FIRESTOP SUBMITTAL PACKAGE

Curtain Wall

PROJECT:

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SUBMITTED BY:

Specified Technologies Inc.

SpecSeal FIRESTOP PRODUCTS

200 Evans Way • Somerville, NJ 08876 • (800) 992-1180 • (908) 526-8000 • Fax (908) 526-9623

www.stifirestop.com

Curtain Wall

Steel Framed/Gypsum Sheathing

SYSTEM	DESCRIPTION	PRODUCT(S)
CW-S-1002	Gypsum sheathing/steel studs with mineral wool insulation with various exterior surfaces optional.	AS Spray
CW-S-1003	Gypsum sheathing/steel studs with fiberglass insulation with various exterior surfaces optional.	AS Spray
CW-S-1006	Gypsum sheathing/steel studs with mineral wool insulation with various exterior surfaces optional.	AS Spray

Brick Veneer Wall

SYSTEM	DESCRIPTION	PRODUCT(S)
CW-S-1002	Brick veneer with mineral wool insulation.	AS Spray
CW-S-1003	Brick veneer with fiberglass insulation.	AS Spray
CW-S-1006	Brick veneer with mineral wool insulation.	AS Spray

Aluminum Box Mullion/Glass Spandrels

SYSTEM	DESCRIPTION	PRODUCT(S)
CW-S-2003	2-in. 8 pcf CW insulation, max. 8-in. wide safing slot.	AS Spray
CW-S-2009	2-in. 8 pcf CW insulation, max. 8-in. wide safing slot.	AS Spray
CW-S-2034	4-in. 4 pcf CW insulation, max. 8-in. wide safing slot.	AS Spray
CW-S-2039	2-in. 8 pcf CW insulation, max. 8-in. wide safing slot.	AS Spray
CW-S-2044	2-in. 8 pcf CW insulation, max. 8-in. wide safing slot.	AS Spray
CW-S-2050	2-in. 8 pcf CW insulation, max. 8-in. wide safing slot.	AS Spray
CW-D-2008	2-in. 8 pcf CW insulation, max. 8-in. wide safing slot. 5% vertical shear.	AS Spray
CW-D-2011	4-in. 4 pcf CW insulation, max. 8-in. wide safing slot. 5% vertical shear.	AS Spray
CW-D-2022	2-in. 8 pcf CW insulation, max. 8-in. wide safing slot. 5% vertical shear.	AS Spray

Aluminum Box Mullion/Aluminum Spandrels

SYSTEM	DESCRIPTION	PRODUCT(S)
CW-S-2006	2-in. 8 pcf CW insulation, max. 8-in. wide safing slot.	AS Spray
CW-S-2010	2-in. 8 pcf CW insulation, max. 8-in. wide safing slot.	AS Spray
CW-S-2035	4-in. 4 pcf CW insulation, max. 8-in. wide safing slot.	AS Spray
CW-S-2040	2-in. 8 pcf CW insulation, max. 8-in. wide safing slot.	AS Spray
CW-S-2045	2-in. 8 pcf CW insulation, max. 8-in. wide safing slot.	AS Spray
CW-S-2051	2-in. 8 pcf CW insulation, max. 8-in. wide safing slot.	AS Spray
CW-D-2009	2-in. 8 pcf CW insulation, max. 8-in. wide safing slot. 5% vertical shear.	AS Spray
CW-D-2012	4-in. 4 pcf CW insulation, max. 8-in. wide safing slot. 5% vertical shear.	AS Spray
CW-D-2023	2-in. 8 pcf CW insulation, max. 8-in. wide safing slot. 5% vertical shear.	AS Spray

Aluminum Box Mullion/Stone Spandrels

SYSTEM	DESCRIPTION	PRODUCT(S)
CW-S-2008	2-in. 8 pcf CW insulation, max. 8-in. wide safing slot.	AS Spray
CW-S-2011	2-in. 8 pcf CW insulation, max. 8-in. wide safing slot.	AS Spray
CW-S-2036	4-in. 4 pcf CW insulation, max. 8-in. wide safing slot.	AS Spray
CW-S-2041	2-in. 8 pcf CW insulation, max. 8-in. wide safing slot.	AS Spray
CW-S-2046	2-in. 8 pcf CW insulation, max. 8-in. wide safing slot.	AS Spray
CW-S-2052	2-in. 8 pcf CW insulation, max. 8-in. wide safing slot.	AS Spray
CW-D-2010	2-in. 8 pcf CW insulation, max. 8-in. wide safing slot. 5% vertical shear.	AS Spray
CW-D-2013	4-in. 4 pcf CW insulation, max. 8-in. wide safing slot. 5% vertical shear.	AS Spray
CW-D-2024	2-in. 8 pcf CW insulation, max. 8-in. wide safing slot. 5% vertical shear.	AS Spray

Aluminum I-Mullion/Glass Spandrels

SYSTEM	DESCRIPTION	PRODUCT(S)
CW-S-2021	4-in. 4 pcf CW insulation, max. 10-in. wide safing slot.	AS Spray
CW-S-2049	3-in. 8 pcf CW insulation, max. 4-in. wide safing slot.	AS Spray
CW-D-2001	4-in. 4 pcf CW insulation, max. 10-in. wide safing slot. 5% vertical shear.	AS Spray

Aluminum I-Mullion/Aluminum Spandrels

SYSTEM	DESCRIPTION	PRODUCT(S)
CW-S-2022	4-in. 4 pcf CW insulation, max. 10-in. wide safing slot.	AS Spray
CW-D-2002	4-in. 4 pcf CW insulation, max. 10-in. wide safing slot. 5% vertical shear.	AS Spray

Curtain Wall (cont).

Aluminum I-Mullion/Stone Spandrels

SYSTEM	DESCRIPTION	PRODUCT(S)
CW-S-2023	4-in. 4 pcf CW insulation, max. 10-in. wide safing slot.	AS Spray
CW-D-2003	4-in. 4 pcf CW insulation, max. 10-in. wide safing slot. 5% vertical shear.	AS Spray

Precast Concrete Panels

SYSTEM	DESCRIPTION	PRODUCT(S)
CW-S-2013	Non-insulated panels, max. 8-in. wide safing slot.	AS Spray
CW-S-2014	Non-insulated panels, max. 8-in. wide safing slot.	AS Spray
CW-S-2047	Non-insulated panels, max. 8-in. wide safing slot.	AS Spray
CW-D-2004	Non-insulated panels, max. 8-in. wide safing slot. 5% vertical shear.	AS Spray
CW-D-2005	Non-insulated panels, max. 8-in. wide safing slot. 5% vertical shear.	AS Spray
CW-D-2020	Non-insulated panels, max. 8-in. wide safing slot. 5% vertical shear.	AS Spray

Insulated Precast Concrete Panels

SYSTEM	DESCRIPTION	PRODUCT(S)
CW-S-2025	2-in. 8 pcf CW insulation, max. 8-in. wide safing slot.	AS Spray
CW-S-2026	2-in. 8 pcf CW insulation, max. 8-in. wide safing slot.	AS Spray
CW-S-2048	2-in. 8 pcf CW insulation, max. 8-in. wide safing slot.	AS Spray
CW-D-2006	2-in. 8 pcf CW insulation, max. 8-in. wide safing slot. 5% vertical shear.	AS Spray
CW-D-2007	2-in. 8 pcf CW insulation, max. 8-in. wide safing slot. 5% vertical shear.	AS Spray
CW-D-2021	2-in. 8 pcf CW insulation, max. 8-in. wide safing slot.	AS Spray

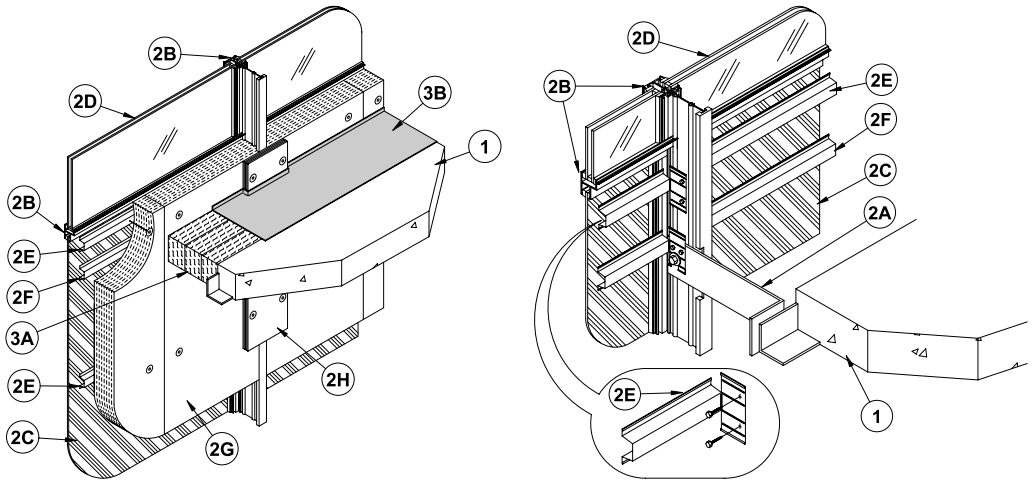
General Certificate of Conformance

Material Safety Data Sheets

SpecSeal AS200 Elastomeric Spray

Product Data Sheets

SpecSeal AS200 Elastomeric Spray



System No. CW-D-2001
October 08, 2001
Integrity Ratings — 1-1/2 and 2 Hr (See Item 2B)
Insulation Rating — 1/2 Hr
Linear Opening Width — 10 In. Max
Class II Movement Capabilities — 5% Vertical Shear (See Item 3)

1. **Floor Assembly** — Min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) structural concrete. Perimeter of floor assembly to be provided with min 3 by 3 by 1/4 in. thick cast-in-place structural steel angle for weld-attachment of mullion mounting clips (Item 2A).
2. **Curtain Wall Assembly** — The curtain wall assembly shall incorporate the following construction features:
   A. **Mullion Mounting Clips** — Min 4 in. long angles with one nom 4 in. leg for attachment to edge of floor assembly and with one leg approx 4 in. longer than distance to nearest face of mullion. Clips to be formed of min 1/4 in. thick steel. Clip welded to steel angle at edge of floor assembly (Item 1) on one side of each vertical mullion (Item 2B) at each floor level. Each clip to be provided with elongated holes to accommodate designed amount of movement. Top edge of each clip to be recessed min 1/2 in. below top surface of floor.
   B. **Framing** — The "I" shaped mullions (vertical members) shall be min 2-1/2 in. wide by 7 in. deep and shall be formed from min 0.125 in. thick aluminum. The horizontal framing members shall be min 2 in. wide by 2 in. deep and formed from min 0.125 in. thick aluminum. Mullions spaced max 60 in. OC and secured to mullion mounting clips (Item 2A) at each floor level with two min 3/8 in. diameter hex head steel bolts in conjunction with steel nuts and washers. Interior face of mullions to be notched to accommodate mullion mounting clips and desired movement and to be max 10 in. from edge of floor assembly. Horizontal framing members to be spaced min 72 in. OC. The Integrity Rating is dependent upon the minimum height from the top of the floor to the bottom of the vision panel sill, as tabulated below:

Min Vision Panel Sill Height Above Floor, in.	Integrity Rating, Hr
6	1-1/2
34	2

   C. **Spandrel Panels** — Nom 1/4 in. thick opaque heat-strengthened glass panels. Each panel secured in position and four-side captured with exterior sponge gasket compressed in place with interior wedge rubber and aluminum glazing bead.
   D. **Vision Panels** — Nom 1 in. thick (double pane) transparent heat-strengthened glass panels. Each panel secured in position and four-side captured with exterior sponge gasket compressed in place with interior wedge rubber and aluminum glazing bead.
   E. **Steel Hat Channels** — Nom 2-1/2 in. wide by 7/8 in. deep No. 24 gauge galvanized steel hat channel installed to span from mullion-to-mullion for attachment of curtain wall insulation (Item 2G). Hat channels to be cut min 4 in. longer than on center spacing of mullions. Ends of hat channels cut, flattened and bent 90 deg to form min 2 in. long tabs for screw-attachment to mullions with No. 10 by 1 in. long self-drilling, self-tapping steel screws. Hat channels installed max 3 in. above top of vision panel, max 3 in. below bottom of vision panel and spaced max 24 in. OC. Hat channels screw-attached to mullions along sides of each spandrel panel with No. 10 by 1 in. long self-drilling, self-tapping steel screws.
   F. **Stiffener Channel** — One nom 2-1/2 in. wide by 7/8 in. deep by 24 gauge (or heavier) steel hat-channel installed to span between mullions at each floor level to restrain curtain wall insulation against outward movement when forming material (Item 3A) is installed. Stiffener channel to be cut min 4 in. longer than on center spacing between mullions. Ends of stiffener channel cut, flattened and bent 90 deg to form min 2 in. long tabs for screw-attachment to the mullion mounting clips (Item 2E) with No. 10 by 3/4 in. long self-drilling, self-tapping steel screws. Each stiffener channel shall be located with its stem centerline at an elevation 2 in. below the top plane of the floor.
   G. **Curtain Wall Insulation*** — Nom 4 in. thick mineral wool batt insulation faced on one side with aluminum foil/scrim vapor retarder, supplied in min 72 in. long batts. Insulation batts compression-fitted between vertical mullions, flush with the interior surface of framing, with a maximum of one vertical seam and with no horizontal seams. Insulation panels secured to each hat channel with min 4-1/2 in. long steel screws with min 1-1/2 in. diameter galv steel clinch shields spaced 3 in. from each vertical edge of batt.

(System No. CW-D-2001 Continued)

THERMAFIBER LLC — FIRESPAN SS Insulation

H. **Mullion Insulation** — **Curtain Wall Insulation*** — Min 8 in. wide strips cut from min 1 in. thick mineral wool batt insulation. Framing covers to be centered over mullions and secured to the steel hat channels with min 5-1/2 in. long steel screws. Framing covers on mullions to abut the mineral wool batt safing material (Item 3A) above and below floor.

THERMAFIBER LLC — FIRESPAN Insulation

3. **Safing System** — Max separation between edge of floor assembly and face of framing members (at time of installation) is 10 in. The safing system is designed to accommodate vertical shear movement up to a max of 5 percent of its installed width. The safing system shall incorporate the following construction features:

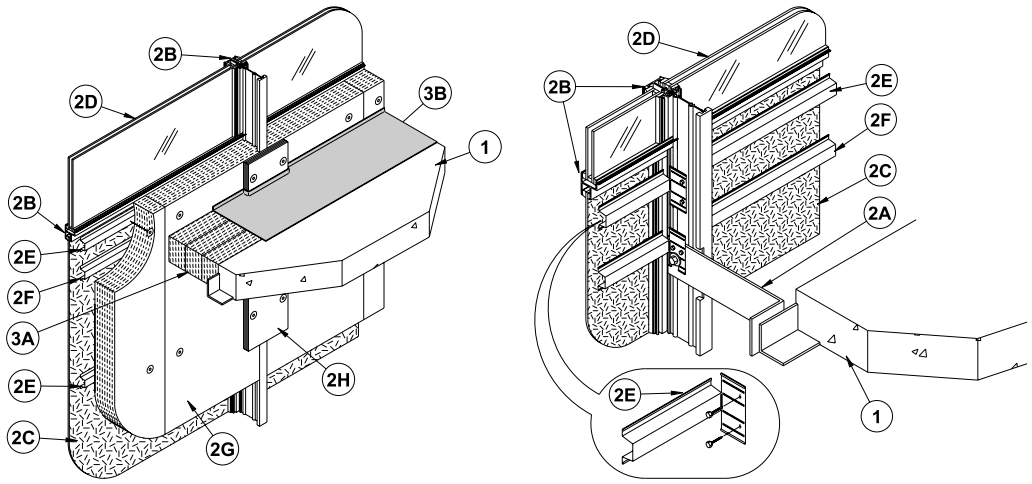
A. **Forming Material*** — Nom 4 pcf density mineral wool batt insulation. Batt sections cut to a 4 in. width and stacked to a thickness which is min 20 percent greater than the width of the linear gap between the curtain wall insulation and the edge of the concrete floor slab. The forming material is compressed and inserted cut-edge-first into linear gap such that its top surface is flush with the top surface of the floor assembly. A max of one tightly-butted seam is permitted between mullions. Additional piece of forming material to be friction-fit into gap between batt sections above mullion mounting clip at each mullion location.

THERMAFIBER LLC — SAF

B. **Fill, Void or Cavity Material*** — Min 1/8 in. wet thickness (min 1/16 in. dry thickness) of fill material spray-applied over top of forming material and lapping min 1/2 in. onto the top surface of the floor and onto the curtain wall insulation and mullion covers.

SPECIFIED TECHNOLOGIES INC — SpecSeal AS200 Elastomeric Spray

*Bearing the UL Classification Marking



System No. CW-D-2002
October 08, 2001
Integrity Ratings — 1 1/2 and 2 Hr (See Item 2B)
Insulation Rating — 1/2 Hr
Linear Opening Width — 10 In. Max
Class II Movement Capabilities — 5% Vertical Shear (See Item 3)

1. **Floor Assembly** — Min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) structural concrete. Perimeter of floor assembly to be provided with min 3 by 3 by 1/4 in. thick cast-in-place structural steel angle for weld-attachment of mullion mounting clips (Item 2A).
2. **Curtain Wall Assembly** — The curtain wall assembly shall incorporate the following construction features:
   A. **Mullion Mounting Clips** — Min 4 in. long angles with one nom 4 in. leg for attachment to edge of floor assembly and with one leg approx 4 in. longer than distance to nearest face of mullion. Clips to be formed of min 1/4 in. thick steel. Clip welded to steel angle at edge of floor assembly (Item 1) on one side of each vertical mullion (Item 2B) at each floor level. Each clip to be provided with elongated holes to accommodate designed amount of movement. Top edge of each clip to be recessed min 1/2 in. below top surface of floor.
   B. **Framing** — The "I" shaped mullions (vertical members) shall be min 2-1/2 in. wide by 7 in. deep and shall be formed from min 0.125 in. thick aluminum. The horizontal framing members shall be min 2 in. wide by 2 in. deep and formed from min 0.125 in. thick aluminum. Mullions spaced max 60 in. OC and secured to mullion mounting clips (Item 2A) at each floor level with two min 3/8 in. diameter hex head steel bolts in conjunction with steel nuts and washers. Interior face of mullions to be notched to accommodate mullion mounting clips and desired movement and to be max 10 in. from edge of floor assembly. Horizontal framing members to be spaced min 72 in. OC. The Integrity Rating is dependent upon the minimum height from the top of the floor to the bottom of the vision panel sill, as tabulated below:

Min Vision Panel Sill Height Above Floor, in.	Integrity Rating, Hr
6	1-1/2
34	2

   C. **Spandrel Panels** — Nom 1/8 in. thick aluminum panels with 1/4 in. thick edges. Each panel secured in position and four-side captured with exterior sponge gasket compressed in place with interior wedge rubber and aluminum glazing bead.
   D. **Vision Panels** — Nom 1 in. thick (double pane) transparent heat-strengthened glass panels. Each panel secured in position and four-side captured with exterior sponge gasket compressed in place with interior wedge rubber and aluminum glazing bead.
   E. **Steel Hat Channels** — Nom 2-1/2 in. wide by 7/8 in. deep No. 24 gauge galvanized steel hat channel installed to span from mullion-to-mullion for attachment of curtain wall insulation (Item 2G). Hat channels to be cut min 4 in. longer than on center spacing of mullions. Ends of hat channels cut, flattened and bent 90 deg to form min 2 in. long tabs for screw-attachment to mullions with No. 10 by 1 in. long self-drilling, self-tapping steel screws. Hat channels installed max 3 in. above top of vision panel, max 3 in. below bottom of vision panel and spaced max 24 in. OC. Hat channels screw-attached to mullions along sides of each spandrel panel with No. 10 by 1 in. long self-drilling, self-tapping steel screws.
   F. **Stiffener Channel** — One nom 2-1/2 in. wide by 7/8 in. deep by 24 gauge (or heavier) steel hat-channel installed to span between mullions at each floor level to restrain curtain wall insulation against outward movement when forming material (Item 3A) is installed. Stiffener channel to be cut min 4 in. longer than on center spacing between mullions. Ends of stiffener channel cut, flattened and bent 90 deg to form min 2 in. long tabs for screw-attachment to the mullion mounting clips (Item 2E) with No. 10 by 3/4 in. long self-drilling, self-tapping steel screws. Each stiffener channel shall be located with its stem centerline at an elevation 2 in. below the top plane of the floor.
   G. **Curtain Wall Insulation*** — Nom 4 in. thick mineral wool batt insulation faced on one side with aluminum foil/scrim vapor retarder, supplied in min 72 in. long batts. Insulation batts compression-fitted between vertical mullions, flush with the interior surface of framing, with a maximum of one vertical seam and with no horizontal seams. Insulation panels secured to each hat channel with min 4-1/2 in. long steel screws with min 1-1/2 in. diameter galv steel clinch shields spaced 3 in. from each vertical edge of batt.

(System No. CW-D-2002 Continued)

THERMAFIBER LLC — FIRESPAN SS Insulation

H. **Mullion Insulation** — **Curtain Wall Insulation*** — Min 8 in. wide strips cut from min 1 in. thick mineral wool batt insulation. Framing covers to be centered over mullions and secured to the steel hat channels with min 5-1/2 in. long steel screws. Framing covers on mullions to abut the mineral wool batt safing material (Item 3A) above and below floor.

THERMAFIBER LLC — FIRESPAN Insulation

3. **Safing System** — Max separation between edge of floor assembly and face of framing members (at time of installation) is 10 in. The safing system is designed to accommodate vertical shear movement up to a max of 5 percent of its installed width. The safing system shall incorporate the following construction features:

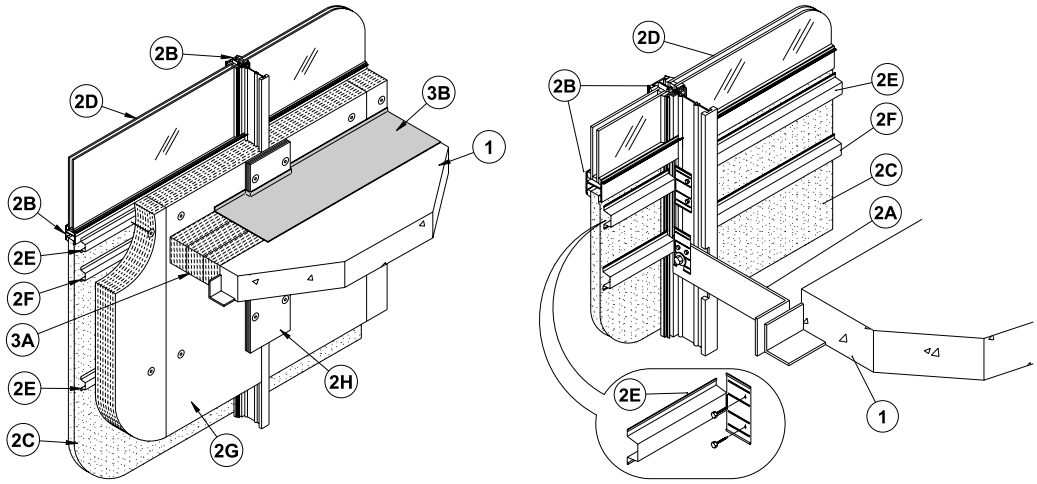
A. **Forming Material*** — Nom 4 pcf density mineral wool batt insulation. Batt sections cut to a 4 in. width and stacked to a thickness which is min 20 percent greater than the width of the linear gap between the curtain wall insulation and the edge of the concrete floor slab. The forming material is compressed and inserted cut-edge-first into linear gap such that its top surface is flush with the top surface of the floor assembly. A max of one tightly-butted seam is permitted between mullions. Additional piece of forming material to be friction-fit into gap between batt sections above mullion mounting clip at each mullion location.

THERMAFIBER LLC — SAF

B. **Fill, Void or Cavity Material*** — Min 1/8 in. wet thickness (min 1/16 in. dry thickness) of fill material spray-applied over top of forming material and lapping min 1/2 in. onto the top surface of the floor and onto the curtain wall insulation and mullion covers.

SPECIFIED TECHNOLOGIES INC — SpecSeal AS200 Elastomeric Spray

*Bearing the UL Classification Marking



System No. CW-D-2003
October 08, 2001
Integrity Ratings — 1-1/2 and 2 Hr (See Item 2B)
Insulation Rating — 1/2 Hr
Linear Opening Width — 10 In. Max
Class II Movement Capabilities — 5% Vertical Shear (See Item 3)

1. **Floor Assembly** — Min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) structural concrete. Perimeter of floor assembly to be provided with min 3 by 3 by 1/4 in. thick cast-in-place structural steel angle for weld-attachment of mullion mounting clips (Item 2A).
2. **Curtain Wall Assembly** — The curtain wall assembly shall incorporate the following construction features:
   A. **Mullion Mounting Clips** — Min 4 in. long angles with one nom 4 in. leg for attachment to edge of floor assembly and with one leg approx 4 in. longer than distance to nearest face of mullion. Clips to be formed of min 1/4 in. thick steel. Clip welded to steel angle at edge of floor assembly (Item 1) on one side of each vertical mullion (Item 2B) at each floor level. Each clip to be provided with elongated holes to accommodate designed amount of movement. Top edge of each clip to be recessed min 1/2 in. below top surface of floor.
   B. **Framing** — The "I" shaped mullions (vertical members) shall be min 2-1/2 in. wide by 7 in. deep and shall be formed from min 0.125 in. thick aluminum. The horizontal framing members shall be min 2 in. wide by 2 in. deep and formed from min 0.125 in. thick aluminum. Mullions spaced max 60 in. OC and secured to mullion mounting clips (Item 2A) at each floor level with two min 3/8 in. diameter hex head steel bolts in conjunction with steel nuts and washers. Interior face of mullions to be notched to accommodate mullion mounting clips and desired movement and to be max 10 in. from edge of floor assembly. Horizontal framing members to be spaced min 72 in. OC. The Integrity Rating is dependent upon the minimum height from the top of the floor to the bottom of the vision panel sill, as tabulated below:

Min Vision Panel Sill Height Above Floor, in.	Integrity Rating, Hr
6	1-1/2
34	2

   C. **Spandrel Panels** — Nom 1-3/16 in. thick polished granite panels with 1 in. thick edges. Each panel secured in position and four-side captured with exterior sponge gasket compressed in place with interior wedge rubber and aluminum glazing bead.
   D. **Vision Panels** — Nom 1 in. thick (double pane) transparent heat-strengthened glass panels. Each panel secured in position and four-side captured with exterior sponge gasket compressed in place with interior wedge rubber and aluminum glazing bead.
   E. **Steel Hat Channels** — Nom 2-1/2 in. wide by 7/8 in. deep No. 24 gauge galvanized steel hat channel installed to span from mullion-to-mullion for attachment of curtain wall insulation (Item 2G). Hat channels to be cut min 4 in. longer than on center spacing of mullions. Ends of hat channels cut, flattened and bent 90 deg to form min 2 in. long tabs for screw-attachment to mullions with No. 10 by 1 in. long self-drilling, self-tapping steel screws. Hat channels installed max 3 in. above top of vision panel, max 3 in. below bottom of vision panel and spaced max 24 in. OC. Hat channels screw-attached to mullions along sides of each spandrel panel with No. 10 by 1 in. long self-drilling, self-tapping steel screws.
   F. **Stiffener Channel** — One nom 2-1/2 in. wide by 7/8 in. deep by 24 gauge (or heavier) steel hat-channel installed to span between mullions at each floor level to restrain curtain wall insulation against outward movement when forming material (Item 3A) is installed. Stiffener channel to be cut min 4 in. longer than on center spacing between mullions. Ends of stiffener channel cut, flattened and bent 90 deg to form min 2 in. long tabs for screw-attachment to the mullion mounting clips (Item 2E) with No. 10 by 3/4 in. long self-drilling, self-tapping steel screws. Each stiffener channel shall be located with its stem centerline at an elevation 2 in. below the top plane of the floor.

(System No. CW-D-200 Continued)

G. **Curtain Wall Insulation*** — Nom 4 in. thick mineral wool batt insulation faced on one side with aluminum foil/scrim vapor retarder, supplied in min 72 in. long batts. Insulation batts compression-fitted between vertical mullions, flush with the interior surface of framing, with a maximum of one vertical seam and with no horizontal seams. Insulation panels secured to each hat channel with min 4-1/2 in. long steel screws with min 1-1/2 in. diameter galv steel clinch shields spaced 3 in. from each vertical edge of batt.

THERMAFIBER LLC — FIRESPAN SS Insulation

H. **Mullion Insulation** — **Curtain Wall Insulation*** — Min 8 in. wide strips cut from min 1 in. thick mineral wool batt insulation. Framing covers to be centered over mullions and secured to the steel hat channels with min 5-1/2 in. long steel screws. Framing covers on mullions to abut the mineral wool batt safing material (Item 3A) above and below floor.

THERMAFIBER LLC — FIRESPAN Insulation

3. **Safing System** — Max separation between edge of floor assembly and face of framing members (at time of installation) is 10 in. The safing system is designed to accommodate vertical shear movement up to a max of 5 percent of its installed width. The safing system shall incorporate the following construction features:

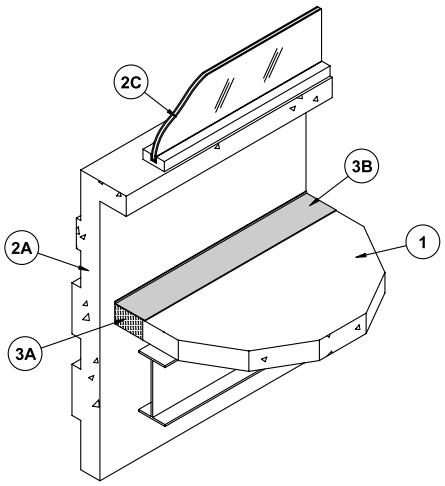
A. **Forming Material*** — Nom 4 pcf density mineral wool batt insulation. Batt sections cut to a 4 in. width and stacked to a thickness which is min 20 percent greater than the width of the linear gap between the curtain wall insulation and the edge of the concrete floor slab. The forming material is compressed and inserted cut-edge-first into linear gap such that its top surface is flush with the top surface of the floor assembly. A max of one tightly-butted seam is permitted between mullions. Additional piece of forming material to be friction-fit into gap between batt sections above mullion mounting clip at each mullion location.

THERMAFIBER LLC — SAF

B. **Fill, Void or Cavity Material*** — Min 1/8 in. wet thickness (min 1/16 in. dry thickness) of fill material spray-applied over top of forming material and lapping min 1/2 in. onto the top surface of the floor and onto the curtain wall insulation and mullion covers.

SPECIFIED TECHNOLOGIES INC — SpecSeal AS200 Elastomeric Spray

*Bearing the UL Classification Marking

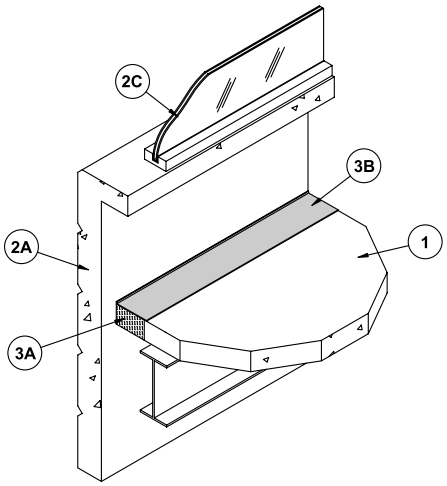


System No. CW-D-2004
July 27, 2001
Integrity Rating — 2 Hr
Insulation Rating — 1/4 Hr
Linear Opening Width — 8 in. Max
Class II Movement Capabilities — 5% Vertical Shear (See Item 3)

1. **Floor Assembly** — Min 4-1/2 in. thick steel-reinforced lightweight or normal weight (100-150 pcf) structural concrete. Floor assembly to be supported at perimeter edges by spandrel beams having a Restrained or Unrestrained Beam Rating of 2 hr.
2. **Curtain Wall Assembly** — The curtain wall assembly shall incorporate the following construction features:
   A. **Spandrel Panels** — Min 72 in. high by min 4 in. thick steel-reinforced lightweight or normal weight (100-150 pcf) structural concrete spandrel panels. Wall may also consist of min 4 in. thick steel-reinforced lightweight or normal weight concrete tilt-up panels with a min 72 in. vertical separation between window openings. Panels provided with steel dead load anchors welded to steel reinforcing bars embedded in the concrete for attachment to the steel columns and spandrel beams. Panels also provided with steel lateral anchors or braces. The dead load anchors which are located in the linear gap between the concrete floor slab and the spandrel panel or tilt-up panel are to be spaced max 72 in. OC. The top of the dead load anchor is to be recessed min 1/2 in. from top surface of floor.
   B. **Joint System** — (Not Shown) — Vertical joints between spandrel panels or tilt-up panels to be protected using Joint System No. WW-S-0038.
   C. **Framed Window** — Metal framed window with nom 1/4 in. thick heat-strengthened glass. Sill of window to be min 34 in. above top of floor.
3. **Safing System** — **Max separation between edge of floor assembly and concrete spandrel or tilt-up panel is 8 in. The safing system is designed to accommodate vertical shear movement between dead load anchors up to a max of 5 percent of its installed width.** The safing system shall incorporate the following construction features:
   A. **Forming Material*** — Nom 4 in. thick mineral wool batt safing material to be installed between the concrete spandrel or tilt-up panel and the edge of the concrete floor slab. Safing material to be cut to a min 4-1/2 in. width and stacked to a thickness which is at least 25 percent greater than the width of the linear gap between the concrete spandrel or tilt-up panel and the edge of the concrete floor slab. The safing material is compressed and inserted cut-edge-first into the linear gap such that its top surface is flush with the top surface of the floor assembly. A max of one tightly-butted seam is permitted between dead load anchors. An additional min 1/2 in. thick piece of mineral wool batt safing material to be installed to cover top surface of each dead load anchor.
      ROXUL INC — SAFE
   B. **Fill, Void or Cavity Material*** — Min 1/8 in. wet thickness of fill material spray-applied over top of forming material and lapping min 1/2 in. onto the top surface of the concrete floor and onto the concrete spandrel panel or tilt-up panel.
      SPECIFIED TECHNOLOGIES INC — SpecSeal AS200 Elastomeric Spray

*Bearing the UL Classification Mark

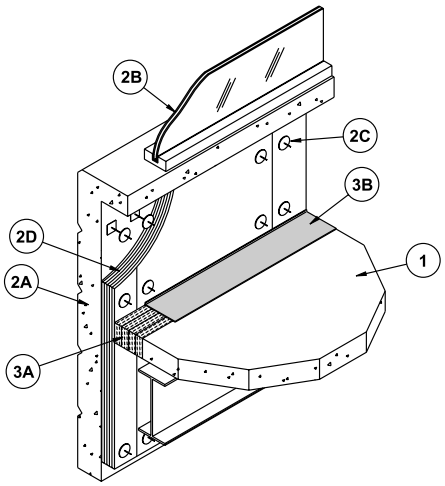
Created or Revised: 10/22/01
Specified Technologies, Inc., Somerville, NJ (800) 992-1180



System No. CW-D-2005
July 27, 2001
Integrity Rating — 2 Hr
Insulation Rating — 1/4 Hr
Linear Opening Width — 8 in. Max
Class II Movement Capabilities — 5% Vertical Shear (See Item 3)

1. **Floor Assembly** — Min 4-1/2 in. thick steel-reinforced lightweight or normal weight (100-150 pcf) structural concrete. Floor assembly to be supported at perimeter edges by spandrel beams having a Restrained or Unrestrained Beam Rating of 2 hr.
2. **Curtain Wall Assembly** — The curtain wall assembly shall incorporate the following construction features:
   A. **Spandrel Panels** — Min 72 in. high by min 4 in. thick steel-reinforced lightweight or normal weight (100-150 pcf) structural concrete spandrel panels. Wall may also consist of min 4 in. thick steel-reinforced lightweight or normal weight concrete tilt-up panels with a min 72 in. vertical separation between window openings. Panels provided with steel dead load anchors welded to steel reinforcing bars embedded in the concrete for attachment to the steel columns and spandrel beams. Panels also provided with steel lateral anchors or braces. The dead load anchors which are located in the linear gap between the concrete floor slab and the spandrel panel or tilt-up panel are to be spaced max 72 in. OC. The top of the dead load anchor is to be recessed min 1/2 in. from top surface of floor.
   B. **Joint System** — (Not Shown) — Vertical joints between spandrel panels or tilt-up panels to be protected using Joint System No. WW-S-0038.
   C. **Framed Window** — Metal framed window with nom 1/4 in. thick heat-strengthened glass. Sill of window to be min 34 in. above top of floor.
3. **Safing System** — Max separation between edge of floor assembly and concrete spandrel or tilt-up panel is 8 in. The safing system is designed to accommodate vertical shear movement between dead load anchors up to a max of 5 percent of its installed width. The safing system shall incorporate the following construction features:
   A. **Forming Material*** — Nom 4 in. thick mineral wool batt safing material to be installed between the concrete spandrel or tilt-up panel and the edge of the concrete floor slab. Safing material to be cut to a min 4-1/2 in. width and stacked to a thickness which is at least 25 percent greater than the width of the linear gap between the concrete spandrel or tilt-up panel and the edge of the concrete floor slab. The safing material is compressed and inserted cut-edge-first into the linear gap such that its top surface is flush with the top surface of the floor assembly. A max of one tightly-butted seam is permitted between dead load anchors. An additional min 1/2 in. thick piece of mineral wool batt safing material to be installed to cover top surface of each dead load anchor.
      THERMAFIBER LLC — SAF
   B. **Fill, Void or Cavity Material*** — Min 1/8 in. wet thickness of fill material spray-applied over top of forming material and lapping min 1/2 in. onto the top surface of the concrete floor and onto the concrete spandrel panel or tilt-up panel.
      SPECIFIED TECHNOLOGIES INC — SpecSeal AS200 Elastomeric Spray

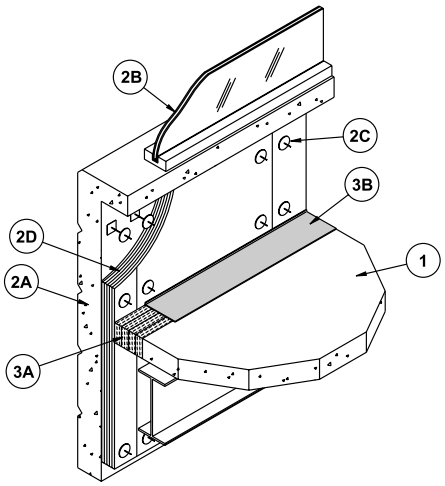
*Bearing the UL Classification Mark



System No. CW-D-2006
December 03, 2001
Integrity Rating — 2 Hr
Insulation Rating — 1/4 Hr
Linear Opening Width — 8 in. Max
Class II Movement Capabilities — 5% Vertical Shear (See Item 3)

1. **Floor Assembly** — Min 4-1/2 in. thick steel-reinforced lightweight or normal weight (100-150 pcf) structural concrete. Floor assembly to be supported at perimeter edges by spandrel beams having a Restrained or Unrestrained Beam Rating of 2 hr. Edge of concrete floor to be max 8 in. from interior surface of spandrel panel (Item 2A).
2. **Curtain Wall Assembly** — The curtain wall assembly shall incorporate the following construction features:
   A. **Spandrel Panels** — Min 72 in. high by min 4 in. thick steel-reinforced lightweight or normal weight (100-150 pcf) structural concrete spandrel panels. Wall may also consist of min 4 in. thick steel-reinforced lightweight or normal weight concrete tilt-up panels with a min 72 in. vertical separation between window openings. Panels provided with steel dead load anchors welded to steel reinforcing bars embedded in the concrete for attachment to the steel columns and spandrel beams. Panels also provided with steel lateral anchors or braces. The dead load anchors, which are located in the linear gap between the concrete floor slab and the spandrel panel or tilt-up panel, are to be spaced max 72 in. OC. The top of the dead load anchor is to be recessed min 1/2 in. from top surface of floor.
   B. **Framed Window** — Metal framed window with nom 1 in. thick (double pane) transparent heat-strengthened glass panels. Sill of window to be min 34 in. above top of floor.
   C. **Impaling Pins** — No. 12 gauge steel pins, min 1/2 in. longer than thickness of insulation boards (Item 2D), swaged to nom 2 by 2 in. galv steel base plate. Steel base plates secured to concrete spandrel panel with steel concrete screws or powder-driven steel fasteners. Impaling pins to be spaced 3 in. from edges of insulation boards (Item 2D) on each side of seams and spaced max 24 in. OC both vertically and horizontally. A min of two horizontal arrays of impaling pins are required to be located on spandrel panel above top surface of floor.
   D. **Curtain Wall Insulation*** — Min 2 in. thick mineral wool board insulation, faced on one side with aluminum foil/scrim vapor retarder, supplied in min 24 by 48 in. boards. Insulation boards installed vertically with tightly-butted seams to cover interior surface of concrete spandrel panel. Horizontal seams of insulation boards (if necessary) to be located min 24 in. above and min 6 in. below planes of floor. Insulation boards secured to spandrel panel with impaling pins in conjunction with min 1-1/2 in. diameter galv steel clinch shields. Butted seams to be covered with aluminum foil tape.
      THERMAFIBER LLC — FIRESPAN Insulation
3. **Safing System** — Max separation between edge of floor assembly and curtain wall insulation is 6 in. The safing system is designed to accommodate vertical shear movement between dead load anchors up to a max of 5 percent of its installed width between the edge of the floor assembly and the curtain wall insulation. The safing system shall incorporate the following construction features:
   A. **Forming Material*** — Mineral wool batt safing material to be cut into min 4-1/2 in. wide pieces and stacked to a thickness which is at least 25 percent greater than the width of the linear gap between the curtain wall insulation (Item 2D) and the edge of the concrete floor slab. The stacked safing material is compressed and inserted cut-edge-first into the linear gap such that its top surface is flush with the top surface of the floor assembly. A max of one tightly butted seam is permitted between spandrel panel attachment plates or tubes. An additional min 1/2 in. thick piece of mineral wool batt safing material is to be installed to cover top surface of each dead load anchor.
      THERMAFIBER LLC — SAF
   B. **Fill, Void or Cavity Material*** — Min 1/8 in. wet thickness (1/16 in. dry) of fill material spray-applied over top of forming material and lapping min 1/2 in. onto the top surface of the concrete floor and onto the curtain wall insulation.
      SPECIFIED TECHNOLOGIES INC — SpecSeal AS200 Elastomeric Spray

