



ICC-ES Evaluation Report

ESR-4841

Issued December 2022

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This report is subject to renewal December 2023.

DIVISION: 07 00 00—THERMAL AND MOISTURE PROTECTION

Section: 07 42 00—Wall Panels

Section: 07 42 43—Composite Wall Panels

REPORT HOLDER:

MIGHTY BUILDINGS, INC.

EVALUATION SUBJECT:

MIGHTY KIT SYSTEM 3D PRINTED PANELS (MB MKS PANELS)

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2021 and 2018 *International Building Code*® (IBC)
- 2021 and 2018 *International Residential Code*® (IRC)

For evaluation for compliance with codes adopted by Los Angeles Department of Building and Safety (LADBS), see [ESR-4841 LABC and LARC Supplement](#).

Properties evaluated:

- Structural
- Weather resistance
- Surface-burning characteristics
- Fire-resistance-rated construction

2.0 USES

The Mighty Kit System 3D Printed Panels (MB MKS panels) are used as non load-bearing exterior wall cladding in Type V-B construction. When installed in accordance with the IRC, the design and installation must comply with the IRC Section R301.1.3.

3.0 DESCRIPTION

3.1 General:

The MB MKS panels are factory assembled 3D printed polymer-based composite panels with a spray applied polyurethane foam core. The panels are 3D printed with an acrylate polymer combined with inorganic fillers, reinforced with continuous glass fibers deposited longitudinally within each printed layer. The layers of the composite panel create

a closed, hollow shell, which is then injected with polyurethane foam in the factory. The panels are attached to load-bearing structural steel frame assemblies described in Section 3.2.3.

The printed panels are produced with an overall thickness ranging from a minimum of 4 inches (101.6 mm) to a maximum of 6⁷/₈ inches (174.6 mm) and come in nominal widths of 3 ft, 4 ft, 5 ft and 6 ft (0.89 m, 1.19 m, 1.50 m and 1.80 m) with a maximum unbraced height of 9 ft 7 in (2.92 m). The panel extends beyond the panel body to form a parapet with a thickness of 4 inches (101.6 mm); see Table 2 and Figure 1A. The panels are available in two parametric designs on the exterior face. See Figures 1B and 1C.

Two additional panel configurations are available, the column hider panels and the corner panels. The column hider panels are used to conceal the structural steel columns, are an overall thickness of 4 inches (101.6 mm) minimum and come in nominal widths of 2 ft, 3ft and 4 ft (0.61 m, 0.89 m, and 1.19 m); see Table 3 and Figure 1D. Corner panels are used to conceal structural steel columns at building corners. The outer corner panels are an overall thickness of 4 inches (101.6 mm) minimum and each leg width come in various nominal lengths between 18 inches to 24 inches (457.2 mm to 609.6 mm). The inner corner panels are an overall thickness of 6⁷/₈ inches (174.6 mm) maximum with a minimum parapet thickness of 4 inches (101.6 mm) and each leg width comes in various nominal lengths between 18 inches to 24⁷/₈ inches (457.2 mm to 631.8 mm). See Table 4 and Figure 1E.

3.2 Materials:

3.2.1 MB MKS Panels: The MB MKS panels are composed of a 3D printed shell and foamed-in-place panel core.

The 3D printed shell is formed by printing layers of a polymer based material to form a shell. The shell layer thickness is 0.63 in to 0.71 in (16 mm to 18 mm). The MB MKS panels must be printed in accordance with the manufacturer's quality control documentation.

The panel core material has a density between 1.95 pcf to 2.20 pcf (31.2 kg/m³ to 35.2 kg/m³). The foam varies from 2⁹/₁₆ in (65.1 mm) to 5⁷/₁₆ in (138.1 mm) as shown in Figures 2A and 3A. The foam plastic has a flame-spread index of 25 or less and a smoke-developed index of 450 or less when tested in accordance ASTM E84.

3.2.2 Coating: The MB MKS panels are factory-coated with a two-part epoxy coating and acrylic paint in accordance with the manufacturer's quality control documentation.

3.2.3 Structural Steel Framing: The MB MKS panels are supported by steel framing members in two configurations, Type I and Type II as described below. The design and fabrication of the structural steel framing is outside the scope of this report and must be determined by registered design professional.

3.2.3.1 Type I: For one-story structures, the MB MKS panels are assembled in the factory with a structural steel HSS beam across the top of the panel and a structural steel HSS column on each end of the panel. The top of the panel is connected to the structural steel beam and to the floor framing by bearing on a steel connection plate or angle inserted into a slot in the panel. In addition, structural steel X-bracing may be provided to resist in-plane lateral wind or seismic loads. See Figures 2A and 2B. Attachment of the connection plates or angles to the steel frame, as well as the structural steel beams, columns and X-bracing are outside the scope of this report and must be designed by a registered design professional.

3.2.3.2 Type II: For multi-story structures, MB MKS panels are assembled in the factory with steel connection angles installed across the top and bottom of the panel. The connection angles allow the panel to be attached to the structural steel beams of the superstructure at the job site. See Figures 3A through 3E. MB MKS column hider panels and outer corner panels are to be used with the Type II configuration. They are connected to structural steel columns with six steel clip angles per column spaced symmetrically, three on each side of the column. The structural steel superstructure is outside the scope of this report and must be designed by a registered design professional.

