batt insulation\*\* may be used. (\*\* Listed with Intertek)
  - Concrete Panel Joint:** Vertical and horizontal concrete panel joints created between panels can be either flush type (butt joint) or key way type (tongue and groove). Concrete panel edges must be in contact with each other. If required, the surface of the panel joints can be sealed with gaskets or sealants.
  - Framing Covers:** (Not Shown - Optional) Framing covers used over the mullions and transoms are optional. When used, the framing covers shall be located, sized and installed according to the curtain wall system manufacturer's guidelines. Framing covers do not pass through the perimeter joint treatment. They are butted to the top and bottom surfaces of the perimeter joint treatment without deforming it. Either mineral wool\*\* or fiberglass batt insulation\*\* may be used. (\*\* Listed with Intertek)
- PERIMETER JOINT PROTECTION:** The perimeter joint (linear opening) shall not exceed an 8 in. nom. joint width (joint width at installation) and the perimeter joint treatment shall incorporate the following construction features:
  - Packing Material:** Use a min. 4 in. thick, 4 pcf density, mineral wool batt insulation\*\* installed with the fibers running parallel to the slab edge and curtain wall. (\*\*Listed with Intertek) The packing material shall be compressed 50% in the nominal joint width. Compress the batt insulation into the perimeter joint such that the top surface of the batt insulation is flush with the top surface of the concrete floor slab. Splices (butt joints) in the lengths of mineral wool batt insulation are to be tightly compressed together. Reference the Introduction to Fire Resistive Joint Systems Section of this Directory for more details on how to determine the cut width of the insulation to be installed in the nominal joint width, and how to determine the compressed percentage of a known insulation width installed in a known nominal joint width.
  - CERTIFIED MANUFACTURER:** Hilti, Inc.  
 CERTIFIED PRODUCT: Joint Spray or Sealant  
 MODEL: Firestop Joint Spray CFS-SP WB or Silicone Joint Spray CFS-SP SIL  
 Fill, Void or Cavity Material: To be applied, (sprayed, brushed, or painted) to cover the exposed surface of the mineral wool installed in the perimeter joint. Apply at the thickness specified in Table 1 and overlap the material a min. 1/2 in. onto the adjacent curtain wall assembly and concrete floor slab assembly. If the spraying process is stopped and the applied liquid cures to an elastomeric film before process is restarted, then overlap the edge of the cured material at least 1/8 in. with the spray. Reference Product Section of this Directory for more details about the Listed product.
  - Support Clips:** (Not Shown - Optional) Use standard Z-shaped clips that are min. 20 GA galvanized steel with the following nom. dimensions: 1 in. wide by 3 in. high with a 2 in. upper leg and 3 in. lower leg.

\*\*Cycling: Before testing, the spliced, test specimen was cycled 500 times at 30 cpm in accordance with ICBO ES AC 30 (Jan. 1997) and ASTM E 1966.



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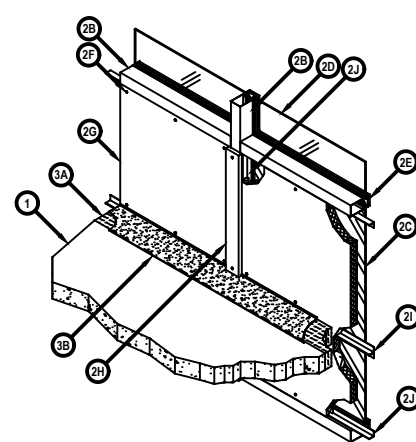


**Design No. CEJ 246 P (HI/BP 120-01)**  
**PERIMETER FIRE BARRIER SYSTEM**

Hilti, Inc.  
**ASTM E 2307**  
**Table 1**

	FIRESTOP JOINT SPRAY CFS-SP WB	SILICONE JOINT SPRAY CFS-SP SIL
F-RATING	1 3/4-HR.	1 3/4-HR.
T-RATING	1 1/4-HR.	1 1/4-HR.
APPLICATION THICKNESS	1/8" WET FILM (1/16" DRY)	2mm (0.079") WET FILM
CYCLING (%)	NONE	NONE
HORIZONTAL VERTICAL SEE NOTE 1	±15 ±5	±7.5 ±5