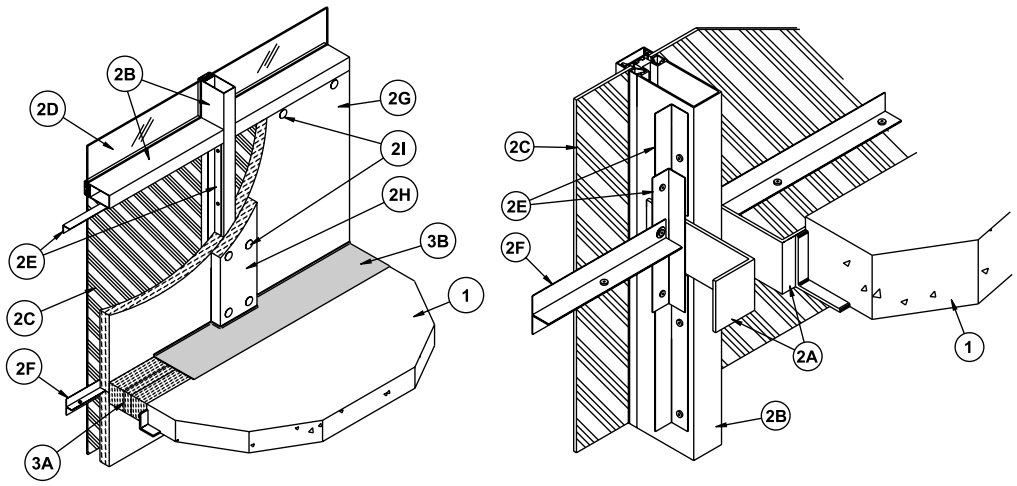
*Bearing the UL Classification Mark



System No. CW-D-2007
December 03, 2001
Integrity Rating — 2 Hr
Insulation Rating — 1/4 Hr
Linear Opening Width — 8 in. Max
Class II Movement Capabilities — 5% Vertical Shear (See Item 3)

1. **Floor Assembly** — Min 4-1/2 in. thick steel-reinforced lightweight or normal weight (100-150 pcf) structural concrete. Floor assembly to be supported at perimeter edges by spandrel beams having a Restrained or Unrestrained Beam Rating of 2 hr. Edge of concrete floor to be max 8 in. from interior surface of spandrel panel (Item 2A).
2. **Curtain Wall Assembly** — The curtain wall assembly shall incorporate the following construction features:
   A. **Spandrel Panels** — Min 72 in. high by min 4 in. thick steel-reinforced lightweight or normal weight (100-150 pcf) structural concrete spandrel panels. Wall may also consist of min 4 in. thick steel-reinforced lightweight or normal weight concrete tilt-up panels with a min 72 in. vertical separation between window openings. Panels provided with steel dead load anchors welded to steel reinforcing bars embedded in the concrete for attachment to the steel columns and spandrel beams. Panels also provided with steel lateral anchors or braces. The dead load anchors, which are located in the linear gap between the concrete floor slab and the spandrel panel or tilt-up panel, are to be spaced max 72 in. OC. The top of the dead load anchor is to be recessed min 1/2 in. from top surface of floor.
   B. **Framed Window** — Metal framed window with nom 1 in. thick (double pane) transparent heat-strengthened glass panels. Sill of window to be min 34 in. above top of floor.
   C. **Impaling Pins** — No. 12 gauge steel pins, min 1/2 in. longer than thickness of insulation boards (Item 2D), swaged to nom 2 by 2 in. galv steel base plate. Steel base plates secured to concrete spandrel panel with steel concrete screws or powder-driven steel fasteners. Impaling pins to be spaced 3 in. from edges of insulation boards (Item 2D) on each side of seams and spaced max 24 in. OC both vertically and horizontally. A min of two horizontal arrays of impaling pins are required to be located on spandrel panel above top surface of floor.
   D. **Curtain Wall Insulation*** — Min 2 in. thick mineral wool board insulation, faced on one side with aluminum foil/scrim vapor retarder, supplied in min 24 by 48 in. boards. Insulation boards installed vertically with tightly-butted seams to cover interior surface of concrete spandrel panel. Horizontal seams of insulation boards (if necessary) to be located min 24 in. above and min 6 in. below planes of floor. Insulation boards secured to spandrel panel with impaling pins in conjunction with min 1-1/2 in. diameter galv steel clinch shields. Butted seams to be covered with aluminum foil tape.
      ROXUL INC — RHT-80
3. **Safing System** — Max separation between edge of floor assembly and curtain wall insulation is 6 in. The safing system is designed to accommodate vertical shear movement between dead load anchors up to a max of 5 percent of its installed width between the edge of the floor assembly and the curtain wall insulation. The safing system shall incorporate the following construction features:
   A. **Forming Material*** — Mineral wool batt safing material to be cut into min 4-1/2 in. wide pieces and stacked to a thickness which is at least 25 percent greater than the width of the linear gap between the curtain wall insulation (Item 2D) and the edge of the concrete floor slab. The stacked safing material is compressed and inserted cut-edge-first into the linear gap such that its top surface is flush with the top surface of the floor assembly. A max of one tightly butted seam is permitted between spandrel panel attachment plates or tubes. An additional min 1/2 in. thick piece of mineral wool batt safing material is to be installed to cover top surface of each dead load anchor
      ROXUL INC — SAFE
   B. **Fill, Void or Cavity Material*** — Min 1/8 in. wet thickness (1/16 in. dry) of fill material spray-applied over top of forming material and lapping min 1/2 in. onto the top surface of the concrete floor and onto the curtain wall insulation.
      SPECIFIED TECHNOLOGIES INC — SpecSeal AS200 Elastomeric Spray

*Bearing the UL Classification Mark



System No. CW-D-2008

o e ber 0, 2001

Integrity Ratings — 1-1/2 and 2 Hr (See Item 2B)

Insulation Ratings — 0 and 1/4 Hr (See Item 2B)

Linear Opening Width — 8 in. Max

Class II Movement Capabilities — 5% Vertical Shear (See Item 3)

1. **Floor Assembly** — Min 4-1/2 in . thick reinforced lightweight or normal weight (100-150 pcf) structural concrete. Perimeter of floor assembly to be provided with min 3 by 3 by 1/4 in. thick cast-in-place structural steel angle for weld-attachment of mullion mounting clips (Item 2A).
2. **Curtain Wall Assembly** — The curtain wall assembly shall incorporate the following construction features:
   A. **Mullion Mounting Clips** — Min 4 in. long angles with one nom 4 in. leg for attachment to edge of floor assembly and with one leg approx 4 in. longer than distance to nearest face of mullion. Clips to be formed of min 1/4 in. thick steel. Clips welded to steel angle at edge of floor assembly (Item 1) on each side of vertical mullion (Item 2B) at each floor level. Each clip to be provided with elongated holes to accommodate designed amount of movement. Top edge of each Clip to be recessed min 1/2 in. below top surface of floor.
   B. **Framing** — The rectangular tubing mullions (vertical members) and transoms (horizontal members) shall be min 2-1/2 in. wide by 5 in. deep and shall be formed from min 0.085 in. thick aluminum. Mullions spaced max 60 in. OC and secured to mullion mounting Clips (Item 2A) at each floor level with two 3/8-16 by 4 in. long hex head steel bolts in conjunction with Steel nuts and wahsers . Interior face of mullions to be max 8 in. from edge of floor assembly. Transoms to be spaced min 60 in. OC. The Insulation and Integrity Ratings are dependent upon the spandrel panel height (center-to-center of transoms) and the min height from the top of the floor to the bottom of the vision panel sill, as tabulated below

Min Spandrel Panel Height, in.	Min Vision Panel Sill Height, in.	Integrity Rating, Hr	Insulation Rating, Hr
60	24	1-1/2	0
69	34	2	1/4

   C. **Spandrel Panels** — Nom 1/4 in. thick opaque heat-strengthened glass. Each panel secured in position with aluminum pressure plates in conjunction with glazing gaskets and steel screws.
   D. **Vision Panels** — Nom 1/4 in. thick transparent heat-strengthened glass. Each panel secured in position with aluminum pressure plates in conjunction with glazing gaskets and steel screws.
   E. **Spandrel Panel Perimeter Angles** — Nom 1-1/2 by 1-1/2 in. No. 22 gauge galvanized steel angles installed around entire perimeter of each spandrel panel. Angles recessed from interior face of framing as necessary to accommodate thickness of curtain wall insulation (Item 2G). Angles cut to be discontinuous at mullion mounting clips (Item 2A). Angles screw-attached to mullions and transom along sides and top of each spandrel panel with No. 8 by 1 in. long self-drilling, self-tapping steel screws spaced max 12 in. OC. Angle along bottom of each spandrel panel to be screw-attached to leg of angle on mullion at each end without any direct attachment to transom. At mullion mounting clips, a length of steel angle shall be installed to bridge between the perimeter angles over the mullion mounting clip. The “bridge” shall be cut approx 6 in. longer than the clear space between angles and shall be secured to the perimeter angles with one No. 8 by 1 in. long steel screw at each end.
   F. **Stiffener Tee** — Two nom 1-1/2 by 1-1/2 in. No. 20 gauge galv steel angles secured together, back-to-back, to form stiffener tee for installation in each horizontal seam of the curtain wall insulation (Item 2G) . The angle legs forming the stem of the tee shall be secured together using No. 8 by 1/2 in. long self-drilling, self-tapping steel screws spaced max 8 in. OC. The tee shall be installed with a clearance of 1/8 to 1/4 in. at each end and shall be screw-attached to the spandrel panel perimeter angles (Item 2E) with No. 10 by 3/4 in. long self-drilling, self-tapping steel screws, with steel washers, through two predrilled 1/4 in. diam holes at each end. One stiffener tee shall be located with its stem at an elevation 2 in. below the top plane of the floor at each floor level.

(System No. CW-D-200 Continued)

G. **Curtain Wall Insulation*** — Min 2 in. thick mineral wool batt insulation faced on one side with aluminum foil/scrim vapor retarder, supplied in min 36 in. wide batts. Insulation batts to be installed with no vertical seams and with horizontal seams spaced min 36 in. OC. Insulation panels tightly-fitted between vertical mullions and between the stem of the stiffener tee (Item 2F) and the transom, flush with the interior surface of framing. Insulation panels secured to spandrel panel perimeter angles and to each stiffener tee with cup head weld pins (Item 2I) spaced max 12 in. OC. The horizontal seam between insulation panels shall be located 2 in. below the top plane of the floor at each floor level.

THERMAFIBER LLC — FIRESPAN Insulation

H. **Framing Covers** — **Curtain Wall Insulation*** Min 8 in. wide strips cut from the same min 2 in. thick mineral wool batt insulation used for the curtain wall insulation (Item 2G). Framing covers to be centered over mullions and secured to the spandrel panel perimeter angles with cup head weld pins (Item 2I) spaced max 12 in. OC. Where more than one spandrel panel occurs between vertically separated vision panels, the horizontal transom between spandrel panels shall also be covered with an 8 in. wide framing cover in the same manner as on the vertical mullions. Framing covers on mullions to abut the mineral wool batt safing material (Item 3A) above and below floor.

THERMAFIBER LLC — FIRESPAN Insulation

I. **Weld Pin** — No. 12 gauge galv steel weld pin with nom 1-3/16 in. diam galv steel cup head. Cup head weld pins provided in two lengths. One length to be equal to thickness of curtain wall insulation (Item 2G) and second length to be equal to thickness of curtain wall insulation plus thickness of framing cover (Item 2H). Cup head weld pins inserted through curtain wall insulation and mullion covers and welded to spandrel panel perimeter angles max 12 in. OC.

3. **Safing System** — **Max separation between edge of floor assembly and face of framing members (at time of installation) is 8 in. The safing system is designed to accommodate vertical shear movement up to a max of 5 percent of its installed width.** The safing system shall incorporate the following construction features:

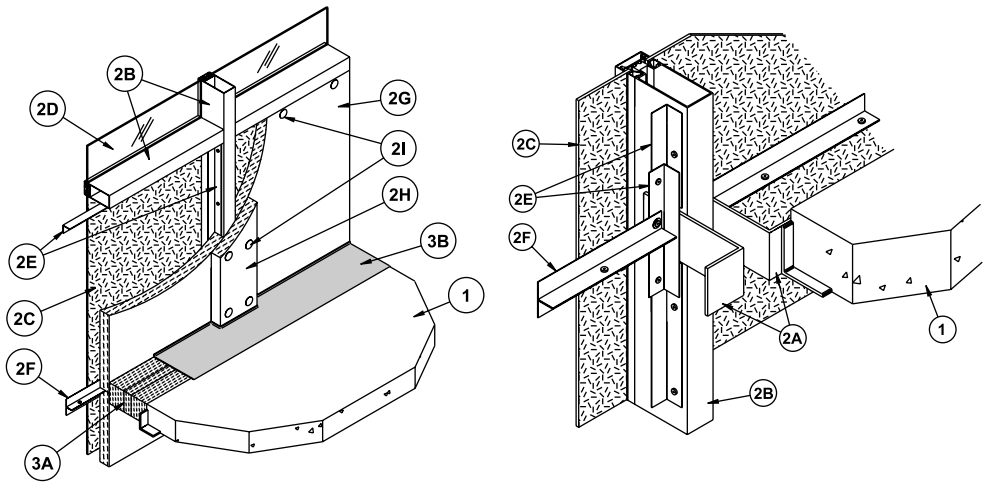
A. **Forming Material*** — Nom 4 pcf density mineral wool batt insulation. Batt sections cut to a min 4-1/2 in. width and stacked to a thickness which is min 20 percent greater than the width of linear gap between the curtain wall insulation and the edge of the concrete floor slab. The forming material is compressed and inserted cut-edge-first into linear gap such that its top surface is flush with the top surface of the floor assembly. A max of one tightly-butted seam is permitted between mullions. Additional pieces of forming material to be friction-fit into spaces between mullion mounting clips at each mullion location.

THERMAFIBER LLC — SAF

B. **Fill, Void or Cavity Material*** — Min 1/8 in. wet thickness (min 1/16 in. dry thickness) of fill material spray-applied over top of forming material and lapping min 1/2 in. onto the top surface of the floor and onto the curtain wall insulation and framing covers.

SPECIFIED TECHNOLOGIES INC — SpecSeal AS200 Elastomeric Spray

*Bearing the UL Classification Mark



System No. CW-D-2009
o e ber 0, 2001
Integrity Ratings — 1-1/2 and 2 Hr (See Item 2B)
Insulation Ratings — 0 and 1/4 Hr (See Item 2B)
Linear Opening Width — 8 in. Max
Class II Movement Capabilities — 5% Vertical Shear (See Item 3)

1. **Floor Assembly** — Min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) structural concrete. Perimeter of floor assembly to be provided with min 3 by 3 by 1/4 in. thick cast-in-place structural steel angle for weld-attachment of mullion mounting clips (Item 2A).
2. **Curtain Wall Assembly** — The curtain wall assembly shall incorporate the following construction features:
   A. **Mullion Mounting Clips** — Min 4 in. long angles with one nom 4 in. leg for attachment to edge of floor assembly and with one leg approx 4 in. longer than distance to nearest face of mullion. Clips to be formed of min 1/4 in. thick steel. Angles Clips welded to steel angle at edge of floor assembly (Item 1) on each side of vertical mullion (Item 2B) at each floor level. Each clip to be provided with elongated holes to accommodate designed amount of movement. Top edge of each clip to be recessed min 1/2 in. below top surface of floor.
   B. **Framing** — The rectangular tubing mullions (vertical members) and transoms (horizontal members) shall be min 2-1/2 in. wide by 5 in. deep and shall be formed from min 0.085 in. thick aluminum. Mullions spaced max 60 in. OC and secured to mullion mounting clips (Item 2A) at each floor level with two 3/8-16 by 4 in. long hex head steel bolts in conjunction with steel nuts and washers . Interior face of mullions to be max 8 in. from edge of floor assembly. Transoms to be spaced min 60 in. OC. The Insulation and Integrity Ratings are dependent upon the spandrel panel height (center-to-center of transoms) and the min height from the top of the floor to the bottom of the vision panel sill, as tabulated below:

Min Spandrel Panel Height, in.	Min Vision Panel Sill Height, in.	Integrity Rating, Hr	Insulation Rating, Hr
60	24	1-1/2	0
69	34	2	1/4

   C. **Spandrel Panels** — Nom 1/8 in. thick aluminum panels with 1/4 in. thick edges. Each panel secured in position with aluminum pressure plates in conjunction with gaskets and steel screws.
   D. **Vision Panels** — Nom 1/4 in. thick transparent heat-strengthened glass. Each panel secured in position with aluminum pressure plates in conjunction with glazing gaskets and steel screws.
   E. **Spandrel Panel Perimeter Angles** — Nom 1-1/2 by 1-1/2 in. No. 22 gauge galvanized steel angles installed around entire perimeter of each spandrel panel. Angles recessed from interior face of framing as necessary to accommodate thickness of curtain wall insulation (Item 2G). Angles cut to be discontinuous at mullion mounting clips (Item 2A). Angles screw-attached to mullions and transom along sides and top of each spandrel panel with No. 8 by 1 in. long self-drilling, self-tapping steel screws spaced max 12 in. OC. Angle along bottom of each spandrel panel to be screw-attached to leg of angle on mullion at each end without any direct attachment to transom. At mullion mounting clips, a length of steel angle shall be installed to bridge between the perimeter angles over the mullion mounting clip. The "bridge" shall be cut approx 6 in. longer than the clear space between angles and shall be secured to the perimeter angles with one No. 8 by 1 in. long steel screw at each end.
   F. **Stiffener Tee** — Two nom 1-1/2 by 1-1/2 in. No. 20 gauge galv steel angles secured together, back-to-back, to form stiffener tees for installation in each horizontal seam of the curtain wall insulation (Item 2G) . The angle legs forming the stem of the tee shall be secured together using No. 8 by 1/2 in. long self-drilling, self-tapping steel screws spaced max 8 in. OC. The tee shall be installed with a clearance of 1/8 to 1/4 in. at each end and shall be screw-attached to the spandrel panel perimeter angles (Item 2E) with No. 10 by 3/4 in. long self-drilling, self-tapping steel screws, with steel washers, through two predrilled 1/4 in. diam holes at each end. One stiffener tee shall be located with its stem at an elevation 2 in. below the top plane of the floor at each floor level.
   G. **Curtain Wall Insulation*** — Min 2 in. thick mineral wool batt insulation faced on one side with aluminum foil/scrim vapor retarder, supplied in min 36 in. wide batts. Insulation batts to be installed with no vertical seams and with horizontal seams spaced min 36 in. OC. Insulation panels tightly-fitted between vertical mullions and between the stem of the stiffener tee (Item 2F) and the

(System No. CW-D-200 Continued)

transom, flush with the interior surface of framing. Insulation panels secured to spandrel panel perimeter angles and to each stiffener tee with cup head weld pins (Item 2I) spaced max 12 in OC. The horizontal seam between insulation panels shall be located 2 in. below the top plane of the floor at each floor level.

THERMAFIBER LLC — FIRESPAN Insulation

H. **Framing Covers** — **Curtain Wall Insulation*** Min 8 in. wide strips cut from the same min 2 in. thick mineral wool batt insulation used for the curtain wall insulation (Item 2G). Framing covers to be centered over mullions and secured to the spandrel panel perimeter angles with cup head weld pins (Item 2I) spaced max 12 in. OC. Where more than one spandrel panel occurs between vertically separated vision panels, the horizontal transom between spandrel panels shall also be covered with an 8 in. wide framing cover in the same manner as on the vertical mullions. Framing covers on mullions to abut the mineral wool batt safing material (Item 3A) above and below floor.

THERMAFIBER LLC — FIRESPAN Insulation

I. **Weld Pin** — No. 12 gauge galv steel weld pin with nom 1-3/16 in. diam galv steel cup head. Cup head weld pins provided in two lengths. One length to be equal to thickness of curtain wall insulation (Item 2G) and second length to be equal to thickness of curtain wall insulation plus thickness of framing cover (Item 2H). Cup head weld pins inserted through curtain wall insulation and mullion covers and welded to spandrel panel perimeter angles max 12 in. OC.

3. **Safing System** — **Max separation between edge of floor assembly and face of framing members (at time of installation) is 8 in. The safing system is designed to accommodate vertical shear movement up to a max of 5 percent of its installed width.** The safing system shall incorporate the following construction features:

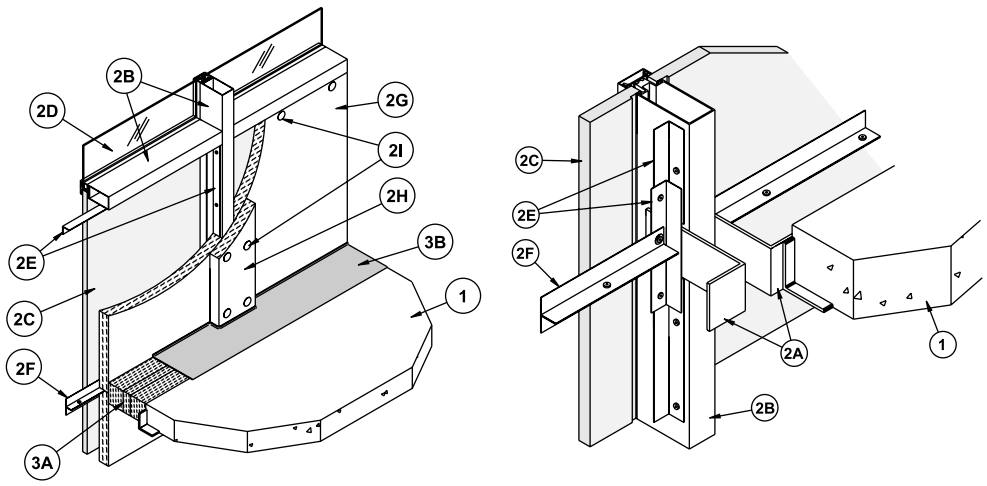
A. **Forming Material*** — Nom 4 pcf density mineral wool batt insulation. Batt sections cut to a min 4-1/2 in. width and stacked to a thickness which is min 20 percent greater than the width of linear gap between the curtain wall insulation and the edge of the concrete floor slab. The forming material is compressed and inserted cut-edge-first into linear gap such that its top surface is flush with the top surface of the floor assembly. A max of one tightly-butted seam is permitted between mullions. Additional pieces of forming material to be friction-fit into spaces between mullion mounting clips at each mullion location.

THERMAFIBER LLC — SAF

B. **Fill, Void or Cavity Material*** — Min 1/8 in. wet thickness (min 1/16 in. dry thickness) of fill material spray- applied over top of forming material and lapping min 1/2 in. onto the top surface of the floor and onto the curtain wall insulation and framing covers.

SPECIFIED TECHNOLOGIES INC — SpecSeal AS200 Elastomeric Spray.

*Bearing the UL Classification Mark



System No. CW-D-2010
o e ber 0, 2001
Integrity Ratings — 1-1/2 and 2 Hr (See Item 2B)
Insulation Ratings — 0 and 1/4 Hr (See Item 2B)
Linear Opening Width — 8 in. Max
Class II Movement Capabilities — 5% Vertical Shear (See Item 3)

1. **Floor Assembly** — Min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) structural concrete. Perimeter of floor assembly to be provided with min 3 by 3 by 1/4 in. thick cast-in-place structural steel angle for weld-attachment of mullion mounting clips (Item 2A).
2. **Curtain Wall Assembly** — The curtain wall assembly shall incorporate the following construction features:
   A. **Mullion Mounting Angles** — Min 4 in. long angles with one nom 4 in. leg for attachment to edge of floor assembly and with one leg approx 4 in. longer than distance to nearest face of mullion. Clips to be formed of min 1/4 in. thick steel. Clips welded to steel angle at edge of floor assembly (Item 1) on each side of vertical mullion (Item 2B) at each floor level. Each clip to be provided with elongated holes to accommodate designed amount of movement. Top edge of each clip to be recessed min 1/2 in. below top surface of floor.
   B. **Framing** — The rectangular tubing mullions (vertical members) and transoms (horizontal members) shall be min 2-1/2 in. wide by 5 in. deep and shall be formed from min 0.085 in. thick aluminum. Mullions spaced max 60 in. OC and secured to mullion mounting clips (Item 2A) at each floor level with two 3/8-16 by 4 in. long hex head steel bolts in conjunction with steel nuts and washers. Interior face of mullions to be max 8 in. from edge of floor assembly. Transoms to be spaced min 60 in. OC. The Insulation and Integrity Ratings are dependent upon the spandrel panel height (center-to-center of transoms) and the min height from the top of the floor to the bottom of the vision panel sill, as tabulated below:

Min Spandrel Panel Height, in.	Min Vision Panel Sill Height, in.	Integrity Rating, Hr	Insulation Rating, Hr
60	24	1-1/2	0
69	34	2	1/4

   C. **Spandrel Panels** — Nom 1-3/16 in. thick polished granite spandrel panels with 1 in. thick gauged edges. Each panel secured in position with aluminum pressure plates in conjunction with gaskets and steel screws.
   D. **Vision Panels** — Nom 1/4 in. thick transparent heat-strengthened glass. Each panel secured in position with aluminum pressure plates in conjunction with glazing gaskets and steel screws.
   E. **Spandrel Panel Perimeter Angles** — Nom 1-1/2 by 1-1/2 in. No. 22 gauge galvanized steel angles installed around entire perimeter of each spandrel panel. Angles recessed from interior face of framing as necessary to accommodate thickness of curtain wall insulation (Item 2G). Angles cut to be discontinuous at mullion mounting clips (Item 2A). Angles screw-attached to mullions and transom along sides and top of each spandrel panel with No. 8 by 1 in. long self-drilling, self-tapping steel screws spaced max 12 in. OC. Angle along bottom of each spandrel panel to be screw-attached to leg of angle on mullion at each end without any direct attachment to transom. At mullion mounting clips, a length of steel angle shall be installed to bridge between the perimeter angles over the mullion mounting clip. The "bridge" shall be cut approx 6 in. longer than the clear space between angles and shall be secured to the perimeter angles with one No. 8 by 1 in. long steel screw at each end.
   F. **Stiffener Tee** — Two nom 1-1/2 by 1-1/2 in. No. 20 gauge galv steel angles secured together, back-to-back, to form stiffener tee for installation in each horizontal seam of the curtain wall insulation (Item 2G). The angle legs forming the stem of the tee shall be secured together using No. 8 by 1/2 in. long self-drilling, self-tapping steel screws spaced max 8 in. OC. The tee shall be installed with a clearance of 1/8 to 1/4 in. at each end and shall be screw-attached to the spandrel panel perimeter angles (Item 2E) with No. 10 by 3/4 in. long self-drilling, self-tapping steel screws, with steel washers, through two predrilled 1/4 in. diam holes at each end. One stiffener tee shall be located with its stem at an elevation 2 in. below the top plane of the floor at each floor level.

(System No. CW-D-2010 Continued)

G. **Curtain Wall Insulation*** — Min 2 in. thick mineral wool batt insulation faced on one side with aluminum foil/scrim vapor retarder, supplied in min 36 in. wide batts. Insulation batts to be installed with no vertical seams and with horizontal seams spaced min 36 in. OC. Insulation panels tightly-fitted between vertical mullions and between the stem of the stiffener tee (Item 2F) and the transom, flush with the interior surface of framing. Insulation panels secured to spandrel panel perimeter angles and to each stiffener tee with cup head weld pins (Item 2I) spaced max 12 in OC. The horizontal seam between insulation panels shall be located 2 in. below the top plane of the floor at each floor level.

THERMAFIBER LLC — FIRESPAN Insulation

H. **Framing Covers** — **Curtain Wall Insulation*** Min 8 in. wide strips cut from the same min 2 in. thick mineral wool batt insulation used for the curtain wall insulation (Item 2G). Framing covers to be centered over mullions and secured to the spandrel panel perimeter angles with cup head weld pins (Item 2I) spaced max 12 in. OC. Where more than one spandrel panel occurs between vertically separated vision panels, the horizontal transom between spandrel panels shall also be covered with an 8 in. wide framing cover in the same manner as on the vertical mullions. Framing covers on mullions to abut the mineral wool batt safing material (Item 3A) above and below floor.

THERMAFIBER LLC — FIRESPAN Insulation

I. **Weld Pin** — No. 12 gauge galv steel weld pin with nom 1-3/16 in. diam galv steel cup head. Cup head weld pins provided in two lengths. One length to be equal to thickness of curtain wall insulation (Item 2G) and second length to be equal to thickness of curtain wall insulation plus thickness of framing cover (Item 2H). Cup head weld pins inserted through curtain wall insulation and mullion covers and welded to spandrel panel perimeter angles max 12 in. OC.

3. **Safing System** — **Max separation between edge of floor assembly and face of framing members (at time of installation) is 8 in. The safing system is designed to accommodate vertical shear movement up to a max of 5 percent of its installed width.** The safing system shall incorporate the following construction features:

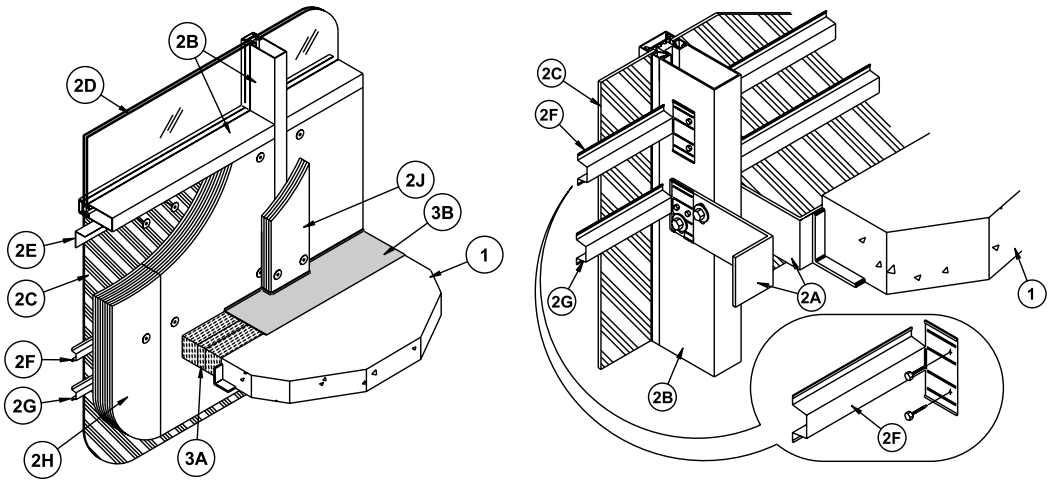
A. **Forming Material*** — Nom 4 pcf density mineral wool batt insulation. Batt sections cut to a min 4-1/2 in. width and stacked to a thickness which is min 20 percent greater than the width of linear gap between the curtain wall insulation and the edge of the concrete floor slab. The forming material is compressed and inserted cut-edge-first into linear gap such that its top surface is flush with the top surface of the floor assembly. A max of one tightly-butted seam is permitted between mullions. Additional pieces of forming material to be friction-fit into spaces between mullion mounting clips at each mullion location.

THERMAFIBER LLC — SAF

B. **Fill, Void or Cavity Material*** — Min 1/8 in. wet thickness (min 1/16 in. dry thickness) of fill material spray-applied over top of forming material and lapping min 1/2 in. onto the top surface of the floor and onto the curtain wall insulation and framing covers.

SPECIFIED TECHNOLOGIES INC — SpecSeal AS200 Elastomeric Spray.

*Bearing the UL Classification Mark



System No. CW-D-2011
o e ber 0, 2001
Integrity Ratings — 1-1/2 and 2 Hr (See Item 2B)
Insulation Ratings — 0 and 1/4 Hr (See Item 2B)
Linear Opening Width — 8 in. Max
Class II Movement Capabilities — 5% Vertical Shear (See Item 3)

1. **Floor Assembly** — Min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) structural concrete. Perimeter of floor assembly to be provided with min 3 by 3 by 1/4 in. thick cast-in-place structural steel angle for weld-attachment of mullion mounting clips (Item 2A).
2. **Curtain Wall Assembly** — The curtain wall assembly shall incorporate the following construction features:
   A. **Mullion Mounting Clips** — Min 4 in. long angles with one nom 4 in. leg for attachment to edge of floor assembly and with one leg approx 4 in. longer than distance to nearest face of mullion. Clips to be formed of min 1/4 in. thick steel. Clips welded to steel angle at edge of floor assembly (Item 1) on each side of vertical mullion (Item 2B) at each floor level. Each clip to be provided with elongated holes to accommodate designed amount of movement. Top edge of each clip to be recessed min 1/2 in. below top surface of floor.
   B. **Framing** — The rectangular tubing mullions (vertical members) and transoms (horizontal members) shall be min 2-1/2 in. wide by 5 in. deep and shall be formed from min 0.085 in. thick aluminum. Mullions spaced max 60 in. OC and secured to mullion mounting clips (Item 2A) at each floor level with two 3/8-16 by 4 in. long hex head steel bolts in conjunction with steel nuts and washers. Interior face of mullions to be max 8 in. from edge of floor assembly. Transoms to be spaced min 60 in. OC. The Insulation and Integrity Ratings are dependent upon the spandrel panel height (center-to-center of transoms) and the min height from the top of the floor to the bottom of the vision panel sill, as tabulated below:

Min Spandrel Panel Height, in.	Min Vision Panel Sill Height, in.	Integrity Rating, Hr	Insulation Rating, Hr
60	24	1-1/2	0
69	34	2	1/4

   C. **Spandrel Panels** — Nom 1/4 in. thick opaque heat-strengthened or tempered glass. Each panel secured in position with aluminum pressure plates in conjunction with glazing gaskets and steel screws.
   D. **Vision Panels** — Nom 1 in. thick (double pane) transparent heat-strengthened glass panels. Each panel secured in position with aluminum pressure plates in conjunction with glazing gaskets and steel screws.
   E. **Spandrel Panel Lintel Angle** — Nom 2 by 2 in. No. 22 gauge galvanized steel angle secured to underside of transom at top of each spandrel panel. Vertical leg of angle recessed 4 in. from interior face of framing to accommodate thickness of curtain wall insulation (Item 2G). Angle installed with 1/8 to 1 in. clearance at each end and screw-attached to transom with No. 8 by 1 in. long self-drilling, self-tapping steel screws spaced max 12 in. OC.
   F. **Steel Hat Channels** — Nom 2-1/2 in. wide by 7/8 in. deep No. 24 gauge galvanized steel hat channel installed to span from mullion-to-mullion for attachment of curtain wall insulation (Item 2H). Hat channels to be cut min 4 in. longer than on center spacing of mullions. Ends of hat channels cut, flattened and bent 90 deg to form min 2 in. long tabs for screw-attachment to mullions with No. 8 by 1 in. long self-drilling, self-tapping steel screws. Hat channels installed max 3 in. above top of vision panel, max 3 in. above top of concrete floor and spaced max 24 in. OC.
   G. **Stiffener Channel** — One nom 2-1/2 in. wide by 7/8 in. deep by 24 gauge (or heavier) steel hat-channel installed to span between mullions at each floor level to restrain curtain wall insulation against outward movement when forming material (Item 3A) is installed. Stiffener channel to be cut min 4 in. longer than on center spacing between mullions. Ends of stiffener channel cut, flattened and bent 90 deg to form min 2 in. long tabs for screw-attachment to the mullion mounting clips (Item 2E) with No. 8 by 1 in. long self-drilling, self-tapping steel screws. Each stiffener channel shall be located with its stem centerline at an elevation 2 in. below the top plane of the floor.
   H. **Curtain Wall Insulation*** — Nom 4 in. thick mineral wool batt insulation faced on one side with aluminum foil/scrim vapor retarder, supplied in lengths at least equal to the spandrel panel height. Insulation batts compression-fitted between vertical mullions, flush with the interior surface of framing, with a maximum of one vertical seam and with no horizontal

(System No. CW-D-2011 Continued)

seams. Insulation panels secured to the spandrel panel lintel angle and to each hat channel with min 4-1/2 in. long steel screws with min 1-1/2 in. diameter galv steel clinch shields spaced 3 in. from each vertical edge of batt and spaced max 24 in. OC between vertical edges of batt.

THERMAFIBER LLC — FIRESPAN SS Insulation

J. **Framing Covers — Curtain Wall Insulation*** — Min 8 in. wide strips cut from min 2 in. thick mineral wool batt insulation. Framing covers to be centered over mullions and secured to the spandrel panel lintel angle and steel hat channels with min 6-1/2 in. long steel screws. Framing covers on mullions to abut the mineral wool batt safing material (Item 3A) above and below floor. Where more than one spandrel panel occurs between vertically separated vision panels, the horizontal transom between spandrel panels shall also be covered with an 8 in. wide framing cover in the same manner as on the vertical mullions.

THERMAFIBER LLC — FIRESPAN Insulation

3. **Safing System — Max separation between edge of floor assembly and face of framing members (at time of installation) is 8 in. The safing system is designed to accommodate vertical shear movement up to a max of 5 percent of its installed width.** The safing system shall incorporate the following construction features:

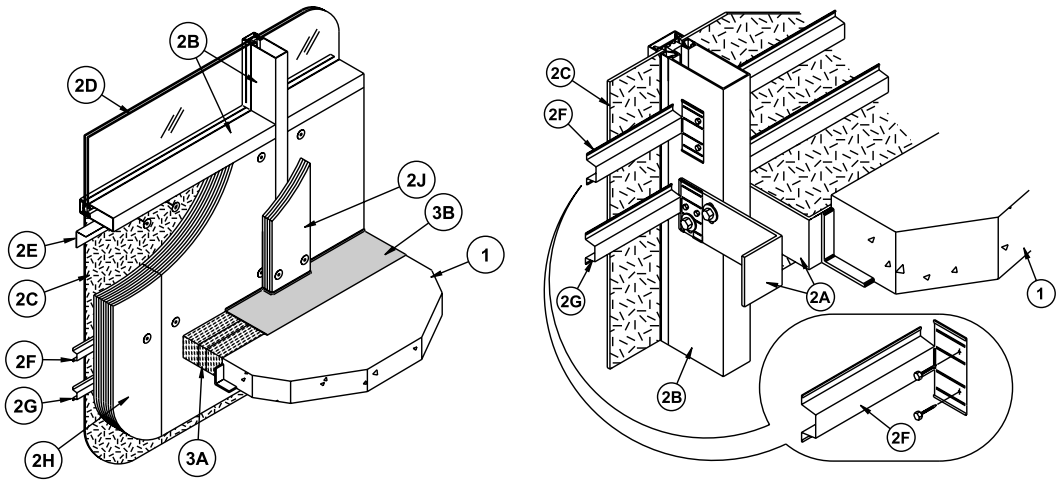
A. **Forming Material*** — Nom 4 pcf density mineral wool batt insulation. Batt sections cut to a min 4-1/2 in. width and stacked to a thickness which is min 20 percent greater than the width of linear gap between the curtain wall insulation and the edge of the concrete floor slab. The forming material is compressed and inserted cut-edge-first into linear gap such that its top surface is flush with the top surface of the floor assembly. A max of one tightly-butted seam is permitted between mullions. Additional pieces of forming material to be friction-fit into spaces between mullion mounting clips at each mullion location.

THERMAFIBER LLC — SAF

B. **Fill, Void or Cavity Material*** — Min 1/8 in. wet thickness (min 1/16 in. dry thickness) of fill material spray-applied over top of forming material and lapping min 1/2 in. onto the top surface of the floor and onto the curtain wall insulation and framing covers.

SPECIFIED TECHNOLOGIES INC — SpecSeal AS200 Elastomeric Spray

*Bearing the UL Classification Marking



System No. CW-D-2012
o e ber 0, 2001
Integrity Ratings — 1-1/2 and 2 Hr (See Item 2B)
Insulation Ratings — 0 and 1/4 Hr (See Item 2B)
Linear Opening Width — 8 in. Max
Class II Movement Capabilities — 5% Vertical Shear (See Item 3)

1. **Floor Assembly** — Min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) structural concrete. Perimeter of floor assembly to be provided with min 3 by 3 by 1/4 in. thick cast-in-place structural steel angle for weld-attachment of mullion mounting clips (Item 2A).
2. **Curtain Wall Assembly** — The curtain wall assembly shall incorporate the following construction features:
   A. **Mullion Mounting Clips**— Min 4 in. long angles with one nom 4 in. leg for attachment to edge of floor assembly and with one leg approx 4 in. longer than distance to nearest face of mullion. Clips to be formed of min 1/4 in. thick steel. Clips welded to steel angle at edge of floor assembly (Item 1) on each side of vertical mullion (Item 2B) at each floor level. Each clip to be provided with elongated holes to accommodate designed amount of movement. Top edge of each clip to be recessed min 1/2 in. below top surface of floor.
   B. **Framing** — The rectangular tubing mullions (vertical members) and transoms (horizontal members) shall be min 2-1/2 in. wide by 5 in. deep and shall be formed from min 0.085 in. thick aluminum. Mullions spaced max 60 in. OC and secured to mullion mounting clips (Item 2A) at each floor level with two 3/8-16 by 4 in. long hex head steel bolts in conjunction with steel nuts and washers. Interior face of mullions to be max 8 in. from edge of floor assembly. Transoms to be spaced min 60 in. OC. The Insulation and Integrity Ratings are dependent upon the spandrel panel height (center-to-center of transoms) and the min height from the top of the floor to the bottom of the vision panel sill, as tabulated below:

Min Spandrel Panel Height, in.	Min Vision Panel Sill Height, in.	Integrity Rating, Hr	Insulation Rating, Hr
60	24	1-1/2	0
69	34	2	1/4

   C. **Spandrel Panels** — Nom 1/8 in. thick aluminum panels with 1/4 in. thick edges. Each panel secured in position with aluminum pressure plates in conjunction with glazing gaskets and steel screws.
   D. **Vision Panels** — Nom 1 in. thick (double pane) transparent heat-strengthened glass panels. Each panel secured in position with aluminum pressure plates in conjunction with glazing gaskets and steel screws.
   E. **Spandrel Panel Lintel Angle** — Nom 2 by 2 in. No. 22 gauge galvanized steel angle secured to underside of transom at top of each spandrel panel. Vertical leg of angle recessed 4 in. from interior face of framing to accommodate thickness of curtain wall insulation (Item 2G). Angle installed with 1/8 to 1 in. clearance at each end and screw-attached to transom with No. 8 by 1 in. long self-drilling, self-tapping steel screws spaced max 12 in. OC.
   F. **Steel Hat Channels** — Nom 2-1/2 in. wide by 7/8 in. deep No. 24 gauge galvanized steel hat channel installed to span from mullion-to-mullion for attachment of curtain wall insulation (Item 2H). Hat channels to be cut min 4 in. longer than on center spacing of mullions. Ends of hat channels cut, flattened and bent 90 deg to form min 2 in. long tabs for screw-attachment to mullions with No. 8 by 1 in. long self-drilling, self-tapping steel screws. Hat channels installed max 3 in. above top of vision panel, max 3 in. above top of concrete floor and spaced max 24 in. OC.
   G. **Stiffener Channel** — One nom 2-1/2 in. wide by 7/8 in. deep by 24 gauge (or heavier) steel hat-channel installed to span between mullions at each floor level to restrain curtain wall insulation against outward movement when forming material (Item 3A) is installed. Stiffener channel to be cut min 4 in. longer than on center spacing between mullions. Ends of stiffener channel cut, flattened and bent 90 deg to form min 2 in. long tabs for screw-attachment to the mullion mounting clips (Item 2E) with No. 8 by 1 in. long self-drilling, self-tapping steel screws. Each stiffener channel shall be located with its stem centerline at an elevation 2 in. below the top plane of the floor.
   H. **Curtain Wall Insulation*** — Nom 4 in. thick mineral wool batt insulation faced on one side with aluminum foil/scrim vapor retarder, supplied in lengths at least equal to the spandrel panel height. Insulation batts compression-fitted between vertical mullions, flush with the interior surface of framing, with a maximum of one vertical seam and with no horizontal seams. Insulation

(System No. CW-D-2012 Continued)

panels secured to the spandrel panel lintel angle and to each hat channel with min 4-1/2 in. long steel screws with min 1-1/2 in. diameter galv steel clinch shields spaced 3 in. from each vertical edge of batt and spaced max 24 in. OC between vertical edges of batt.