3.2.4 Top and Bottom Steel Connection: For one-story structures, the top plate is a 0.25-inch (6.35 mm) continuous steel plate complying with ASTM A36. The bottom connection is a 2 inch x 3 inch x 0.25 inch (50.8 x 76.2 x 6.4 mm) continuous steel angle, 22.5 inches to 70.5 inches (572 mm to 1791 mm) long, complying with ASTM A36. See Figure 4A.

For multi-story structures, the top and bottom connections are 2.5 inches x 3.5 inches x 0.25-inch (63.5 mm x 88.9 mm x 6.4 mm) continuous steel angles, 22.5 inches to 70.5 inches (572 mm to 1791 mm) long, complying with ASTM A36. See Figure 4B.

3.2.5 Steel Clip Connection for Column Hider Panels and Corner Panels: Steel clips are 0.25-inch thick (6.4 mm) with long slotted holes on the legs. Each clip is fastened to the panel with two $\frac{3}{8}$ -inch (9.53 mm) diameter screw anchors. Each steel clip is fastened to the structural steel column with three metal screws to be designed by the registered design professional. See Figures 3B, 3C and 3E.

4.0 DESIGN AND INSTALLATION

4.1 Design:

The MB MKS panel strength capacity for standard panels, column hidens and corner panels is limited to the allowable transverse loads indicated in Table 1 of this report. The tabulated transverse loads for the standard panels indicate the capacity of the MB MKS panel spanning vertically between connection angles and/or plates, as applicable, without consideration of the structural steel frame supporting the MB MKS panels. Strength capacity of the

parametric panels may be taken as the strength capacity of the standard panels. The steel framing members supporting the panels (Type I or Type II) must be designed to resist the required wind load, with a maximum allowable deflection of $L/240$ of the framing member span. The capacity of the fasteners to steel framing members and steel framing members to resist applicable forces is outside the scope of this report and must be determined by registered design professional and submitted to approval to the code official.

4.2 Installation:

4.2.1 General: MB MKS panels must be installed in accordance with the manufacturer's published installation instructions, this evaluation report, and the plans and specifications approved by the code official. The manufacturer's published installation instructions must be available at the jobsite at all times.

4.2.2 Joints: Approved sealing methods must be field applied in accordance with the manufacturer's published installation instructions.

4.2.3 Cutting and Notching: No field cutting or routing in the panels shall be permitted except as shown in the approved construction documents.

4.2.4 Protection from Termite Resistance and Decay: MB MKS panels supported on concrete foundation shall be located 6 inches (152.4 mm) above ground to establish compliance with IBC Section 2603.8. Corrosion protection of steel frame must be provided as determined by registered design professional.

4.2.5 Exterior Wall Covering: MB MKS panels installed in accordance with this section (Section 4.2) comply as an exterior wall envelope based on testing in accordance with Exception 2 of IBC Section 1402.2.

4.2.6 Interior Wall Covering: The MB MKS panels must be separated from the interior of the building by interior frame wall assembly cladded with $\frac{1}{2}$ -inch gypsum wall board complying with IBC Chapter 25.

4.3 Fire-resistance-rated Wall Assembly:

4.3.1 One-hour Fire-resistance-rated Non-Loadbearing Wall Assembly rated for both sides: The asymmetrical non-loadbearing wall assembly, with the MB MKS Panels as a component, passes the requirements for a one-hour fire-resistance-rated assembly when tested in accordance with ASTM E119 and built as detailed in Figure 5A.

4.3.2 Two-hour Fire-resistance-rated Non-Loadbearing Wall Assembly rated for both sides: The asymmetrical non-loadbearing wall assembly, with the MB MKS Panels as a component, passes the requirements for a two-hour fire-resistance-rated assembly when tested in accordance with ASTM E119 and built as detailed in Figure 5B.

5.0 CONDITIONS OF USE

The MB MKS panels described in this report comply with, or are a suitable alternative to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

5.1 The MB MKS panels must be installed in accordance with this report and the manufacturer's published installation instructions. In the event that there is a conflict between this report and the manufacturer's instruction, the more restrictive governs.

5.2 Design loads to be resisted by the MB MKS panels must be determined in accordance with the IBC or IRC, as applicable, and must not exceed the allowable loads noted in this report.

- 5.3 Remaining portions of the structure, other than the panels, must be designed and constructed in accordance with the applicable code.
- 5.4 All construction documents specifying the MB MKS panels must comply with the design limitations of this report. Design calculations and details for the specific application must be furnished to the code official, verifying compliance with this report and applicable codes. The structural steel framing supporting the panels are outside the scope of this report and must be addressed in the design calculations and details.
- 5.5 The MB MKS panels must be separated from the interior of building as indicated in Section 4.2.6 of this report.

6.0 EVIDENCE SUBMITTED

- 6.1 Report of accelerated weathering tests in accordance with ASTM G155.
- 6.2 Report of freeze-thaw tests in accordance with ASTM D1037.
- 6.3 Report of flexural strength tests in accordance with ASTM D1037.
- 6.4 Report of salt-spray resistance tests in accordance with ASTM B117.
- 6.5 Report of water resistance tests in accordance with ASTM D2247.
- 6.6 Report of surface-burning characteristics tests in accordance with ASTM E84.