L-Rating N/A



- FLOOR ASSEMBLY:** Two-hour rated concrete floor assembly made from either lightweight or normal weight concrete with a density of 100-150 pcf, with a min. thickness of 4-1/2 in. at the joint face. Overall slab thickness may increase to accommodate various breakout depths (longitudinal recesses) formed in the concrete, to house an architectural cover plate. The breakout width may also vary without restriction.
- CURTAIN WALL ASSEMBLY:** The curtain wall assembly shall incorporate the following construction features:
  - Mounting Attachment:** (Not shown) Attachment of the curtain wall framing to the structural framing is required at each floor. The mounting attachments to the floor slab shall be either to the top surface of the floor slab or the joint face of the floor slab, according to the curtain wall manufacturer's instructions. The distance between mounting attachments shall be a min. 60 in. on center (oc) The mounting attachments shall be steel.
  - Aluminum Framing:** Rectangular aluminum tubing mullions and transoms, sized according to the curtain wall system manufacturer's guidelines. Min. overall dimensions of framing required is 0.100 in. thick aluminum with a min. 5-1/4 in. height and a min. of 2-1/2 in. width of the extrusion. Mullions are to be spaced a min. 60 in. oc and transoms are to be spaced a min. 72 in. oc Transoms are to be located at a min. height of 33 in. above the top surface of the concrete floor assembly (as measured from the bottom of the transom).
  - Glass Spandrel Panels:** Glass spandrel panels shall be installed to curtain wall framing according to the curtain wall system manufacturer's guidelines. Use a min. 1/4 in. thick, clear tempered glass with a max. width of 59 in. and height of 71 in.
  - Glass Vision Panels:** Glass vision panels shall be at least 35-1/2 in. above the top surface of the floor assembly and installed to curtain wall framing according to the curtain wall system manufacturer's guidelines. Same min. requirements as in 2C.
  - Secure panels with a thermal break** (thermal-set rubber extrusion), pressure bar (aluminum extrusion), 1/4-20 x 5/8 in. long screws, and a snap face (aluminum extrusion). The spandrel panels shall be insulated according to 2G.
  - Impaling Pins:** When pins are used instead of screws, locate pins in the same manner as the screws in 2F, sized and installed according to the curtain wall system manufacturer's guidelines, or be a min. 4-1/2 in. long, 12 GA steel pin attached to a nom. 2 in. by 2 in. galvanized sheet steel plate, a nom. 2 by 2 by 2 in. long angle, or directly attached to the framing using a stud gun. Space pins a max. of 12 in. oc and install around the periphery so that the interior face of the curtain wall insulation is flush with the interior face of the framing.
  - Curtain Wall Insulation:** Insulate all spandrel panels with a min. 2 in. thick, 8 pcf, mineral wool batt insulation\*\* faced on one side with aluminum foil scrim (vapor retarder) which is exposed to the room interior. (\*\* Listed with Intertek) Tightly fit insulation between vertical framing members, and secure with screws placed a max. 8 in. oc attached to perimeter spandrel angles (2j). Locate horizontal seam at the mid-height of the perimeter joint protection (3). All other horizontal seams in the insulation are to be at least 6 in. from the top surface of the perimeter joint treatment. The interior face of the batts is flush with the interior face of the curtain wall framing. A min. 2 in. air space is created between the glass and the insulation. The 36 in. wide batts shall be installed without vertical seams, spanning the full length between the vertical and horizontal curtain wall framing members, which create the spandrel panel area.
  - Framing Covers:** Make strips of min. 1 in. thick by 4 in. wide, 8 pcf, mineral wool batt insulation\*\* faced on one side with aluminum foil scrim (vapor retarder), which is exposed to the room interior. (\*\*Listed with Intertek) Center framing covers over each vertical framing member and secured to the member with impaling pins and clips spaced max. 12 in. oc. Do not pass framing covers through the perimeter joint protection (3). Butt framing covers to the top and bottom surfaces of the perimeter joint protection (3). Seal the sides of the mullion covers with aluminum foil tape flared min. 1 in. onto curtain wall insulation (2G).
  - Reinforcing Angle:** At the horizontal butt joints of the insulation in the field of the glass spandrel panels (2C), place two 20 GA steel angles back to back to form a "T". Locate the "T" reinforcing angle at the horizontal centerline of the perimeter joint protection and secure the "T" angle to the perimeter spandrel angles (2j).
  - Perimeter Spandrel Angles:** Use a min. 16 GA 1-1/2 x 1-1/2 steel angles around the entire perimeter of spandrel window area. Attach the vertical angles to the mullions with screws. Attach the horizontal angles to the vertical angles with screws.
- PERIMETER JOINT PROTECTION:** The perimeter joint (linear opening) shall not exceed 8 in. nom. joint width (joint width at installation) and the perimeter joint treatment shall incorporate the following construction features:
  - Packing Material:** Use a min. 4 in. thick, 4 pcf density, mineral wool batt insulation\*\* installed with the fibers running parallel to the slab edge and curtain wall. (\*\* Listed with Intertek) The packing material shall be compressed 33% in the nominal joint width. Compress the batt insulation into the perimeter joint such that the top surface of the batt insulation is flush with the top surface of the concrete floor slab. Splices (butt joints) in the lengths of mineral wool batt insulation are to be tightly compressed together. Reference the Introduction to Fire Resistive Joint Systems Section of this Directory for more details on how to determine the cut width of the insulation to be installed in the nominal joint width, and how to determine the compressed percentage of a known insulation width installed in a known nominal joint width.
  - CERTIFIED MANUFACTURER:** Hilti, Inc.  
 CERTIFIED PRODUCT: Joint Spray or Sealant  
 MODEL: Firestop Joint Spray CFS-SP WB or Silicone Joint Spray CFS-SP SIL  
 Fill, Void or Cavity Material: To be spray applied to cover the exposed surface of the mineral wool installed in the perimeter joint. Apply at the thickness specified in Table 1 and overlap the material a min. 1/2 in. onto the adjacent curtain wall assembly and concrete floor slab assembly. If the spraying process is stopped and the applied liquid cures to an elastomeric film before process is restarted, then overlap the edge of the cured material at least 1/8 in. with the spray. Reference Product Section of this Directory for more details about the Listed product.
  - Support Clips:** (Not Shown) Support clips are optional but recommended for installations subject to vertical shear movement. Standard Z shaped clips are 20 GA galvanized steel with the following dimensions: 1 in. wide by 3 in. high with a 2 in. upper leg and 3 in. lower leg.