THERMAFIBER LLC — FIRESPAN SS Insulation

J. **Framing Covers — Curtain Wall Insulation*** — Min 8 in. wide strips cut from min 2 in. thick mineral wool batt insulation. Framing covers to be centered over mullions and secured to the spandrel panel lintel angle and steel hat channels with min 6-1/2 in. long steel screws. Framing covers on mullions to abut the mineral wool batt safing material (Item 3A) above and below floor. Where more than one spandrel panel occurs between vertically separated vision panels, the horizontal transom between spandrel panels shall also be covered with an 8 in. wide framing cover in the same manner as on the vertical mullions.

THERMAFIBER LLC — FIRESPAN Insulation

3. **Safing System — Max separation between edge of floor assembly and face of framing members (at time of installation) is 8 in. The safing system is designed to accommodate vertical shear movement up to a max of 5 percent of its installed width.** The safing system shall incorporate the following construction features:

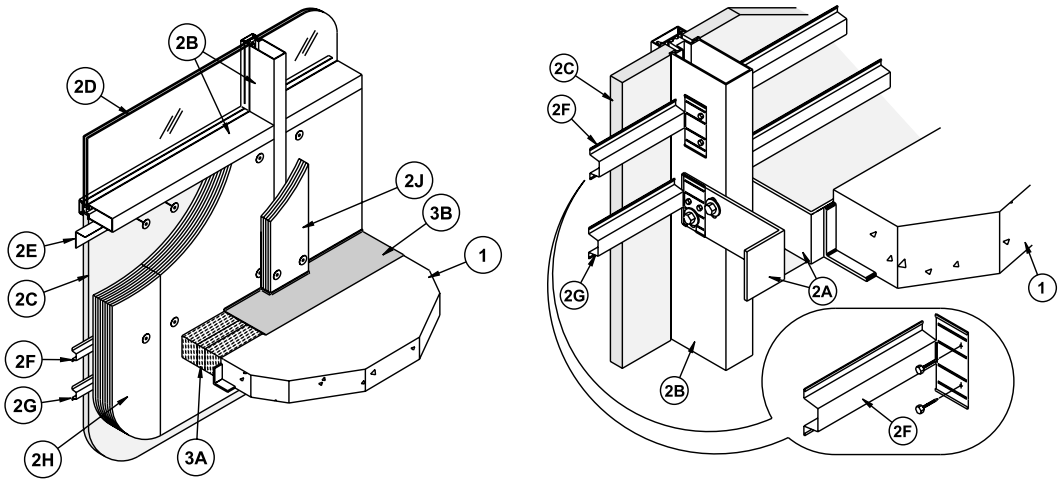
A. **Forming Material*** — Nom 4 pcf density mineral wool batt insulation. Batt sections cut to a min 4-1/2 in. width and stacked to a thickness which is min 20 percent greater than the width of linear gap between the curtain wall insulation and the edge of the concrete floor slab. The forming material is compressed and inserted cut-edge-first into linear gap such that its top surface is flush with the top surface of the floor assembly. A max of one tightly-butted seam is permitted between mullions. Additional pieces of forming material to be friction-fit into spaces between mullion mounting clips at each mullion location.

THERMAFIBER LLC — SAF

B. **Fill, Void or Cavity Material*** — Min 1/8 in. wet thickness (min 1/16 in. dry thickness) of fill material spray-applied over top of forming material and lapping min 1/2 in. onto the top surface of the floor and onto the curtain wall insulation and framing covers.

SPECIFIED TECHNOLOGIES INC — SpecSeal AS200 Elastomeric Spray

*Bearing the UL Classification Marking



System No. CW-D-2013
o e ber 0, 2001
Integrity Ratings — 1-1/2 and 2 Hr (See Item 2B)
Insulation Ratings — 0 and 1/4 Hr (See Item 2B)
Linear Opening Width — 8 in. Max
Class II Movement Capabilities — 5% Vertical Shear (See Item 3)

1. **Floor Assembly** — Min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) structural concrete. Perimeter of floor assembly to be provided with min 3 by 3 by 1/4 in. thick cast-in-place structural steel angle for weld-attachment of mullion mounting clips (Item 2A).
2. **Curtain Wall Assembly** — The curtain wall assembly shall incorporate the following construction features:
   A. **Mullion Mounting Clips** — Min 4 in. long angles with one nom 4 in. leg for attachment to edge of floor assembly and with one leg approx 4 in. longer than distance to nearest face of mullion. Clips to be formed of min 1/4 in. thick steel. Clips welded to steel angle at edge of floor assembly (Item 1) on each side of vertical mullion (Item 2B) at each floor level. Each clip to be provided with elongated holes to accommodate designed amount of movement. Top edge of each clip to be recessed min 1/2 in. below top surface of floor.
   B. **Framing** — The rectangular tubing mullions (vertical members) and transoms (horizontal members) shall be min 2-1/2 in. wide by 5 in. deep and shall be formed from min 0.085 in. thick aluminum. Mullions spaced max 60 in. OC and secured to mullion mounting clips (Item 2A) at each floor level with two 3/8-16 by 4 in. long hex head steel bolts in conjunction with steel nuts and washers. Interior face of mullions to be max 8 in. from edge of floor assembly. Transoms to be spaced min 60 in. OC. The Insulation and Integrity Ratings are dependent upon the spandrel panel height (center-to-center of transoms) and the min height from the top of the floor to the bottom of the vision panel sill, as tabulated below:

Min Spandrel Panel Height, in.	Min Vision Panel Sill Height, in.	Integrity Rating, Hr	Insulation Rating, Hr
60	24	1-1/2	0
69	34	2	1/4

   C. **Spandrel Panels** — Nom 1-3/16 in. thick polished granite spandrel panels with 1 in. thick gauged edges. Each panel secured in position with aluminum pressure plates in conjunction with glazing gaskets and steel screws.
   D. **Vision Panels** — Nom 1 in. thick (double pane) transparent heat-strengthened glass panels. Each panel secured in position with aluminum pressure plates in conjunction with glazing gaskets and steel screws.
   E. **Spandrel Panel Lintel Angle** — Nom 2 by 2 in. No. 22 gauge galvanized steel angle secured to underside of transom at top of each spandrel panel. Vertical leg of angle recessed 4 in. from interior face of framing to accommodate thickness of curtain wall insulation (Item 2G). Angle installed with 1/8 to 1 in. clearance at each end and screw-attached to transom with No. 8 by 1 in. long self-drilling, self-tapping steel screws spaced max 12 in. OC.
   F. **Steel Hat Channels** — Nom 2-1/2 in. wide by 7/8 in. deep No. 24 gauge galvanized steel hat channel installed to span from mullion-to-mullion for attachment of curtain wall insulation (Item 2H). Hat channels to be cut min 4 in. longer than on center spacing of mullions. Ends of hat channels cut, flattened and bent 90 deg to form min 2 in. long tabs for screw-attachment to mullions with No. 8 by 1 in. long self-drilling, self-tapping steel screws. Hat channels installed max 3 in. above top of vision panel, max 3 in. above top of concrete floor and spaced max 24 in. OC.
   G. **Stiffener Channel** — One nom 2-1/2 in. wide by 7/8 in. deep by 24 gauge (or heavier) steel hat-channel installed to span between mullions at each floor level to restrain curtain wall insulation against outward movement when forming material (Item 3A) is installed. Stiffener channel to be cut min 4 in. longer than on center spacing between mullions. Ends of stiffener channel cut, flattened and bent 90 deg to form min 2 in. long tabs for screw-attachment to the mullion mounting clips (Item 2E) with No. 8 by 1 in. long self-drilling, self-tapping steel screws. Each stiffener channel shall be located with its stem centerline at an elevation 2 in. below the top plane of the floor.
   H. **Curtain Wall Insulation*** — Nom 4 in. thick mineral wool batt insulation faced on one side with aluminum foil/scrim vapor retarder, supplied in lengths at least equal to the spandrel panel height. Insulation batts compression-fitted between vertical mullions, flush with the interior surface of framing, with a maximum of one vertical seam and with no horizontal seams. Insulation

(System No. CW-D-201 Continued)

panels secured to the spandrel panel lintel angle and to each hat channel with min 4-1/2 in. long steel screws with min 1-1/2 in. diameter galv steel clinch shields spaced 3 in. from each vertical edge of batt and spaced max 24 in. OC between vertical edges of batt.

THERMAFIBER LLC — FIRESPAN SS Insulation

J. **Framing Covers — Curtain Wall Insulation*** — Min 8 in. wide strips cut from min 2 in. thick mineral wool batt insulation. Framing covers to be centered over mullions and secured to the spandrel panel lintel angle and steel hat channels with min 6-1/2 in. long steel screws. Framing covers on mullions to abut the mineral wool batt safing material (Item 3A) above and below floor. Where more than one spandrel panel occurs between vertically separated vision panels, the horizontal transom between spandrel panels shall also be covered with an 8 in. wide framing cover in the same manner as on the vertical mullions.

THERMAFIBER LLC — FIRESPAN Insulation

3. **Safing System — Max separation between edge of floor assembly and face of framing members (at time of installation) is 8 in. The safing system is designed to accommodate vertical shear movement up to a max of 5 percent of its installed width.** The safing system shall incorporate the following construction features:

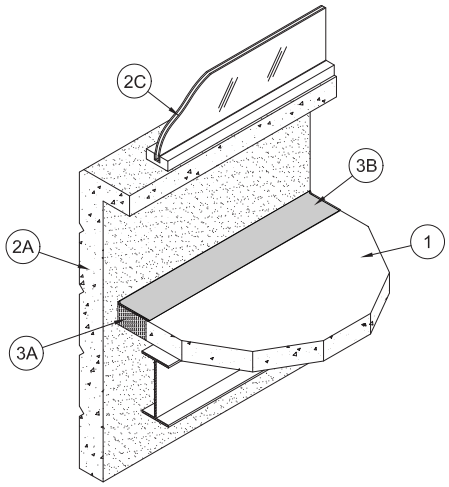
A. **Forming Material*** — Nom 4 pcf density mineral wool batt insulation. Batt sections cut to a min 4-1/2 in. width and stacked to a thickness which is min 20 percent greater than the width of linear gap between the curtain wall insulation and the edge of the concrete floor slab. The forming material is compressed and inserted cut-edge-first into linear gap such that its top surface is flush with the top surface of the floor assembly. A max of one tightly-butted seam is permitted between mullions. Additional pieces of forming material to be friction-fit into spaces between mullion mounting clips at each mullion location.

THERMAFIBER LLC — SAF

B. **Fill, Void or Cavity Material*** — Min 1/8 in. wet thickness (min 1/16 in. dry thickness) of fill material spray-applied over top of forming material and lapping min 1/2 in. onto the top surface of the floor and onto the curtain wall insulation and framing covers.

SPECIFIED TECHNOLOGIES INC — SpecSeal AS200 Elastomeric Spray

*Bearing the UL Classification Marking



System No. CW-D-2020
Integrity Rating — 2 Hr
Insulation Rating — 1/4 Hr
Linear Opening Width — 8 In. Max
Class II Movement Capabilities — 5% Vertical Shear (See Item 3)

1. **Floor Assembly** — Min 4-1/2 in. thick steel-reinforced lightweight or normal weight (100-150 pcf) structural concrete. Floor assembly to be supported at perimeter edges by spandrel beams having a Restrained or Unrestrained Beam Rating of 2 hr.
2. **Curtain Wall Assembly** — The curtain wall assembly shall incorporate the following construction features:
   A. **Spandrel Panels** — Min 72 in. high by min 4 in. thick steel-reinforced lightweight or normal weight (100-150 pcf) structural concrete spandrel panels. Wall may also consist of min 4 in. thick steel-reinforced lightweight or normal weight concrete tilt-up panels with a min 72 in. vertical separation between window openings. Panels provided with steel dead load anchors welded to steel reinforcing bars embedded in the concrete for attachment to the steel columns and spandrel beams. Panels also provided with steel lateral anchors or braces. The dead load anchors which are located in the linear gap between the concrete floor slab and the spandrel panel or tilt-up panel are to be spaced max 72 in. OC. The top of the dead load anchor is to be recessed min 1/2 in. from top surface of floor.
   B. **Joint System** — (Not Shown) — Vertical joints between spandrel panels or tilt-up panels to be protected using Joint System No. WW-S-0038.
   C. **Framed Window** — Metal framed window with nom 1/4 in. thick heat-strengthened glass. Sill of window to be min 34 in. above top of floor.
3. **Safing System** — **Max separation between edge of floor assembly and concrete spandrel or tilt-up panel is 8 in. The safing system is designed to accommodate vertical shear movement between dead load anchors up to a max of 5 percent of its installed width.** The safing system shall incorporate the following construction features:
   A. **Forming Material*** — Nom 4 pcf density mineral wool batt safing material to be installed between the concrete spandrel or tilt-up panel and the edge of the concrete floor slab. Safing material to be cut to a min 4-1/2 in. width and stacked to a thickness which is at least 25 percent greater than the width of the linear gap between the concrete spandrel or tilt-up panel and the edge of the concrete floor slab. The safing material is compressed and inserted cut-edge-first into the linear gap such that its top surface is flush with the top surface of the floor assembly. A max of one tightly-butted seam is permitted between dead load anchors. An additional min 1/2 in. thick piece of mineral wool batt safing material to be installed to cover top surface of each dead load anchor.
      OWENS CORNING HT INC, DIV OF OWENS CORNING — Safing Insulation/MW
   B. **Fill, Void or Cavity Material*** — Min 1/8 in. wet thickness of fill material spray-applied over top of forming material and lapping min 1/2 in. onto the top surface of the concrete floor and onto the concrete spandrel panel or tilt-up panel.
      SPECIFIED TECHNOLOGIES INC — SpecSeal AS200 Elastomeric Spray

*Bearing the UL Classification Mark

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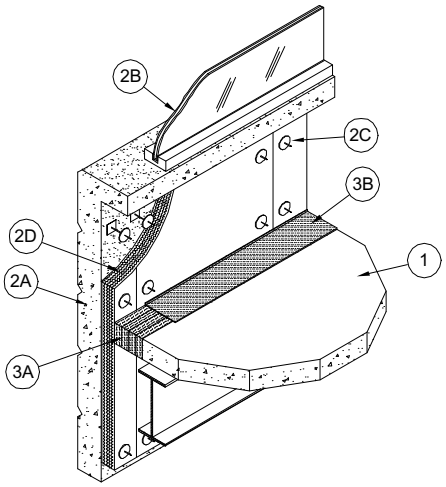

System No. CW-D-2021
Integrity Rating — 2 Hr
Insulation Rating — 1/4 Hr
Linear Opening Width — 8 in. Max
Class II Movement Capabilities — 5% Vertical Shear (See Item 3)

1. **Floor Assembly** — Min 4-1/2 in. thick steel-reinforced lightweight or normal weight (100-150 pcf) structural concrete. Floor assembly to be supported at perimeter edges by spandrel beams having a Restrained or Unrestrained Beam Rating of 2 hr. Edge of concrete floor to be max 8 in. from interior surface of spandrel panel (Item 2A).
2. **Curtain Wall Assembly** — The curtain wall assembly shall incorporate the following construction features:
   A. **Spandrel Panels** — Min 72 in. high by min 4 in. thick steel-reinforced lightweight or normal weight (100-150 pcf) structural concrete spandrel panels. Wall may also consist of min 4 in. thick steel-reinforced lightweight or normal weight concrete tilt-up panels with a min 72 in. vertical separation between window openings. Panels provided with steel dead load anchors welded to steel reinforcing bars embedded in the concrete for attachment to the steel columns and spandrel beams. Panels also provided with steel lateral anchors or braces. The dead load anchors, which are located in the linear gap between the concrete floor slab and the spandrel panel or tilt-up panel, are to be spaced max 72 in. OC. The top of the dead load anchor is to be recessed min 1/2 in. from top surface of floor.
   B. **Framed Window** — Metal framed window with nom 1 in. thick (double pane) transparent heat-strengthened glass panels. Sill of window to be min 34 in. above top of floor.
   C. **Impaling Pins** — No. 12 gauge steel pins, min 1/2 in. longer than thickness of insulation boards (Item 2D), swaged to nom 2 by 2 in. galv steel base plate. Steel base plates secured to concrete spandrel panel with steel concrete screws or powder-driven steel fasteners. Impaling pins to be spaced 3 in. from edges of insulation boards (Item 2D) on each side of seams and spaced max 24 in. OC both vertically and horizontally. A min of two horizontal arrays of impaling pins are required to be located on spandrel panel above top surface of floor.
   D. **Curtain Wall Insulation*** — Min 2 in. thick mineral wool board insulation, faced on one side with aluminum foil/scrim vapor retarder, supplied in min 24 by 48 in. boards. Insulation boards installed vertically with tightly-butted seams to cover interior surface of concrete spandrel panel. Horizontal seams of insulation boards (if necessary) to be located min 24 in. above and min 6 in. below planes of floor. Insulation boards secured to spandrel panel with impaling pins in conjunction with min 1-1/2 in. diameter galv steel clinch shields. Butted seams to be covered with aluminum foil tape.
      OWENS CORNING HT INC, DIV OF OWENS CORNING — CW-8
3. **Safing System** — **Max separation between edge of floor assembly and curtain wall insulation is 6 in. The safing system is designed to accommodate vertical shear movement between dead load anchors up to a max of 5 percent of its installed width between the edge of the floor assembly and the curtain wall insulation.** The safing system shall incorporate the following construction features:
   A. **Forming Material*** — Nom 4 pcf density mineral wool batt safing material to be cut into min 4-1/2 in. wide pieces and stacked to a thickness which is at least 25 percent greater than the width of the linear gap between the curtain wall insulation (Item 2D) and the edge of the concrete floor slab. The stacked safing material is compressed and inserted cut-edge-first into the linear gap such that its top surface is flush with the top surface of the floor assembly. A max of one tightly butted seam is permitted between spandrel panel attachment plates or tubes. An additional min 1/2 in. thick piece of mineral wool batt safing material is to be installed to cover top surface of each dead load anchor.
      OWENS CORNING HT INC, DIV OF OWENS CORNING — Safing Insulation/MW
   B. **Fill, Void or Cavity Material*** — Min 1/8 in. wet thickness (1/16 in. dry) of fill material spray-applied over top of forming material and lapping min 1/2 in. onto the top surface of the concrete floor and onto the curtain wall insulation.
      SPECIFIED TECHNOLOGIES INC — SpecSeal AS200 Elastomeric Spray

*Bearing the UL Classification Mark

Created or Revised: 06/21/02
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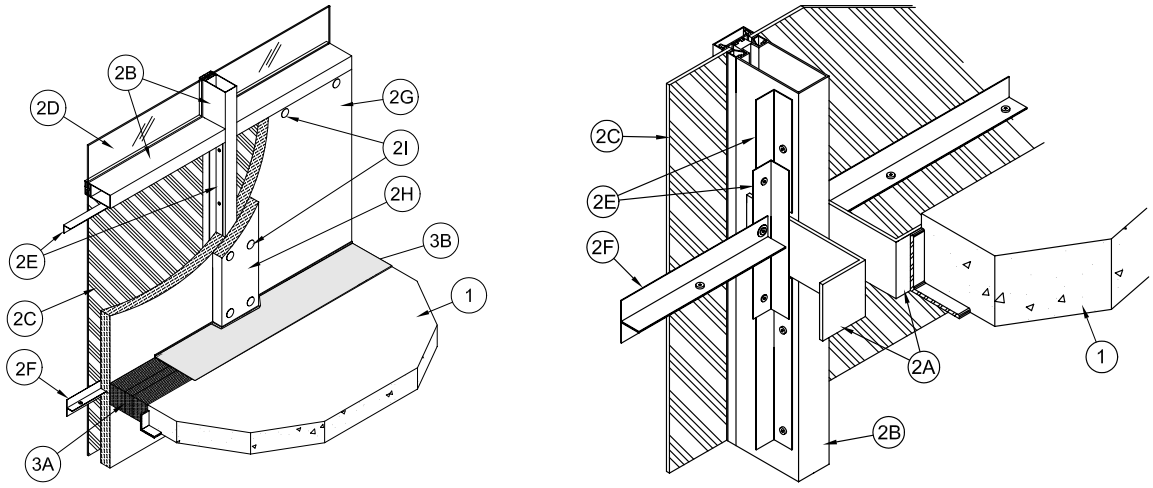


System No. CW-D-2022
Integrity Ratings — 1-1/2 and 2 Hr (See Item 2B)
Insulation Ratings — 0 and 1/4 Hr (See Item 2B)
Linear Opening Width — 8 in. Max
Class II Movement Capabilities—5% Vertical Shear (See Item 3)

1. **Floor Assembly** — Min 4-1/2 in . thick reinforced lightweight or normal weight (100-150 pcf) structural concrete. Perimeter of floor assembly to be provided with min 3 by 3 by 1/4 in. thick cast-in-place structural steel angle for weld-attachment of mullion mounting clips (Item 2A).
2. **Curtain Wall Assembly** — The curtain wall assembly shall incorporate the following construction features:
   A. **Mullion Mounting Angles** — Min 4 in. long angles with one nom 4 in. leg for attachment to edge of floor assembly and with one leg approx 4 in. longer than distance to nearest face of mullion. Clips to be formed of min 1/4 in. thick steel. Clips welded to steel angle at edge of floor assembly (Item 1) on each side of vertical mullion (Item 2B) at each floor level. Each clip to be provided with elongated holes to accommodate designed amount of movement. Top edge of each clip to be recessed min 1/2 in. below top surface of floor.
   B. **Framing** — The rectangular tubing mullions (vertical members) and transoms (horizontal members) shall be min 2-1/2 in. wide by 5 in. deep and shall be formed from min 0.085 in. thick aluminum. Mullions spaced max 60 in. OC and secured to mullion mounting Clips (Item 2A) at each floor level with two 3/8-16 by 4 in. long hex head steel bolts in conjunction with steel nuts and washers . Interior face of mullions to be max 8 in. from edge of floor assembly. Transoms to be spaced min 60 in. OC. The Insulation and Integrity Ratings are dependent upon the spandrel panel height (center-to-center of transoms) and the min height from the top of the floor to the bottom of the vision panel sill, as tabulated below:

Min Spandrel Panel Height, in.	Min Vision Panel Sill Height, in.	Integrity Rating, Hr	Insulation Rating, Hr
60	24	1-1/2	0
69	34	2	1/4

   C. **Spandrel Panels** — Nom 1/4 in. thick opaque heat-strengthened glass. Each panel secured in position with aluminum pressure plates in conjunction with glazing gaskets and steel screws.
   D. **Vision Panels** — Nom 1/4 in. thick transparent heat-strengthened glass. Each panel secured in position with aluminum pressure plates in conjunction with silicone rubber setting blocks, glazing gaskets and steel screws.
   E. **Spandrel Panel Perimeter Angles** — Nom 1-1/2 by 1-1/2 in. No. 22 gauge galvanized steel angles installed around entire perimeter of each spandrel panel. Angles recessed from interior face of framing as necessary to accommodate thickness of curtain wall insulation (Item 2G). Angles cut to be discontinuous at mullion mounting clips (Item 2A). Angles screw-attached to mullions and transom along sides and top of each spandrel panel with No. 8 by 1 in. long self-drilling, self-tapping steel screws spaced max 12 in. OC. Angle along bottom of each spandrel panel to be screw-attached to leg of angle on mullion at each end without any direct attachment to transom. At mullion mounting clips, a length of steel angle shall be installed to bridge between the perimeter angles over the mullion mounting clip. The “bridge” shall be cut approx 6 in. longer than the clear space between angles and shall be secured to the perimeter angles with one No. 8 by 1 in. long steel screw at each end.
   F. **Stiffener Tee** — Two nom 1-1/2 by 1-1/2 in. No. 20 gauge galv steel angles secured together, back-to-back, to form stiffener tee for installation in each horizontal seam of the curtain wall insulation (Item 2G) . The angle legs forming the stem of the tee shall be secured together using No. 8 by 1/2 in. long self-drilling, self-tapping steel screws spaced max 8 in. OC. The tee shall be installed with a clearance of 1/8 to 1/4 in. at each end and shall be screw-attached to the spandrel panel perimeter angles (Item 2E) with No. 10 by 3/4 in. long self-drilling, self-tapping steel screws, with steel washers, through two predrilled 1/4 in. diam holes at each end. One stiffener tee shall be located with its stem at an elevation 2 in. below the top plane of the floor at each floor level.
   G. **Curtain Wall Insulation*** — Min 2 in. thick mineral wool batt insulation faced on one side with aluminum foil/scrim vapor retarder, supplied in min 36 in. wide boards. Insulation boards to be installed with no vertical seams and with horizontal seams spaced min 36 in. OC. Insulation boards tightly-fitted between vertical mullions and between the stem of the stiffener tee (Item 2F) and

(System No. CW-D-2022 Continued)

the transom, flush with the interior surface of framing. Insulation boards secured to spandrel panel perimeter angles and to each stiffener tee with cup head weld pins (Item 2I) spaced max 12 in. OC. The horizontal seam between insulation boards shall be located 2 in. below the top plane of the floor at each floor level.

OWENS CORNING HT INC, DIV OF OWENS CORNING — CW-8

H. **Framing Covers — Curtain Wall Insulation*** — Min 1 in. thick mineral wool batt insulation faced on one side with aluminum foil/scrim vapor retarder, supplied in min 24 by 48 in. boards. Nom 8 in. wide strips to be centered over mullions and secured to the spandrel panel perimeter angles with cup head weld pins (Item 2I) spaced max 12 in. OC. Where more than one spandrel panel occurs between vertically separated vision panels, the horizontal transom between spandrel panels shall also be covered with an 8 in. wide framing cover in the same manner as on the vertical mullions. Framing covers on mullions to abut the mineral wool batt safing material (Item 3A) above and below floor.

OWENS CORNING HT INC, DIV OF OWENS CORNING — CW-8

I. **Weld Pin** — No. 12 gauge galv steel weld pin with nom 1-3/16 in. diam galv steel cup head. Cup head weld pins provided in two lengths. One length to be equal to thickness of curtain wall insulation (Item 2G) and second length to be equal to thickness of curtain wall insulation plus thickness of framing cover (Item 2H). Cup head weld pins inserted through curtain wall insulation and mullion covers and welded to spandrel panel perimeter angles max 12 in. OC.

J. **Steel Screw And Clinch Shield** — (Not Shown) — As an alternate to the weld pins (Item 2I), self-drilling, self-tapping steel screws with min 1-1/2 in. diam galv steel clinch shields may be used to secure the curtain wall insulation and framing covers. Steel screws provided in two lengths. One length to be 1/2 in. greater than thickness of curtain wall insulation (Item 2G) and second length to be 1/2 in. greater than thickness of curtain wall insulation plus thickness of framing cover (Item 2H). Screws secured to spandrel panel perimeter angles, through curtain wall insulation and mullion covers, and spaced max 12 in. OC.

3. **Safing System — Max separation between edge of floor assembly and face of framing members (at time of installation) is 8 in. The safing system is designed to accommodate vertical shear movement up to a max of 5 percent of its installed width.** The safing system shall incorporate the following construction features:

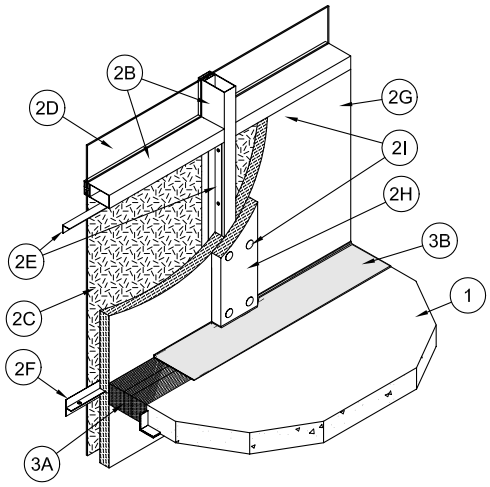
A. **Forming Material*** — Nom 4 pcf density mineral wool batt insulation. Batt sections cut to a min 4-1/2 in. width and stacked to a thickness which is min 20 percent greater than the width of linear gap between the curtain wall insulation and the edge of the concrete floor slab. The forming material is compressed and inserted cut-edge-first into linear gap such that its top surface is flush with the top surface of the floor assembly. A max of one tightly-butted seam is permitted between mullions. Additional pieces of forming material to be friction-fit into spaces between mullion mounting clips at each mullion location.

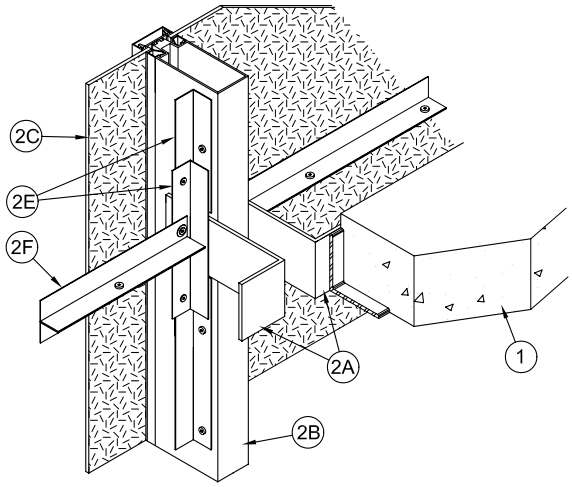
OWENS CORNING HT INC, DIV OF OWENS CORNING — Safing Insulation/MW

B. **Fill, Void or Cavity Material*** — Min 1/8 in. wet thickness (min 1/16 in. dry thickness) of fill material spray-applied over top of forming material and lapping min 1/2 in. onto the top surface of the floor and onto the curtain wall insulation and framing covers.

SPECIFIED TECHNOLOGIES INC — SpecSeal AS200 Elastomeric Spray

*Bearing the UL Classification Mark





System No. CW-D-2023
Integrity Ratings — 1-1/2 and 2 Hr (See Item 2B)
Insulation Ratings — 0 and 1/4 Hr (See Item 2B)
Linear Opening Width — 8 in. Max
Class II Movement Capabilities — 5% Vertical Shear (See Item 3)

1. **Floor Assembly** — Min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) structural concrete. Perimeter of floor assembly to be provided with min 3 by 3 by 1/4 in. thick cast-in-place structural steel angle for weld-attachment of mullion mounting clips (Item 2A).
2. **Curtain Wall Assembly** — The curtain wall assembly shall incorporate the following construction features:
   A. **Mullion Mounting Angles** — Min 4 in. long angles with one nom 4 in. leg for attachment to edge of floor assembly and with one leg approx 4 in. longer than distance to nearest face of mullion. Clips to be formed of min 1/4 in. thick steel. Angles Clips welded to steel angle at edge of floor assembly (Item 1) on each side of vertical mullion (Item 2B) at each floor level. Each clip to be provided with elongated holes to accommodate designed amount of movement. Top edge of each clip to be recessed min 1/2 in. below top surface of floor.
   B. **Framing** — The rectangular tubing mullions (vertical members) and transoms (horizontal members) shall be min 2-1/2 in. wide by 5 in. deep and shall be formed from min 0.085 in. thick aluminum. Mullions spaced max 60 in. OC and secured to mullion mounting clips (Item 2A) at each floor level with two 3/8-16 by 4 in. long hex head steel bolts in conjunction with steel nuts and washers. Interior face of mullions to be max 8 in. from edge of floor assembly. Transoms to be spaced min 60 in. OC. The Insulation and Integrity Ratings are dependent upon the spandrel panel height (center-to-center of transoms) and the min height from the top of the floor to the bottom of the vision panel sill, as tabulated below:

Min Spandrel Panel Height, in.	Min Vision Panel Sill Height, in.	Integrity Rating, Hr	Insulation Rating, Hr
60	24	1-1/2	0
69	34	2	1/4

   C. **Spandrel Panels** — Nom 1/8 in. thick aluminum panels with 1/4 in. thick edges. Each panel secured in position with aluminum pressure plates in conjunction with gaskets and steel screws.
   D. **Vision Panels** — Nom 1/4 in. thick transparent heat-strengthened glass. Each panel secured in position with aluminum pressure plates in conjunction with silicone rubber setting blocks, glazing gaskets and steel screws.
   E. **Spandrel Panel Perimeter Angles** — Nom 1-1/2 by 1-1/2 in. No. 22 gauge galvanized steel angles installed around entire perimeter of each spandrel panel. Angles recessed from interior face of framing as necessary to accommodate thickness of curtain wall insulation (Item 2G). Angles cut to be discontinuous at mullion mounting clips (Item 2A). Angles screw-attached to mullions and transom along sides and top of each spandrel panel with No. 8 by 1 in. long self-drilling, self-tapping steel screws spaced max 12 in. OC. Angle along bottom of each spandrel panel to be screw-attached to leg of angle on mullion at each end without any direct attachment to transom. At mullion mounting clips, a length of steel angle shall be installed to bridge between the perimeter angles over the mullion mounting clip. The "bridge" shall be cut approx 6 in. longer than the clear space between angles and shall be secured to the perimeter angles with one No. 8 by 1 in. long steel screw at each end.
   F. **Stiffener Tee** — Two nom 1-1/2 by 1-1/2 in. No. 20 gauge galv steel angles secured together, back-to-back, to form stiffener tees for installation in each horizontal seam of the curtain wall insulation (Item 2G) . The angle legs forming the stem of the tee shall be secured together using No. 8 by 1/2 in. long self-drilling, self-tapping steel screws spaced max 8 in. OC. The tee shall be installed with a clearance of 1/8 to 1/4 in. at each end and shall be screw-attached to the spandrel panel perimeter angles (Item 2E) with No. 10 by 3/4 in. long self-drilling, self-tapping steel screws, with steel washers, through two predrilled 1/4 in. diam holes at each end. One stiffener tee shall be located with its stem at an elevation 2 in. below the top plane of the floor at each floor level.
   G. **Curtain Wall Insulation*** — Min 2 in. thick mineral wool batt insulation faced on one side with aluminum foil/scrim vapor retarder, supplied in min 36 in. wide batts. Insulation batts to be installed with no vertical seams and with horizontal seams spaced min 36 in. OC. Insulation panels tightly-fitted between vertical mullions and between the stem of the stiffener tee (Item 2F) and the

(System No. CW-D-2023 Continued)

transom, flush with the interior surface of framing. Insulation panels secured to spandrel panel perimeter angles and to each stiffener tee with cup head weld pins (Item 2I) spaced max 12 in OC. The horizontal seam between insulation panels shall be located 2 in. below the top plane of the floor at each floor level.

OWENS CORNING HT INC, DIV OF OWENS CORNING — CW-8

H. **Framing Covers** — Curtain Wall Insulation* Min 1 in. thick mineral wool batt insulation faced on one side with aluminum foil/ scrim vapor retarder, supplied in min 24 by 48 in. boards. Nom 8 in. wide strips to be centered over mullions and secured to the spandrel panel perimeter angles with cup head weld pins (Item 2I) spaced max 12 in. OC. Where more than one spandrel panel occurs between vertically separated vision panels, the horizontal transom between spandrel panels shall also be covered with an 8 in. wide framing cover in the same manner as on the vertical mullions. Framing covers on mullions to abut the mineral wool batt safing material (Item 3A) above and below floor.

OWENS CORNING HT INC, DIV OF OWENS CORNING — CW-8

I. **Weld Pin** — No. 12 gauge galv steel weld pin with nom 1-3/16 in. diam galv steel cup head. Cup head weld pins provided in two lengths. One length to be equal to thickness of curtain wall insulation (Item 2G) and second length to be equal to thickness of curtain wall insulation plus thickness of framing cover (Item 2H). Cup head weld pins inserted through curtain wall insulation and mullion covers and welded to spandrel panel perimeter angles max 12 in. OC.

J. **Steel Screw And Clinch Shield** — (Not Shown) — As an alternate to the weld pins (Item 2I), self-drilling, self-tapping steel screws with min 1-1/2 in. diam galv steel clinch shields may be used to secure the curtain wall insulation and framing covers. Steel screws provided in two lengths. One length to be 1/2 in. greater than thickness of curtain wall insulation (Item 2G) and second length to be 1/2 in. greater than thickness of curtain wall insulation plus thickness of framing cover (Item 2H). Screws secured to spandrel panel perimeter angles, through curtain wall insulation and mullion covers, and spaced max 12 in. OC.

3. **Safing System** — Max separation between edge of floor assembly and face of framing members (at time of installation) is 8 in. The safing system is designed to accommodate vertical shear movement up to a max of 5 percent of its installed width. The safing system shall incorporate the following construction features:

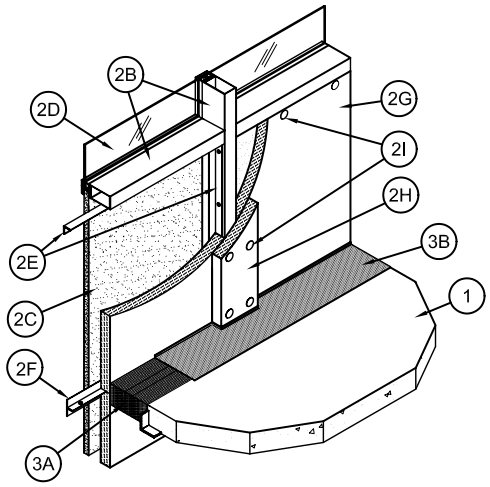
A. **Forming Material*** — Nom 4 pcf density mineral wool batt insulation. Batt sections cut to a min 4-1/2 in. width and stacked to a thickness which is min 20 percent greater than the width of linear gap between the curtain wall insulation and the edge of the concrete floor slab. The forming material is compressed and inserted cut-edge-first into linear gap such that its top surface is flush with the top surface of the floor assembly. A max of one tightly-butted seam is permitted between mullions. Additional pieces of forming material to be friction-fit into spaces between mullion mounting clips at each mullion location.

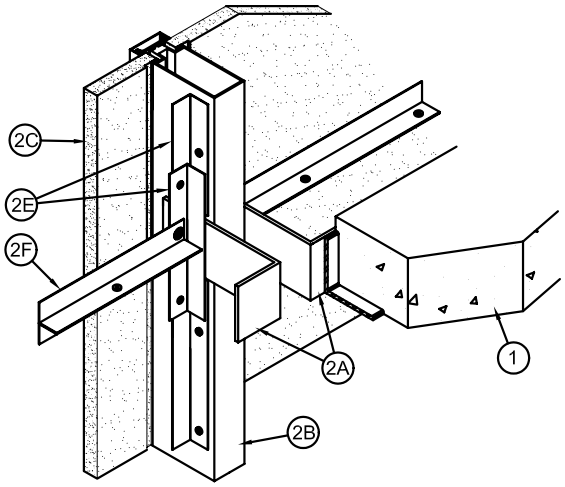
OWENS CORNING HT INC, DIV OF OWENS CORNING — Safing Insulation/MW

B. **Fill, Void or Cavity Material*** — Min 1/8 in. wet thickness (min 1/16 in. dry thickness) of fill material spray- applied over top of forming material and lapping min 1/2 in. onto the top surface of the floor and onto the curtain wall insulation and framing covers.