- 6.7 Report of fire-resistance-rated tests in accordance with ASTM E119.
- 6.8 Report of transverse load tests in accordance with ASTM E72.
- 6.9 Report of density-water absorption tests in accordance with ASTM C272.
- 6.10 Report of water penetration tests in accordance with ASTM E331.
- 6.11 Report of vapor permeability tests in accordance with ASTM E96.

7.0 IDENTIFICATION

- 7.1 The ICC-ES mark of conformity, electronic labeling, or the evaluation report number (ICC-ES ESR-4841) along with the name (Mighty Buildings, Inc.), registered trademark, or registered logo of the report holder must be included in the product label.
- 7.2 In addition, product labeling shall include the address and the panel serial number.
- 7.3 The report holder's contact information is the following:

MIGHTY BUILDINGS, INC.
610 85TH AVENUE
OAKLAND, CALIFORNIA 94621
www.mightybuildings.com

TABLE 1—POSITIVE AND NEGATIVE WIND PRESSURE LOADS FOR MB MKS PANELS^{4,5}

NOMINAL PANEL WIDTH OR DESIGNATION (ft)	ULTIMATE POSITIVE AND NEGATIVE WIND PRESSURE FOR 115-in. SPAN ¹ (psf)	ALLOWABLE POSITIVE AND NEGATIVE WIND PRESSURE FOR 115-in. SPAN ¹ (psf)	ALLOWABLE POSITIVE AND NEGATIVE WIND PRESSURE FOR 122-in. SPAN AND 15-in. PARAPET HEIGHT ² (psf)	ALLOWABLE POSITIVE AND NEGATIVE WIND PRESSURE FOR 122-in. SPAN AND 23-in. PARAPET HEIGHT ³ (psf)
Column Hider ⁶	345	115	108	98
Corner Panel ⁶	345	115	108	98
3	404	121	114	103
4	330	110	103	94
5	255	85	80	72
6	240	80	75	68

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 psf = 4.88 kg/m.

¹MB MKS panels must be single span, simply supported at top and bottom of the panel. The top and bottom of the panel must be supported by steel connection angles at a maximum distance of 9 ft 7 inches apart. A 4-inch thick parapet may extend a maximum of 30 inches above the top support of the wall.

²MB MKS panels must be single span, simply supported at top and bottom of the panel. The top and bottom of the panel must be supported by steel connection angles at a maximum distance of 10 ft 2 inches apart. A 4-inch thick parapet may extend a maximum of 15 inches above the top support of the wall.

³MB MKS panels must be single span, simply supported at top and bottom of the panel. The top and bottom of the panel must be supported by steel connection angles at a maximum distance of 10 ft 2 inches apart. A 4-inch thick parapet may extend a maximum of 23 inches above the top support of the wall.

⁴The tabulated allowable transverse load is the maximum load (pounds per square foot) applied uniformly across the panel.

⁵Tabulated loads are based on strength of the panel. Deflection at L/240 does not control, where L is the unsupported height of the panel in inches.

⁶The column hider and corner panels are connected to the structural steel columns with steel clips. Tabulated loads do not consider the capacity of the fasteners to the structural steel columns, which are considered outside the scope of this report.

TABLE 2— MB MKS PANEL CONFIGURATIONS¹

NOMINAL PANEL WIDTH (FEET)	MINIMUM PANEL WIDTH (INCH)	MAXIMUM PANEL WIDTH (INCH)	MAXIMUM FLANGE WIDTH (INCH)	FLANGE THICKNESS (INCH)	MAXIMUM PANEL HEIGHT (INCH)	MAXIMUM PANEL THICKNESS (INCH)	PARAPET THICKNESS (INCH)	MAXIMUM CELL WIDTH (INCH)
3	29	35.25	5	4	145	6.875	4	12
4	41	47.25	5	4	145	6.875	4	12
5	53	59.25	5	4	145	6.875	4	12
6	65	71.25	5	4	145	6.875	4	12

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 psf = 4.88 kg/m.

¹ MB MKS panels must be single span, simply supported at top and bottom of the panel. The top and bottom of the panel must be supported by steel connection angles at a maximum distance between 9 ft 7 inches and 10 ft 2 inches (body height). A 4-inch thick parapet may extend a maximum of 30 inches above the top support of the wall. Maximum panel height includes the body height and parapet height.

TABLE 3— MB MKS COLUMN HIDER PANEL CONFIGURATIONS¹

NOMINAL COLUMN HIDER PANEL WIDTH (FEET)	MINIMUM PANEL WIDTH (INCH)	MAXIMUM PANEL WIDTH (INCH)	MAXIMUM PANEL HEIGHT (INCH)	PANEL THICKNESS (INCH)	PARAPET THICKNESS (INCH)
2	19	23.25	145	4	4
3	29	35.25	145	4	4
4	41	47.25	145	4	4

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

¹ MB MKS Column Hider Panel must be supported by six steel clips attached to the I-beam as shown on the submittal drawings. The top and bottom clips are placed a maximum distance of 8 feet apart.