\*\*Cycling: Before testing, the spliced, test specimen was cycled 500 times at 30 cpm in accordance with ICBO ES AC 30 (Jan. 1997) and ASTM E 1966.



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**Notes:**

- Refer to section 07840 of the specifications. For Quality Control requirements, refer to the Quality Control portion of the specification.
- Details shown are typical details. If field conditions do not match requirements of typical details, approved alternate details shall be utilized. Field conditions and dimensions need to be verified for compliance with the details, including but not limited to the following:
  - \* Minimum and maximum Width of Joints
  - \* Type and thickness of fire-rated construction. The minimum assembly rating of the firestop assembly shall meet or exceed the highest rating of the adjacent construction.
- If alternate details matching the field conditions are not available, manufacturer's engineering judgment drawings are acceptable. Drawings shall follow the International Firestop Council (IFC) Guidelines for Evaluating Firestop Systems Engineering Judgments.
- References:
  - \* 2013 Underwriter's Laboratories Fire Resistance Directory, Volume 2
  - \* 2013 Directory of Listed Materials and Assemblies, Omega Point Laboratories
  - \* All governing local and regional building codes

<Notes to designer (delete this note after reading and replace with title block information)>  
 1. Any modification to these details could result in an application/system not meeting the UL or Intertek Classification or the intended temperature or fire ratings.  
 2. Details shown are up to date as of February, 2015.  
 3. For additional information on the details, refer to the most current systems found on the Underwriter's Laboratories or Intertek websites  
 4. Coordinate fabrication and construction details with curtain wall supplier.

**JOB NUMBER:** \_\_\_\_\_

**DRAWN:** \_\_\_\_\_

**CHECKED:** \_\_\_\_\_

**ISSUE DATE:** \_\_\_\_\_

**REVISIONS:**

TYPICAL FIRESTOP PERIMETER JOINT DETAILS

**SHEET NAME:** \_\_\_\_\_