SPECIFIED TECHNOLOGIES INC — SpecSeal AS200 Elastomeric Spray

*Bearing the UL Classification Mark





System No. CW-D-2024
Integrity Ratings — 1-1/2 and 2 Hr (See Item 2B)
Insulation Ratings — 0 and 1/4 Hr (See Item 2B)
Linear Opening Width — 8 in. Max
Class II Movement Capabilities — 5% Vertical Shear (See Item 3)

1. **Floor Assembly** — Min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) structural concrete. Perimeter of floor assembly to be provided with min 3 by 3 by 1/4 in. thick cast-in-place structural steel angle for weld-attachment of mullion mounting clips (Item 2A).
2. **Curtain Wall Assembly** — The curtain wall assembly shall incorporate the following construction features:
   A. **Mullion Mounting Angles** — Min 4 in. long angles with one nom 4 in. leg for attachment to edge of floor assembly and with one leg approx 4 in. longer than distance to nearest face of mullion. Clips to be formed of min 1/4 in. thick steel. Clips welded to steel angle at edge of floor assembly (Item 1) on each side of vertical mullion (Item 2B) at each floor level. Each clip to be provided with elongated holes to accommodate designed amount of movement. Top edge of each clip to be recessed min 1/2 in. below top surface of floor.
   B. **Framing** — The rectangular tubing mullions (vertical members) and transoms (horizontal members) shall be min 2-1/2 in. wide by 5 in. deep and shall be formed from min 0.085 in. thick aluminum. Mullions spaced max 60 in. OC and secured to mullion mounting clips (Item 2A) at each floor level with two 3/8-16 by 4 in. long hex head steel bolts in conjunction with steel nuts and washers. Interior face of mullions to be max 8 in. from edge of floor assembly. Transoms to be spaced min 60 in. OC. The Insulation and Integrity Ratings are dependent upon the spandrel panel height (center-to-center of transoms) and the min height from the top of the floor to the bottom of the vision panel sill, as tabulated below:

Min Spandrel Panel Height, in.	Min Vision Panel Sill Height, in.	Integrity Rating, Hr	Insulation Rating, Hr
60	24	1-1/2	0
69	34	2	1/4

   C. **Spandrel Panels** — Nom 1-3/16 in. thick polished granite spandrel panels with 1 in. thick gauged edges. Each panel secured in position with aluminum pressure plates in conjunction with gaskets and steel screws.
   D. **Vision Panels** — Nom 1/4 in. thick transparent heat-strengthened glass. Each panel secured in position with aluminum pressure plates in conjunction with silicone rubber setting blocks, glazing gaskets and steel screws.
   E. **Spandrel Panel Perimeter Angles** — Nom 1-1/2 by 1-1/2 in. No. 22 gauge galvanized steel angles installed around entire perimeter of each spandrel panel. Angles recessed from interior face of framing as necessary to accommodate thickness of curtain wall insulation (Item 2G). Angles cut to be discontinuous at mullion mounting clips (Item 2A). Angles screw-attached to mullions and transom along sides and top of each spandrel panel with No. 8 by 1 in. long self-drilling, self-tapping steel screws spaced max 12 in. OC. Angle along bottom of each spandrel panel to be screw-attached to leg of angle on mullion at each end without any direct attachment to transom. At mullion mounting clips, a length of steel angle shall be installed to bridge between the perimeter angles over the mullion mounting clip. The "bridge" shall be cut approx 6 in. longer than the clear space between angles and shall be secured to the perimeter angles with one No. 8 by 1 in. long steel screw at each end.
   F. **Stiffener Tee** — Two nom 1-1/2 by 1-1/2 in. No. 20 gauge galv steel angles secured together, back-to-back, to form stiffener tee for installation in each horizontal seam of the curtain wall insulation (Item 2G). The angle legs forming the stem of the tee shall be secured together using No. 8 by 1/2 in. long self-drilling, self-tapping steel screws spaced max 8 in. OC. The tee shall be installed with a clearance of 1/8 to 1/4 in. at each end and shall be screw-attached to the spandrel panel perimeter angles (Item 2E) with No. 10 by 3/4 in. long self-drilling, self-tapping steel screws, with steel washers, through two predrilled 1/4 in. diam holes at each end. One stiffener tee shall be located with its stem at an elevation 2 in. below the top plane of the floor at each floor level.
   G. **Curtain Wall Insulation*** — Min 2 in. thick mineral wool batt insulation faced on one side with aluminum foil/scrim vapor retarder, supplied in min 36 in. wide batts. Insulation batts to be installed with no vertical seams and with horizontal seams spaced min 36 in. OC. Insulation panels tightly-fitted between vertical mullions and between the stem of the stiffener tee (Item 2F) and the

(System No. CW-D-2024 Continued)

transom, flush with the interior surface of framing. Insulation panels secured to spandrel panel perimeter angles and to each stiffener tee with cup head weld pins (Item 2I) spaced max 12 in OC. The horizontal seam between insulation panels shall be located 2 in. below the top plane of the floor at each floor level.

OWENS CORNING HT INC, DIV OF OWENS CORNING — CW-8

H. **Framing Covers — Curtain Wall Insulation*** — Min 1 in. thick mineral wool batt insulation faced on one side with aluminum foil/scrim vapor retarder, supplied in min 24 by 48 in. boards. Nom 8 in. wide strips to be centered over mullions and secured to the spandrel panel perimeter angles with cup head weld pins (Item 2I) spaced max 12 in. OC. Where more than one spandrel panel occurs between vertically separated vision panels, the horizontal transom between spandrel panels shall also be covered with an 8 in. wide framing cover in the same manner as on the vertical mullions. Framing covers on mullions to abut the mineral wool batt safing material (Item 3A) above and below floor.

OWENS CORNING HT INC, DIV OF OWENS CORNING — CW-8

I. **Weld Pin** — No. 12 gauge galv steel weld pin with nom 1-3/16 in. diam galv steel cup head. Cup head weld pins provided in two lengths. One length to be equal to thickness of curtain wall insulation (Item 2G) and second length to be equal to thickness of curtain wall insulation plus thickness of framing cover (Item 2H). Cup head weld pins inserted through curtain wall insulation and mullion covers and welded to spandrel panel perimeter angles max 12 in. OC.

J. **Steel Screw And Clinch Shield** — (Not Shown) — As an alternate to the weld pins (Item 2I), self-drilling, self-tapping steel screws with min 1-1/2 in. diam galv steel clinch shields may be used to secure the curtain wall insulation and framing covers. Steel screws provided in two lengths. One length to be 1/2 in. greater than thickness of curtain wall insulation (Item 2G) and second length to be 1/2 in. greater than thickness of curtain wall insulation plus thickness of framing cover (Item 2H). Screws secured to spandrel panel perimeter angles, through curtain wall insulation and mullion covers, and spaced max 12 in. OC.

3. **Safing System — Max separation between edge of floor assembly and face of framing members (at time of installation) is 8 in. The safing system is designed to accommodate vertical shear movement up to a max of 5 percent of its installed width.** The safing system shall incorporate the following construction features:

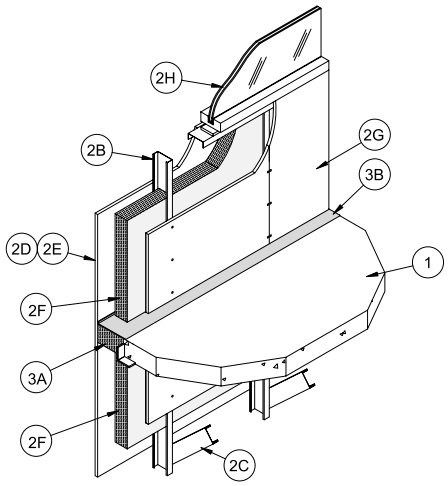
A. **Forming Material*** — Nom 4 pcf density mineral wool batt insulation. Batt sections cut to a min 4-1/2 in. width and stacked to a thickness which is min 20 percent greater than the width of linear gap between the curtain wall insulation and the edge of the concrete floor slab. The forming material is compressed and inserted cut-edge-first into linear gap such that its top surface is flush with the top surface of the floor assembly. A max of one tightly-butted seam is permitted between mullions. Additional pieces of forming material to be friction-fit into spaces between mullion mounting clips at each mullion location.

OWENS CORNING HT INC, DIV OF OWENS CORNING — Safing Insulation/MW

B. **Fill, Void or Cavity Material*** — Min 1/8 in. wet thickness (min 1/16 in. dry thickness) of fill material spray-applied over top of forming material and lapping min 1/2 in. onto the top surface of the floor and onto the curtain wall insulation and framing covers.

SPECIFIED TECHNOLOGIES INC — SpecSeal AS200 Elastomeric Spray

*Bearing the UL Classification Mark



System No. CW-S-1002
November 08, 2001
Integrity Rating — 2 Hr
Insulation Rating — 1/4 Hr
Linear Opening Width — 2-1/2 In. Max
L Rating At Ambient — Less Than 1 CFM/Lin Ft
L Rating At 400°F — Less Than 1 CFM/Lin Ft

1. **Floor Assembly** — Min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) structural concrete. Perimeter of floor assembly to be provided with min 3 by 3 by 1/4 in. thick cast-in-place structural steel angle for weld-attachment of mounting angles (Item 2A).
2. **Curtain Wall Assembly** — The curtain wall assembly shall incorporate the following construction features:
   A. **Mounting Angles** — (Not Shown) — Min 3 in. long angles with one nom 4 in. leg for attachment to edge of floor assembly and with one leg approx 2-1/2 to 3 in. longer than distance to interior face of steel studs. Angles to be formed of min 1/8 in. thick steel. Angles welded to cast-in-place structural steel angle at edge of floor assembly (Item 1) on one side of each steel stud (Item 2B) at each floor level. Top edge of each mounting angle to be recessed 1 to 1-1/2 in. below top surface of floor.
   B. **Steel Studs** — C-shaped studs formed from min 0.034 in. thick (20 ga) galv steel. The steel studs shall be 3-5/8 in. wide by 1-1/4 in. deep with 5/16 in. wide stiffening flanges and shall be assembled using runner channels formed from min 0.034 in. thick galv steel. Studs spaced max 24 in. OC and welded, bolted or screwed to mounting angles (Item 2A) at each floor level. When cementitious backer units (Item 2E) are used for exterior sheathing, max stud spacing is 16 in. OC. Interior face of studs to be max 2-1/2 in. from edge of floor assembly.
   C. **Steel Struts** — Short lengths of steel stud (Item 2B) used to brace each steel stud against lateral movement. One end of strut bolted, screwed or welded to steel stud beneath plane of floor assembly. Opposite end of strut anchored to underside of floor.
   D. **Gypsum Board*** — One layer of nom 5/8 in. thick, 48 in. wide gypsum sheathing installed to cover entire exterior surface of wall. Sheathing applied with joints centered over studs and secured to steel studs with min 1 in. long bugle head steel screws spaced max 8 in. OC along the edges and max 12 in. OC in the field of each sheet.
   E. **Cementitious Backer Units*** — As an alternate to the gypsum sheathing (Item 2D), nom 1/2 in. or 5/8 in. thick square-edge boards attached to studs with 1-1/4 in. long corrosion resistant self-tapping wafer-head steel screws spaced 6 in OC. Joints covered with glass fiber mesh tape.
      UNITED STATES GYPSUM CO — Durock Exterior Cement Board, Durock Cement Board or Durock WMB
   F. **Curtain Wall Insulation*** — Min 3 in. thick mineral wool batt insulation, unfaced or faced on one side with aluminum foil/scrim vapor retarder, supplied in nom 16 in. or 24 in. wide batts to accommodate spacing of steel studs. Insulation batts installed to completely fill all stud cavities of curtain wall above the top of the fill material (Item 3C) and below the forming material (Item 3B). Insulation batts to be friction-fitted between studs with adjoining lengths of batt tightly butted.
      THERMAFIBER LLC — FIRESPAN Insulation
   G. **Gypsum Board*** — One layer of nom 5/8 in. thick, 48 in. wide gypsum board applied with joints centered over studs. Gypsum board secured to steel studs on interior surface of curtain wall with min 1 in. long bugle head steel screws spaced max 8 in. OC along the edges and max 12 in. OC in the field of each sheet. Gypsum board installed to cover interior surface of wall above the top of the fill material (Item 3C) and below the forming material (Item 3B).
   H. **Framed Window** — Metal-framed window with nom 1/4 in. thick heat-strengthened glass. Sill of window to be min 34 in. above top of floor slab. Top of window to be min 33 in. below bottom of floor slab.
   I. **Siding, Brick or Stucco** — (Not Shown) — Aluminum siding, steel siding, brick veneer or stucco installed over gypsum sheathing or cementitious backer units and meeting the requirements of local code agencies. Brick veneer wall attached to studs with corrugated metal wall ties attached to each stud with steel screws.
3. **Safing System** — The safing system shall incorporate the following construction features:

(System No. CW-S-1002 Continued)

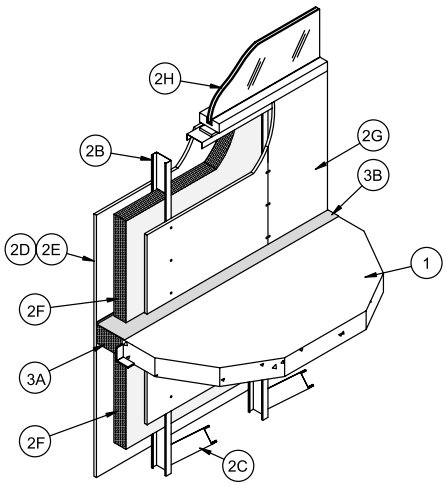
A. **Forming Material*** — Nom 4 pcf density mineral wool batt insulation. Batt sections to be cut to a min 4-1/2 in. width. and stacked to a thickness which is 20 percent greater than the width of linear gap between the gypsum sheathing and the edge of the concrete floor. The forming material is compressed and inserted cut-edge-first into linear gap between edge of floor slab and sheathing material such that its top surface is flush with the top surface of the floor assembly. Length of batt to be equal to on-center spacing of steel studs such that it is friction-fitted between studs and mounting angles without seams. Additional pieces of mineral wool batt to be stuffed inside the channel of each steel stud throughout the thickness of the forming material.

THERMAFIBER LLC — SAF

B. **Fill, Void or Cavity Material*** — Min 1/8 in. wet thickness (min 1/16 in. dry) of fill material spray-applied over top of forming material and lapping min 1/2 in. onto the top surface of the floor and onto the gypsum sheathing and steel studs.

SPECIFIED TECHNOLOGIES INC — SpecSeal AS200 Elastomeric Spray

*Bearing the UL Classification Mark



System No. CW-S-1003
o e ber 08, 2001
Integrity Rating — 2 Hr
Insulation Rating — 1/4 Hr
Linear Opening Width — 2-1/2 In. Max
L Rating At Ambient — Less Than 1 CFM/Lin Ft
L Rating At 400 F — Less Than 1 CFM/Lin Ft

1. **Floor Assembly** — Min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) structural concrete. Perimeter of floor assembly to be provided with min 3 by 3 by 1/4 in. thick cast-in-place structural steel angle for weld-attachment of mounting angles (Item 2A).
2. **Curtain Wall Assembly** — The curtain wall assembly shall incorporate the following construction features:
   A. **Mounting Angles** — (Not Shown) — Min 3 in. long angles with one nom 4 in. leg for attachment to edge of floor assembly and with one leg approx 2-1/2 to 3 in. longer than distance to interior face of steel studs. Angles to be formed of min 1/8 in. thick steel. Angles welded to cast-in-place structural steel angle at edge of floor assembly (Item 1) on one side of each steel stud (Item 2B) at each floor level. Top edge of each mounting angle to be recessed 1 to 1-1/2 in. below top surface of floor.
   B. **Steel Studs** — C-shaped studs formed from min 0.034 in. thick (20 ga) galv steel. The steel studs shall be 3-5/8 in. wide by 1-1/4 in. deep with 5/16 in. wide stiffening flanges and shall be assembled using runner channels formed from min 0.034 in. thick galv steel. Studs spaced max 24 in. OC and welded, bolted or screwed to mounting angles (Item 2A) at each floor level. When cementitious backer units (Item 2E) are used for exterior sheathing, max stud spacing is 16 in. OC. Interior face of studs to be max 2-1/2 in. from edge of floor assembly.
   C. **Steel Struts** — Short lengths of steel stud (Item 2B) used to brace each steel stud against lateral movement. One end of strut bolted, screwed or welded to steel stud beneath plane of floor assembly. Opposite end of strut anchored to underside of floor.
   D. **Gypsum Board*** — One layer of nom 5/8 in. thick, 48 in. wide gypsum sheathing installed to cover entire exterior surface of wall. Sheathing applied with joints centered over studs and secured to steel studs with min 1 in. long bugle head steel screws spaced max 8 in. OC along the edges and max 12 in. OC in the field of each sheet.
   E. **Cementitious Backer Units*** — As an alternate to the gypsum sheathing (Item 2D), nom 1/2 in. or 5/8 in. thick square-edge boards attached to studs with 1-1/4 in. long corrosion resistant self-tapping wafer-head steel screws spaced 6 in OC. Joints covered with glass fiber mesh tape.
      UNITED STATES GYPSUM CO — Durock Exterior Cement Board, Durock Cement Board or Durock WMB
   F. **Batts and Blankets*** — Any glass fiber insulation bearing the UL Classification Marking as to fire resistance or surface burning characteristics, of a thickness to completely fill stud cavity. Insulation batts friction fit to completely fill all stud cavities of curtain wall above the top of the fill material (Item B) and below the forming material (Item 3A).
      See **Batts and Blankets (BZJZ)** category for names of manufacturers.
   G. **Gypsum Board*** — One layer of nom 5/8 in. thick, 48 in. wide gypsum board applied with joints centered over studs. Gypsum board secured to steel studs on interior surface of curtain wall with min 1 in. long bugle head steel screws spaced max 8 in. OC along the edges and max 12 in. OC in the field of each sheet. Gypsum board installed to cover interior surface of wall above the top of the fill material (Item 3C) and below the forming material (Item 3B).
   H. **Framed Window** — Metal-framed window with nom 1/4 in. thick heat-strengthened glass. Sill of window to be min 34 in. above top of floor slab. Top of window to be min 33 in. below bottom of floor slab.
   I. **Siding, Brick or Stucco** — (Not Shown) — Aluminum siding, steel siding, brick veneer or stucco installed over gypsum sheathing or cementitious backer units and meeting the requirements of local code agencies. Brick veneer wall attached to studs with corrugated metal wall ties attached to each stud with steel screws.
3. **Safing System** — The safing system shall incorporate the following construction features:

(System No. CW-S-100 Continued)

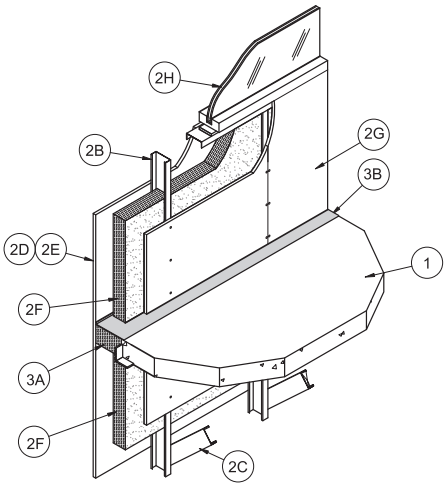
A. **Forming Material*** — Nom 4 pcf density mineral wool batt insulation. Batt sections to be cut to a min width of 4 in. and stacked to a thickness which is 20 percent greater than the width of linear gap between the gypsum sheathing and the edge of the concrete floor. The forming material is compressed and inserted cut-edge-first into linear gap between edge of floor slab and sheathing material such that its top surface is flush with the top surface of the floor assembly. Length of batt to be equal to on-center spacing of steel studs such that it is friction-fitted between studs and mounting angles without seams. Additional pieces of mineral wool batt to be stuffed inside the channel of each steel stud throughout the thickness of the forming material.

THERMAFIBER LLC — SAF

B. **Fill, Void or Cavity Material*** — Min 1/8 in. wet thickness (min 1/16 in. dry) of fill material spray-applied over top of forming material and lapping min 1/2 in. onto the top surface of the floor and onto the gypsum sheathing and steel studs.

SPECIFIED TECHNOLOGIES INC — SpecSeal AS200 Elastomeric Spray

*Bearing the UL Classification Mark



System No. CW-S-1006
Integrity Rating — 2 Hr
Insulation Rating — 1/4 Hr
Linear Opening Width — 2-1/2 in. Max.
L Rating At Ambient — Less Than 1 CFM/Lin Ft
L Rating At 400 F — Less Than 1 CFM/Lin Ft

1. **Floor Assembly** — Min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) structural concrete. Perimeter of floor assembly to be provided with min 3 by 3 by 1/4 in. thick cast-in-place structural steel angle for weld-attachment of mounting angles (Item 2A).
2. **Curtain Wall Assembly** — The curtain wall assembly shall incorporate the following construction features:
   A. **Mounting Angles** — (Not Shown) — Min 3 in. long angles with one nom 4 in. leg for attachment to edge of floor assembly and with one leg approx 2-1/2 to 3 in. longer than distance to interior face of steel studs. Angles to be formed of min 1/8 in. thick steel. Angles welded to cast-in-place structural steel angle at edge of floor assembly (Item 1) on one side of each steel stud (Item 2B) at each floor level. Top edge of each mounting angle to be recessed 1 to 1-1/2 in. below top surface of floor.
   B. **Steel Studs** — C-shaped studs formed from min 0.034 in. thick (20 ga) galv steel. The steel studs shall be 3-1/2 in. to 6 in. wide by 1-1/4 in. deep with 5/16 in. wide stiffening flanges and shall be assembled using runner channels formed from min 0.034 in. thick galv steel. Studs spaced max 24 in. OC and welded, bolted or screwed to mounting angles (Item 2A) at each floor level. When cementitious backer units (Item 2E) are used for exterior sheathing, max stud spacing is 16 in. OC. Interior face of studs to be max 2-1/2 in. from edge of floor assembly.
   C. **Steel Struts** — Short lengths of steel stud (Item 2B) used to brace each steel stud against lateral movement. One end of strut bolted, screwed or welded to steel stud beneath plane of floor assembly. Opposite end of strut anchored to underside of floor.
   D. **Gypsum Board*** — One layer of nom 5/8 in. thick, 48 in. wide gypsum sheathing installed to cover entire exterior surface of wall. Sheathing applied with joints centered over studs and secured to steel studs with min 1 in. long bugle head steel screws spaced max 8 in. OC along the edges and max 12 in. OC in the field of each sheet.
   E. **Cementitious Backer Units*** — As an alternate to the gypsum sheathing (Item 2D), nom 1/2 in. or 5/8 in. thick square-edge boards attached to studs with 1-1/4 in. long corrosion resistant self-tapping wafer-head steel screws spaced 6 in OC. Joints covered with glass fiber mesh tape.
      UNITED STATES GYPSUM CO — Durock Exterior Cement Board, Durock Cement Board or Durock WMB
   F. **Curtain Wall Insulation*** — Min 3 in. thick mineral wool batt insulation, unfaced or faced on one side with aluminum foil/scrim vapor retarder, supplied in nom 16 in. or 24 in. wide batts to accommodate spacing of steel studs. Insulation batts installed to completely fill all stud cavities of curtain wall above the top of the fill material (Item 3C) and below the forming material (Item 3B). Insulation batts to be friction-fitted between studs with adjoining lengths of batt tightly butted.
      OWENS CORNING HT INC, DIV OF OWENS CORNING — CW-8
   G. **Gypsum Board*** — One layer of nom 5/8 in. thick, 48 in. wide gypsum board applied with joints centered over studs. Gypsum board secured to steel studs on interior surface of curtain wall with min 1 in. long bugle head steel screws spaced max 8 in. OC along the edges and max 12 in. OC in the field of each sheet. Gypsum board installed to cover interior surface of wall above the top of the fill material (Item 3C) and below the forming material (Item 3B).
   H. **Framed Window** — Metal framed window with nom 1/4 in. thick heat-strengthened glass. Sill of window to be min 34 in. above top of floor slab. Top of window to be min 33 in. below bottom of floor slab.
   I. **Siding, Brick or Stucco** — (Not Shown) — Aluminum siding, steel siding, brick veneer or stucco installed over gypsum sheathing or cementitious backer units and meeting the requirements of local code agencies. Brick veneer wall attached to studs with corrugated metal wall ties attached to each stud with steel screws.
3. **Safing System** — The safing system shall incorporate the following construction features:
   A. **Forming Material*** — Nom 4 pcf density mineral wool batt insulation. Batt sections to be cut to a min 4-1/2 in. width. and stacked to a thickness which is 25 percent greater than the width of linear gap between the gypsum sheathing and the edge of the concrete floor slab to attain a min 20 percent compression in the thickness direction. The forming material is compressed and

(System No. CW-S-1006 Continued)

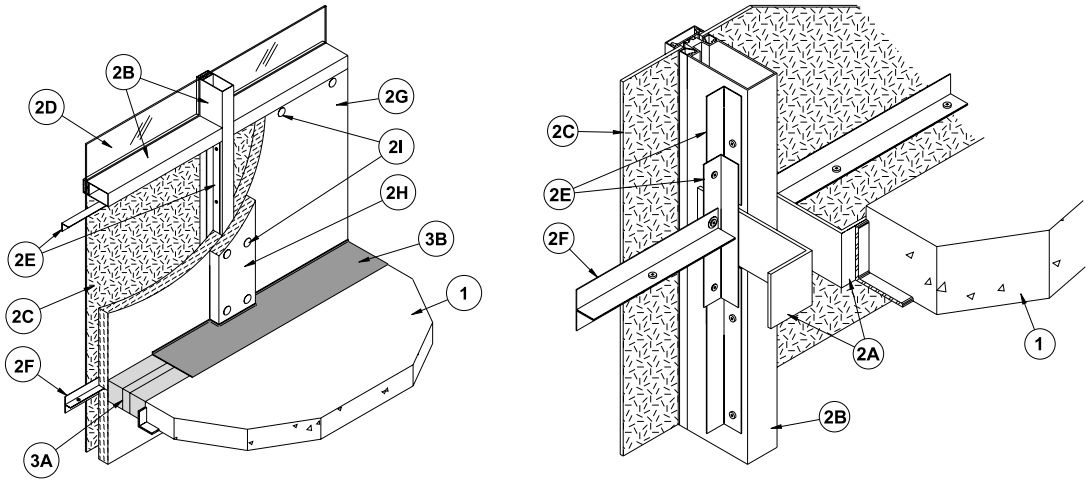
inserted cut-edge-first into linear gap between edge of floor slab and sheathing material such that its top surface is flush with the top surface of the floor assembly. Length of batt to be equal to on-center spacing of steel studs such that it is friction-fitted between studs and mounting angles without seams. Additional pieces of mineral wool batt to be stuffed inside the channel of each steel stud throughout the thickness of the forming material.

OWENS CORNING HT INC, DIV OF OWENS CORNING — Safing Insulation/MW

B. **Fill, Void or Cavity Material*** — Min 1/8 in. wet thickness (min 1/16 in. dry) of fill material spray-applied over top of forming material and lapping min 1/2 in. onto the top surface of the floor and onto the gypsum sheathing and steel studs.

SPECIFIED TECHNOLOGIES INC — SpecSeal AS200 Elastomeric Spray

*Bearing the UL Classification Mark



System No. CW-S-2006
November 08, 2001
Integrity Ratings — 1-1/2 and 2 Hr (See Item 2B)
Insulation Ratings — 0 and 1/4 Hr (See Item 2B)
Linear Opening Width — 8 In. Max
L Rating At Ambient — Less Than 1 CFM/Lin Ft
L Rating At 400°F — Less Than 1 CFM/Lin Ft

1. **Floor Assembly** — Min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) structural concrete. Perimeter of floor assembly to be provided with min 3 by 3 by 1/4 in. thick cast-in-place structural steel angle for weld-attachment of mullion mounting clips (Item 2A).
2. **Curtain Wall Assembly** — The curtain wall assembly shall incorporate the following construction features:
   A. **Mullion Mounting Clips** — Min 4 in. long angles with one nom 4 in. leg for attachment to edge of floor assembly and with one leg approx 4 in. longer than distance to nearest face of mullion. Clips to be formed of min 1/4 in. thick steel. Angles Clips welded to steel angle at edge of floor assembly (Item 1) on each side of vertical mullion (Item 2B) at each floor level. Top edge of each clip to be recessed min 1/2 in. below top surface of floor.
   B. **Framing** — The rectangular tubing mullions (vertical members) and transoms (horizontal members) shall be min 2-1/2 in. wide by 5 in. deep and shall be formed from min 0.085 in. thick aluminum. Mullions spaced max 60 in. OC and secured to mullion mounting clips (Item 2A) at each floor level with two 3/8-16 by 4 in. long hex head steel bolts in conjunction with steel nuts and washers . Interior face of mullions to be max 8 in. from edge of floor assembly. Transoms to be spaced min 60 in. OC. The Insulation and Integrity Ratings are dependent upon the spandrel panel height (center-to-center of transoms) and the min height from the top of the floor to the bottom of the vision panel sill, as tabulated below:

Min Spandrel Panel Height, In.	Min Vision Panel Sill Height, In.	Integrity Rating Hr.	Insulation Rating Hr.
60	24	1-1/2	0
69	34	2	1/4

   C. **Spandrel Panels** — Nom 1/8 in. thick aluminum panels with 1/4 in. thick edges. Each panel secured in position with aluminum pressure plates in conjunction with gaskets and steel screws.
   D. **Vision Panels** — Nom 1/4 in. thick transparent heat-strengthened glass. Each panel secured in position with aluminum pressure plates in conjunction with glazing gaskets and steel screws.
   E. **Spandrel Panel Perimeter Angles** — Nom 1-1/2 by 1-1/2 in. No. 22 gauge galvanized steel angles installed around entire perimeter of each spandrel panel. Angles recessed from interior face of framing as necessary to accommodate thickness of curtain wall insulation (Item 2G). Angles cut to be discontinuous at mullion mounting clips (Item 2A). Angles screw-attached to mullions and transom along sides and top of each spandrel panel with No. 8 by 1 in. long self-drilling, self-tapping steel screws spaced max 12 in. OC. Angle along bottom of each spandrel panel to be screw-attached to leg of angle on mullion at each end without any direct attachment to transom. At mullion mounting clips, a length of steel angle shall be installed to bridge between the perimeter angles over the mullion mounting clip. The “bridge” shall be cut approx 6 in. longer than the clear space between angles and shall be secured to the perimeter angles with one No. 8 by 1 in. long steel screw at each end.
   F. **Stiffener Tee** — Two nom 1-1/2 by 1-1/2 in. No. 20 gauge galv steel angles secured together, back-to-back, to form stiffener tees for installation in each horizontal seam of the curtain wall insulation (Item 2G) . The angle legs forming the stem of the tee shall be secured together using No. 8 by 1/2 in. long self-drilling, self-tapping steel screws spaced max 8 in. OC. The tee shall be installed with a clearance of 1/8 to 1/4 in. at each end and shall be screw-attached to the spandrel panel perimeter angles (Item 2E) with No. 10 by 3/4 in. long self-drilling, self-tapping steel screws, with steel washers, through two predrilled 1/4 in. diam holes at each end. One stiffener tee shall be located with its stem at an elevation 2 in. below the top plane of the floor at each floor level.

(System No. CW-S-2006 Continued)

G. **Curtain Wall Insulation*** — Min 2 in. thick mineral wool batt insulation faced on one side with aluminum foil/scrim vapor retarder, supplied in min 36 in. wide batts. Insulation batts to be installed with no vertical seams and with horizontal seams spaced min 36 in. OC. Insulation panels tightly-fitted between vertical mullions and between the stem of the stiffener tee (Item 2F) and the transom, flush with the interior surface of framing. Insulation panels secured to spandrel panel perimeter angles and to each stiffener tee with cup head weld pins (Item 2I) spaced max 12 in OC. The horizontal seam between insulation panels shall be located 2 in. below the top plane of the floor at each floor level.

THERMAFIBER LLC — FIRESPAN Insulation

H. **Framing Covers** — **Curtain Wall Insulation*** — Min 8 in. wide strips cut from the same min 2 in. thick mineral wool batt insulation used for the curtain wall insulation (Item 2G). Framing covers to be centered over mullions and secured to the spandrel panel perimeter angles with cup head weld pins (Item 2I) spaced max 12 in. OC. Where more than one spandrel panel occurs between vertically separated vision panels, the horizontal transom between spandrel panels shall also be covered with an 8 in. wide framing cover in the same manner manner as on the vertical mullions. Framing covers on mullions to abut the mineral wool batt safing material (Item 3A) above and below floor.

THERMAFIBER LLC — FIRESPAN Insulation

I. **Weld Pin** — No. 12 gauge galv steel weld pin with nom 1-3/16 in. diam galv steel cup head. Cup head weld pins provided in two lengths. One length to be equal to thickness of curtain wall insulation (Item 2G) and second length to be equal to thickness of curtain wall insulation plus thickness of framing cover (Item 2H). Cup head weld pins inserted through curtain wall insulation and mullion covers and welded to spandrel panel perimeter angles max 12 in. OC.

3. **Safing System** — The safing system shall incorporate the following construction features:

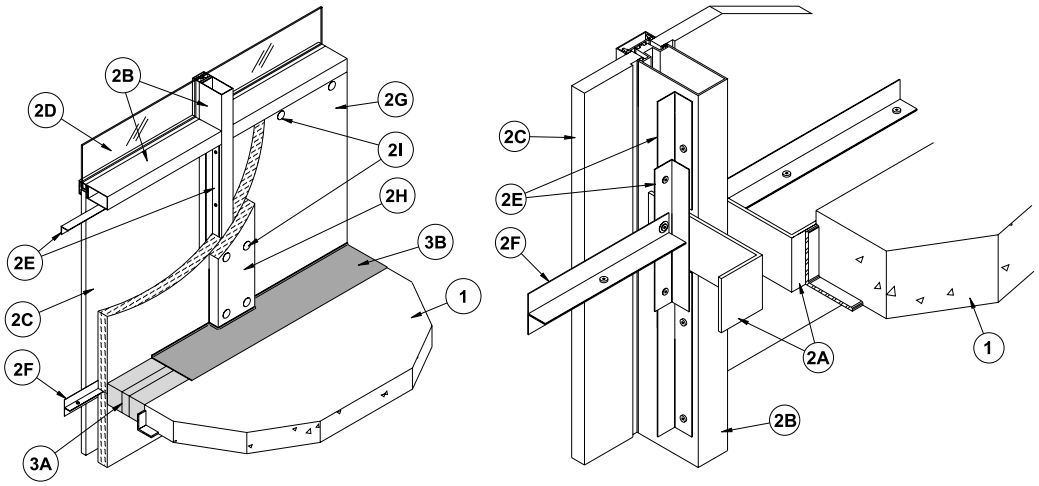
A. **Forming Material*** — Nom 4 pcf density mineral wool batt insulation. Batt sections cut to a min 4-1/2 in. width and stacked to a thickness which is min 20 percent greater than the width of linear gap between the curtain wall insulation and the edge of the concrete floor slab. The forming material is compressed and inserted cut-edge-first into linear gap such that its top surface is flush with the top surface of the floor assembly. A max of one tightly-butted seam is permitted between mullions. Additional pieces of forming material to be friction-fit into spaces between mullion mounting clips at each mullion location.

THERMAFIBER LLC — SAF

B. **Fill, Void or Cavity Material*** — Min 1/8 in. wet thickness (min 1/16 in. dry) of fill material spray- applied over top of forming material and lapping min 1/2 in. onto the top surface of the floor and onto the curtain wall insulation and framing covers.

SPECIFIED TECHNOLOGIES INC — SpecSeal AS200 Elastomeric Spray.

*Bearing the UL Classification Mark



System No. CW-S-2008
November 08, 2001
Integrity Rating — 1-1/2 and 2 Hr (See Item 2B)
Insulation Rating — 0 and 1/4 Hr (See Item 2B)
Linear Opening Width — 8 In. Max
L Rating At Ambient — Less Than 1 CFM/Lin Ft
L Rating At 400°F — Less Than 1 CFM/Lin Ft

1. **Floor Assembly** — Min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) structural concrete. Perimeter of floor assembly to be provided with min 3 by 3 by 1/4 in. thick cast-in-place structural steel angle for weld-attachment of mullion mounting clips (Item 2A).
2. **Curtain Wall Assembly** — The curtain wall assembly shall incorporate the following construction features:
   A. **Mullion Mounting Angles** — Min 4 in. long angles with one nom 4 in. leg for attachment to edge of floor assembly and with one leg approx 4 in. longer than distance to nearest face of mullion. Clips to be formed of min 1/4 in. thick steel. Clips welded to steel angle at edge of floor assembly (Item 1) on each side of vertical mullion (Item 2B) at each floor level. Top edge of each clip to be recessed min 1/2 in. below top surface of floor.
   B. **Framing** — The rectangular tubing mullions (vertical members) and transoms (horizontal members) shall be min 2-1/2 in. wide by 5 in. deep and shall be formed from min 0.085 in. thick aluminum. Mullions spaced max 60 in. OC and secured to mullion mounting clips (Item 2A) at each floor level with two 3/8-16 by 4 in. long hex head steel bolts in conjunction with steel nuts and washers. Interior face of mullions to be max 8 in. from edge of floor assembly. Transoms to be spaced min 60 in. OC. The Insulation and Integrity Ratings are dependent upon the spandrel panel height (center-to-center of transoms) and the min height from the top of the floor to the bottom of the vision panel sill, as tabulated below:

Min Spandrel Panel Height, In.	Min Vision Panel Still Height, In.	Integrity Rating Hr.	Insulation Rating Hr.
60	24	1-1/2	0
69	34	2	1/4

   C. **Spandrel Panels** — Nom 1-3/16 in. thick polished granite spandrel panels with 1 in. thick gauged edges. Each panel secured in position with aluminum pressure plates in conjunction with gaskets and steel screws.
   D. **Vision Panels** — Nom 1/4 in. thick transparent heat-strengthened glass. Each panel secured in position with aluminum pressure plates in conjunction with glazing gaskets and steel screws.
   E. **Spandrel Panel Perimeter Angles** — Nom 1-1/2 by 1-1/2 in. No. 22 gauge galvanized steel angles installed around entire perimeter of each spandrel panel. Angles recessed from interior face of framing as necessary to accommodate thickness of curtain wall insulation (Item 2G). Angles cut to be discontinuous at mullion mounting clips (Item 2A). Angles screw-attached to mullions and transom along sides and top of each spandrel panel with No. 8 by 1 in. long self-drilling, self-tapping steel screws spaced max 12 in. OC. Angle along bottom of each spandrel panel to be screw-attached to leg of angle on mullion at each end without any direct attachment to transom. At mullion mounting clips, a length of steel angle shall be installed to bridge between the perimeter angles over the mullion mounting clip. The "bridge" shall be cut approx 6 in. longer than the clear space between angles and shall be secured to the perimeter angles with one No. 8 by 1 in. long steel screw at each end.
   F. **Stiffener Tee** — Two nom 1-1/2 by 1-1/2 in. No. 20 gauge galv steel angles secured together, back-to-back, to form stiffener tee for installation in each horizontal seam of the curtain wall insulation (Item 2G). The angle legs forming the stem of the tee shall be secured together using No. 8 by 1/2 in. long self-drilling, self-tapping steel screws spaced max 8 in. OC. The tee shall be installed with a clearance of 1/8 to 1/4 in. at each end and shall be screw-attached to the spandrel panel perimeter angles (Item 2E) with No. 10 by 3/4 in. long self-drilling, self-tapping steel screws, with steel washers, through two predrilled 1/4 in. diam holes at each end. One stiffener tee shall be located with its stem at an elevation 2 in. below the top plane of the floor at each floor level.

(System No. CW-S-2008 Continued)

G. **Curtain Wall Insulation*** — Min 2 in. thick mineral wool batt insulation faced on one side with aluminum foil/scrim vapor retarder, supplied in min 36 in. wide batts. Insulation batts to be installed with no vertical seams and with horizontal seams spaced min 36 in. OC. Insulation panels tightly-fitted between vertical mullions and between the stem of the stiffener tee (Item 2F) and the transom, flush with the interior surface of framing. Insulation panels secured to spandrel panel perimeter angles and to each stiffener tee with cup head weld pins (Item 2I) spaced max 12 in OC. The horizontal seam between insulation panels shall be located 2 in. below the top plane of the floor at each floor level.

THERMAFIBER LLC — FIRESPAN Insulation

H. **Framing Covers** — **Curtain Wall Insulation*** — Min 8 in. wide strips cut from the same min 2 in. thick mineral wool batt insulation used for the curtain wall insulation (Item 2G). Framing covers to be centered over mullions and secured to the spandrel panel perimeter angles with cup head weld pins (Item 2I) spaced max 12 in. OC. Where more than one spandrel panel occurs between vertically separated vision panels, the horizontal transom between spandrel panels shall also be covered with an 8 in. wide framing cover in the same manner as on the vertical mullions. Framing covers on mullions to abut the mineral wool batt safing material (Item 3A) above and below floor.

THERMAFIBER LLC — FIRESPAN Insulation

I. **Weld Pin** — No. 12 gauge galv steel weld pin with nom 1-3/16 in. diam galv steel cup head. Cup head weld pins provided in two lengths. One length to be equal to thickness of curtain wall insulation (Item 2G) and second length to be equal to thickness of curtain wall insulation plus thickness of framing cover (Item 2H). Cup head weld pins inserted through curtain wall insulation and mullion covers and welded to spandrel panel perimeter angles max 12 in. OC.

3. **Safing System** — The safing system shall incorporate the following construction features:

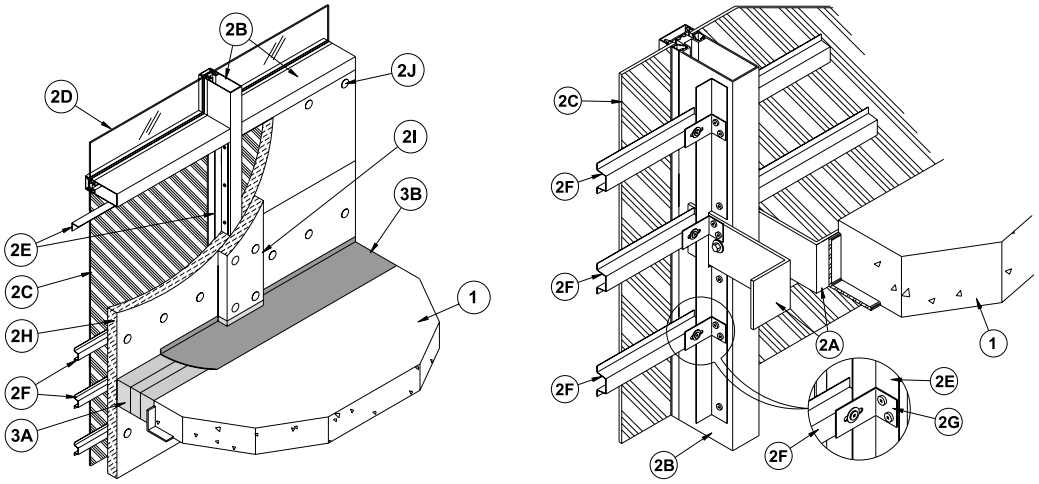
A. **Forming Material*** — Nom 4 pcf density mineral wool batt insulation. Batt sections cut to a min 4-1/2 in. width and stacked to a thickness which is min 20 percent greater than the width of linear gap between the curtain wall insulation and the edge of the concrete floor slab. The forming material is compressed and inserted cut-edge-first into linear gap such that its top surface is flush with the top surface of the floor assembly. A max of one tightly-butted seam is permitted between mullions. Additional pieces of forming material to be friction-fit into spaces between mullion mounting clips at each mullion location.

THERMAFIBER LLC — SAF

B. **Fill, Void or Cavity Material*** — Min 1/8 in. wet thickness (min 1/16 in. dry) of fill material spray- applied over top of forming material and lapping min 1/2 in. onto the top surface of the floor and onto the curtain wall insulation and framing covers.

SPECIFIED TECHNOLOGIES INC — SpecSeal AS200 Elastomeric Spray.