TABLE 4— MB MKS CORNER PANEL CONFIGURATIONS^{1,2}

CORNER CONFIGURATION	NOMINAL PANEL WIDTH (INCH)	MAXIMUM PANEL WIDTH (INCH)	MAXIMUM PANEL HEIGHT (INCH)	PANEL THICKNESS (INCH)	PARAPET THICKNESS (INCH)
OUTER	18	17.625	145	4	4
	24	23.625	145	4	4
INNER	18	17.625	145	6.875	4
	24.875	24.5	145	6.875	4

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

¹ MB MKS Outer Corner panels must be single span, simply supported at top and bottom of the panel. The top and bottom of the panel must be supported by steel connection angles at a distance between 9 ft 7 inches and 10 ft 2 inches (body height). A 4-inch thick parapet may extend a maximum of 30 inches above the top support of the wall.

² MB MKS Inner Corner Panel must be supported by six steel clips attached to the I-beam as shown on the submittal drawings. The top and bottom clips are placed with a maximum distance of 8 feet.

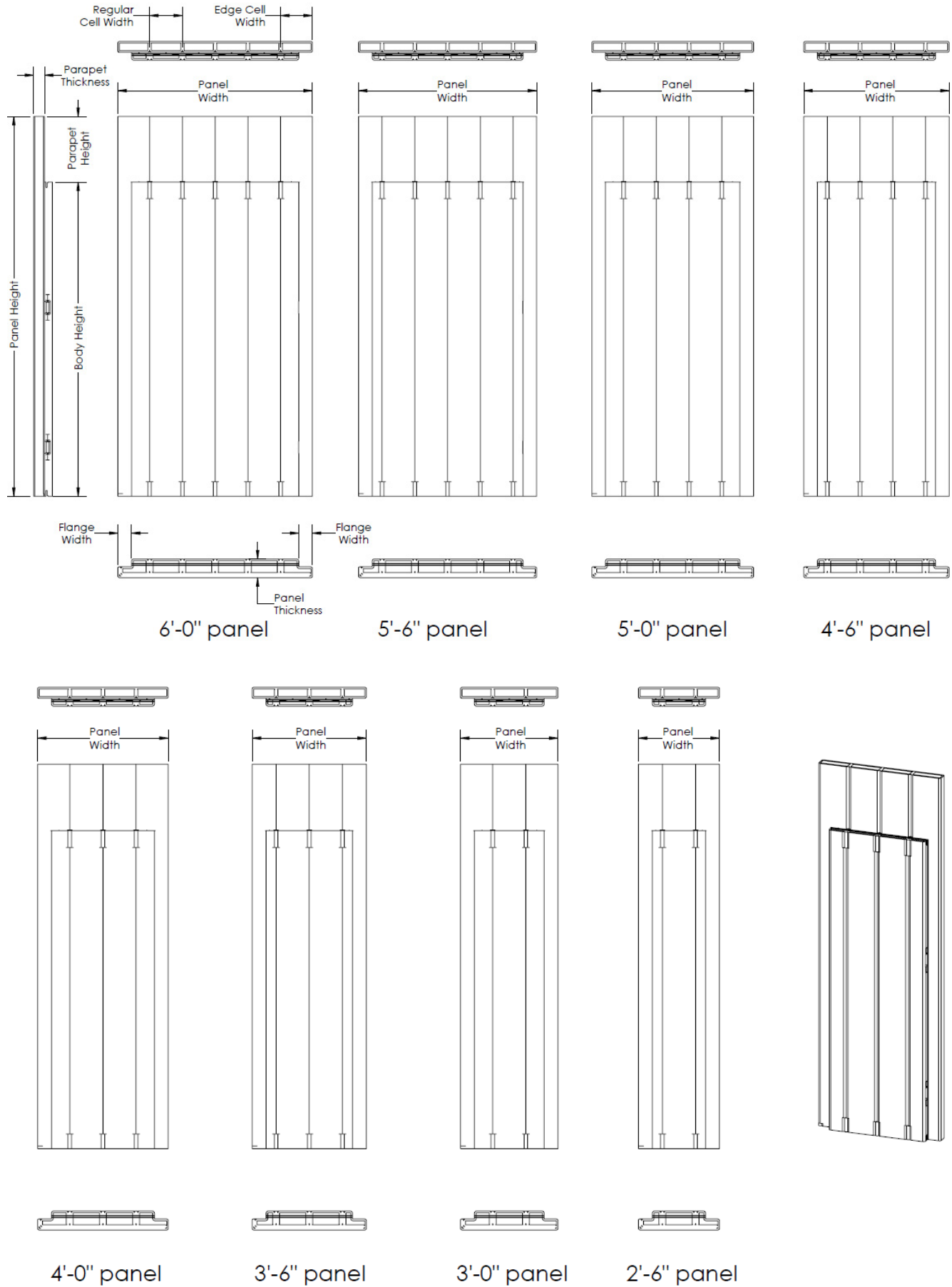


FIGURE 1A.—MB MKS PANEL CONFIGURATIONS

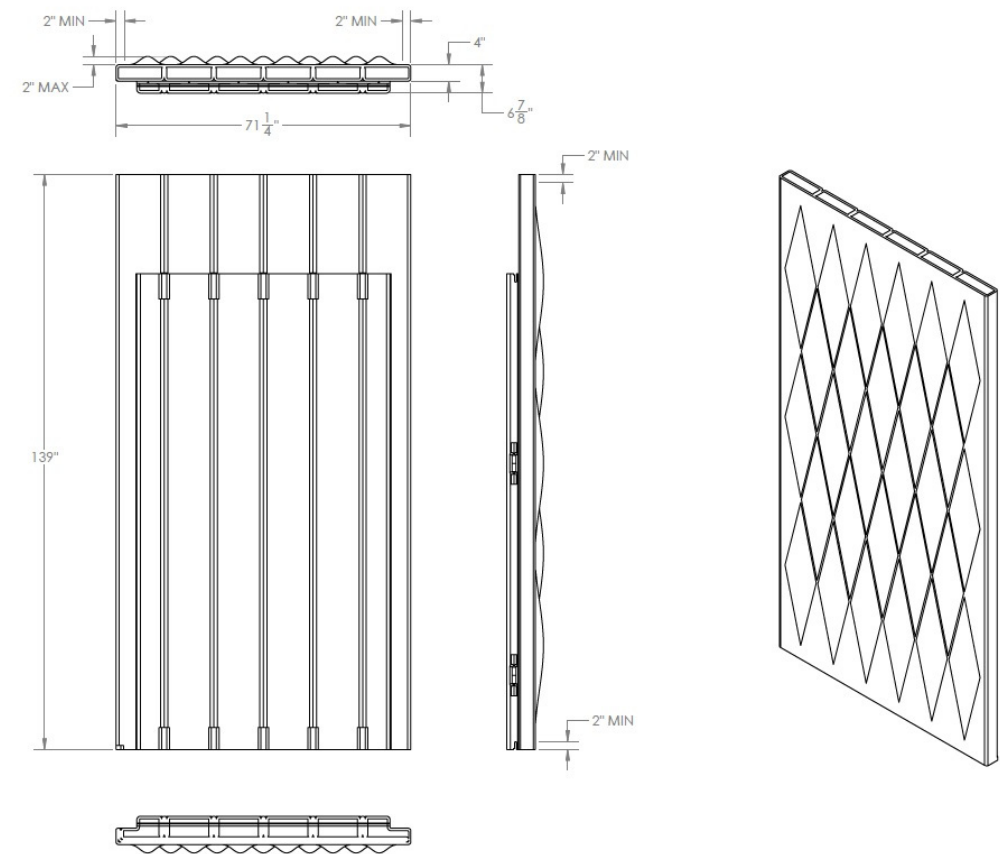


FIGURE1B.—MB MKS PARAMETRIC PANEL CONFIGURATION (DIAGRID CONVEX PATTERN)

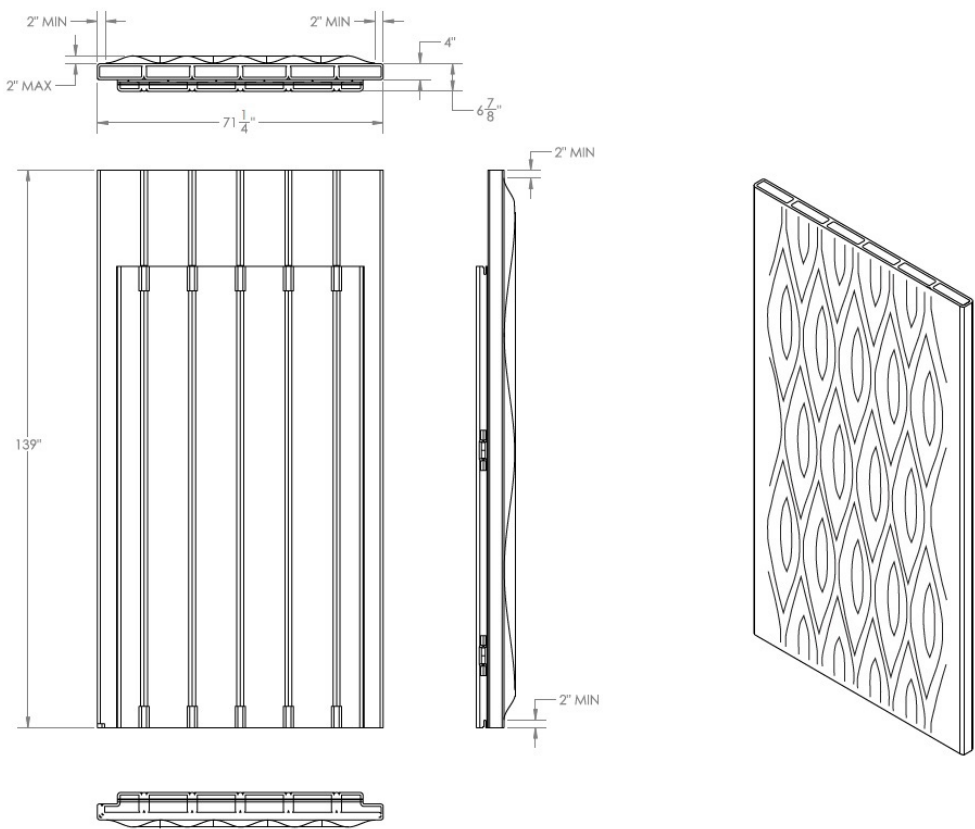


FIGURE1C.—MB MKS PARAMETRIC PANEL CONFIGURATION (DIAGRID CONCAVE PATTERN)