*Bearing the UL Classification Mark



System No. CW-S-2009
November 08, 2001
Integrity Rating — 2 Hr
Insulation Rating — 1/4 Hr
Linear Opening Width — 8 In. Max
L Rating At Ambient — Less Than 1 CFM/Lin Ft (See Item 2H)
L Rating At 400°F — Less Than 1 CFM/Lin Ft (See Item 2H)

1. **Floor Assembly** — Min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) structural concrete. Perimeter of floor assembly to be provided with min 4 by 4 by 1/4 in. thick cast-in-place structural steel angle for weld-attachment of mullion mounting clips (Item 2A).
2. **Curtain Wall Assembly** — The curtain wall assembly shall incorporate the following construction features:
   A. **Mullion Mounting Angles** — Min 4 in. long angles with one nom 4 in. leg for attachment to edge of floor assembly and with one leg approx 4 in. longer than distance to nearest face of mullion. Clips welded to steel angle at edge of floor assembly (Item 1) on each side of vertical mullion (Item 2B) at each floor level. Top edge of each mounting angle to be recessed min 1/2 in. below top surface of floor.
   B. **Framing** — The rectangular tubing mullions (vertical members) and transoms (horizontal members) shall be minimum 2-1/2 in. wide by 5 in. deep and shall be formed from min 0.100 in. thick aluminum. Mullions spaced max 60 in. OC and secured to mullion mounting clips (Item 2A) at each floor level with two 1/2 in. diam by 4 in. long hex head steel bolts in conjunction with steel nuts and washers. Interior face of mullions to be max 8 in. from edge of floor assembly. Transoms framing top and bottom edges of spandrel panels (Item 2C) to be spaced min 72 in. OC. Transom forming sill of vision panel (Item 2D) to be located such that its bottom surface is at height of 33 in. above the top surface of the floor (Item 1).
   C. **Spandrel Panels** — Nom 1/4 in. thick opaque heat-strengthened glass. Each panel secured in position with aluminum pressure plates in conjunction with glazing gaskets and steel screws.
   D. **Vision Panels** — Nom 1/4 in. thick transparent heat-strengthened glass. Each panel secured in position with aluminum pressure plates in conjunction with glazing gaskets and steel screws.
   E. **Spandrel Panel Perimeter Angles** — Nom 1-1/2 by 1-1/2 in. No. 22 gauge galvanized steel angles installed around entire perimeter of each spandrel panel. Angles recessed from interior face of framing as necessary to accommodate thickness of curtain wall insulation (Item 2H). Angles notched as necessary to be continuous over mullion mounting clips (Item 2A). Angles screw-attached to mullions and transom along sides and top of each spandrel panel with No. 10 by 1/2 in. long self-drilling, self-tapping steel screws spaced max 12 in. OC. Angle along bottom of each spandrel panel to be screw-attached to leg of angle on mullion at each end without any direct attachment to transom.
   F. **Stiff Back Channel** — Nom 2-1/2 in. wide by 7/8 in. deep hat-shaped channel formed of 22 gauge galv steel to be installed to stiffen curtain wall insulation between mullions above, below and at elevation of safing joint. One stiff back channel to be located with its centerline approx 6 in. below floor and one stiff back channel to be located with its centerline approx 6 in. above floor. A third stiff back channel is to be located near the midheight of the safing joint. A clearance of 1/4 to 1/2 in. shall be maintained between the ends of the stiff back channels and the mullions. Stiff back channel secured to mullion at each end with channel attachment clip (Item 2G) in conjunction with a No. 8 by 1/2 in. long self-drilling, self-tapping wafer head steel screw or a 3/16 in. diam steel bolt with nut and washer.
   G. **Channel Attachment Clip** — Nom 1-1/2 by 2-1/2 by 1-1/2 in. long angle formed of 16 gauge galv steel. The 2-1/2 in. leg is provided with a 1/4 in. wide by 1-1/2 in. long slot along its centerline for attachment of the stiff back channel. Clips secured to mullion mounting clips (Item 2A) and mullions, through perimeter angles, with two No. 10 by 1/2 in. long self-drilling, self-tapping steel screws. Channel clips installed with 2-1/2 in. leg recessed from interior face of mullion to accommodate thickness of curtain wall insulation (Item 2H).

(System No. CW-S-2009 Continued)

H. **Curtain Wall Insulation*** — Min 2 in. thick mineral wool board insulation, unfaced or faced on one side with aluminum foil/scrim vapor retarder, supplied in min 36 in. wide boards. Insulation boards to be installed with no vertical seams. A full-width board shall be centered at the midheight of floor and tightly-fitted between vertical mullions, flush with interior surface of framing. The centered board shall be secured to the stiff back channels (Item 2F) located approx 6 in. above and below the floor with cup head weld pins (Item 2J) spaced max 10 in. OC along each channel. The remainder of the spandrel panel framing above and below the centered full-width board shall be filled in with additional lengths of board cut to fit tightly between mullions and with the horizontal seams between board sections tightly butted. The boards shall be secured to the spandrel panel perimeter angles with cup head weld pins at each corner of each board and spaced max 10 in. OC. When faced boards are used, butted seams to be covered with min 4 in. wide aluminum foil tape. **When unfaced boards are used, L Ratings do not apply.**

ROXUL INC — RHT-80

I. **Framing Covers** — **Curtain Wall Insulation*** — Min 8 in. wide strips cut from the same min 2 in. thick mineral wool batt insulation used for the curtain wall insulation (Item 2H). Framing covers to be centered over mullions and secured to the spandrel panel perimeter angles (Item 2E) with cup head weld pins (Item 2J) spaced max 12 in. OC. Where more than one spandrel panel occurs between vertically separated vision panels, the horizontal transom between spandrel panels shall also be covered with an 8 in. wide framing cover in the same manner as on the vertical mullions. Framing covers on mullions to abut the mineral wool batt safing material (Item 3A) above and below floor.

ROXUL INC — RHT-80

J. **Weld Pin** — No. 12 gauge galv steel weld pin with nom 1-3/16 in. diam galv steel cup head. Cup head weld pins provided in two lengths. One length to be equal to thickness of curtain wall insulation (Item 2H) and second length to be equal to thickness of curtain wall insulation plus thickness of framing cover (Item 2I). Cup head weld pins inserted through curtain wall insulation and mullion covers and welded to spandrel panel perimeter angles at max OC spacings referenced in Items 2H and 2I.

3. **Perimeter Fire Containment System** — The perimeter fire containment system shall incorporated the following construction features:

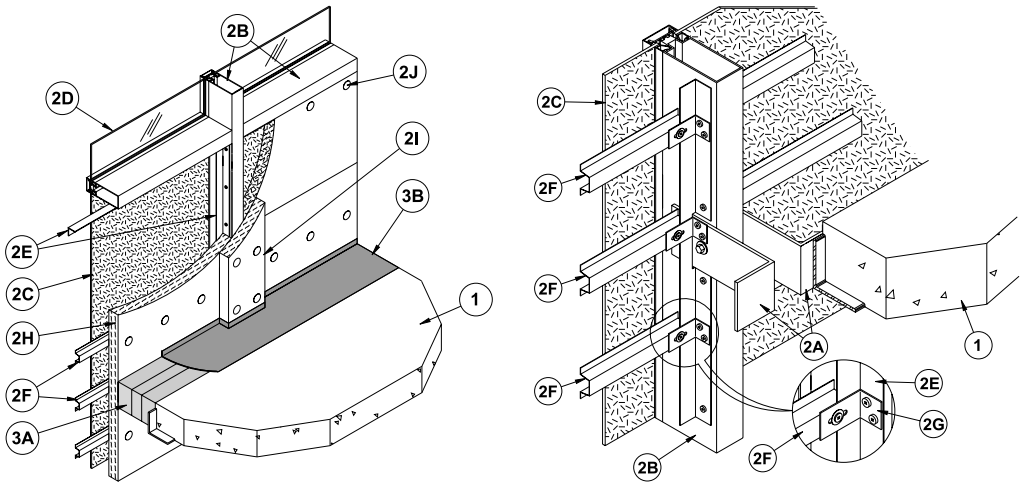
A. **Forming Material*** — Nom 4 in. thick mineral wool batt safing material to be installed in continuous pieces between mullion clips. Safing material to be cut to a min 4-1/2 in. width and stacked to a thickness which is at least 25 percent greater than the width of the linear gap between the curtain wall and the edge of the concrete floor slab. The safing material is compressed and inserted cut-edge-first into the linear gap such that its top surface is flush with the top surface of the floor assembly and such that it is friction-fit between mullion mounting angles. Additional pieces of safing material to be friction-fit into space between mullion mounting clips at each mullion location with top edges of mullion clips covered with a min 1/2 in. thickness of compressed safing material.

ROXUL INC — SAFE

B. **Fill, Void or Cavity Material***— Min 1/8 in. wet thickness (min 1/16 in. dry) of fill material spray-applied over top of forming material and lapping min 1 in. onto the top surface of the concrete floor and onto the curtain wall insulation and framing covers.

SPECIFIED TECHNOLOGIES INC — SpecSeal AS200 Elastomeric Spray

*Bearing the UL Classification Mark



System No. CW-S-2010
November 08, 2001
Integrity Rating — 2 Hr
Insulation Rating — 1/4 Hr
Linear Opening Width — 8 In. Max
L Rating At Ambient — Less Than 1 CFM/Lin Ft (See Item 2H)
L Rating At 400°F — Less Than 1 CFM/Lin Ft (See Item 2H)

1. **Floor Assembly** — Min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) structural concrete. Perimeter of floor assembly to be provided with min 4 by 4 by 1/4 in. thick cast-in-place structural steel angle for weld-attachment of mullion mounting clips (Item 2A).
2. **Curtain Wall Assembly** — The curtain wall assembly shall incorporate the following construction features:
   A. **Mullion Mounting Angles** — Min 4 in. long angles with one nom 4 in. leg for attachment to edge of floor assembly and with one leg approx 4 in. longer than distance to nearest face of mullion. Clips welded to steel angle at edge of floor assembly (Item 1) on each side of vertical mullion (Item 2B) at each floor level. Top edge of each mounting angle to be recessed min 1/2 in. below top surface of floor.
   B. **Framing** — The rectangular tubing mullions (vertical members) and transoms (horizontal members) shall be minimum 2-1/2 in. wide by 5 in. deep and shall be formed from min 0.100 in. thick aluminum. Mullions spaced max 60 in. OC and secured to mullion mounting clips (Item 2A) at each floor level with two 1/2 in. diam by 4 in. long hex head steel bolts in conjunction with steel nuts and washers. Interior face of mullions to be max 8 in. from edge of floor assembly. Transoms framing top and bottom edges of spandrel panels (Item 2C) to be spaced min 72 in. OC. Transom forming sill of vision panel (Item 2D) to be located such that its bottom surface is at height of 33 in. above the top surface of the floor (Item 1).
   C. **Spandrel Panels** — Nom 1/8 in. thick aluminum panels with 1/4 in. thick edges. Each panel secured in position with aluminum pressure plates in conjunction with gaskets and steel screws.
   D. **Vision Panels** — Nom 1/4 in. thick transparent heat-strengthened glass. Each panel secured in position with aluminum pressure plates in conjunction with glazing gaskets and steel screws.
   E. **Spandrel Panel Perimeter Angles** — Nom 1-1/2 by 1-1/2 in. No. 22 gauge galvanized steel angles installed around entire perimeter of each spandrel panel. Angles recessed from interior face of framing as necessary to accommodate thickness of curtain wall insulation (Item 2H). Angles notched as necessary to be continuous over mullion mounting clips (Item 2A). Angles screw-attached to mullions and transom along sides and top of each spandrel panel with No. 10 by 1/2 in. long self-drilling, self-tapping steel screws spaced max 12 in. OC. Angle along bottom of each spandrel panel to be screw-attached to leg of angle on mullion at each end without any direct attachment to transom.
   F. **Stiff Back Channel** — Nom 2-1/2 in. wide by 7/8 in. deep hat-shaped channel formed of 22 gauge galv steel to be installed to stiffen curtain wall insulation between mullions above, below and at elevation of safing joint. One stiff back channel to be located with its centerline approx 6 in. below floor and one stiff back channel to be located with its centerline approx 6 in. above floor. A third stiff back channel is to be located near the midheight of the safing joint. A clearance of 1/4 to 1/2 in. shall be maintained between the ends of the stiff back channels and the mullions. Stiff back channel secured to mullion at each end with channel attachment clip (Item 2G) in conjunction with a No. 8 by 1/2 in. long self-drilling, self-tapping wafer head steel screw or a 3/16 in. diam steel bolt with nut and washer.
   G. **Channel Attachment Clips** — Nom 1-1/2 by 2-1/2 by 1-1/2 in. long angle formed of 16 gauge galv steel. The 2-1/2 in. leg is provided with a 1/4 in. wide by 1-1/2 in. long slot along its centerline for attachment of the stiff back channel. Clips secured to mullion mounting clips (Item 2A) and mullions, through perimeter angles, with two No. 10 by 1/2 in. long self-drilling, self-tapping steel screws. Channel clips installed with 2-1/2 in. leg recessed from interior face of mullion to accommodate thickness of curtain wall insulation (Item 2H).

(System No. CW-S-2010 Continued)

H. **Curtain Wall Insulation*** — Min 2 in. thick mineral wool board insulation, unfaced or faced on one side with aluminum foil/scrim vapor retarder, supplied in min 36 in. wide boards. Insulation boards to be installed with no vertical seams. A full-width board shall be centered at the midheight of floor and tightly-fitted between vertical mullions, flush with interior surface of framing. The centered board shall be secured to the stiff back channels (Item 2F) located approx 6 in. above and below the floor with cup head weld pins (Item 2J) spaced max 10 in. OC along each channel. The remainder of the spandrel panel framing above and below the centered full-width board shall be filled in with additional lengths of board cut to fit tightly between mullions and with the horizontal seams between board sections tightly butted. The boards shall be secured to the spandrel panel perimeter angles with cup head weld pins at each corner of each board and spaced max 10 in. OC. When faced boards are used, butted seams to be covered with min 4 in. wide aluminum foil tape. **When unfaced boards are used, L Ratings do not apply.**

ROXUL INC — RHT-80

I. **Framing Covers** — **Curtain Wall Insulation*** — Min 8 in. wide strips cut from the same min 2 in. thick mineral wool batt insulation used for the curtain wall insulation (Item 2H). Framing covers to be centered over mullions and secured to the spandrel panel perimeter angles (Item 2E) with cup head weld pins (Item 2J) spaced max 12 in. OC. Where more than one spandrel panel occurs between vertically separated vision panels, the horizontal transom between spandrel panels shall also be covered with an 8 in. wide framing cover in the same manner as on the vertical mullions. Framing covers on mullions to abut the mineral wool batt safing material (Item 3A) above and below floor.

ROXUL INC — RHT-80

J. **Weld Pin** — No. 12 gauge galv steel weld pin with nom 1-3/16 in. diam galv steel cup head. Cup head weld pins provided in two lengths. One length to be equal to thickness of curtain wall insulation (Item 2H) and second length to be equal to thickness of curtain wall insulation plus thickness of framing cover (Item 2I). Cup head weld pins inserted through curtain wall insulation and mullion covers and welded to spandrel panel perimeter angles at max OC spacings referenced in Items 2H and 2I.

3. **Perimeter Fire Containment System** — The perimeter fire containment system shall incorporated the following construction features:

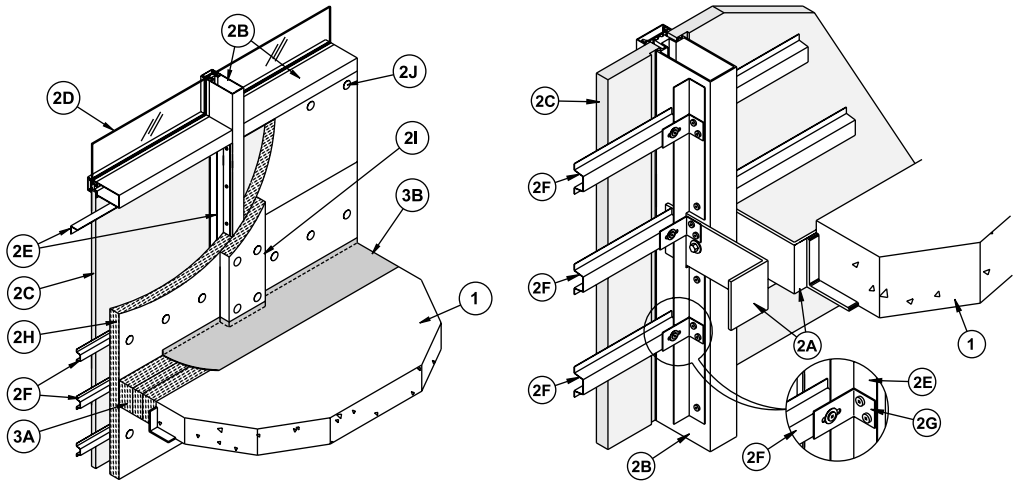
A. **Forming Material*** — Nom 4 in. thick mineral wool batt safing material to be installed in continuous pieces between mullion clips. Safing material to be cut to a min 4-1/2 in. width and stacked to a thickness which is at least 25 percent greater than the width of the linear gap between the curtain wall and the edge of the concrete floor slab. The safing material is compressed and inserted cut-edge-first into the linear gap such that its top surface is flush with the top surface of the floor assembly and such that it is friction-fit between mullion mounting angles. Additional pieces of safing material to be friction-fit into space between mullion mounting clips at each mullion location with top edges of mullion clips covered with a min 1/2 in. thickness of compressed safing material.

ROXUL INC — SAFE

B. **Fill, Void or Cavity Material*** — Min 1/8 in. wet thickness (min 1/16 in. dry) of fill material spray-applied over top of forming material and lapping min 1 in. onto the top surface of the concrete floor and onto the curtain wall insulation and framing covers.

SPECIFIED TECHNOLOGIES INC — SpecSeal AS200 Elastomeric Spray

*Bearing the UL Classification Mark



System No. CW-S-2011
November 08, 2001
Integrity Rating — 2 Hr
Insulation Rating — 1/4 Hr
Linear Opening Width — 8 In. Max
L Rating At Ambient — Less Than 1 CFM/Lin Ft (See Item 2H)
L Rating At 400°F — Less Than 1 CFM/Lin Ft (See Item 2H)

1. **Floor Assembly** — Min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) structural concrete. Perimeter of floor assembly to be provided with min 4 by 4 by 1/4 in. thick cast-in-place structural steel angle for weld-attachment of mullion mounting clips (Item 2A).
2. **Curtain Wall Assembly** — The curtain wall assembly shall incorporate the following construction features:
   A. **Mullion Mounting Angles** — Min 4 in. long angles with one nom 4 in. leg for attachment to edge of floor assembly and with one leg approx 4 in. longer than distance to nearest face of mullion. Clips welded to steel angle at edge of floor assembly (Item 1) on each side of vertical mullion (Item 2B) at each floor level. Top edge of each mounting angle to be recessed min 1/2 in. below top surface of floor.
   B. **Framing** — The rectangular tubing mullions (vertical members) and transoms (horizontal members) shall be minimum 2-1/2 in. wide by 5 in. deep and shall be formed from min 0.100 in. thick aluminum. Mullions spaced max 60 in. OC and secured to mullion mounting clips (Item 2A) at each floor level with two 1/2 in. diam by 4 in. long hex head steel bolts in conjunction with steel nuts and washers. Interior face of mullions to be max 8 in. from edge of floor assembly. Transoms framing top and bottom edges of spandrel panels (Item 2C) to be spaced min 72 in. OC. Transom forming sill of vision panel (Item 2D) to be located such that its bottom surface is at height of 33 in. above the top surface of the floor (Item 1).
   C. **Spandrel Panels** — Nom 1-3/16 in. thick polished granite spandrel panels with 1 in. thick gauged edges. Each panel secured in position with aluminum pressure plates in conjunction with gaskets and steel screws.
   D. **Vision Panels** — Nom 1/4 in. thick transparent heat-strengthened glass. Each panel secured in position with aluminum pressure plates in conjunction with glazing gaskets and steel screws.
   E. **Spandrel Panel Perimeter Angles** — Nom 1-1/2 by 1-1/2 in. No. 22 gauge galvanized steel angles installed around entire perimeter of each spandrel panel. Angles recessed from interior face of framing as necessary to accommodate thickness of curtain wall insulation (Item 2H). Angles notched as necessary to be continuous over mullion mounting clips (Item 2A). Angles screw-attached to mullions and transom along sides and top of each spandrel panel with No. 10 by 1/2 in. long self-drilling, self-tapping steel screws spaced max 12 in. OC. Angle along bottom of each spandrel panel to be screw-attached to leg of angle on mullion at each end without any direct attachment to transom.
   F. **Stiff Back Channel** — Nom 2-1/2 in. wide by 7/8 in. deep hat-shaped channel formed of 22 gauge galv steel to be installed to stiffen curtain wall insulation between mullions above, below and at elevation of safing joint. One stiff back channel to be located with its centerline approx 6 in. below floor and one stiff back channel to be located with its centerline approx 6 in. above floor. A third stiff back channel is to be located near the midheight of the safing joint. A clearance of 1/4 to 1/2 in. shall be maintained between the ends of the stiff back channels and the mullions. Stiff back channel secured to mullion at each end with channel attachment clip (Item 2G) in conjunction with a No. 8 by 1/2 in. long self-drilling, self-tapping wafer head steel screw or a 3/16 in. diam steel bolt with nut and washer.
   G. **Channel Attachment Clips** — Nom 1-1/2 by 2-1/2 by 1-1/2 in. long angle formed of 16 gauge galv steel. The 2-1/2 in. leg is provided with a 1/4 in. wide by 1-1/2 in. long slot along its centerline for attachment of the stiff back channel. Clips secured to mullion mounting clips (Item 2A) and mullions, through perimeter angles, with two No. 10 by 1/2 in. long self-drilling, self-tapping steel screws. Channel clips installed with 2-1/2 in. leg recessed from interior face of mullion to accommodate thickness of curtain wall insulation (Item 2H).

(System No. CW-S-2011 Continued)

H. **Curtain Wall Insulation*** — Min 2 in. thick mineral wool board insulation, unfaced or faced on one side with aluminum foil/scrim vapor retarder, supplied in min 36 in. wide boards. Insulation boards to be installed with no vertical seams. A full-width board shall be centered at the midheight of floor and tightly-fitted between vertical mullions, flush with interior surface of framing. The centered board shall be secured to the stiff back channels (Item 2F) located approx 6 in. above and below the floor with cup head weld pins (Item 2J) spaced max 10 in. OC along each channel. The remainder of the spandrel panel framing above and below the centered full-width board shall be filled in with additional lengths of board cut to fit tightly between mullions and with the horizontal seams between board sections tightly butted. The boards shall be secured to the spandrel panel perimeter angles with cup head weld pins at each corner of each board and spaced max 10 in. OC. When faced boards are used, butted seams to be covered with min 4 in. wide aluminum foil tape. **When unfaced boards are used, L Ratings do not apply.**

ROXUL INC — RHT-80

I. **Framing Covers** — **Curtain Wall Insulation*** Min 8 in. wide strips cut from the same min 2 in. thick mineral wool batt insulation used for the curtain wall insulation (Item 2H). Framing covers to be centered over mullions and secured to the spandrel panel perimeter angles (Item 2E) with cup head weld pins (Item 2J) spaced max 12 in. OC. Where more than one spandrel panel occurs between vertically separated vision panels, the horizontal transom between spandrel panels shall also be covered with an 8 in. wide framing cover in the same manner as on the vertical mullions. Framing covers on mullions to abut the mineral wool batt safing material (Item 3A) above and below floor.

ROXUL INC — RHT-80

J. **Weld Pin** — No. 12 gauge galv steel weld pin with nom 1-3/16 in. diam galv steel cup head. Cup head weld pins provided in two lengths. One length to be equal to thickness of curtain wall insulation (Item 2H) and second length to be equal to thickness of curtain wall insulation plus thickness of framing cover (Item 2I). Cup head weld pins inserted through curtain wall insulation and mullion covers and welded to spandrel panel perimeter angles at max OC spacings referenced in Items 2H and 2I.

3. **Perimeter Fire Containment System** — The perimeter fire containment system shall incorporated the following construction features:

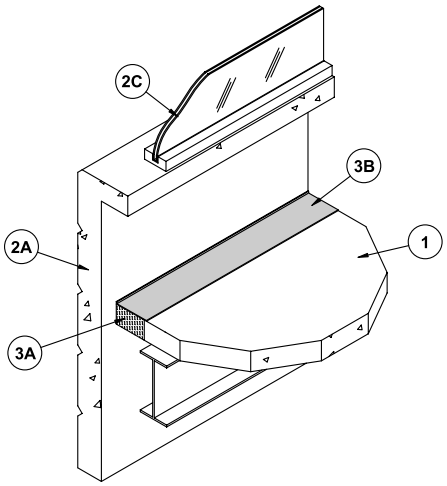
A. **Forming Material** — Nom 4 in. thick mineral wool batt safing material to be installed in continuous pieces between mullion clips. Safing material to be cut to a min 4-1/2 in. width stacked to a thickness which is at least 25 percent greater than the width of the linear gap between the curtain wall and the edge of the concrete floor slab. The safing material is compressed and inserted cut-edge-first into the linear gap such that its top surface is flush with the top surface of the floor assembly and such that it is friction-fit between mullion mounting angles. Additional pieces of safing material to be friction-fit into space between mullion mounting clips at each mullion location with top edges of mullion clips covered with a min 1/2 in. thickness of compressed safing material.

ROXUL INC — SAFE

B. **Fill, Void or Cavity Material*** — Min 1/8 in. wet thickness (min 1/16 in. dry) of fill material spray-applied over top of forming material and lapping min 1 in. onto the top surface of the concrete floor and onto the curtain wall insulation and framing covers.

SPECIFIED TECHNOLOGIES INC — SpecSeal AS200 Elastomeric Spray

*Bearing the UL Classification Mark

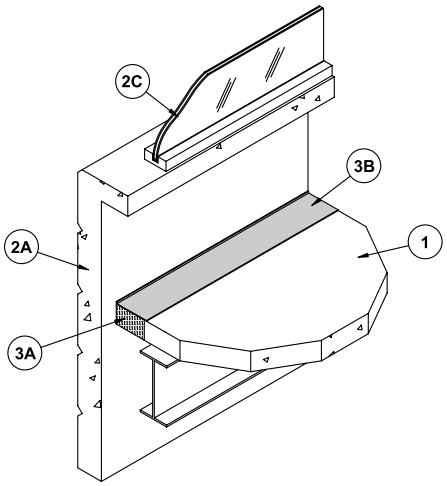


System No. CW-S-2013
o e ber 08, 2001
Integrity Rating — 2 Hr
Insulation Rating — 1/4 Hr
Linear Opening Width — 8 in. Max
L Rating At Ambient — Less Than 1 CFM/Lin Ft
L Rating At 400°F — Less Than 1 CFM/Lin Ft

1. **Floor Assembly** — Min 4-1/2 in. thick steel-reinforced lightweight or normal weight (100-150 pcf) structural concrete. Floor assembly to be supported at perimeter edges by spandrel beams having a Restrained or Unrestrained Beam Rating of 2 hr.
2. **Curtain Wall Assembly** — The curtain wall assembly shall incorporate the following construction features:
   A. **Spandrel Panels** — Min 72 in. high by min 4 in. thick steel-reinforced lightweight or normal weight (100-150 pcf) structural concrete spandrel panels. Wall may also consist of min 4 in. thick steel-reinforced lightweight or normal weight concrete tilt-up panels with a min 72 in. vertical separation between window openings. Panels provided with dead load anchors welded to steel reinforcing bars embedded in the concrete for attachment to the steel columns and spandrel beams. Panels also provided with lateral anchors or braces. The dead load anchors which are located in the linear gap between the concrete floor slab and the spandrel panel or tilt-up panel are to be spaced max 72 in. OC. The top of the dead load anchor is to be recessed min 1/2 in. from top surface of floor.
   B. **Joint System** — (Not Shown) — Vertical joints between spandrel panels or tilt-up panels to be protected using Joint System No. WW-S-0038.
   C. **Framed Window** — Metal framed window with nom 1/4 in. thick heat-strengthened glass. Sill of window to be min 34 in. above top of floor.
3. **Safing System** — **Max separation between edge of floor assembly and concrete spandrel or tilt-up panel is 8 in.** The safing system shall incorporate the following construction features:
   A. **Forming Material*** — Nom 4 in. thick mineral wool batt safing material to be installed between the concrete spandrel or tilt-up panel and the edge of the concrete floor slab. Safing material to be cut to a min 4-1/2 in. width and stacked to a thickness which is at least 25 percent greater than the width of the linear gap between the concrete spandrel or tilt-up panel and the edge of the concrete floor slab. The safing material is compressed and inserted cut-edge-first into the linear gap such that its top surface is flush with the top surface of the floor assembly. A max of one tightly-butted seam is permitted between dead load anchors. An additional min 1/2 in. thick piece of mineral wool batt safing material to be installed to cover top surface of each dead load anchor.
      ROXUL INC — SAFE
   B. **Fill, Void or Cavity Material*** — Min 1/8 in. wet thickness (min 1/16 in. dry) of fill material spray-applied over top of forming material and lapping min 1/2 in. onto the top surface of the concrete floor and onto the concrete spandrel panel or tilt-up panel.
      SPECIFIED TECHNOLOGIES INC — SpecSeal AS200 Elastomeric Spray

*Bearing the UL Classification Mark

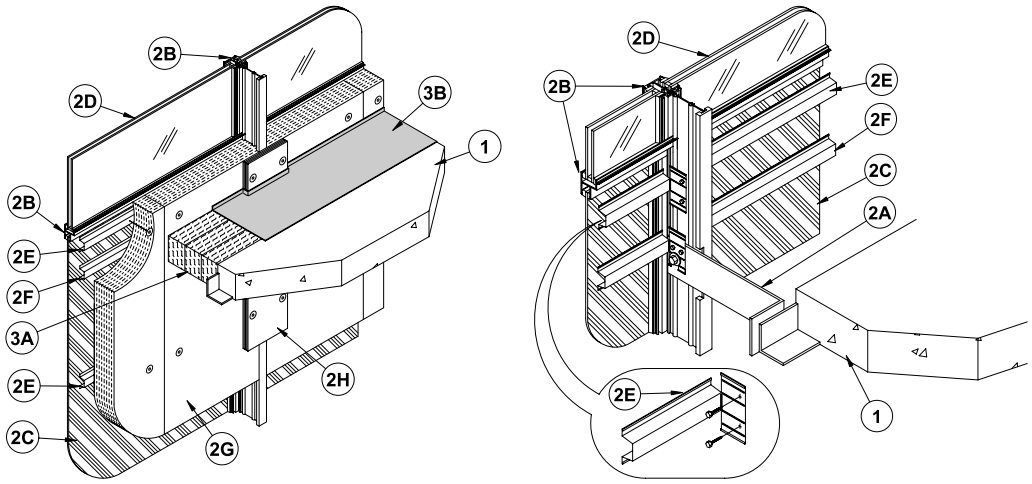
Created or Revised: 10/25/01
Specified Technologies, Inc., Somerville, NJ (800) 992-1180



System No. CW-S-2014
o e ber 08, 2001
Integrity Rating — 2 Hr
Insulation Rating — 1/4 Hr
Linear Opening Width — 8 in. Max
L Rating At Ambient — Less Than 1 CFM/Lin Ft
L Rating At 400°F — Less Than 1 CFM/Lin Ft

1. **Floor Assembly** — Min 4-1/2 in. thick steel-reinforced lightweight or normal weight (100-150 pcf) structural concrete. Floor assembly to be supported at perimeter edges by spandrel beams having a Restrained or Unrestrained Beam Rating of 2 hr.
2. **Curtain Wall Assembly** — The curtain wall assembly shall incorporate the following construction features:
   A. **Spandrel Panels** — Min 72 in. high by min 4 in. thick steel-reinforced lightweight or normal weight (100-150 pcf) structural concrete spandrel panels. Wall may also consist of min 4 in. thick steel-reinforced lightweight or normal weight concrete tilt-up panels with a min 72 in. vertical separation between window openings. Panels provided with steel dead load anchors welded to steel reinforcing bars embedded in the concrete for attachment to the steel columns and spandrel beams. Panels also provided with steel lateral anchors or braces. The dead load anchors which are located in the linear gap between the concrete floor slab and the spandrel panel or tilt-up panel are to be spaced max 72 in. OC. The top of the dead load anchor is to be recessed min 1/2 in. from top surface of floor.
   B. **Joint System** — (Not Shown) — Vertical joints between spandrel panels or tilt-up panels to be protected using Joint System No. WW-S-0038.
   C. **Framed Window** — Metal framed window with nom 1/4 in. thick heat-strengthened glass. Sill of window to be min 34 in. above top of floor.
3. **Safing System** — **Max separation between edge of floor assembly and concrete spandrel or tilt-up panel is 8 in.** The safing system shall incorporate the following construction features:
   A. **Forming Material*** — Nom 4 in. thick mineral wool batt safing material to be installed between the concrete spandrel or tilt-up panel and the edge of the concrete floor slab. Safing material to be cut to a min 4-1/2 in. width and stacked to a thickness which is at least 25 percent greater than the width of the linear gap between the concrete spandrel or tilt-up panel and the edge of the concrete floor slab. The safing material is compressed and inserted cut-edge-first into the linear gap such that its top surface is flush with the top surface of the floor assembly. A max of one tightly-butted seam is permitted between dead load anchors. An additional min 1/2 in. thick piece of mineral wool batt safing material to be installed to cover top surface of each dead load anchor.
      THERMAFIBER LLC — SAF
   B. **Fill, Void or Cavity Material*** — Min 1/8 in. wet thickness (min 1/16 in. dry) of fill material spray-applied over top of forming material and lapping min 1/2 in. onto the top surface of the concrete floor and onto the concrete spandrel panel or tilt-up panel.
      SPECIFIED TECHNOLOGIES INC — SpecSeal AS200 Elastomeric Spray

*Bearing the UL Classification Mark



System No. CW-S-2021
October 17, 2001
Integrity Ratings — 1-1/2 and 2 Hr (See Item 2B)
Insulation Rating — 1/2 Hr
Linear Opening Width — 10 In. Max

1. **Floor Assembly** — Min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) structural concrete. Perimeter of floor assembly to be provided with min 3 by 3 by 1/4 in. thick cast-in-place structural steel angle for weld-attachment of mullion mounting clips (Item 2A).
2. **Curtain Wall Assembly** — The curtain wall assembly shall incorporate the following construction features:
   A. **Mullion Mounting Clips** — Min 4 in. long angles with one nom 4 in. leg for attachment to edge of floor assembly and with one leg approx 4 in. longer than distance to nearest face of mullion. Clips to be formed of min 1/4 in. thick steel. Clip welded to steel angle at edge of floor assembly (Item 1) on one side of each vertical mullion (Item 2B) at each floor level. Top edge of each clip to be recessed min 1/2 in. below top surface of floor.
   B. **Framing** — The "I" shaped mullions (vertical members) shall be min 2-1/2 in. wide by 7 in. deep and shall be formed from min 0.125 in. thick aluminum. The horizontal framing members shall be min 2 in. wide by 2 in. deep and formed from min 0.125 in. thick aluminum. Mullions spaced max 60 in. OC and secured to mullion mounting clips (Item 2A) at each floor level with two min 3/8 in. diameter hex head steel bolts in conjunction with steel nuts and washers. Interior face of mullions to be notched to accommodate mullion mounting clips and to be max 10 in. from edge of floor assembly. Horizontal framing members to be spaced min 72 in. OC. The Integrity Rating is dependent upon the minimum height from the top of the floor to the bottom of the vision panel sill, as tabulated below:

Min Vision Panel Sill Height Above Floor, in.	Integrity Rating, Hr
6	1-1/2
4	2

   C. **Spandrel Panels** — Nom 1/4 in. thick opaque heat-strengthened glass panels. Each panel secured in position and four-side captured with exterior sponge gasket compressed in place with interior wedge rubber and aluminum glazing bead.
   D. **Vision Panels** — Nom 1 in. thick (double pane) transparent heat-strengthened glass panels. Each panel secured in position and four-side captured with exterior sponge gasket compressed in place with interior wedge rubber and aluminum glazing bead.
   E. **Steel Hat Channels** — Nom 2-1/2 in. wide by 7/8 in. deep No. 24 gauge galvanized steel hat channel installed to span from mullion-to-mullion for attachment of curtain wall insulation (Item 2G). Hat channels to be cut min 4 in. longer than on center spacing of mullions. Ends of hat channels cut, flattened and bent 90 deg to form min 2 in. long tabs for screw-attachment to mullions with No. 10 by 1 in. long self-drilling, self-tapping steel screws. Hat channels installed max 3 in. above top of vision panel, max 3 in. below bottom of vision panel and spaced max 24 in. OC. Hat channels screw-attached to mullions along sides of each spandrel panel with No. 10 by 1 in. long self-drilling, self-tapping steel screws.
   F. **Stiffener Channel** — One nom 2-1/2 in. wide by 7/8 in. deep by 24 gauge (or heavier) steel hat-channel installed to span between mullions at each floor level to restrain curtain wall insulation against outward movement when forming material (Item 3A) is installed. Stiffener channel to be cut min 4 in. longer than on center spacing between mullions. Ends of stiffener channel cut, flattened and bent 90 deg to form min 2 in. long tabs for screw-attachment to the mullion mounting clips (Item 2E) with No. 10 by 3/4 in. long self-drilling, self-tapping steel screws. Each stiffener channel shall be located with its stem centerline at an elevation 2 in. below the top plane of the floor.
   G. **Curtain Wall Insulation*** — Nom 4 in. thick mineral wool batt insulation faced on one side with aluminum foil/scrim vapor retarder, supplied in min 72 in. long batts. Insulation batts compression-fitted between vertical mullions, flush with the interior surface of framing, with a maximum of one vertical seam and with no horizontal seams. Insulation panels secured to each hat channel with min 4-1/2 in. long steel screws with min 1-1/2 in. diameter galv steel clinch shields spaced 3 in. from each vertical edge of batt.

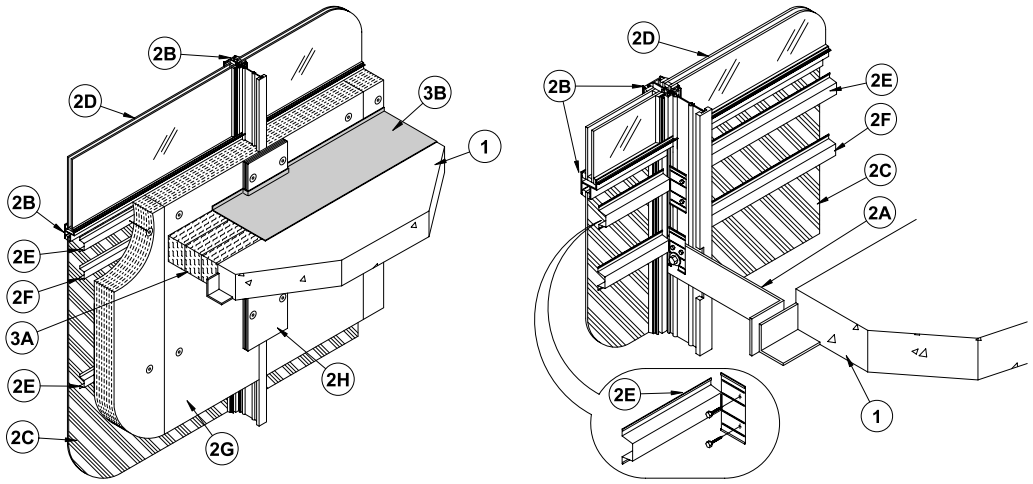
THERMAFIBER LLC — FIRESPAN SS Insulation

(System No. CW-S-2021 Continued)

H. **Mullion Insulation** — **Curtain Wall Insulation*** — Min 8 in. wide strips cut from min 1 in. thick mineral wool batt insulation. Framing covers to be centered over mullions and secured to the steel hat channels with min 5-1/2 in. long steel screws. Framing covers on mullions to abut the mineral wool batt safing material (Item 3A) above and below floor.
THERMAFIBER LLC — FIRESPAN Insulation

3. **Safing System** — The safing system shall incorporate the following construction features:
   A. **Forming Material*** — Nom 4 pcf density mineral wool batt insulation. Batt sections cut to a 4 in. width and stacked to a thickness which is min 20 percent greater than the width of the linear gap between the curtain wall insulation and the edge of the concrete floor slab. The forming material is compressed and inserted cut-edge-first into linear gap such that its top surface is flush with the top surface of the floor assembly. A max of one tightly-butted seam is permitted between mullions. Additional piece of forming material to be friction-fit into gap between batt sections above mullion mounting clip at each mullion location.
   THERMAFIBER LLC — SAF
   B. **Fill, Void or Cavity Material*** — Min 1/8 in. wet thickness (min 1/16 in. dry thickness) of fill material spray-applied over top of forming material and lapping min 1/2 in. onto the top surface of the floor and onto the curtain wall insulation and mullion covers.
   SPECIFIED TECHNOLOGIES INC — SpecSeal AS200 Elastomeric Spray

*Bearing the UL Classification Marking



System No. CW-S-2021
October 17, 2001
Integrity Ratings – 1-1/2 and 2 Hr (See Item 2B)
Insulation Rating – 1/2 Hr
Linear Opening Width – 10 In. Max

1. **Floor Assembly** – Min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) structural concrete. Perimeter of floor assembly to be provided with min 3 by 3 by 1/4 in. thick cast-in-place structural steel angle for weld-attachment of mullion mounting clips (Item 2A).
2. **Curtain Wall Assembly** — The curtain wall assembly shall incorporate the following construction features:
   A. **Mullion Mounting Clips** — Min 4 in. long angles with one nom 4 in. leg for attachment to edge of floor assembly and with one leg approx 4 in. longer than distance to nearest face of mullion. Clips to be formed of min 1/4 in. thick steel. Clip welded to steel angle at edge of floor assembly (Item 1) on one side of each vertical mullion (Item 2B) at each floor level. Top edge of each clip to be recessed min 1/2 in. below top surface of floor.
   B. **Framing** — The "I" shaped mullions (vertical members) shall be min 2-1/2 in. wide by 7 in. deep and shall be formed from min 0.125 in. thick aluminum. The horizontal framing members shall be min 2 in. wide by 2 in. deep and formed from min 0.125 in. thick aluminum. Mullions spaced max 60 in. OC and secured to mullion mounting clips (Item 2A) at each floor level with two min 3/8 in. diameter hex head steel bolts in conjunction with steel nuts and washers. Interior face of mullions to be notched to accommodate mullion mounting clips and to be max 10 in. from edge of floor assembly. Horizontal framing members to be spaced min 72 in. OC. The Integrity Rating is dependent upon the minimum height from the top of the floor to the bottom of the vision panel sill, as tabulated below:

Min Vision Panel Sill Height Above Floor, in.	Integrity Rating, Hr
6	1-1/2
4	2

   C. **Spandrel Panels** — Nom 1/4 in. thick opaque heat-strengthened glass panels. Each panel secured in position and four-side captured with exterior sponge gasket compressed in place with interior wedge rubber and aluminum glazing bead.
   D. **Vision Panels** — Nom 1 in. thick (double pane) transparent heat-strengthened glass panels. Each panel secured in position and four-side captured with exterior sponge gasket compressed in place with interior wedge rubber and aluminum glazing bead.
   E. **Steel Hat Channels** — Nom 2-1/2 in. wide by 7/8 in. deep No. 24 gauge galvanized steel hat channel installed to span from mullion-to-mullion for attachment of curtain wall insulation (Item 2G). Hat channels to be cut min 4 in. longer than on center spacing of mullions. Ends of hat channels cut, flattened and bent 90 deg to form min 2 in. long tabs for screw-attachment to mullions with No. 10 by 1 in. long self-drilling, self-tapping steel screws. Hat channels installed max 3 in. above top of vision panel, max 3 in. below bottom of vision panel and spaced max 24 in. OC. Hat channels screw-attached to mullions along sides of each spandrel panel with No. 10 by 1 in. long self-drilling, self-tapping steel screws.
   F. **Stiffener Channel** — One nom 2-1/2 in. wide by 7/8 in. deep by 24 gauge (or heavier) steel hat-channel installed to span between mullions at each floor level to restrain curtain wall insulation against outward movement when forming material (Item 3A) is installed. Stiffener channel to be cut min 4 in. longer than on center spacing between mullions. Ends of stiffener channel cut, flattened and bent 90 deg to form min 2 in. long tabs for screw-attachment to the mullion mounting clips (Item 2E) with No. 10 by 3/4 in. long self-drilling, self-tapping steel screws. Each stiffener channel shall be located with its stem centerline at an elevation 2 in. below the top plane of the floor.
   G. **Curtain Wall Insulation*** — Nom 4 in. thick mineral wool batt insulation faced on one side with aluminum foil/scrim vapor retarder, supplied in min 72 in. long batts. Insulation batts compression-fitted between vertical mullions, flush with the interior surface of framing, with a maximum of one vertical seam and with no horizontal seams. Insulation panels secured to each hat channel with min 4-1/2 in. long steel screws with min 1-1/2 in. diameter galv steel clinch shields spaced 3 in. from each vertical edge of batt.

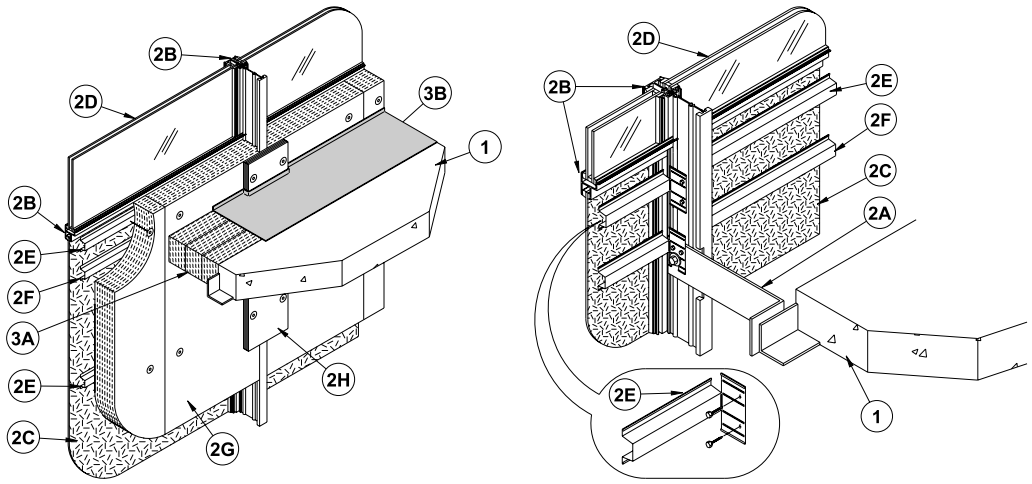
THERMAFIBER LLC — FIRESPAN SS Insulation

(System No. CW-S-2021 Continued)

H. **Mullion Insulation** — **Curtain Wall Insulation*** — Min 8 in. wide strips cut from min 1 in. thick mineral wool batt insulation. Framing covers to be centered over mullions and secured to the steel hat channels with min 5-1/2 in. long steel screws. Framing covers on mullions to abut the mineral wool batt safing material (Item 3A) above and below floor.
THERMAFIBER LLC — FIRESPAN Insulation

3. **Safing System** — The safing system shall incorporate the following construction features:
   A. **Forming Material*** — Nom 4 pcf density mineral wool batt insulation. Batt sections cut to a 4 in. width and stacked to a thickness which is min 20 percent greater than the width of the linear gap between the curtain wall insulation and the edge of the concrete floor slab. The forming material is compressed and inserted cut-edge-first into linear gap such that its top surface is flush with the top surface of the floor assembly. A max of one tightly-butted seam is permitted between mullions. Additional piece of forming material to be friction-fit into gap between batt sections above mullion mounting clip at each mullion location.
   THERMAFIBER LLC — SAF
   B. **Fill, Void or Cavity Material*** — Min 1/8 in. wet thickness (min 1/16 in. dry thickness) of fill material spray-applied over top of forming material and lapping min 1/2 in. onto the top surface of the floor and onto the curtain wall insulation and mullion covers.
   SPECIFIED TECHNOLOGIES INC — SpecSeal AS200 Elastomeric Spray

*Bearing the UL Classification Marking



System No. CW-S-2022
October 17, 2001
Integrity Ratings — 1-1/2 and 2 Hr (See Item 2B)
Insulation Rating — 1/2 Hr
Linear Opening Width — 10 In. Max

1. **Floor Assembly** — Min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) structural concrete. Perimeter of floor assembly to be provided with min 3 by 3 by 1/4 in. thick cast-in-place structural steel angle for weld-attachment of mullion mounting clips (Item 2A).
2. **Curtain Wall Assembly** — The curtain wall assembly shall incorporate the following construction features:
   A. **Mullion Mounting Clips** — Min 4 in. long angles with one nom 4 in. leg for attachment to edge of floor assembly and with one leg approx 4 in. longer than distance to nearest face of mullion. Clips to be formed of min 1/4 in. thick steel. Clip welded to steel angle at edge of floor assembly (Item 1) on one side of each vertical mullion (Item 2B) at each floor level. Top edge of each clip to be recessed min 1/2 in. below top surface of floor.
   B. **Framing** — The "I" shaped mullions (vertical members) shall be min 2-1/2 in. wide by 7 in. deep and shall be formed from min 0.125 in. thick aluminum. The horizontal framing members shall be min 2 in. wide by 2 in. deep and formed from min 0.125 in. thick aluminum. Mullions spaced max 60 in. OC and secured to mullion mounting clips (Item 2A) at each floor level with two min 3/8 in. diameter hex head steel bolts in conjunction with steel nuts and washers. Interior face of mullions to be notched to accommodate mullion mounting clips and to be max 10 in. from edge of floor assembly. Horizontal framing members to be spaced min 72 in. OC. The Integrity Rating is dependent upon the minimum height from the top of the floor to the bottom of the vision panel sill, as tabulated below:

Min Vision Panel Sill Height Above Floor, in.	Integrity Rating, Hr
6	1-1/2
34	2

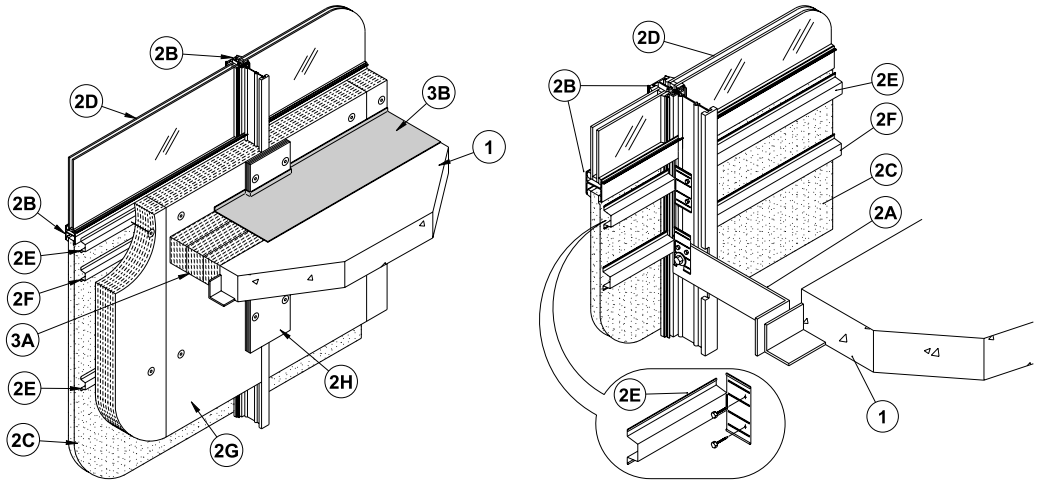
   C. **Spandrel Panels** — Nom 1/8 in. thick aluminum panels with 1/4 in. thick edges. Each panel secured in position and four-side captured with exterior sponge gasket compressed in place with interior wedge rubber and aluminum glazing bead.
   D. **Vision Panels** — Nom 1 in. thick (double pane) transparent heat-strengthened glass panels. Each panel secured in position and four-side captured with exterior sponge gasket compressed in place with interior wedge rubber and aluminum glazing bead.
   E. **Steel Hat Channels** — Nom 2-1/2 in. wide by 7/8 in. deep No. 24 gauge galvanized steel hat channel installed to span from mullion-to-mullion for attachment of curtain wall insulation (Item 2G). Hat channels to be cut min 4 in. longer than on center spacing of mullions. Ends of hat channels cut, flattened and bent 90 deg to form min 2 in. long tabs for screw-attachment to mullions with No. 10 by 1 in. long self-drilling, self-tapping steel screws. Hat channels installed max 3 in. above top of vision panel, max 3 in. below bottom of vision panel and spaced max 24 in. OC. Hat channels screw-attached to mullions along sides of each spandrel panel with No. 10 by 1 in. long self-drilling, self-tapping steel screws.
   F. **Stiffener Channel** — One nom 2-1/2 in. wide by 7/8 in. deep by 24 gauge (or heavier) steel hat-channel installed to span between mullions at each floor level to restrain curtain wall insulation against outward movement when forming material (Item 3A) is installed. Stiffener channel to be cut min 4 in. longer than on center spacing between mullions. Ends of stiffener channel cut, flattened and bent 90 deg to form min 2 in. long tabs for screw-attachment to the mullion mounting clips (Item 2E) with No. 10 by 3/4 in. long self-drilling, self-tapping steel screws. Each stiffener channel shall be located with its stem centerline at an elevation 2 in. below the top plane of the floor.
   G. **Curtain Wall Insulation*** — Nom 4 in. thick mineral wool batt insulation faced on one side with aluminum foil/scrim vapor retarder, supplied in min 72 in. long batts. Insulation batts compression-fitted between vertical mullions, flush with the interior surface of framing, with a maximum of one vertical seam and with no horizontal seams. Insulation panels secured to each hat channel with min 4-1/2 in. long steel screws with min 1-1/2 in. diameter galv steel clinch shields spaced 3 in. from each vertical edge of batt.
      THERMAFIBER LLC — FIRESPAN SS Insulation

(System No. CW-S-2022 Continued)

H. **Mullion Insulation** — **Curtain Wall Insulation*** — Min 8 in. wide strips cut from min 1 in. thick mineral wool batt insulation. Framing covers to be centered over mullions and secured to the steel hat channels with min 5-1/2 in. long steel screws. Framing covers on mullions to abut the mineral wool batt safing material (Item 3A) above and below floor.
THERMAFIBER LLC — FIRESPAN Insulation

3. **Safing System** — The safing system shall incorporate the following construction features:
   A. **Forming Material*** — Nom 4 pcf density mineral wool batt insulation. Batt sections cut to a 4 in. width and stacked to a thickness which is min 20 percent greater than the width of the linear gap between the curtain wall insulation and the edge of the concrete floor slab. The forming material is compressed and inserted cut-edge-first into linear gap such that its top surface is flush with the top surface of the floor assembly. A max of one tightly-butted seam is permitted between mullions. Additional piece of forming material to be friction-fit into gap between batt sections above mullion mounting clip at each mullion location.
   THERMAFIBER LLC — SAF
   B. **Fill, Void or Cavity Material*** — Min 1/8 in. wet thickness (min 1/16 in. dry thickness) of fill material spray-applied over top of forming material and lapping min 1/2 in. onto the top surface of the floor and onto the curtain wall insulation and mullion covers.
   SPECIFIED TECHNOLOGIES INC — SpecSeal AS200 Elastomeric Spray

*Bearing the UL Classification Marking



System No. CW-S-2023
October 17, 2001
Integrity Ratings — 1-1/2 and 2 Hr (See Item 2B)
Insulation Rating — 1/2 Hr
Linear Opening Width — 10 In. Max

1. **Floor Assembly** — Min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) structural concrete. Perimeter of floor assembly to be provided with min 3 by 3 by 1/4 in. thick cast-in-place structural steel angle for weld-attachment of mullion mounting clips (Item 2A).
2. **Curtain Wall Assembly** — The curtain wall assembly shall incorporate the following construction features:
   A. Mullion Mounting Clips — Min 4 in. long angles with one nom 4 in. leg for attachment to edge of floor assembly and with one leg approx 4 in. longer than distance to nearest face of mullion. Clips to be formed of min 1/4 in. thick steel. Clip welded to steel angle at edge of floor assembly (Item 1) on one side of each vertical mullion (Item 2B) at each floor level. Top edge of each clip to be recessed min 1/2 in. below top surface of floor.
   B. **Framing** — The "I" shaped mullions (vertical members) shall be min 2-1/2 in. wide by 7 in. deep and shall be formed from min 0.125 in. thick aluminum. The horizontal framing members shall be min 2 in. wide by 2 in. deep and formed from min 0.125 in. thick aluminum. Mullions spaced max 60 in. OC and secured to mullion mounting clips (Item 2A) at each floor level with two min 3/8 in. diameter hex head steel bolts in conjunction with steel nuts and washers. Interior face of mullions to be notched to accommodate mullion mounting clips and to be max 10 in. from edge of floor assembly. Horizontal framing members to be spaced min 72 in. OC. The Integrity Rating is dependent upon the minimum height from the top of the floor to the bottom of the vision panel sill, as tabulated below:

Min Vision Panel Sill Height Above Floor, in.	Integrity Rating, Hr
6	1-1/2
34	2

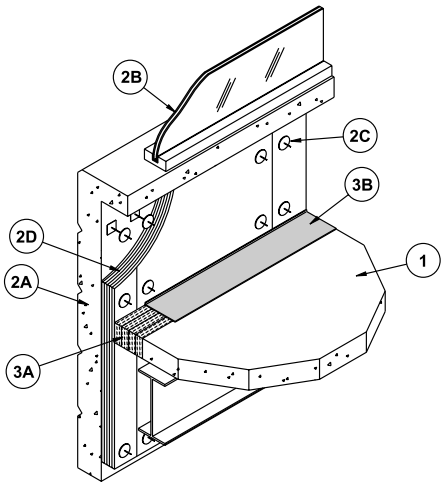
   C. **Spandrel Panels** — Nom 1-3/16 in. thick polished granite panels with 1 in. thick edges. Each panel secured in position and four-side captured with exterior sponge gasket compressed in place with interior wedge rubber and aluminum glazing bead.
   D. **Vision Panels** — Nom 1 in. thick (double pane) transparent heat-strengthened glass panels. Each panel secured in position and four-side captured with exterior sponge gasket compressed in place with interior wedge rubber and aluminum glazing bead.
   E. **Steel Hat Channels** — Nom 2-1/2 in. wide by 7/8 in. deep No. 24 gauge galvanized steel hat channel installed to span from mullion-to-mullion for attachment of curtain wall insulation (Item 2G). Hat channels to be cut min 4 in. longer than on center spacing of mullions. Ends of hat channels cut, flattened and bent 90 deg to form min 2 in. long tabs for screw-attachment to mullions with No. 10 by 1 in. long self-drilling, self-tapping steel screws. Hat channels installed max 3 in. above top of vision panel, max 3 in. below bottom of vision panel and spaced max 24 in. OC. Hat channels screw-attached to mullions along sides of each spandrel panel with No. 10 by 1 in. long self-drilling, self-tapping steel screws.
   F. **Stiffener Channel** — One nom 2-1/2 in. wide by 7/8 in. deep by 24 gauge (or heavier) steel hat-channel installed to span between mullions at each floor level to restrain curtain wall insulation against outward movement when forming material (Item 3A) is installed. Stiffener channel to be cut min 4 in. longer than on center spacing between mullions. Ends of stiffener channel cut, flattened and bent 90 deg to form min 2 in. long tabs for screw-attachment to the mullion mounting clips (Item 2E) with No. 10 by 3/4 in. long self-drilling, self-tapping steel screws. Each stiffener channel shall be located with its stem centerline at an elevation 2 in. below the top plane of the floor.
   G. **Curtain Wall Insulation*** — Nom 4 in. thick mineral wool batt insulation faced on one side with aluminum foil/scrim vapor retarder, supplied in min 72 in. long batts. Insulation batts compression-fitted between vertical mullions, flush with the interior surface of framing, with a maximum of one vertical seam and with no horizontal seams. Insulation panels secured to each hat channel with min 4-1/2 in. long steel screws with min 1-1/2 in. diameter galv steel clinch shields spaced 3 in. from each vertical edge of batt.
      THERMAFIBER LLC — FIRESPAN SS Insulation
   H. **Mullion Insulation** — **Curtain Wall Insulation*** — Min 8 in. wide strips cut from min 1 in. thick mineral wool batt insulation. Framing covers to be centered over mullions and secured to the steel hat channels with min 5-1/2 in. long steel screws. Framing covers on mullions to abut the mineral wool batt safing material (Item 3A) above and below floor.

(System No. CW-S-2023 Continued)

THERMAFIBER LLC — FIRESPAN Insulation

3. **Safing System** — The safing system shall incorporate the following construction features:
   A. **Forming Material*** — Nom 4 pcf density mineral wool batt insulation. Batt sections cut to a 4 in. width and stacked to a thickness which is min 20 percent greater than the width of the linear gap between the curtain wall insulation and the edge of the concrete floor slab. The forming material is compressed and inserted cut-edge-first into linear gap such that its top surface is flush with the top surface of the floor assembly. A max of one tightly-butted seam is permitted between mullions. Additional piece of forming material to be friction-fit into gap between batt sections above mullion mounting clip at each mullion location.
      THERMAFIBER LLC — SAF
   B. **Fill, Void or Cavity Material*** — Min 1/8 in. wet thickness (min 1/16 in. dry thickness) of fill material spray-applied over top of forming material and lapping min 1/2 in. onto the top surface of the floor and onto the curtain wall insulation and mullion covers.
      SPECIFIED TECHNOLOGIES INC — SpecSeal AS200 Elastomeric Spray

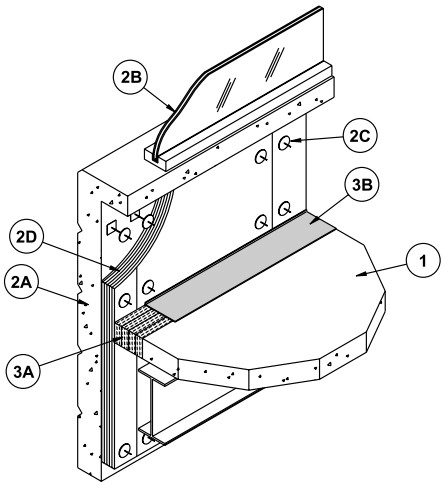
*Bearing the UL Classification Marking



System No. CW-S-2025
December 03, 2001
Integrity Rating — 2 Hr
Insulation Rating — 1/4 Hr
Linear Opening Width — 8 in. Max

1. **Floor Assembly** — Min 4-1/2 in. thick steel-reinforced lightweight or normal weight (100-150 pcf) structural concrete. Floor assembly to be supported at perimeter edges by spandrel beams having a Restrained or Unrestrained Beam Rating of 2 hr. Edge of concrete floor to be max 8 in. from interior surface of spandrel panel (Item 2A).
2. **Curtain Wall Assembly** — The curtain wall assembly shall incorporate the following construction features:
   A. **Spandrel Panels** — Min 72 in. high by min 4 in. thick steel-reinforced lightweight or normal weight (100-150 pcf) structural concrete spandrel panels. Wall may also consist of min 4 in. thick steel-reinforced lightweight or normal weight concrete tilt-up panels with a min 72 in. vertical separation between window openings. Panels provided with steel dead load anchors welded to steel reinforcing bars embedded in the concrete for attachment to the steel columns and spandrel beams. Panels also provided with steel lateral anchors or braces. The dead load anchors, which are located in the linear gap between the concrete floor slab and the spandrel panel or tilt-up panel, are to be spaced max 72 in. OC. The top of the dead load anchor is to be recessed min 1/2 in. from top surface of floor.
   B. **Framed Window** — Metal framed window with nom 1 in. thick (double pane) transparent heat-strengthened glass panels. Sill of window to be min 34 in. above top of floor.
   C. **Impaling Pins** — No. 12 gauge steel pins, min 1/2 in. longer than thickness of insulation boards (Item 2D), swaged to nom 2 by 2 in. galv steel base plate. Steel base plates secured to concrete spandrel panel with steel concrete screws or powder-driven steel fasteners. Impaling pins to be spaced 3 in. from edges of insulation boards (Item 2D) on each side of seams and spaced max 24 in. OC both vertically and horizontally. A min of two horizontal arrays of impaling pins are required to be located on spandrel panel above top surface of floor.
   D. **Curtain Wall Insulation*** — Min 2 in. thick mineral wool board insulation, faced on one side with aluminum foil/scrim vapor retarder, supplied in min 24 by 48 in. boards. Insulation boards installed vertically with tightly-butted seams to cover interior surface of concrete spandrel panel. Horizontal seams of insulation boards (if necessary) to be located min 24 in. above and min 6 in. below planes of floor. Insulation boards secured to spandrel panel with impaling pins in conjunction with min 1-1/2 in. diameter galv steel clinch shields. Butted seams to be covered with aluminum foil tape.
      THERMAFIBER LLC — FIRESPAN Insulation
3. **Safing System** — The safing system shall incorporate the following construction features:
   A. **Forming Material*** — Mineral wool batt safing material to be cut into min 4-1/2 in. wide pieces and stacked to a thickness which is at least 25 percent greater than the width of the linear gap between the curtain wall insulation (Item 2D) and the edge of the concrete floor slab. The stacked safing material is compressed and inserted cut-edge-first into the linear gap such that its top surface is flush with the top surface of the floor assembly. A max of one tightly butted seam is permitted between spandrel panel attachment plates or tubes. An additional min 1/2 in. thick piece of mineral wool batt safing material is to be installed to cover top surface of each dead load anchor.
      THERMAFIBER LLC — SAF
   B. **Fill, Void or Cavity Material*** — Min 1/8 in. wet thickness (1/16 in. dry) of fill material spray-applied over top of forming material and lapping min 1/2 in. onto the top surface of the concrete floor and onto the curtain wall insulation.
      SPECIFIED TECHNOLOGIES INC — SpecSeal AS200 Elastomeric Spray

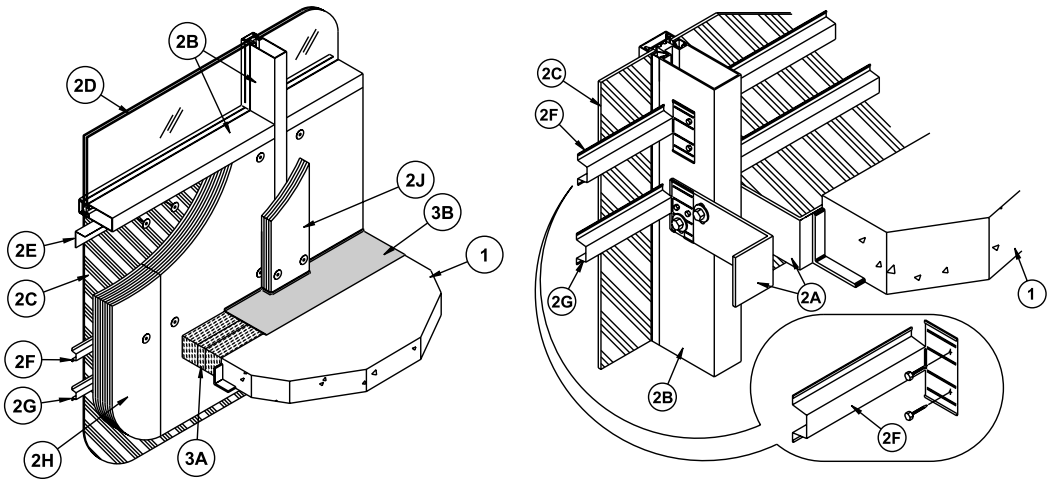
*Bearing the UL Classification Mark



System No. CW-S-2026
December 03, 2001
Integrity Rating — 2 Hr
Insulation Rating — 1/4 Hr
Linear Opening Width — 8 in. Max

1. **Floor Assembly** — Min 4-1/2 in. thick steel-reinforced lightweight or normal weight (100-150 pcf) structural concrete. Floor assembly to be supported at perimeter edges by spandrel beams having a Restrained or Unrestrained Beam Rating of 2 hr. Edge of concrete floor to be max 8 in. from interior surface of spandrel panel (Item 2A).
2. **Curtain Wall Assembly** — The curtain wall assembly shall incorporate the following construction features:
   A. **Spandrel Panels** — Min 72 in. high by min 4 in. thick steel-reinforced lightweight or normal weight (100-150 pcf) structural concrete spandrel panels. Wall may also consist of min 4 in. thick steel-reinforced lightweight or normal weight concrete tilt-up panels with a min 72 in. vertical separation between window openings. Panels provided with steel dead load anchors welded to steel reinforcing bars embedded in the concrete for attachment to the steel columns and spandrel beams. Panels also provided with steel lateral anchors or braces. The dead load anchors, which are located in the linear gap between the concrete floor slab and the spandrel panel or tilt-up panel, are to be spaced max 72 in. OC. The top of the dead load anchor is to be recessed min 1/2 in. from top surface of floor.
   B. **Framed Window** — Metal framed window with nom 1 in. thick (double pane) transparent heat-strengthened glass panels. Sill of window to be min 34 in. above top of floor.
   C. **Impaling Pins** — No. 12 gauge steel pins, min 1/2 in. longer than thickness of insulation boards (Item 2D), swaged to nom 2 by 2 in. galv steel base plate. Steel base plates secured to concrete spandrel panel with steel concrete screws or powder-driven steel fasteners. Impaling pins to be spaced 3 in. from edges of insulation boards (Item 2D) on each side of seams and spaced max 24 in. OC both vertically and horizontally. A min of two horizontal arrays of impaling pins are required to be located on spandrel panel above top surface of floor.
   D. **Curtain Wall Insulation*** — Min 2 in. thick mineral wool board insulation, faced on one side with aluminum foil/scrim vapor retarder, supplied in min 24 by 48 in. boards. Insulation boards installed vertically with tightly-butted seams to cover interior surface of concrete spandrel panel. Horizontal seams of insulation boards (if necessary) to be located min 24 in. above and min 6 in. below planes of floor. Insulation boards secured to spandrel panel with impaling pins in conjunction with min 1-1/2 in. diameter galv steel clinch shields. Butted seams to be covered with aluminum foil tape.
      ROXUL INC — RHT-80
3. **Safing System** — The safing system shall incorporate the following construction features:
   A. **Forming Material*** — Mineral wool batt safing material to be cut into min 4-1/2 in. wide pieces and stacked to a thickness which is at least 25 percent greater than the width of the linear gap between the curtain wall insulation (Item 2D) and the edge of the concrete floor slab. The stacked safing material is compressed and inserted cut-edge-first into the linear gap such that its top surface is flush with the top surface of the floor assembly. A max of one tightly butted seam is permitted between spandrel panel attachment plates or tubes. An additional min 1/2 in. thick piece of mineral wool batt safing material is to be installed to cover top surface of each dead load anchor.
      ROXUL INC — SAFE
   B. **Fill, Void or Cavity Material*** — Min 1/8 in. wet thickness (1/16 in. dry) of fill material spray-applied over top of forming material and lapping min 1/2 in. onto the top surface of the concrete floor and onto the curtain wall insulation.
      SPECIFIED TECHNOLOGIES INC — SpecSeal AS200 Elastomeric Spray

*Bearing the UL Classification Mark



System No. CW-S-2034
o e ber 0, 2001
Integrity Ratings — 1-1/2 and 2 Hr (See Item 2B)
Insulation Ratings — 0 and 1/4 Hr (See Item 2B)
Linear Opening Width — 8 in. Max

1. **Floor Assembly** — Min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) structural concrete. Perimeter of floor assembly to be provided with min 3 by 3 by 1/4 in. thick cast-in-place structural steel angle for weld-attachment of mullion mounting clips (Item 2A).
2. **Curtain Wall Assembly** — The curtain wall assembly shall incorporate the following construction features:
   A. **Mullion Mounting Clips** — Min 4 in. long angles with one nom 4 in. leg for attachment to edge of floor assembly and with one leg approx 4 in. longer than distance to nearest face of mullion. Clips to be formed of min 1/4 in. thick steel. Clips welded to steel angle at edge of floor assembly (Item 1) on each side of vertical mullion (Item 2B) at each floor level. Top edge of each clip to be recessed min 1/2 in. below top surface of floor.
   B. **Framing** — The rectangular tubing mullions (vertical members) and transoms (horizontal members) shall be min 2-1/2 in. wide by 5 in. deep and shall be formed from min 0.085 in. thick aluminum. Mullions spaced max 60 in. OC and secured to mullion mounting clips (Item 2A) at each floor level with two 3/8-16 by 4 in. long hex head steel bolts in conjunction with steel nuts and washers. Interior face of mullions to be max 8 in. from edge of floor assembly. Transoms to be spaced min 60 in. OC. The Insulation and Integrity Ratings are dependent upon the spandrel panel height (center-to-center of transoms) and the min height from the top of the floor to the bottom of the vision panel sill, as tabulated below:

Min Spandrel Panel Height, in.	Min Vision Panel Sill Height, in.	Integrity Rating, Hr	Insulation Rating, Hr
60	24	1-1/2	0
69	34	2	1/4

   C. **Spandrel Panels** — Nom 1/4 in. thick opaque heat-strengthened or tempered glass. Each panel secured in position with aluminum pressure plates in conjunction with glazing gaskets and steel screws.
   D. **Vision Panels** — Nom 1 in. thick (double pane) transparent heat-strengthened glass panels. Each panel secured in position with aluminum pressure plates in conjunction with glazing gaskets and steel screws.
   E. **Spandrel Panel Lintel Angle** — Nom 2 by 2 in. No. 22 gauge galvanized steel angle secured to underside of transom at top of each spandrel panel. Vertical leg of angle recessed 4 in. from interior face of framing to accommodate thickness of curtain wall insulation (Item 2G). Angle installed with 1/8 to 1 in. clearance at each end and screw-attached to transom with No. 8 by 1 in. long self-drilling, self-tapping steel screws spaced max 12 in. OC.
   F. **Steel Hat Channels** — Nom 2-1/2 in. wide by 7/8 in. deep No. 24 gauge galvanized steel hat channel installed to span from mullion-to-mullion for attachment of curtain wall insulation (Item 2H). Hat channels to be cut min 4 in. longer than on center spacing of mullions. Ends of hat channels cut, flattened and bent 90 deg to form min 2 in. long tabs for screw-attachment to mullions with No. 8 by 1 in. long self-drilling, self-tapping steel screws. Hat channels installed max 3 in. above top of vision panel, max 3 in. above top of concrete floor and spaced max 24 in. OC.
   G. **Stiffener Channel** — One nom 2-1/2 in. wide by 7/8 in. deep by 24 gauge (or heavier) steel hat-channel installed to span between mullions at each floor level to restrain curtain wall insulation against outward movement when forming material (Item 3A) is installed. Stiffener channel to be cut min 4 in. longer than on center spacing between mullions. Ends of stiffener channel cut, flattened and bent 90 deg to form min 2 in. long tabs for screw-attachment to the mullion mounting clips (Item 2E) with No. 8 by 1 in. long self-drilling, self-tapping steel screws. Each stiffener channel shall be located with its stem centerline at an elevation 2 in. below the top plane of the floor.
   H. **Curtain Wall Insulation*** — Nom 4 in. thick mineral wool batt insulation faced on one side with aluminum foil/scrim vapor retarder, supplied in lengths at least equal to the spandrel panel height. Insulation batts compression-fitted between vertical mullions, flush with the interior surface of framing, with a maximum of one vertical seam and with no horizontal seams. Insulation

(System No. CW-S-20 Continued)

panels secured to the spandrel panel lintel angle and to each hat channel with min 4-1/2 in. long steel screws with min 1-1/2 in. diameter galv steel clinch shields spaced 3 in. from each vertical edge of batt and spaced max 24 in. OC between vertical edges of batt.

THERMAFIBER LLC — FIRESPAN SS Insulation

J. **Framing Covers — Curtain Wall Insulation*** Min 8 in. wide strips cut from min 2 in. thick mineral wool batt insulation. Framing covers to be centered over mullions and secured to the spandrel panel lintel angle and steel hat channels with min 6-1/2 in. long steel screws. Framing covers on mullions to abut the mineral wool batt safing material (Item 3A) above and below floor. Where more than one spandrel panel occurs between vertically separated vision panels, the horizontal transom between spandrel panels shall also be covered with an 8 in. wide framing cover in the same manner as on the vertical mullions.

THERMAFIBER LLC — FIRESPAN Insulation

3. **Safing System** — The safing system shall incorporate the following construction features:

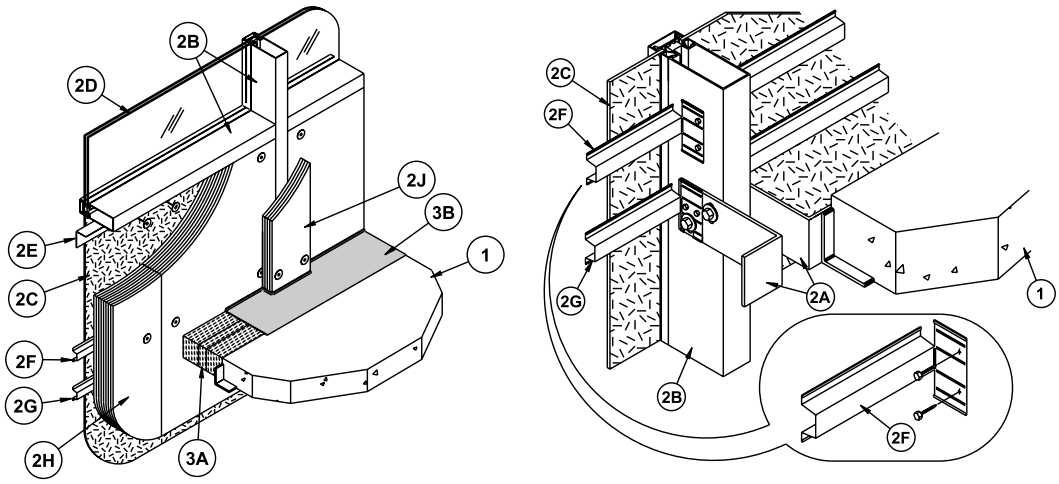
A. **Forming Material*** — Nom 4 pcf density mineral wool batt insulation. Batt sections cut to a min 4-1/2 in. width and stacked to a thickness which is min 20 percent greater than the width of linear gap between the curtain wall insulation and the edge of the concrete floor slab. The forming material is compressed and inserted cut-edge-first into linear gap such that its top surface is flush with the top surface of the floor assembly. A max of one tightly-butted seam is permitted between mullions. Additional pieces of forming material to be friction-fit into spaces between mullion mounting clips at each mullion location.

THERMAFIBER LLC — SAF

B. **Fill, Void or Cavity Material*** — Min 1/8 in. wet thickness (min 1/16 in. dry thickness) of fill material spray-applied over top of forming material and lapping min 1/2 in. onto the top surface of the floor and onto the curtain wall insulation and framing covers.

SPECIFIED TECHNOLOGIES INC — SpecSeal AS200 Elastomeric Spray

*Bearing the UL Classification Marking



System No. CW-S-2035
o e ber 0, 2001
Integrity Ratings — 1-1/2 and 2 Hr (See Item 2B)
Insulation Ratings — 0 and 1/4 Hr (See Item 2B)
Linear Opening Width — 8 in. Max

1. **Floor Assembly** — Min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) structural concrete. Perimeter of floor assembly to be provided with min 3 by 3 by 1/4 in. thick cast-in-place structural steel angle for weld-attachment of mullion mounting clips (Item 2A).
2. **Curtain Wall Assembly** — The curtain wall assembly shall incorporate the following construction features:
   A. **Mullion Mounting Clips** — Min 4 in. long angles with one nom 4 in. leg for attachment to edge of floor assembly and with one leg approx 4 in. longer than distance to nearest face of mullion. Clips to be formed of min 1/4 in. thick steel. Clips welded to steel angle at edge of floor assembly (Item 1) on each side of vertical mullion (Item 2B) at each floor level. Top edge of each clip to be recessed min 1/2 in. below top surface of floor.
   B. **Framing** — The rectangular tubing mullions (vertical members) and transoms (horizontal members) shall be min 2-1/2 in. wide by 5 in. deep and shall be formed from min 0.085 in. thick aluminum. Mullions spaced max 60 in. OC and secured to mullion mounting clips (Item 2A) at each floor level with two 3/8-16 by 4 in. long hex head steel bolts in conjunction with steel nuts and washers. Interior face of mullions to be max 8 in. from edge of floor assembly. Transoms to be spaced min 60 in. OC. The Insulation and Integrity Ratings are dependent upon the spandrel panel height (center-to-center of transoms) and the min height from the top of the floor to the bottom of the vision panel sill, as tabulated below:

Min Spandrel Panel Height, in.	Min Vision Panel Sill Height, in.	Integrity Rating, Hr	Insulation Rating, Hr
60	24	1-1/2	0
69	34	2	1/4

   C. **Spandrel Panels** — Nom 1/8 in. thick aluminum panels with 1/4 in. thick edges. Each panel secured in position with aluminum pressure plates in conjunction with glazing gaskets and steel screws.
   D. **Vision Panels** — Nom 1 in. thick (double pane) transparent heat-strengthened glass panels. Each panel secured in position with aluminum pressure plates in conjunction with glazing gaskets and steel screws.
   E. **Spandrel Panel Lintel Angle** — Nom 2 by 2 in. No. 22 gauge galvanized steel angle secured to underside of transom at top of each spandrel panel. Vertical leg of angle recessed 4 in. from interior face of framing to accommodate thickness of curtain wall insulation (Item 2G). Angle installed with 1/8 to 1 in. clearance at each end and screw-attached to transom with No. 8 by 1 in. long self-drilling, self-tapping steel screws spaced max 12 in. OC.
   F. **Steel Hat Channels** — Nom 2-1/2 in. wide by 7/8 in. deep No. 24 gauge galvanized steel hat channel installed to span from mullion-to-mullion for attachment of curtain wall insulation (Item 2H). Hat channels to be cut min 4 in. longer than on center spacing of mullions. Ends of hat channels cut, flattened and bent 90 deg to form min 2 in. long tabs for screw-attachment to mullions with No. 8 by 1 in. long self-drilling, self-tapping steel screws. Hat channels installed max 3 in. above top of vision panel, max 3 in. above top of concrete floor and spaced max 24 in. OC.
   G. **Stiffener Channel** — One nom 2-1/2 in. wide by 7/8 in. deep by 24 gauge (or heavier) steel hat-channel installed to span between mullions at each floor level to restrain curtain wall insulation against outward movement when forming material (Item 3A) is installed. Stiffener channel to be cut min 4 in. longer than on center spacing between mullions. Ends of stiffener channel cut, flattened and bent 90 deg to form min 2 in. long tabs for screw-attachment to the mullion mounting clips (Item 2E) with No. 8 by 1 in. long self-drilling, self-tapping steel screws. Each stiffener channel shall be located with its stem centerline at an elevation 2 in. below the top plane of the floor.
   H. **Curtain Wall Insulation*** — Nom 4 in. thick mineral wool batt insulation faced on one side with aluminum foil/scrim vapor retarder, supplied in lengths at least equal to the spandrel panel height. Insulation batts compression-fitted between vertical mullions, flush with the interior surface of framing, with a maximum of one vertical seam and with no horizontal seams. Insulation

(System No. CW-S-20 Continued)

panels secured to the spandrel panel lintel angle and to each hat channel with min 4-1/2 in. long steel screws with min 1-1/2 in. diameter galv steel clinch shields spaced 3 in. from each vertical edge of batt and spaced max 24 in. OC between vertical edges of batt.

THERMAFIBER LLC — FIRESPAN SS Insulation

J. **Framing Covers — Curtain Wall Insulation*** Min 8 in. wide strips cut from min 2 in. thick mineral wool batt insulation. Framing covers to be centered over mullions and secured to the spandrel panel lintel angle and steel hat channels with min 6-1/2 in. long steel screws. Framing covers on mullions to abut the mineral wool batt safing material (Item 3A) above and below floor. Where more than one spandrel panel occurs between vertically separated vision panels, the horizontal transom between spandrel panels shall also be covered with an 8 in. wide framing cover in the same manner as on the vertical mullions.

THERMAFIBER LLC — FIRESPAN Insulation

3. **Safing System** — The safing system shall incorporate the following construction features:

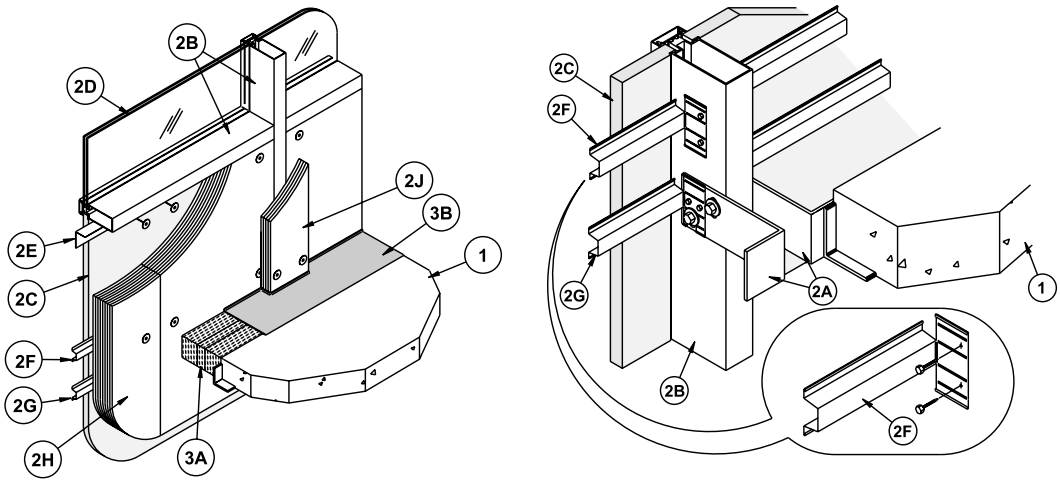
A. **Forming Material*** — Nom 4 pcf density mineral wool batt insulation. Batt sections cut to a min 4-1/2 in. width and stacked to a thickness which is min 20 percent greater than the width of linear gap between the curtain wall insulation and the edge of the concrete floor slab. The forming material is compressed and inserted cut-edge-first into linear gap such that its top surface is flush with the top surface of the floor assembly. A max of one tightly-butted seam is permitted between mullions. Additional pieces of forming material to be friction-fit into spaces between mullion mounting clips at each mullion location.