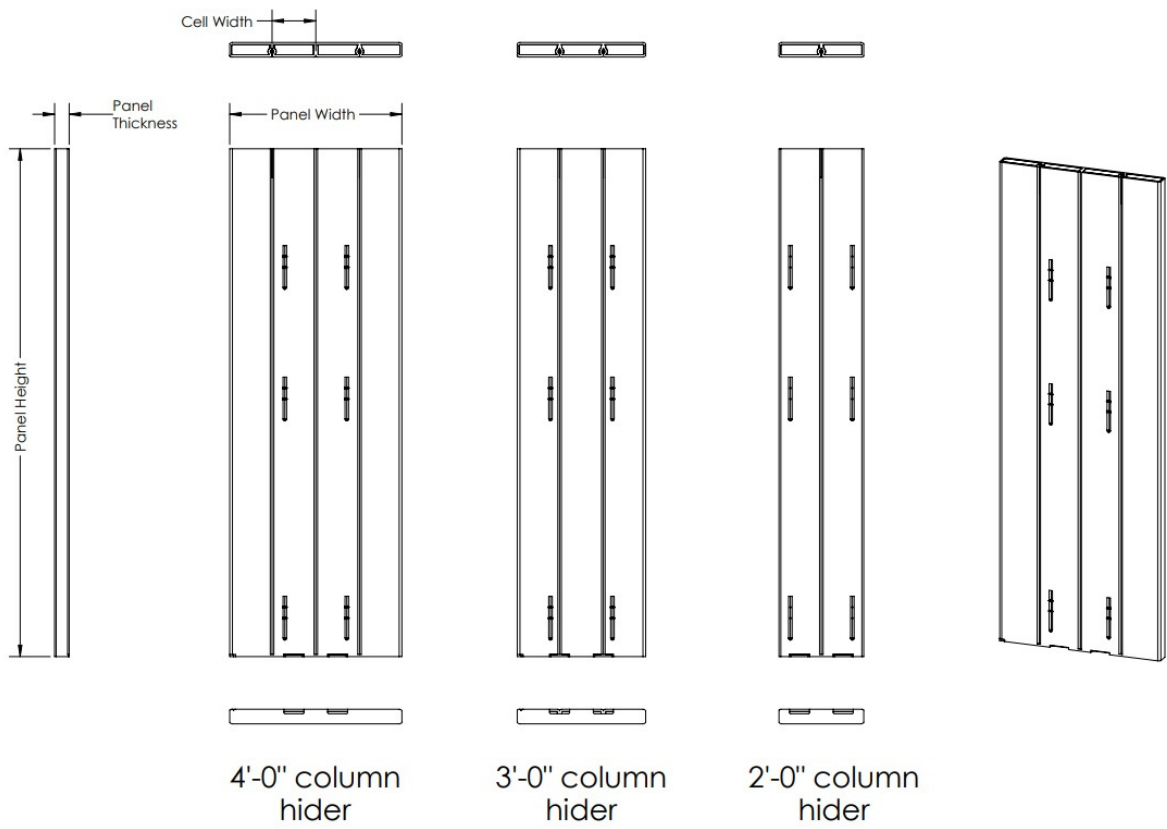


FIGURE 1D.—MB MKS COLUMN HIDER PANEL CONFIGURATIONS

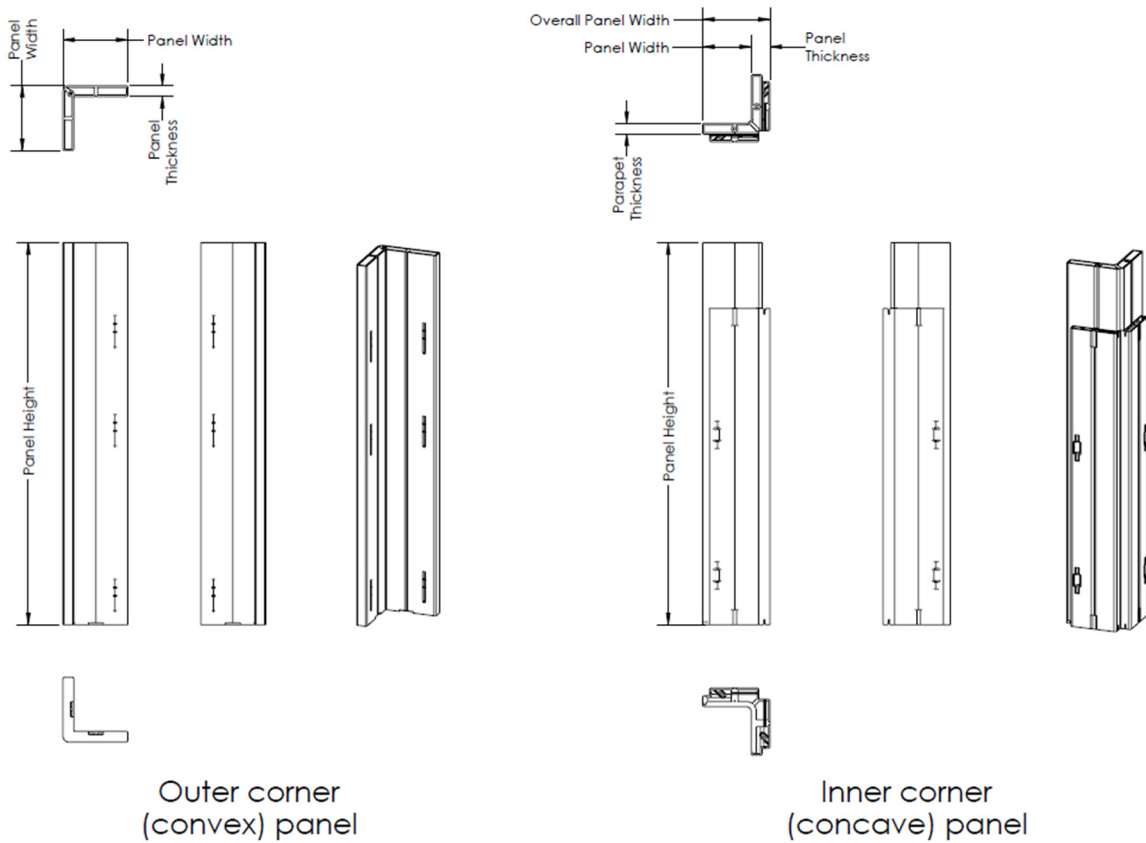
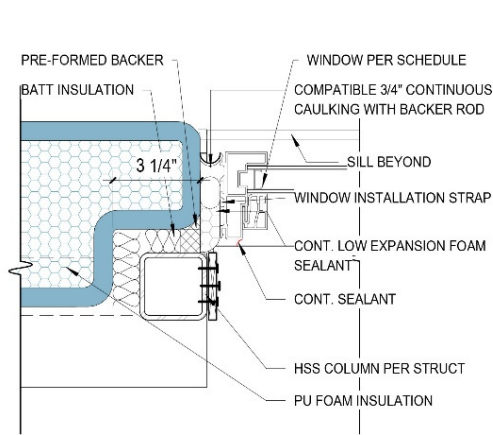
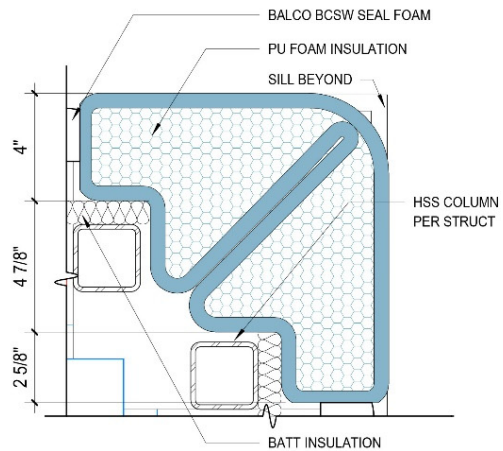


FIGURE 1E.—MB MKS CORNER PANEL CONFIGURATIONS



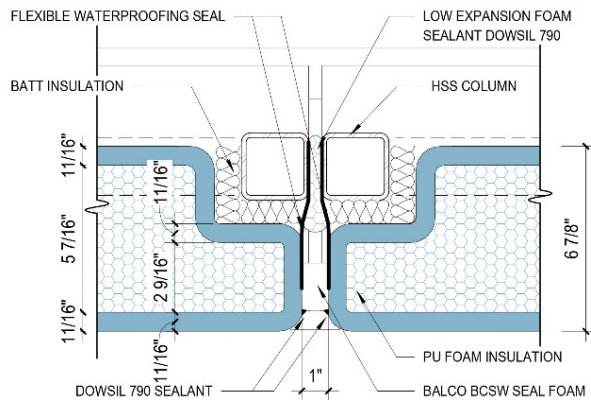
WINDOW JAMB

SCALE: 3" = 1'-0"



CORNER PANEL

SCALE: 3" = 1'-0"



PANEL-TO-PANEL

SCALE: 3" = 1'-0"

FIGURE 2A.—TYPICAL MB MKS PANEL SECTION (TYPE I)