THERMAFIBER LLC — SAF

B. **Fill, Void or Cavity Material*** — Min 1/8 in. wet thickness (min 1/16 in. dry thickness) of fill material spray-applied over top of forming material and lapping min 1/2 in. onto the top surface of the floor and onto the curtain wall insulation and framing covers.

SPECIFIED TECHNOLOGIES INC — SpecSeal AS200 Elastomeric Spray

*Bearing the UL Classification Marking



System No. CW-S-2036
o e ber 0, 2001
Integrity Ratings — 1-1/2 and 2 Hr (See Item 2B)
Insulation Ratings — 0 and 1/4 Hr (See Item 2B)
Linear Opening Width — 8 in. Max

1. **Floor Assembly** — Min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) structural concrete. Perimeter of floor assembly to be provided with min 3 by 3 by 1/4 in. thick cast-in-place structural steel angle for weld-attachment of mullion mounting clips (Item 2A).
2. **Curtain Wall Assembly** — The curtain wall assembly shall incorporate the following construction features:
   A. **Mullion Mounting Clips** — Min 4 in. long angles with one nom 4 in. leg for attachment to edge of floor assembly and with one leg approx 4 in. longer than distance to nearest face of mullion. Clips to be formed of min 1/4 in. thick steel. Clips welded to steel angle at edge of floor assembly (Item 1) on each side of vertical mullion (Item 2B) at each floor level. Top edge of each clip to be recessed min 1/2 in. below top surface of floor.
   B. **Framing** — The rectangular tubing mullions (vertical members) and transoms (horizontal members) shall be min 2-1/2 in. wide by 5 in. deep and shall be formed from min 0.085 in. thick aluminum. Mullions spaced max 60 in. OC and secured to mullion mounting clips (Item 2A) at each floor level with two 3/8-16 by 4 in. long hex head steel bolts in conjunction with steel nuts and washers. Interior face of mullions to be max 8 in. from edge of floor assembly. Transoms to be spaced min 60 in. OC. The Insulation and Integrity Ratings are dependent upon the spandrel panel height (center-to-center of transoms) and the min height from the top of the floor to the bottom of the vision panel sill, as tabulated below:

Min Spandrel Panel Height, in.	Min Vision Panel Sill Height, in.	Integrity Rating, Hr	Insulation Rating, Hr
60	24	1-1/2	0
69	34	2	1/4

   C. **Spandrel Panels** — Nom 1-3/16 in. thick polished granite spandrel panels with 1 in. thick gauged edges. Each panel secured in position with aluminum pressure plates in conjunction with glazing gaskets and steel screws.
   D. **Vision Panels** — Nom 1 in. thick (double pane) transparent heat-strengthened glass panels. Each panel secured in position with aluminum pressure plates in conjunction with glazing gaskets and steel screws.
   E. **Spandrel Panel Lintel Angle** — Nom 2 by 2 in. No. 22 gauge galvanized steel angle secured to underside of transom at top of each spandrel panel. Vertical leg of angle recessed 4 in. from interior face of framing to accommodate thickness of curtain wall insulation (Item 2G). Angle installed with 1/8 to 1 in. clearance at each end and screw-attached to transom with No. 8 by 1 in. long self-drilling, self-tapping steel screws spaced max 12 in. OC.
   F. **Steel Hat Channels** — Nom 2-1/2 in. wide by 7/8 in. deep No. 24 gauge galvanized steel hat channel installed to span from mullion-to-mullion for attachment of curtain wall insulation (Item 2H). Hat channels to be cut min 4 in. longer than on center spacing of mullions. Ends of hat channels cut, flattened and bent 90 deg to form min 2 in. long tabs for screw-attachment to mullions with No. 8 by 1 in. long self-drilling, self-tapping steel screws. Hat channels installed max 3 in. above top of vision panel, max 3 in. above top of concrete floor and spaced max 24 in. OC.
   G. **Stiffener Channel** — One nom 2-1/2 in. wide by 7/8 in. deep by 24 gauge (or heavier) steel hat-channel installed to span between mullions at each floor level to restrain curtain wall insulation against outward movement when forming material (Item 3A) is installed. Stiffener channel to be cut min 4 in. longer than on center spacing between mullions. Ends of stiffener channel cut, flattened and bent 90 deg to form min 2 in. long tabs for screw-attachment to the mullion mounting clips (Item 2E) with No. 8 by 1 in. long self-drilling, self-tapping steel screws. Each stiffener channel shall be located with its stem centerline at an elevation 2 in. below the top plane of the floor.
   H. **Curtain Wall Insulation*** — Nom 4 in. thick mineral wool batt insulation faced on one side with aluminum foil/scrim vapor retarder, supplied in lengths at least equal to the spandrel panel height. Insulation batts compression-fitted between vertical mullions, flush with the interior surface of framing, with a maximum of one vertical seam and with no horizontal

(System No. CW-S-20 Continued)

seams. Insulation panels secured to the spandrel panel lintel angle and to each hat channel with min 4-1/2 in. long steel screws with min 1-1/2 in. diameter galv steel clinch shields spaced 3 in. from each vertical edge of batt and spaced max 24 in. OC between vertical edges of batt.

THERMAFIBER LLC — FIRESPAN SS Insulation

J. **Framing Covers — Curtain Wall Insulation*** — Min 8 in. wide strips cut from min 2 in. thick mineral wool batt insulation. Framing covers to be centered over mullions and secured to the spandrel panel lintel angle and steel hat channels with min 6-1/2 in. long steel screws. Framing covers on mullions to abut the mineral wool batt safing material (Item 3A) above and below floor. Where more than one spandrel panel occurs between vertically separated vision panels, the horizontal transom between spandrel panels shall also be covered with an 8 in. wide framing cover in the same manner as on the vertical mullions.

THERMAFIBER LLC — FIRESPAN Insulation

3. **Safing System** — The safing system shall incorporate the following construction features:

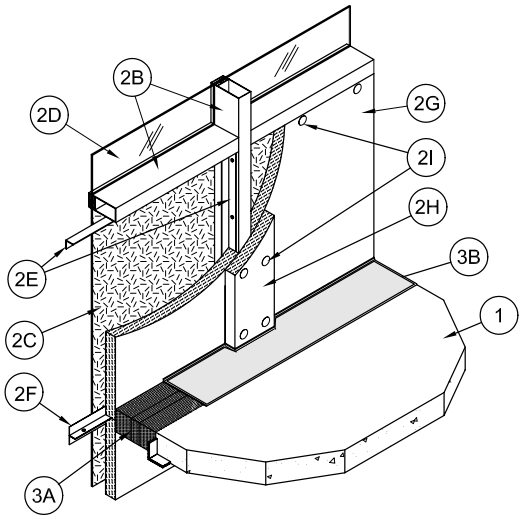
A. **Forming Material*** — Nom 4 pcf density mineral wool batt insulation. Batt sections cut to a min 4-1/2 in. width and stacked to a thickness which is min 20 percent greater than the width of linear gap between the curtain wall insulation and the edge of the concrete floor slab. The forming material is compressed and inserted cut-edge-first into linear gap such that its top surface is flush with the top surface of the floor assembly. A max of one tightly-butted seam is permitted between mullions. Additional pieces of forming material to be friction-fit into spaces between mullion mounting clips at each mullion location.

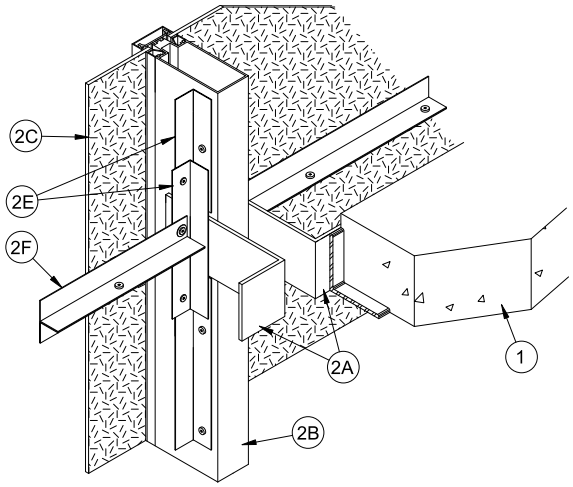
THERMAFIBER LLC — SAF

B. **Fill, Void or Cavity Material*** — Min 1/8 in. wet thickness (min 1/16 in. dry thickness) of fill material spray-applied over top of forming material and lapping min 1/2 in. onto the top surface of the floor and onto the curtain wall insulation and framing covers.

SPECIFIED TECHNOLOGIES INC — SpecSeal AS200 Elastomeric Spray

*Bearing the UL Classification Marking





System No. CW-S-2040

Integrity Ratings — 1-1/2 and 2 Hr (See Item 2B)
Insulation Ratings — 0 and 1/4 Hr (See Item 2B)
Linear Opening Width — 8 In. Max

1. **Floor Assembly** — Min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) structural concrete. Perimeter of floor assembly to be provided with min 3 by 3 by 1/4 in. thick cast-in-place structural steel angle for weld-attachment of mullion mounting clips (Item 2A).
2. **Curtain Wall Assembly** — The curtain wall assembly shall incorporate the following construction features:
   A. **Mullion Mounting Clips** — Min 4 in. long angles with one nom 4 in. leg for attachment to edge of floor assembly and with one leg approx 4 in. longer than distance to nearest face of mullion. Clips to be formed of min 1/4 in. thick steel. Clips welded to steel angle at edge of floor assembly (Item 1) on each side of vertical mullion (Item 2B) at each floor level. Top edge of each clip to be recessed min 1/2 in. below top surface of floor.
   B. **Framing** — The rectangular tubing mullions (vertical members) and transoms (horizontal members) shall be min 2-1/2 in. wide by 5 in. deep and shall be formed from min 0.085 in. thick aluminum. Mullions spaced max 60 in. OC and secured to mullion mounting clips (Item 2A) at each floor level with two 3/8-16 by 4 in. long hex head steel bolts in conjunction with steel nuts and washers. Interior face of mullions to be max 8 in. from edge of floor assembly. Transoms to be spaced min 60 in. OC. The Insulation and Integrity Ratings are dependent upon the spandrel panel height (center-to-center of transoms) and the min height from the top of the floor to the bottom of the vision panel sill, as tabulated below:

Min Spandrel Panel Height, in.	Min Vision Panel Sill Height, in.	Integrity Rating, Hr	Insulation Rating, Hr
60	24	1-1/2	0
69	34	2	1/4

   C. **Spandrel Panels** — Nom 1/8 in. thick aluminum panels with 1/4 in. thick edges. Each panel secured in position with aluminum pressure plates in conjunction with gaskets and steel screws.
   D. **Vision Panels** — Nom 1/4 in. thick transparent heat-strengthened glass. Each panel secured in position with aluminum pressure plates in conjunction with glazing gaskets and steel screws.
   E. **Spandrel Panel Perimeter Angles** — Nom 1-1/2 by 1-1/2 in. No. 22 gauge galvanized steel angles installed around entire perimeter of each spandrel panel. Angles recessed from interior face of framing as necessary to accommodate thickness of curtain wall insulation (Item 2G). Angles cut to be discontinuous at mullion mounting clips (Item 2A). Angles screw-attached to mullions and transom along sides and top of each spandrel panel with No. 8 by 1 in. long self-drilling, self-tapping steel screws spaced max 12 in. OC. Angle along bottom of each spandrel panel to be screw-attached to leg of angle on mullion at each end without any direct attachment to transom. At mullion mounting clips, a length of steel angle shall be installed to bridge between the perimeter angles over the mullion mounting clip. The "bridge" shall be cut approx 6 in. longer than the clear space between angles and shall be secured to the perimeter angles with one No. 8 by 1 in. long steel screw at each end.
   F. **Stiffener Tee** — Two nom 1-1/2 by 1-1/2 in. No. 20 gauge galv steel angles secured together, back-to-back, to form stiffener tee for installation in each horizontal seam of the curtain wall insulation (Item 2G). The angle legs forming the stem of the tee shall be secured together using No. 8 by 1/2 in. long self-drilling, self-tapping steel screws spaced max 8 in. OC. The tee shall be installed with a clearance of 1/8 to 1/4 in. at each end and shall be screw-attached to the spandrel panel perimeter angles (Item 2E) with No. 10 by 3/4 in. long self-drilling, self-tapping steel screws, with steel washers, through two predrilled 1/4 in. diam holes at each end. One stiffener tee shall be located with its stem at an elevation 2 in. below the top plane of the floor at each floor level.
   G. **Curtain Wall Insulation*** — Min 2 in. thick mineral wool batt insulation faced on one side with aluminum foil/scrim vapor retarder, supplied in min 36 in. wide batts. Insulation batts to be installed with no vertical seams and with horizontal seams spaced min 36 in. OC. Insulation panels tightly-fitted between vertical mullions and between the stem of the stiffener tee (Item 2F) and the transom, flush with the interior surface of framing. Insulation panels secured to spandrel panel perimeter angles and to each stiffener tee with cup head weld pins (Item 2I) spaced max 12 in OC. The horizontal seam between insulation panels shall be located 2 in. below the top plane of the floor at each floor level.

(System No. CW-S-2040 Continued)

FIBREX INSULATIONS INC — FBX CW90 Curtain Wall Insulation

H. **Framing Covers — Curtain Wall Insulation*** — Min 8 in. wide strips cut from the same min 2 in. thick mineral wool batt insulation used for the curtain wall insulation (Item 2G). Framing covers to be centered over mullions and secured to the spandrel panel perimeter angles with cup head weld pins (Item 2I) spaced max 12 in. OC. Where more than one spandrel panel occurs between vertically separated vision panels, the horizontal transom between spandrel panels shall also be covered with an 8 in. wide framing cover in the same manner as on the vertical mullions. Framing covers on mullions to abut the mineral wool batt safing material (Item 3A) above and below floor.

FIBREX INSULATIONS INC — FBX CW90 Curtain Wall Insulation

I. **Weld Pin** — No. 12 gauge galv steel weld pin with nom 1-3/16 in. diam galv steel cup head. Cup head weld pins provided in two lengths. One length to be equal to thickness of curtain wall insulation (Item 2G) and second length to be equal to thickness of curtain wall insulation plus thickness of framing cover (Item 2H). Cup head weld pins inserted through curtain wall insulation and mullion covers and welded to spandrel panel perimeter angles max 12 in. OC.

3. **Safing System** — The safing system shall incorporate the following construction features:

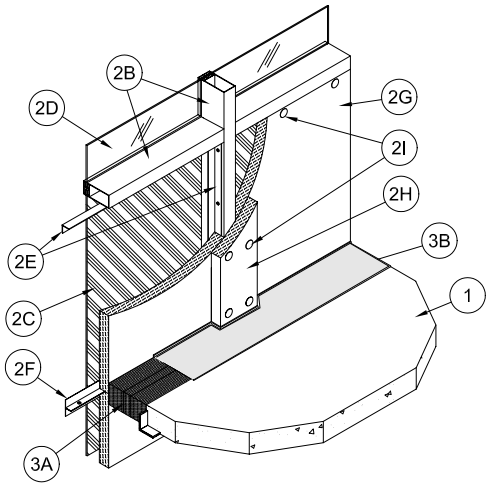
A. **Forming Material*** — Nom 4 pcf density mineral wool batt insulation. Batt sections cut to a width equal to the thickness of the floor and stacked to a thickness which is min 20 percent greater than the width of linear gap between the curtain wall insulation and the edge of the concrete floor slab. The forming material is compressed and inserted cut-edge-first into linear gap such that its top and bottom surfaces are flush with the surfaces of the floor assembly. A max of one tightly-butted seam is permitted between mullions. Additional pieces of forming material to be friction-fit into spaces between mullion mounting clips at each mullion location.

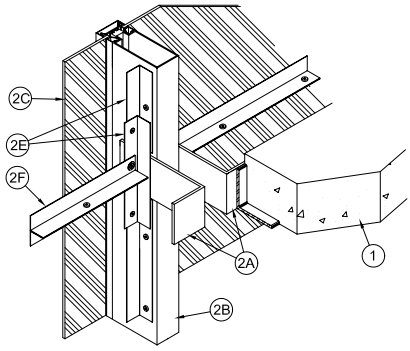
FIBREX INSULATIONS INC — FBX Safing Insulation

B. **Fill, Void or Cavity Material*** — Min 1/8 in. wet thickness of fill material spray- applied over top of forming material and lapping min 1/2 in. onto the top surface of the floor and onto the curtain wall insulation and framing covers.

SPECIFIED TECHNOLOGIES INC — SpecSeal AS200 Elastomeric Spray.

*Bearing the UL Classification Marking





System No. CW-S-2044

Integrity Ratings — 1-1/2 and 2 Hr (See Item 2B)
Insulation Ratings — 0 and 1/4 Hr (See Item 2B)
Linear Opening Width — 8 In. Max
L Rating At Ambient — Less Than 1 CFM/Lin Ft
L Rating At 400°F — Less Than 1 CFM/Lin Ft

1. **Floor Assembly** — Min 4-1/2 in . thick reinforced lightweight or normal weight (100-150 pcf) structural concrete. Perimeter of floor assembly to be provided with min 3 by 3 by 1/4 in. thick cast-in-place structural steel angle for weld-attachment of mullion mounting clips (Item 2A).
2. **Curtain Wall Assembly** — The curtain wall assembly shall incorporate the following construction features:
   A. **Mullion Mounting Clips** — Min 4 in. long angles with one nom 4 in. leg for attachment to edge of floor assembly and with one leg approx 4 in. longer than distance to nearest face of mullion. Clips to be formed of min 1/4 in. thick steel. Clips welded to steel angle at edge of floor assembly (Item 1) on each side of vertical mullion (Item 2B) at each floor level. Top edge of each Clip to be recessed min 1/2 in. below top surface of floor.
   B. **Framing** — The rectangular tubing mullions (vertical members) and transoms (horizontal members) shall be min 2-1/2 in. wide by 5 in. deep and shall be formed from min 0.085 in. thick aluminum. Mullions spaced max 60 in. OC and secured to mullion mounting Clips (Item 2A) at each floor level with two 3/8-16 by 4 in. long hex head steel bolts in conjunction with Steel nuts and washers. Interior face of mullions to be max 8 in. from edge of floor assembly. Transoms to be spaced min 60 in. OC. The Insulation and Integrity Ratings are dependent upon the spandrel panel height (center-to-center of transoms) and the min height from the top of the floor to the bottom of the vision panel sill, as tabulated below

Min Spandrel Panel Height, in.	Min Vision Panel Sill Height, in.	Integrity Rating, Hr	Insulation Rating, Hr
60	24	1-1/2	0
69	34	2	1/4

   C. **Spandrel Panels** — Nom 1/4 in. thick opaque heat-strengthened glass. Each panel secured in position with aluminum pressure plates in conjunction with glazing gaskets and steel screws.
   D. **Vision Panels** — Nom 1/4 in. thick transparent heat-strengthened glass. Each panel secured in position with aluminum pressure plates in conjunction with silicone rubber setting blocks, glazing gaskets and steel screws.
   E. **Spandrel Panel Perimeter Angles** — Nom 1-1/2 by 1-1/2 in. No. 22 gauge galvanized steel angles installed around entire perimeter of each spandrel panel. Angles recessed from interior face of framing as necessary to accommodate thickness of curtain wall insulation (Item 2G). Angles cut to be discontinuous at mullion mounting clips (Item 2A). Angles screw-attached to mullions and transom along sides and top of each spandrel panel with No. 8 by 1 in. long self-drilling, self-tapping steel screws spaced max 12 in. OC. Angle along bottom of each spandrel panel to be screw-attached to leg of angle on mullion at each end without any direct attachment to transom. At mullion mounting clips, a length of steel angle shall be installed to bridge between the perimeter angles over the mullion mounting clip. The “bridge” shall be cut approx 6 in. longer than the clear space between angles and shall be secured to the perimeter angles with one No. 8 by 1 in. long steel screw at each end.
   F. **Stiffener Tee** — Two nom 1-1/2 by 1-1/2 in. No. 20 gauge galv steel angles secured together, back-to-back, to form stiffener tee for installation in each horizontal seam of the curtain wall insulation (Item 2G) . The angle legs forming the stem of the tee shall be secured together using No. 8 by 1/2 in. long self-drilling, self-tapping steel screws spaced max 8 in. OC. The tee shall be installed with a clearance of 1/8 to 1/4 in. at each end and shall be screw-attached to the spandrel panel perimeter angles (Item 2E) with No. 10 by 3/4 in. long self-drilling, self-tapping steel screws, with steel washers, through two predrilled 1/4 in. diam holes at each end. One stiffener tee shall be located with its stem at an elevation 2 in. below the top plane of the floor at each floor level.
   G. **Curtain Wall Insulation*** — Min 2 in. thick mineral wool batt insulation faced on one side with aluminum foil/scrim vapor retarder, supplied in min 36 in. wide batts. Insulation batts to be installed with no vertical seams and with horizontal seams spaced min 36 in. OC. Insulation panels tightly-fitted between vertical mullions and between the stem of the stiffener tee (Item 2F) and the

(System No. CW-S-2044 Continued)

transom, flush with the interior surface of framing. Insulation panels secured to spandrel panel perimeter angles and to each stiffener tee with cup head weld pins (Item 2I) spaced max 12 in. OC. The horizontal seam between insulation panels shall be located 2 in. below the top plane of the floor at each floor level.

OWENS CORNING HT INC, DIV OF OWENS CORNING — CW-8

H. **Framing Covers — Curtain Wall Insulation*** — Min 1 in. thick mineral wool batt insulation faced on one side with aluminum foil/scrim vapor retarder, supplied in min 24 by 48 in. boards. Nom 8 in. wide strips to be centered over mullions and secured to the spandrel panel perimeter angles with cup head weld pins (Item 2I) spaced max 12 in. OC. Where more than one spandrel panel occurs between vertically separated vision panels, the horizontal transom between spandrel panels shall also be covered with an 8 in. wide framing cover in the same manner as on the vertical mullions. Framing covers on mullions to abut the mineral wool batt safing material (Item 3A) above and below floor.

OWENS CORNING HT INC, DIV OF OWENS CORNING — CW-8

I. **Weld Pin** — No. 12 gauge galv steel weld pin with nom 1-3/16 in. diam galv steel cup head. Cup head weld pins provided in two lengths. One length to be equal to thickness of curtain wall insulation (Item 2G) and second length to be equal to thickness of curtain wall insulation plus thickness of framing cover (Item 2H). Cup head weld pins inserted through curtain wall insulation and mullion covers and welded to spandrel panel perimeter angles max 12 in. OC.

J. **Steel Screw And Clinch Shield** — (Not Shown) — As an alternate to the weld pins (Item 2I), self-drilling, self-tapping steel screws with min 1-1/2 in. diam galv steel clinch shields may be used to secure the curtain wall insulation and framing covers. Steel screws provided in two lengths. One length to be 1/2 in. greater than thickness of curtain wall insulation (Item 2G) and second length to be 1/2 in. greater than thickness of curtain wall insulation plus thickness of framing cover (Item 2H). Screws secured to spandrel panel perimeter angles, through curtain wall insulation and mullion covers, and spaced max 12 in. OC.

3. **Safing System** — The safing system shall incorporate the following construction features:

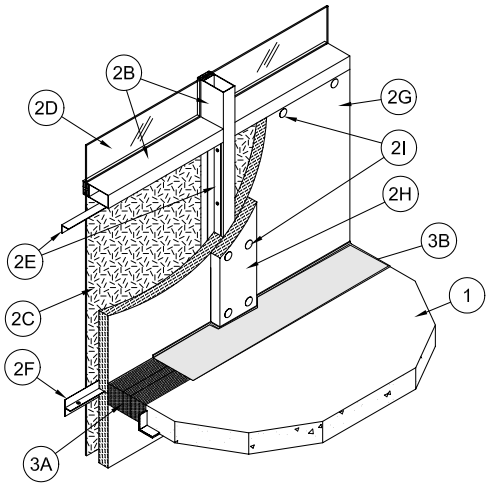
A. **Forming Material*** — Nom 4 pcf density mineral wool batt insulation. Batt sections cut to a min 4-1/2 in. width and stacked to a thickness which is min 20 percent greater than the width of linear gap between the curtain wall insulation and the edge of the concrete floor slab. The forming material is compressed and inserted cut-edge-first into linear gap such that its top surface is flush with the top surface of the floor assembly. A max of one tightly-butted seam is permitted between mullions. Additional pieces of forming material to be friction-fit into spaces between mullion mounting clips at each mullion location.

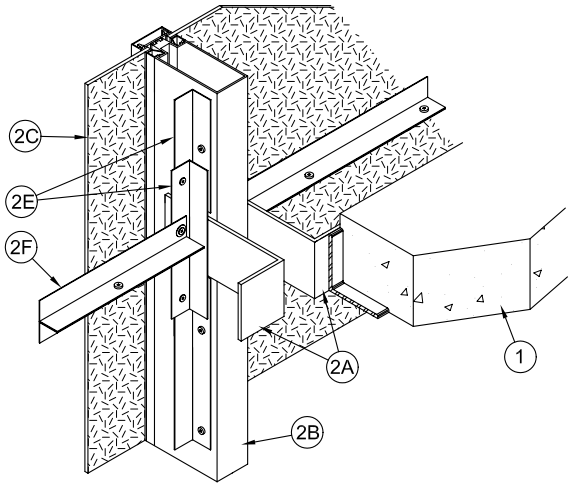
OWENS CORNING HT INC, DIV OF OWENS CORNING — Safing Insulation/MW

B. **Fill, Void or Cavity Material*** — Min 1/8 in. wet thickness (min 1/16 in. dry) of fill material spray-applied over top of forming material and lapping min 1/2 in. onto the top surface of the floor and onto the curtain wall insulation and framing covers.

SPECIFIED TECHNOLOGIES INC — SpecSeal AS200 Elastomeric Spray

*Bearing the UL Classification Mark





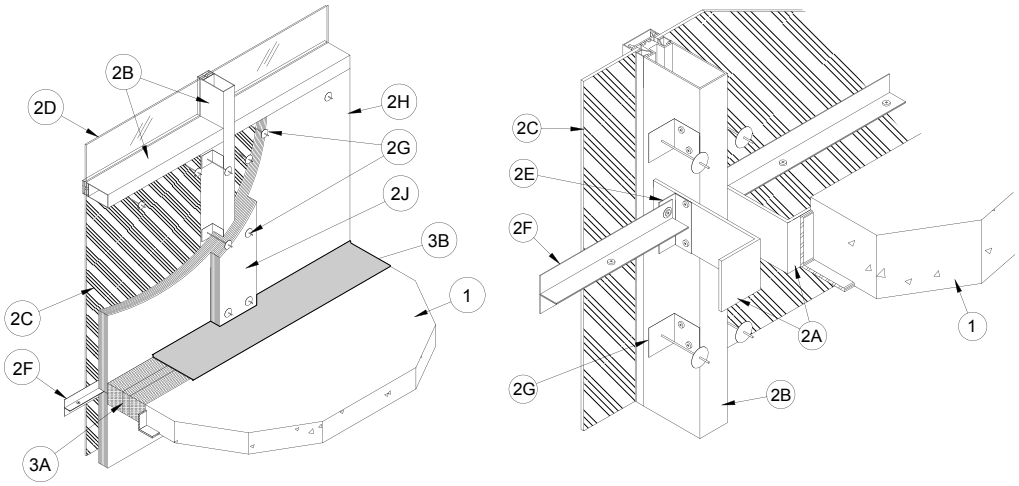
System No. CW-S-2045
Integrity Ratings — 1-1/2 and 2 Hr (See Item 2B)
Insulation Ratings — 0 and 1/4 Hr (See Item 2B)
Linear Opening Width — 8 In. Max
L Rating At Ambient — Less Than 1 CFM/Lin Ft
L Rating At 400°F — Less Than 1 CFM/Lin Ft

1. **Floor Assembly** — Min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) structural concrete. Perimeter of floor assembly to be provided with min 3 by 3 by 1/4 in. thick cast-in-place structural steel angle for weld-attachment of mullion mounting clips (Item 2A).
2. **Curtain Wall Assembly** — The curtain wall assembly shall incorporate the following construction features:
   A. **Mullion Mounting Clips** — Min 4 in. long angles with one nom 4 in. leg for attachment to edge of floor assembly and with one leg approx 4 in. longer than distance to nearest face of mullion. Clips to be formed of min 1/4 in. thick steel. Angles Clips welded to steel angle at edge of floor assembly (Item 1) on each side of vertical mullion (Item 2B) at each floor level. Top edge of each clip to be recessed min 1/2 in. below top surface of floor.
   B. **Framing** — The rectangular tubing mullions (vertical members) and transoms (horizontal members) shall be min 2-1/2 in. wide by 5 in. deep and shall be formed from min 0.085 in. thick aluminum. Mullions spaced max 60 in. OC and secured to mullion mounting clips (Item 2A) at each floor level with two 3/8-16 by 4 in. long hex head steel bolts in conjunction with steel nuts and washers . Interior face of mullions to be max 8 in. from edge of floor assembly. Transoms to be spaced min 60 in. OC. The Insulation and Integrity Ratings are dependent upon the spandrel panel height (center-to-center of transoms) and the min height from the top of the floor to the bottom of the vision panel sill, as tabulated below:

Min Spandrel Panel Height, in.	Min Vision Panel Sill Height, in.	Integrity Rating, Hr	Insulation Rating, Hr
60	24	1-1/2	0
69	34	2	1/4

   C. **Spandrel Panels** — Nom 1/8 in. thick aluminum panels with 1/4 in. thick edges. Each panel secured in position with aluminum pressure plates in conjunction with gaskets and steel screws.
   D. **Vision Panels** — Nom 1/4 in. thick transparent heat-strengthened glass. Each panel secured in position with aluminum pressure plates in conjunction with silicone rubber setting blocks, glazing gaskets and steel screws.
   E. **Spandrel Panel Perimeter Angles** — Nom 1-1/2 by 1-1/2 in. No. 22 gauge galvanized steel angles installed around entire perimeter of each spandrel panel. Angles recessed from interior face of framing as necessary to accommodate thickness of curtain wall insulation (Item 2G). Angles cut to be discontinuous at mullion mounting clips (Item 2A). Angles screw-attached to mullions and transom along sides and top of each spandrel panel with No. 8 by 1 in. long self-drilling, self-tapping steel screws spaced max 12 in. OC. Angle along bottom of each spandrel panel to be screw-attached to leg of angle on mullion at each end without any direct attachment to transom. At mullion mounting clips, a length of steel angle shall be installed to bridge between the perimeter angles over the mullion mounting clip. The “bridge” shall be cut approx 6 in. longer than the clear space between angles and shall be secured to the perimeter angles with one No. 8 by 1 in. long steel screw at each end.
   F. **Stiffener Tee** — Two nom 1-1/2 by 1-1/2 in. No. 20 gauge galv steel angles secured together, back-to-back, to form stiffener tees for installation in each horizontal seam of the curtain wall insulation (Item 2G) . The angle legs forming the stem of the tee shall be secured together using No. 8 by 1/2 in. long self-drilling, self-tapping steel screws spaced max 8 in. OC. The tee shall be installed with a clearance of 1/8 to 1/4 in. at each end and shall be screw-attached to the spandrel panel perimeter angles (Item 2E) with No. 10 by 3/4 in. long self-drilling, self-tapping steel screws, with steel washers, through two predrilled 1/4 in. diam holes at each end. One stiffener tee shall be located with its stem at an elevation 2 in. below the top plane of the floor at each floor level.
   G. **Curtain Wall Insulation*** — Min 2 in. thick mineral wool batt insulation faced on one side with aluminum foil/scrim vapor retarder, supplied in min 36 in. wide batts. Insulation batts to be installed with no vertical seams and with horizontal seams spaced min 36 in. OC. Insulation panels tightly-fitted between vertical mullions and between the stem of the stiffener tee (Item 2F) and the

(System No. CW-S-2045 Continued)



System No. CW-S-2050
Integrity Rating — 3 Hr
Insulation Rating — 1/4 Hr
Linear Opening Width — 8 In. Max
L Rating At Ambient — Less Than 1 CFM/Lin Ft
L Rating At 400°F — Less Than 1 CFM/Lin Ft

1. **Floor Assembly** — Min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) structural concrete. Perimeter of floor assembly to be provided with min 3 by 3 by 1/4 in. thick cast-in-place structural steel angle for weld-attachment of mullion mounting clips (Item 2A).
2. **Curtain Wall Assembly** — The curtain wall assembly shall incorporate the following construction features:
   A. **Mullion Mounting Clips** — Nom 4 in. long angles with one nom 4 in. leg for attachment to edge of floor assembly and with one leg approx 4 in. longer than the distance from the floor edge to the mullion. Clips to be formed of min 1/4 in. thick steel. Clips welded to steel angle at edge of floor assembly (Item 1) on each side of vertical mullion (Item 2B) at each floor level. Top edge of each clip to be recessed min 1/2 in. below top surface of floor.
   B. **Framing** — The rectangular tubing mullions (vertical members) and transoms (horizontal members) shall be min 2-1/2 in. wide by 5 in. deep and shall be formed from min 0.100 in. thick aluminum. Mullions spaced max 60 in. OC and secured to mullion mounting clips (Item 2A) at each floor level with two 3/8-16 by 4 in. long hex head steel bolts in conjunction with steel nuts and washers. Interior face of mullions to be max 8 in. from edge of floor assembly. Transoms to be spaced min 66 in. OC. The minimum height from the top of the floor to the bottom of the vision panel sill is 33 in.
   C. **Spandrel Panels** — Nom 1/4 in. thick or nom 1 in. thick (double pane) heat-strengthened glass panels. Each panel installed on silicone rubber setting blocks and secured in position with aluminum pressure plates in conjunction with glazing gaskets and steel screws.
   D. **Vision Panels** — Nom 1 in. thick insulated glass units with two layers of nom 1/4 in. thick transparent heat-strengthened glass separated by a 1/2 in. air space. Each panel installed on silicone rubber setting blocks and secured in position with aluminum pressure plates in conjunction with glazing gaskets and steel screws.
   E. **Stiffener Tee Attachment Angles** — Nom 1-1/2 by 1-1/2 by 4 in. long No. 22 gauge galvanized steel angles. Each angle secured to steel mullion mounting clip (Item 2A) with two No. 10 by min 1/2 in. long self-tapping steel screws. Angle recessed from interior face of framing as necessary to accommodate the thickness of curtain wall insulation (Item 2H).
   F. **Stiffener Tee** — Two nom 1-1/2 by 1-1/2 in. No. 22 gauge galv steel angles secured together, back-to-back, to form stiffener tee for installation between mullions at each floor level to restrain curtain wall insulation (Item 2H) against outward movement when forming material (Item 3A) is installed. The angle legs forming the stem of the tee shall be secured together using No. 8 by 1/2 in. long self-drilling, self-tapping steel screws spaced max 8 in. OC. The tee shall be installed with a clearance of 1/8 to 1/4 in. at each end and shall be screw-attached to the stiffener tee attachment angles (Item 2E) with No. 10 by min 1/2 in. long self-drilling, self-tapping steel screws, with steel washers, through two predrilled 1/4 in. diam holes at each end. Each stiffener tee shall be located with its stem at an elevation 3 in. below the top plane of the floor.
   G. **Insulation Hangers** — Min 4-1/2 in. long No. 12 gauge steel pins swaged to nom 2 by 2 by 2 in. long No. 28 gauge galvanized steel angles. Insulation hangers screw-attached to mullions and transoms with two No. 10 by min 1/2 in. long self-drilling, self-tapping steel screws per hanger. Insulation hangers to be located in each corner of spandrel panel and spaced max 12 in. OC along sides and top of each spandrel panel. No insulation hangers to be used on the transom at the head (lintel) of a vision panel.
   H. **Curtain Wall Insulation*** — Min 2 in. thick mineral wool batt insulation faced on one side with aluminum foil/scrim vapor retarder, supplied in min 36 in. wide batts. Insulation batts to be installed with no vertical seams and with horizontal seams spaced min 36 in. OC. Insulation panels tightly-fitted between vertical mullions and between the stem of the stiffener tee (Item 2F) and the transom, flush with the interior surface of framing. Insulation panels impaled on steel pins (Item 2G) and secured in place with nom 1-1/2 in. diam steel self-locking washers ("clinch shields"). The horizontal seam between insulation panels shall be located 3 in. below the top plane of the floor at each floor level.

OWENS CORNING HT INC, DIV OF OWENS CORNING — CW-8

(System No. CW-S-2050 Continued)

J. **Framing Covers** — **Curtain Wall Insulation*** — Min 1 in. thick mineral wool batt insulation faced on one side with aluminum foil/scrim vapor retarder, supplied in min 24 by 48 in. boards. Nom 8 in. wide strips to be centered over mullions and impaled on the same pins (Item 2G) and secured in place with nom 1-1/2 in. diam steel self-locking washers ("clinch shields"). Where more than one spandrel panel occurs between vertically separated vision panels, the horizontal transom between spandrel panels shall also be covered with an 8 in. wide framing cover in the same manner as on the vertical mullions. Framing covers on mullions to abut the mineral wool batt safing material (Item 3A) above and below floor.

OWENS CORNING HT INC, DIV OF OWENS CORNING — CW-8

3. **Safing System** — The safing system shall incorporate the following construction features:

A. **Forming Material*** — Nom 4 pcf density mineral wool batt insulation. Batt sections cut to a min 4-1/2 in. width and stacked to a thickness, which is min 25 percent greater than the width of linear gap between the curtain wall insulation and the edge of the concrete floor slab to attain a min 20 percent compression in the thickness direction. The forming material is compressed and inserted cut-edge-first into linear gap such that its top surface is flush with the top surface of the floor assembly. A max of one tightly-butted seam is permitted between mullions. Additional pieces of forming material to be friction-fit into spaces between mullion mounting clips at each mullion location.

OWENS CORNING HT INC, DIV OF OWENS CORNING — Safing Insulation

B. **Fill, Void or Cavity Material*** — Min 1/8 in. wet thickness (min 1/16 in. dry thickness) of fill material spray-applied over top of forming material and lapping min 1/2 in. onto the top surface of the floor and onto the curtain wall insulation and framing covers.

SPECIFIED TECHNOLOGIES INC — SpecSeal AS200 Elastomeric Spray

*Bearing the UL Classification Mark

transom, flush with the interior surface of framing. Insulation panels secured to spandrel panel perimeter angles and to each stiffener tee with cup head weld pins (Item 2I) spaced max 12 in OC. The horizontal seam between insulation panels shall be located 2 in. below the top plane of the floor at each floor level.

OWENS CORNING HT INC, DIV OF OWENS CORNING — CW-8

H. **Framing Covers — Curtain Wall Insulation*** — Min 1 in. thick mineral wool batt insulation faced on one side with aluminum foil/scrim vapor retarder, supplied in min 24 by 48 in. boards. Nom 8 in. wide strips to be centered over mullions and secured to the spandrel panel perimeter angles with cup head weld pins (Item 2I) spaced max 12 in. OC. Where more than one spandrel panel occurs between vertically separated vision panels, the horizontal transom between spandrel panels shall also be covered with an 8 in. wide framing cover in the same manner as on the vertical mullions. Framing covers on mullions to abut the mineral wool batt safing material (Item 3A) above and below floor.

OWENS CORNING HT INC, DIV OF OWENS CORNING — Safing Insulation/MW

I. **Weld Pin** — No. 12 gauge galv steel weld pin with nom 1-3/16 in. diam galv steel cup head. Cup head weld pins provided in two lengths. One length to be equal to thickness of curtain wall insulation (Item 2G) and second length to be equal to thickness of curtain wall insulation plus thickness of framing cover (Item 2H). Cup head weld pins inserted through curtain wall insulation and mullion covers and welded to spandrel panel perimeter angles max 12 in. OC.

J. **Steel Screw And Clinch Shield** — (Not Shown) — As an alternate to the weld pins (Item 2I), self-drilling, self-tapping steel screws with min 1-1/2 in. diam galv steel clinch shields may be used to secure the curtain wall insulation and framing covers. Steel screws provided in two lengths. One length to be 1/2 in. greater than thickness of curtain wall insulation (Item 2G) and second length to be 1/2 in. greater than thickness of curtain wall insulation plus thickness of framing cover (Item 2H). Screws secured to spandrel panel perimeter angles, through curtain wall insulation and mullion covers, and spaced max 12 in. OC.

3. **Safing System** — The safing system shall incorporate the following construction features:

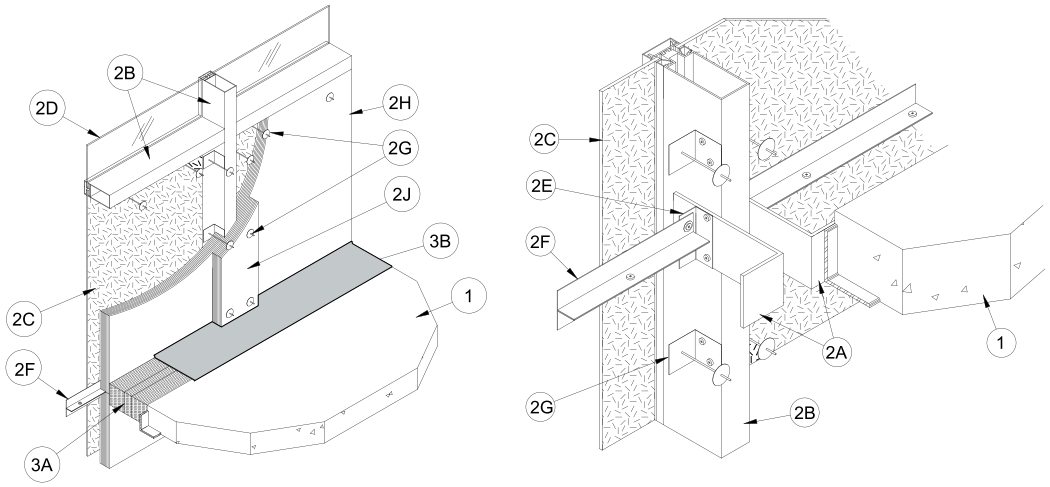
A. **Forming Material*** — Nom 4 pcf density mineral wool batt insulation. Batt sections cut to a min 4-1/2 in. width and stacked to a thickness which is min 20 percent greater than the width of linear gap between the curtain wall insulation and the edge of the concrete floor slab. The forming material is compressed and inserted cut-edge-first into linear gap such that its top surface is flush with the top surface of the floor assembly. A max of one tightly-butted seam is permitted between mullions. Additional pieces of forming material to be friction-fit into spaces between mullion mounting clips at each mullion location.

OWENS CORNING HT INC, DIV OF OWENS CORNING — Safing Insulation/MW

B. **Fill, Void or Cavity Material*** — Min 1/8 in. wet thickness (min 1/16 in. dry) of fill material spray- applied over top of forming material and lapping min 1/2 in. onto the top surface of the floor and onto the curtain wall insulation and framing covers.

SPECIFIED TECHNOLOGIES INC — SpecSeal AS200 Elastomeric Spray.

*Bearing the UL Classification Mark



System No. CW-S-2051
Integrity Rating — 3 Hr
Insulation Rating — 1/4 Hr
Linear Opening Width — 8 In. Max
L Rating At Ambient — Less Than 1 CFM/Lin Ft
L Rating At 400°F — Less Than 1 CFM/Lin Ft

1. **Floor Assembly** — Min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) structural concrete. Perimeter of floor assembly to be provided with min 3 by 3 by 1/4 in. thick cast-in-place structural steel angle for weld-attachment of mullion mounting clips (Item 2A).
2. **Curtain Wall Assembly** — The curtain wall assembly shall incorporate the following construction features:
   A. **Mullion Mounting Clips** — Nom 4 in. long angles with one nom 4 in. leg for attachment to edge of floor assembly and with one leg approx 4 in. longer than the distance from the floor edge to the mullion. Clips to be formed of min 1/4 in. thick steel. Clips welded to steel angle at edge of floor assembly (Item 1) on each side of vertical mullion (Item 2B) at each floor level. Top edge of each clip to be recessed min 1/2 in. below top surface of floor.
   B. **Framing** — The rectangular tubing mullions (vertical members) and transoms (horizontal members) shall be min 2-1/2 in. wide by 5 in. deep and shall be formed from min 0.100 in. thick aluminum. Mullions spaced max 60 in. OC and secured to mullion mounting clips (Item 2A) at each floor level with two 3/8-16 by 4 in. long hex head steel bolts in conjunction with steel nuts and washers. Interior face of mullions to be max 8 in. from edge of floor assembly. Transoms to be spaced min 66 in. OC. The minimum height from the top of the floor to the bottom of the vision panel sill is 33 in.
   C. **Spandrel Panels** — Nom 1/8 in. thick aluminum panels with 1/4 in. thick edges. Each panel secured in position with aluminum pressure plates in conjunction with glazing gaskets and steel screws.
   D. **Vision Panels** — Nom 1 in. thick insulated glass units with two layers of nom 1/4 in. thick transparent heat-strengthened glass separated by a 1/2 in. air space. Each panel installed on silicone rubber setting blocks and secured in position with aluminum pressure plates in conjunction with glazing gaskets and steel screws.
   E. **Stiffener Tee Attachment Angles** — Nom 1-1/2 by 1-1/2 by 4 in. long No. 22 gauge galvanized steel angles. Each angle secured to steel mullion mounting clip (Item 2A) with two No. 10 by min 1/2 in. long self-tapping steel screws. Angle recessed from interior face of framing as necessary to accommodate the thickness of curtain wall insulation (Item 2H).
   F. **Stiffener Tee** — Two nom 1-1/2 by 1-1/2 in. No. 22 gauge galv steel angles secured together, back-to-back, to form stiffener tee for installation between mullions at each floor level to restrain curtain wall insulation (Item 2H) against outward movement when forming material (Item 3A) is installed. The angle legs forming the stem of the tee shall be secured together using No. 8 by 1/2 in. long self-drilling, self-tapping steel screws spaced max 8 in. OC. The tee shall be installed with a clearance of 1/8 to 1/4 in. at each end and shall be screw-attached to the stiffener tee attachment angles (Item 2E) with No. 10 by min 1/2 in. long self-drilling, self-tapping steel screws, with steel washers, through two predrilled 1/4 in. diam holes at each end. Each stiffener tee shall be located with its stem at an elevation 3 in. below the top plane of the floor.
   G. **Insulation Hangers** — Min 4-1/2 in. long No. 12 gauge steel pins swaged to nom 2 by 2 by 2 in. long No. 28 gauge galvanized steel angles. Insulation hangers screw-attached to mullions and transoms with two No. 10 by min 1/2 in. long self-drilling, self-tapping steel screws per hanger. Insulation hangers to be located in each corner of spandrel panel and spaced max 12 in. OC along sides and top of each spandrel panel. No insulation hangers to be used on the transom at the head (lintel) of a vision panel.
   H. **Curtain Wall Insulation*** — Min 2 in. thick mineral wool batt insulation faced on one side with aluminum foil/scrim vapor retarder, supplied in min 36 in. wide batts. Insulation batts to be installed with no vertical seams and with horizontal seams spaced min 36 in. OC. Insulation panels tightly-fitted between vertical mullions and between the stem of the stiffener tee (Item 2F) and the transom, flush with the interior surface of framing. Insulation panels impaled on steel pins (Item 2G) and secured in place with nom 1-1/2 in. diam steel self-locking washers ("clinch shields"). The horizontal seam between insulation panels shall be located 3 in. below the top plane of the floor at each floor level.

OWENS CORNING HT INC, DIV OF OWENS CORNING — CW-8

(System No. CW-S-2051 Continued)

J. **Framing Covers** — Curtain Wall Insulation* — Min 1 in. thick mineral wool batt insulation faced on one side with aluminum foil/scrim vapor retarder, supplied in min 24 by 48 in. boards. Nom 8 in. wide strips to be centered over mullions and impaled on the same pins (Item 2G) and secured in place with nom 1-1/2 in. diam steel self-locking washers ("clinch shields"). Where more than one spandrel panel occurs between vertically separated vision panels, the horizontal transom between spandrel panels shall also be covered with an 8 in. wide framing cover in the same manner as on the vertical mullions. Framing covers on mullions to abut the mineral wool batt safing material (Item 3A) above and below floor.

OWENS CORNING HT INC, DIV OF OWENS CORNING — CW-8

3. **Safing System** — The safing system shall incorporate the following construction features:

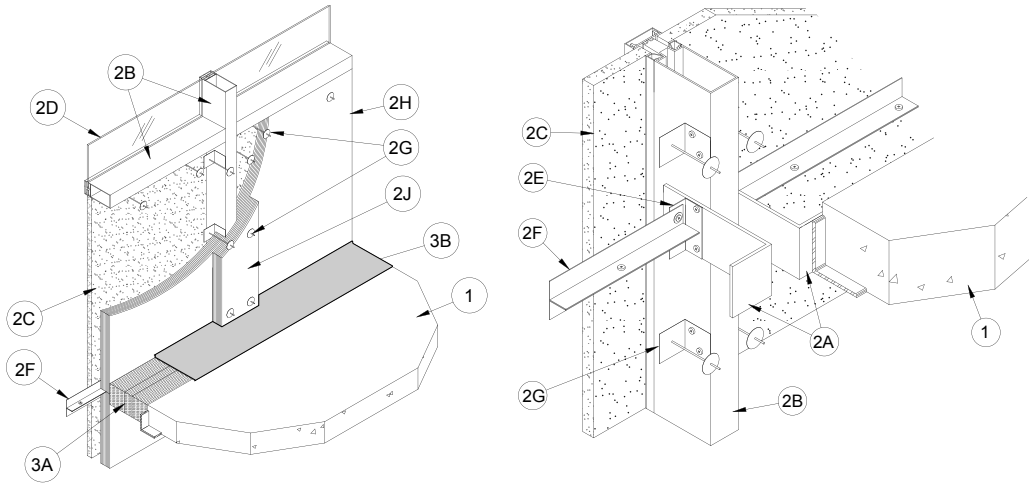
A. **Forming Material*** — Nom 4 pcf density mineral wool batt insulation. Batt sections cut to a min 4-1/2 in. width and stacked to a thickness, which is min 25 percent greater than the width of linear gap between the curtain wall insulation and the edge of the concrete floor slab to attain a min 20 percent compression in the thickness direction. The forming material is compressed and inserted cut-edge-first into linear gap such that its top surface is flush with the top surface of the floor assembly. A max of one tightly-butted seam is permitted between mullions. Additional pieces of forming material to be friction-fit into spaces between mullion mounting clips at each mullion location.

OWENS CORNING HT INC, DIV OF OWENS CORNING — Safing Insulation

B. **Fill, Void or Cavity Material*** — Min 1/8 in. wet thickness (min 1/16 in. dry thickness) of fill material spray-applied over top of forming material and lapping min 1/2 in. onto the top surface of the floor and onto the curtain wall insulation and framing covers.

SPECIFIED TECHNOLOGIES INC — SpecSeal AS200 Elastomeric Spray

*Bearing the UL Classification Mark



System No. CW-S-2052
Integrity Rating — 3 Hr
Insulation Rating — 1/4 Hr
Linear Opening Width — 8 In. Max
L Rating At Ambient — Less Than 1 CFM/Lin Ft
L Rating At 400°F — Less Than 1 CFM/Lin Ft

1. **Floor Assembly** — Min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) structural concrete. Perimeter of floor assembly to be provided with min 3 by 3 by 1/4 in. thick cast-in-place structural steel angle for weld-attachment of mullion mounting clips (Item 2A).
2. **Curtain Wall Assembly** — The curtain wall assembly shall incorporate the following construction features:
   A. **Mullion Mounting Clips** — Nom 4 in. long angles with one nom 4 in. leg for attachment to edge of floor assembly and with one leg approx 4 in. longer than the distance from the floor edge to the mullion. Clips to be formed of min 1/4 in. thick steel. Clips welded to steel angle at edge of floor assembly (Item 1) on each side of vertical mullion (Item 2B) at each floor level. Top edge of each clip to be recessed min 1/2 in. below top surface of floor.
   B. **Framing** — The rectangular tubing mullions (vertical members) and transoms (horizontal members) shall be min 2-1/2 in. wide by 5 in. deep and shall be formed from min 0.100 in. thick aluminum. Mullions spaced max 60 in. OC and secured to mullion mounting clips (Item 2A) at each floor level with two 3/8-16 by 4 in. long hex head steel bolts in conjunction with steel nuts and washers. Interior face of mullions to be max 8 in. from edge of floor assembly. Transoms to be spaced min 66 in. OC. The minimum height from the top of the floor to the bottom of the vision panel sill is 33 in.
   C. **Spandrel Panels** — Nom 1-3/16 in. thick polished granite panels with 1 in. thick edges. Each panel secured in position with aluminum pressure plates in conjunction with glazing gaskets and steel screws.
   D. **Vision Panels** — Nom 1 in. thick insulated glass units with two layers of nom 1/4 in. thick transparent heat-strengthened glass separated by a 1/2 in. air space. Each panel installed on silicone rubber setting blocks and secured in position with aluminum pressure plates in conjunction with glazing gaskets and steel screws.
   E. **Stiffener Tee Attachment Angles** — Nom 1-1/2 by 1-1/2 by 4 in. long No. 22 gauge galvanized steel angles. Each angle secured to steel mullion mounting clip (Item 2A) with two No. 10 by min 1/2 in. long self-tapping steel screws. Angle recessed from interior face of framing as necessary to accommodate the thickness of curtain wall insulation (Item 2H).
   F. **Stiffener Tee** — Two nom 1-1/2 by 1-1/2 in. No. 22 gauge galv steel angles secured together, back-to-back, to form stiffener tee for installation between mullions at each floor level to restrain curtain wall insulation (Item 2H) against outward movement when forming material (Item 3A) is installed. The angle legs forming the stem of the tee shall be secured together using No. 8 by 1/2 in. long self-drilling, self-tapping steel screws spaced max 8 in. OC. The tee shall be installed with a clearance of 1/8 to 1/4 in. at each end and shall be screw-attached to the stiffener tee attachment angles (Item 2E) with No. 10 by min 1/2 in. long self-drilling, self-tapping steel screws, with steel washers, through two predrilled 1/4 in. diam holes at each end. Each stiffener tee shall be located with its stem at an elevation 3 in. below the top plane of the floor.
   G. **Insulation Hangers** — Min 4-1/2 in. long No. 12 gauge steel pins swaged to nom 2 by 2 by 2 in. long No. 28 gauge galvanized steel angles. Insulation hangers screw-attached to mullions and transoms with two No. 10 by min 1/2 in. long self-drilling, self-tapping steel screws per hanger. Insulation hangers to be located in each corner of spandrel panel and spaced max 12 in. OC along sides and top of each spandrel panel. No insulation hangers to be used on the transom at the head (lintel) of a vision panel.
   H. **Curtain Wall Insulation*** — Min 2 in. thick mineral wool batt insulation faced on one side with aluminum foil/scrim vapor retarder, supplied in min 36 in. wide batts. Insulation batts to be installed with no vertical seams and with horizontal seams spaced min 36 in. OC. Insulation panels tightly-fitted between vertical mullions and between the stem of the stiffener tee (Item 2F) and the transom, flush with the interior surface of framing. Insulation panels impaled on steel pins (Item 2G) and secured in place with nom 1-1/2 in. diam steel self-locking washers ("clinch shields"). The horizontal seam between insulation panels shall be located 3 in. below the top plane of the floor at each floor level.

OWENS CORNING HT INC, DIV OF OWENS CORNING — CW-8

(System No. CW-S-2052 Continued)

J. **Framing Covers** — **Curtain Wall Insulation*** — Min 1 in. thick mineral wool batt insulation faced on one side with aluminum foil/scrim vapor retarder, supplied in min 24 by 48 in. boards. Nom 8 in. wide strips to be centered over mullions and impaled on the same pins (Item 2G) and secured in place with nom 1-1/2 in. diam steel self-locking washers ("clinch shields"). Where more than one spandrel panel occurs between vertically separated vision panels, the horizontal transom between spandrel panels shall also be covered with an 8 in. wide framing cover in the same manner as on the vertical mullions. Framing covers on mullions to abut the mineral wool batt safing material (Item 3A) above and below floor.

OWENS CORNING HT INC, DIV OF OWENS CORNING — CW-8

3. **Safing System** — The safing system shall incorporate the following construction features:

A. **Forming Material*** — Nom 4 pcf density mineral wool batt insulation. Batt sections cut to a min 4-1/2 in. width and stacked to a thickness, which is min 25 percent greater than the width of linear gap between the curtain wall insulation and the edge of the concrete floor slab to attain a min 20 percent compression in the thickness direction. The forming material is compressed and inserted cut-edge-first into linear gap such that its top surface is flush with the top surface of the floor assembly. A max of one tightly-butted seam is permitted between mullions. Additional pieces of forming material to be friction-fit into spaces between mullion mounting clips at each mullion location.

OWENS CORNING HT INC, DIV OF OWENS CORNING — Safing Insulation

B. **Fill, Void or Cavity Material*** — Min 1/8 in. wet thickness (min 1/16 in. dry thickness) of fill material spray-applied over top of forming material and lapping min 1/2 in. onto the top surface of the floor and onto the curtain wall insulation and framing covers.

SPECIFIED TECHNOLOGIES INC — SpecSeal AS200 Elastomeric Spray

*Bearing the UL Classification Mark

Specified
Technologies
Inc.

200 Evans Way, Suite 2
Somerville, N .J. 08876
Phone: (908) 526-8000
Fax: (908) 526-9623
Toll Free: (800) 992-1180

GENERAL CERTIFICATE of CONFORMANCE

Description: SpecSeal® Firestop Products

Included Products:

Series SSS Intumescent Sealant
Series LCI Intumescent Sealant
Series LC Latex Endothermic Sealant
Series SSP Intumescent Putty
Series EP Power Shield™ Box Insert
Series SSWRED Intumescent Wrap Strips
Series SSWBLU Intumescent Wrap Strips
Series SSC Intumescent Firestop Collars
Series LCC Intumescent Firestop Collars
Series SSB Intumescent Firestop Pillows
Series AS100 Elastomeric Spray
Series AS200 Elastomeric Spray
Series ES100 Elastomeric Sealant
Series SSM Firestop Mortar
Pensil Series PEN200 Silicone Foam
Pensil Series PEN300 Silicone Sealant
Pensil Series PEN300SL Silicone Sealant

These products are tested to the following standards where applicable:

ASTM STANDARD:

E 814	Fire Tests of Through-Penetration Fire Stops
E 119	Fire Tests of Building Construction and Materials
E 1966	Fire-Resistive Joint Systems
E 84	Surface Burning Characteristics of Building Materials
E 1399	Cyclic Movement and Measuring the Minimum and Maximum Joint Widths of Architectural Joint Systems

UL STANDARD

1479	Fire Tests of Through-Penetration Firestops
263	Fire Tests of Building Construction and Materials
2079	Tests for Fire-Resistance of Building Joint Systems
723	Tests for Surface Burning Characteristics of Building Materials

Chemical Content Statements:

No asbestos, PCB's or water-soluble intumescent ingredients are used or contained in these products.

February 1, 2002

James P. Stahl, Jr.
Technical Manager

Date

Material Safety Data Sheet

01-JAN-2003

SpecSeal® AS200 ELASTOMERIC SPRAY

CHEMICAL PRODUCT/COMPANY IDENTIFICATION

Material Identification

PRODUCT NAME .....SpecSeal® AS200 SPRAY
CHEMICAL FAMILY.....Mixture

Company Identification

MANUFACTURER/DISTRIBUTOR

Specified Technologies, Inc.
200 Evans Way
Somerville, NJ 08876

PHONE NUMBERS

Product Information : 1-908-526-8000
Emergency : 1-800-255-3924

COMPOSITION/INFORMATION ON INGREDIENTS

INGREDIENT NAME	CAS NUMBER
Proprietary mixture	----------

HAZARDS IDENTIFICATION

**********EMERGENCY OVERVIEW**********
* Possible skin and eye irritant. Blue paste. *
****

Potential Health Effects:

EYE: Contact may cause irritation.

SKIN: Contact may cause irritation.

INGESTION: Relatively non-toxic.

INHALATION: Irritation of the nose, throat, and lungs may result from over-exposure to vapors or mist.

CHRONIC (CANCER) INFORMATION: Not classified as carcinogenic.

LONG TERM TOXIC EFFECTS: None known.

FIRST AID MEASURES

First Aid

INHALATION: Remove to fresh air.
SKIN CONTACT: Wash thoroughly.
EYE CONTACT: Irrigate eyes with running water for at least 15 minutes. Get medical attention if irritation develops.
INGESTION: None applicable.

FIRE FIGHTING MEASURES

Not a fire hazard.
EXTINGUISHING MEDIA.....Dry Chemical; Carbon Dioxide; Foam; Water spray for large fires.
SPECIAL FIRE FIGHTING PROCEDURES: .....As for surrounding fire.

ACCIDENTAL RELEASE MEASURES

Safeguards (Personnel)
NOTE: Review FIRE FIGHTING MEASURES and HANDLING (PERSONNEL) sections before proceeding with clean-up. Use appropriate PERSONAL PROTECTIVE EQUIPMENT during clean-up.

HANDLING AND STORAGE

Store under ambient conditions. No special handling required.

EXPOSURE CONTROLS/PERSONAL PROTECTION

EYE PROTECTION REQUIREMENTS:.....Safety glasses/goggles.
SKIN PROTECTION REQUIREMENTS:.....Gloves.
RESPIRATOR REQUIREMENTS:.....None.
VENTILATION REQUIREMENTS:.....If needed, use local exhaust ventilation to keep airborne concentrations below the TLV.

Exposure Guidelines
Exposure Limits

PEL(OSHA) : Particulates (Not Otherwise Classified) 15 mg/m3, 8 Hr. TWA, total dust 5 mg/m3, 8 Hr. TWA, respirable dust
TLV(ACGIH): None Established

PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL FORM ..... Blue paste
SPECIFIC GRAVITY..... 1.1
PERCENT VOLATILES..... 22+/-2
EVAPORATION RATE..... >1
BOILING POINT ..... 100 deg. C
SOLUBILITY IN WATER..... Infinitely dilutable

STABILITY AND REACTIVITY

STABILITY: ..... This is a stable material.
CONDITIONS TO AVOID..... Storage >55 deg. C
HAZARDOUS POLYMERIZATION:..... Will not occur.
INCOMPATIBILITIES:.....None special.

TOXICOLOGICAL INFORMATION

Mixture not tested but based on components:

May be irritating to skin and eyes and may produce symptoms of nausea in poorly ventilated areas.

None of the components are listed as carcinogens.

ECOLOGICAL INFORMATION

No data.

DISPOSAL CONSIDERATIONS

Waste Disposal:
Treatment, storage, transportation, and disposal must be in accordance with applicable Federal, State/Provincial, and Local regulations.

TRANSPORTATION INFORMATION

DOT – not regulated.

REGULATORY INFORMATION

U.S. Federal Regulations

TSCA Inventory Status : Reported/Included.

Section 313 Supplier Notifications.
This product contains no toxic chemicals subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-To-Know Act of 1986 and of 40 CFR 372:

OTHER INFORMATION

NPCA-HMIS Rating
- Health : 1
- Flammability : 0
- Reactivity : 0

Personal Protection rating to be supplied by user depending on use conditions.

STATE RIGHT-TO-KNOW LAWS

No substances on the state hazardous substances list, for the states indicated below, are used in the manufacture of products on this Material Safety Data Sheet, with the exceptions indicated. While we do not specifically analyze these products, or the raw materials used in their manufacture, for substances on various state hazardous substances lists, to the best of our knowledge the products on this Material Safety Data Sheet contain no such substances except for those specifically listed below:

SUBSTANCES ON THE NEW JERSEY WORKPLACE HAZARDOUS SUBSTANCE LIST PRESENT AT A CONCENTRATION OF 1% OR MORE (0.1% FOR SUBSTANCES IDENTIFIED AS CARCINOGENS, MUTAGENS OR TERATOGENS): NJTSRN-AS200

WARNING: SUBSTANCES KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER: None known.

WARNING: SUBSTANCES KNOWN TO THE STATE OF CALIFORNIA TO CAUSE BIRTH DEFECTS OR OTHER REPRODUCTIVE HARM: None known.

This information relates to the specific material designated and may not be valid for such material used in combination with any other materials or in any process. Such information is to the best of our knowledge and belief accurate and reliable as of the data compiled. However, no representation, warranty, or guarantee is made as to its accuracy, reliability or completeness. It is the user's responsibility to satisfy himself as to the suitability and completeness of such information for his own particular use. We do not accept liability for any loss or damage that may occur form the use of this information.

Responsibility for MSDS :

Specified Technologies, Inc.
200 Evans Way
Somerville, NJ 08876

Specified Technologies, Inc.

PRODUCT DATA SHEET

SpecSeal® Series AS Elastomeric Spray

CLASSIFIED UL 3L73

FILL, VOID OR CAVITY MATERIALS CLASSIFIED BY UNDERWRITERS LABORATORIES INC. ® FOR USE IN JOINT SYSTEMS & THROUGH-PENETRATION FIRESTOP SYSTEMS.

SEE UL FIRE RESISTANCE DIRECTORY

CLASSIFIED C UL

FILL, VOID, OR CAVITY MATERIALS CLASSIFIED BY UNDERWRITERS LABORATORIES INC. FOR USE IN JOINT SYSTEMS & THROUGH-PENETRATION FIRESTOP SYSTEMS. SEE UL DIRECTORY OF PRODUCTS CERTIFIED FOR CANADA AND UL FIRE RESISTANCE DIRECTORY

FM APPROVED

FEATURES

- **Water-Based** for easy installation and cleanup.
- **Non-halogenated.**
- **Thixotropic** for high-build application.
- **Auto Bonding.**
- **Safe**...no solvents! No asbestos!
- **Flexible!**
- **Water Resistant!**
- **Low Abrasion** for longer pump life and less maintenance.
- **UL Classified.**
- Tested with **Direct-Applied Fireproofing.**

1. PRODUCT DESCRIPTION

SpecSeal® Elastomeric Spray Coating is a non-halogenated latex-based, highly elastomeric coating designed to provide passive smoke and fire protection in construction joints.

SpecSeal® Elastomeric Spray Coating is engineered to adhere to virtually all construction surfaces and may be applied using airless spray equipment or with a brush (for small applications or touch ups).

SpecSeal® Elastomeric Spray Coating dries to form a flexible shield against the propagation of fire. Its premium latex binder system is totally resistant to water and will not re-emulsify after drying. SpecSeal® Elastomeric Spray Coating contains no inorganic fibers, asbestos, solvents.

2. APPLICATIONS

SpecSeal® Elastomeric Spray Coating is designed primarily for the protection of construction joints and certain through-penetrations.

3. PHYSICAL PROPERTIES

See Table A.

4. PERFORMANCE

When applied to a wet film thickness of 1/8" (3.2mm) over appropriate backing materials, SpecSeal® Elastomeric Spray Coating has been successfully tested in one, two, three and four hour joints. Consult factory for individual system designs and application requirements.

LIMITATIONS: Use product as per manufacturer's instructions. Use only in applications per the manufacturer's tested and published designs or specific recommendations. End user must ultimately determine the suitability of the product and designs to his specific requirement and assumes responsibility for its use. PRODUCT CONTAINS WATER AND IS CONDUCTIVE UNTIL DRY. DO NOT APPLY IN THE PRESENCE OF EXPOSED OR ENERGIZED ELECTRICAL CONDUCTORS.

5. SPECIFICATIONS

The fire protective joint coating shall be a water-based, non-halogenated elastomeric coating and shall contain no solvents, inorganic fibers, nor asbestos. The coating shall dry to form a flexible, moisture resistant film and shall adhere to all common construction surfaces. The coating shall be thixotropic and shall be capable of being applied by brush, trowel or by airless spray. The approved coating shall be SpecSeal® Elastomeric Spray.

SPECIFIED DIVISIONS

DIV.	7	07840	Through-Penetration Firestopping
DIV.	13	13900	Special Construction Fire Suppression & Supervisory Systems
DIV.	15	15250	Mechanical Insulation – Fire Protection
DIV.	16	16050	Basic Electrical Materials & Methods

Table B: PHYSICAL PROPERTIES

Color	Pale Blue
Odor	Mild Latex
Specific Gravity	1.1
Solids	75%
Flame Spread	0*
Smoke Developed	25*
Movement	±18.75%**
Coverage	12.8 sq ft/gal @ 1/8˝ 0.31 sq m/l @ 3.2mm
Viscosity	110,000 cps
pH	7.5
Solvent Content	None
In-Service Temp.	≤120° F (49° C)
Drying Time	Tack Free 2 Hours
	Dry Through 24-48 Hours[A]
STC Rating	51
VOC Content* **	0.16 lb/gal (20.0 g/L)

* Tested to ASTM E84 (UL723) @ 14% coverage.
**500 Cycles per UL2079, AC30 (ICBO) and ASTM E1399
[A] Dependent on temperature and humidity.
***ASTM D3960 and EPA Federal Refrerence Method 24.

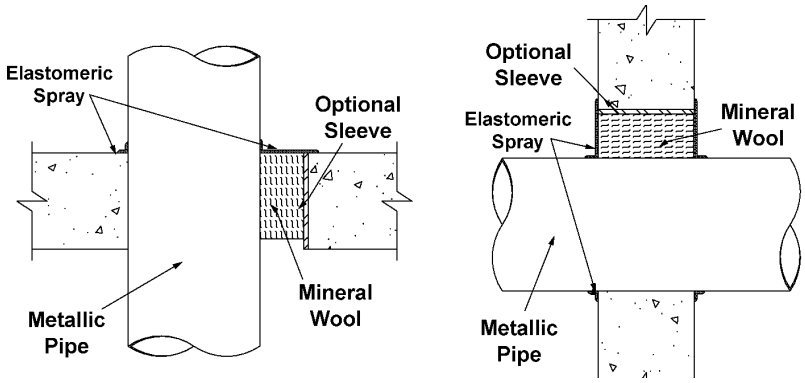
6. INSTALLATION INSTRUCTIONS

GENERAL: Areas to be protected must be clean and free of oil, loose dirt, rust or scale. Recommended storage temperatures range between 40°F (4°C) and 95°F (35°C). Recommended application temperature range is 60°F (16°C) to 90°F (32°C). When applying product at the lower end of the temperature range, warming the material to 70°F (21°C) will enhance drying characteristics. Drying time will vary according to prevailing temperature and humidity. Allow to thoroughly dry before exposure to moisture.

Consult appropriate manufacturer's drawing for system design requirements. Forming or packing materials may be required as an integral part of various system designs.

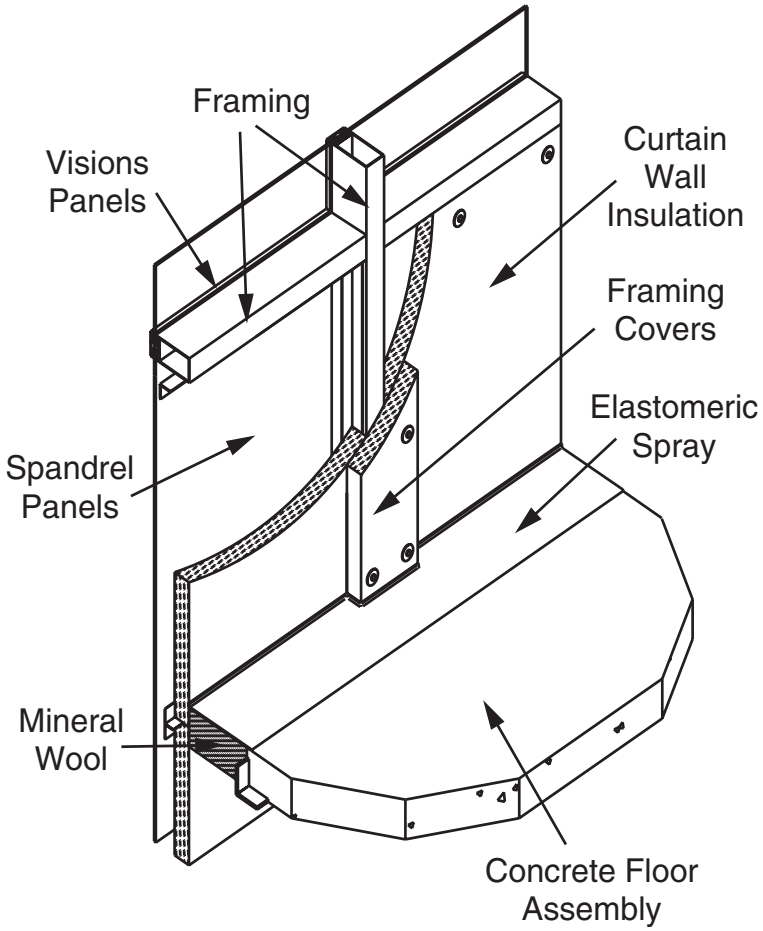
Coating may be applied by airless spray in a single pass up to 3/16" (4.8mm) wet coating depth. If applying by brush or spraying on vertical surfaces where coating appears to be prone to slumping, multiple coats or the application of a thin tack coat may be required. DO

FIG. 1: METALLIC PIPE PENETRATIONS - CONCRETE/MASONRY FLOORS & WALLS



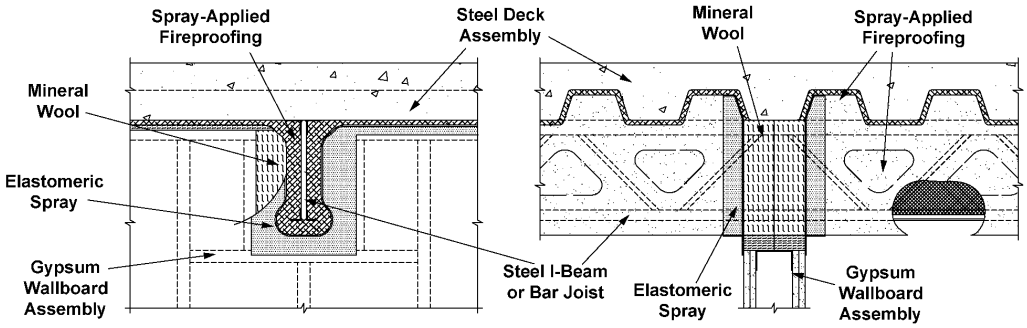
UL System No. C-AJ-1318
F Rating – 2 Hr • T Rating – 0 Hr
Steel or Iron Pipe: <12", Copper Pipe: <6"
Annulus: Point Contact to 2"
Forming Material: Nom 4 pcf mineral wool to 4" depth
Spray Depth: 1/8" wet depth (+1/2" overlap)Sealant Depth: 1/2"
Forming Material: 3" Tightly Packed
Min. Wool (nom 4 pcf)

FIG. 2: SLAB-EDGE SAFING GAP APPLICATIONS



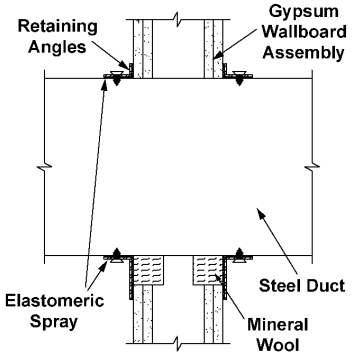
UL System No. CW-S-2003
Integrity Rating – 1-1/2 and 2 Hr
Insulation Rating – 0 and 1/4 Hr
Joint Width: Nom 8 in. wide.
Forming Material: Nom 4 pcf mineral wool to 4" depth.
Spray Depth: 1/8" wet depth (+1/2" lap onto adjoining substrates)

FIG. 3: FIREPROOFED STRUCTURAL PENETRATIONS - GYPSUM WALLBOARD WALLS



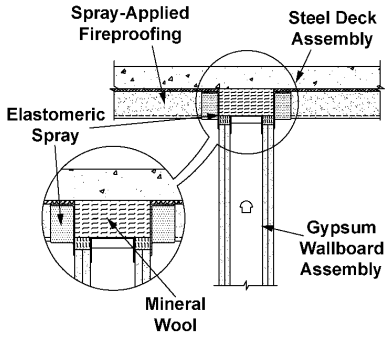
UL System No. HW-D-0099
Assembly Rating – 1 & 2 Hr
Movement Capabilities: ±18.75% Compress/Extend
Structural Support: Steel I Beam or Bar Joist protected with Spray-Applied Fire Resistive Materials.
Forming Material: Nom 6 pcf mineral wool to full depth.
Spray Depth: 1/8" wet depth (+2" lap onto fireproofing and 1/2" lap onto wall) on both sides.

FIG. 4: STEEL HVAC DUCT PENETRATIONS - GYPSUM WALLBOARD WALLS



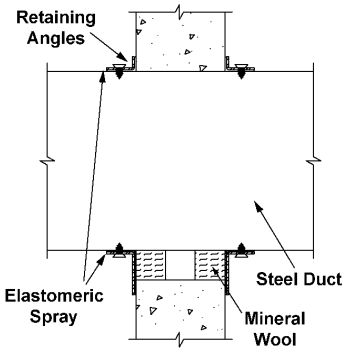
UL System No. W-L-7024
F Rating – 1 & 2 Hr • T Rating – 0 Hr
Steel Duct: 20" by 12"
Forming Material: Nom 4 pcf mineral wool to 2" depth.
Spray Depth: 1/8" wet depth (+2" overlap onto duct, 1" lap onto wall) on both sides.
Steel Angles: No. 16 MSG steel angles.

FIG. 5: HEAD-OF-WALL JOINTS BETWEEN WALLS AND FIREPROOFED STEEL DECKS



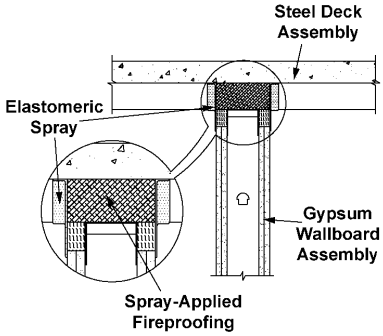
UL System No. HW-D-0088
Assembly Rating – 1 & 2 Hr
Movement Capabilities: ±18.75% Compress/Extend
Nominal Joint Width: 1"
Forming Material: Nom 6 pcf mineral wool to full depth.
Spray Depth: 1/8" wet depth (+2" lap onto fireproofing and 1/2" lap onto wall) on both sides.

FIG. 6: STEEL HVAC DUCT PENETRATIONS - CONCRETE/MASONRY WALLS



UL System No. W-J-7006
F Rating – 2 Hr • T Rating – 0 Hr
Steel Duct: 20" by 12"
Forming Material: Nom 4 pcf mineral wool to 2" depth.
Spray Depth: 1/8" wet depth (+2" overlap onto duct, 1" lap onto wall) on both sides.
Steel Angles: No. 16 MSG steel angles.

FIG. 7: HEAD-OF-WALL JOINTS WITH FIREPROOFING INSTALLED INTO FLUTES AS FORMING



UL System No. HW-D-0102
Assembly Rating – 1, 2, 3 and 4 .Hr
Movement Capabilities: ±25% Compress/Extend • Nominal Joint Width: 2"
Forming Material: Spray-Applied Fire Resistive Materials
to full depth allowing for a 2 in. relief gap between wallboard and fireproofing.
Relief gap packed with 4 pcf mineral wool insulation.
Spray Depth: 1/8" wet depth (+1/2" lap onto adjoining substrates) on both sides.

NOT ATTEMPT TO THIN PRODUCT BY ADDING WATER.

7. MAINTENANCE

Inspection: Installations should be inspected periodically for subsequent damage. Following safety precautions listed below (See 9. Precautionary Information) and pertinent installation guidelines, remove coating in damaged areas down to undamaged material. Reapply fresh coating material to original coating thickness.

8. TECHNICAL SERVICE

Specified Technologies Inc. provides toll free technical support to assist in product selection and installation information.

9. PRECAUTIONARY INFORMATION

Consult Material Safety Data Sheet for additional information on the safe handling and disposal of this material. Wash areas of skin contact with soap and water. Avoid contact with eyes. The use of an OSHA or NIOSH approved mask for dust and mist environment is recommended. Apply in areas with adequate ventilation.

CAUTION: COATING IS CONDUC-TIVE UNTIL DRY. DO NOT APPLY TO OR IN THE PRESENCE OF ENERGIZED ELECTRICAL CON-DUCTORS. INSTALL UNDER THE SUPERVISION OF PLANT OR FACILITY ELECTRICAL ENGINEER OR SAFETY MANAGER.

10. AVAILABILITY

SpecSeal® Elastomeric Spray is available from authorized distributors. Consult factory for the names and locations of the nearest sales representatives or distributors.

FIG. 1: METALLIC PIPE PENETRATIONS - CONCRETE/ MASONRY FLOORS & WALLS

NOTICE: Spray application of SpecSeal Elastomeric Spray requires airless spray equipment meeting the following specifications:
Working Pressure: Min. 3,000 PSI

Delivery: Min. 1.0 U.S. gpm (2.1 l/min.) recommended

Spray Tip Orifice: 0.023˝ to 0.026˝ recommended

Wetted Parts: All seals and contact surfaces suitable for contact with latex emulsions.

The following airless spray equipment has demonstrated suitability for application of this product. STI makes no warranties concerning the suitability or use of this equipment and has no affiliation of any kind with its manufacturer.

A minimum 3/8˝ fluid line is required, a 1/2˝ line is preferred. Consult pump manufacturer for long hose runs or lifts to higher elevations. A reversible spray tip is recommended. A 6˝ fan pattern is suggested to minimize overspray.

The following equipment is manufactured by Titan Tool, Inc. Franklin Lakes, NJ:

Item	Item Name & Description
PowrTwin Model 3500 Sprayer	Electric or gas powered airless sprayer

TABLE C: ORDERING INFORMATION

SpecSeal® Elastomeric Spray Coating is available in 5 gal. pails, 55 gal. drums are available on a special order basis.

AS205 5 gal. Pail 1,155 cu. in. (19 liters)

Additional SpecSeal Products...

ES Series Sealant
Inexpensive water-based Elastomeric Sealant for construction joint applications. Design to provide up to ± 25% movement.

SSS Series Sealant
The industry's most versatile sealant provides the firestopping solutions for a wide range of combustible and noncombustible applications. Water-based intumescent sealant expands up to 8X!

SSP Firestop Putty
Available both in bar form and in pads, putty provides easy retrofit for through-penetrations and economical protection for electrical boxes.

Firestop Mortar
Lightweight, versatile and economical! The best choice for large or complex installations.

Pensil® Silicones
Sealants and foam for through-penetrations and construction joints. Unexcelled aging characteristics and flexibility.

Intumescent Wrap Strips
Two grades of intumescent wrap strips provide an unmatched combination of flexibility, economy, and expansion (up to 30X). Systems for plastic pipes including FR Polypropylene up to 8" trade size!

Molded Firestop Collars
Easy to install, economical protection for ABS and PVC pipes (both solid and foam core) as well as CPVC, PVDF, and FRPP. Collars available up to 6" trade size.

CITY OF NEW YORK MEA 310-99-M

Important Notice: All statements, technical information, and recommendations contained herein are based upon testing believed to be reliable, but the accuracy and completeness thereof is not guaranteed.
WARRANTY: Specified Technologies Inc. manufactures its goods in a manner to be free of defects. Should any defect occur in its goods (within one year), Specified Technologies Inc., upon prompt notification, will at its option, exchange or repair the goods or refund the purchase price.
Limitations and Exclusions: THIS WARRANTY IS IN LIEU OF ALL OTHER REPRESENTATIONS EXPRESSED OR IMPLIED (INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR USE) AND UNDER NO CIRCUMSTANCES SHALL SPECIFIED TECHNOLOGIES INC. BE RESPONSIBLE FOR ANY INCIDENTAL OR CONSEQUENTIAL PROPERTY DAMAGE OR LOSSES. PRIOR TO USE, THE USER SHALL DETERMINE THE SUITABILITY OF THE PRODUCT FOR ITS INTENDED USE, AND THE USER ASSUMES ALL RISKS AND LIABILITY FOR SUBSEQUENT USE.
No statement or recommendation not contained herein shall have any force or effect unless in an agreement signed by officers of seller and manufacturer.

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