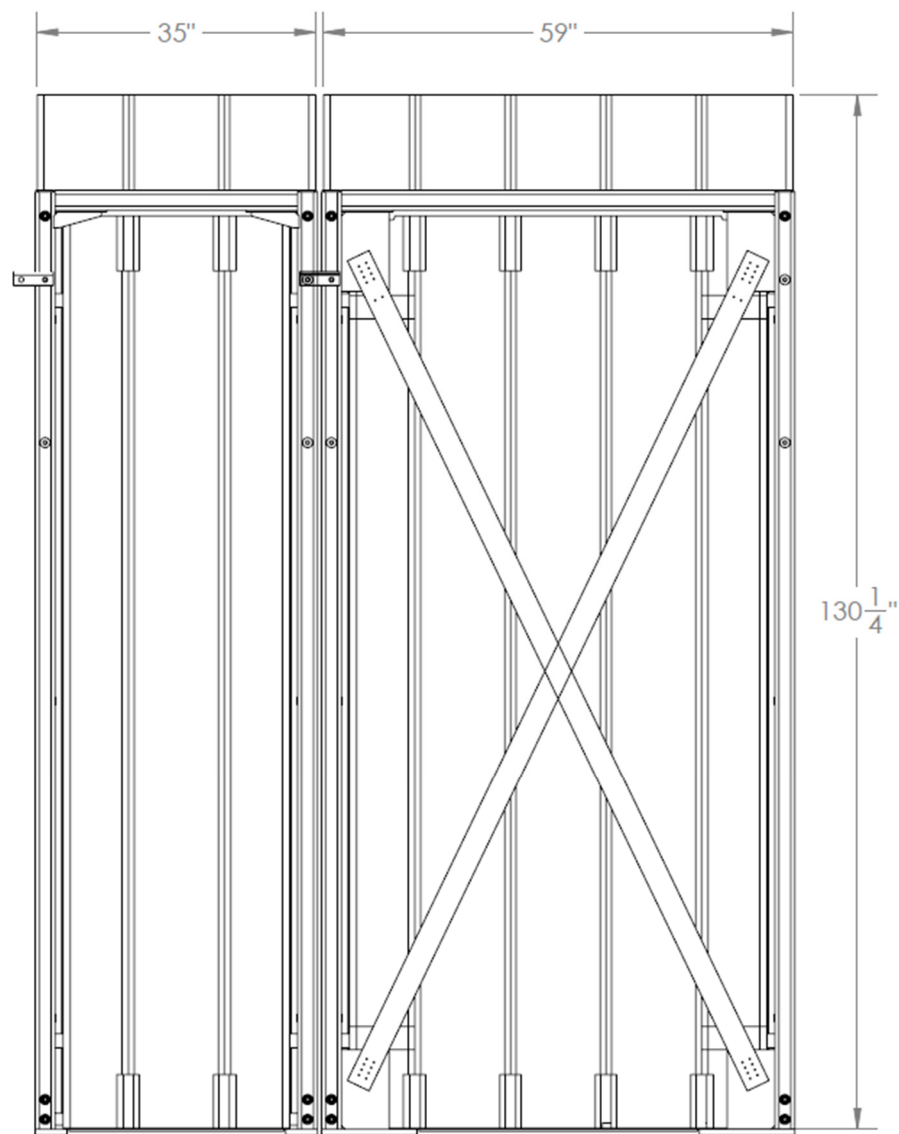
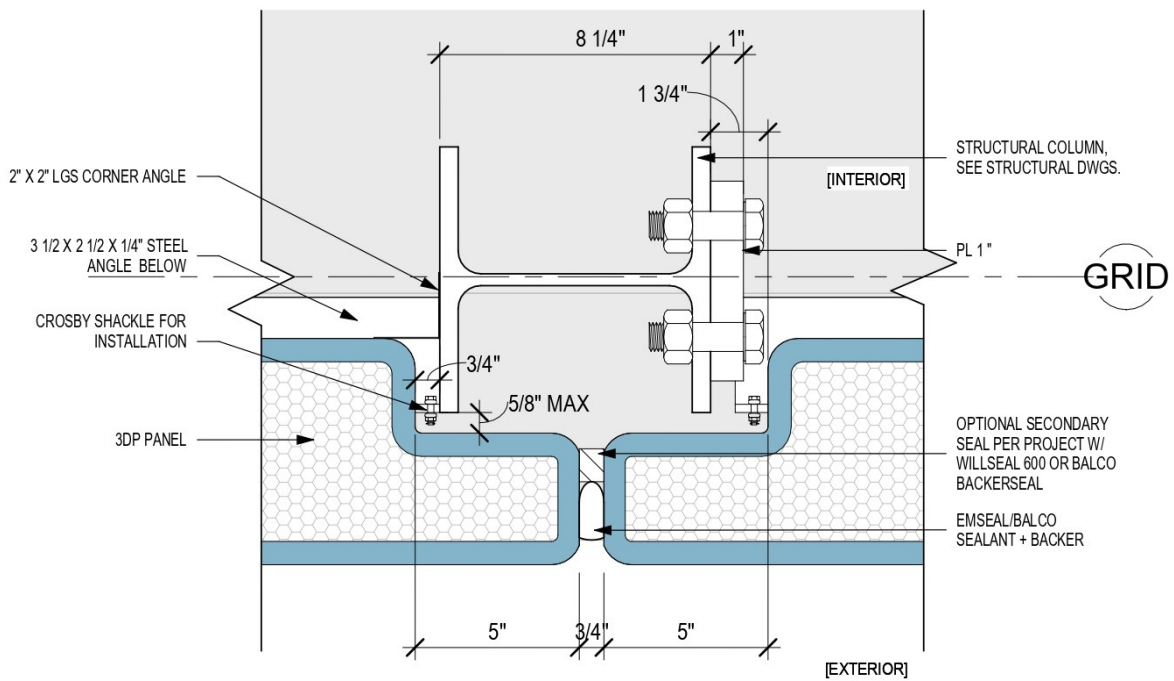
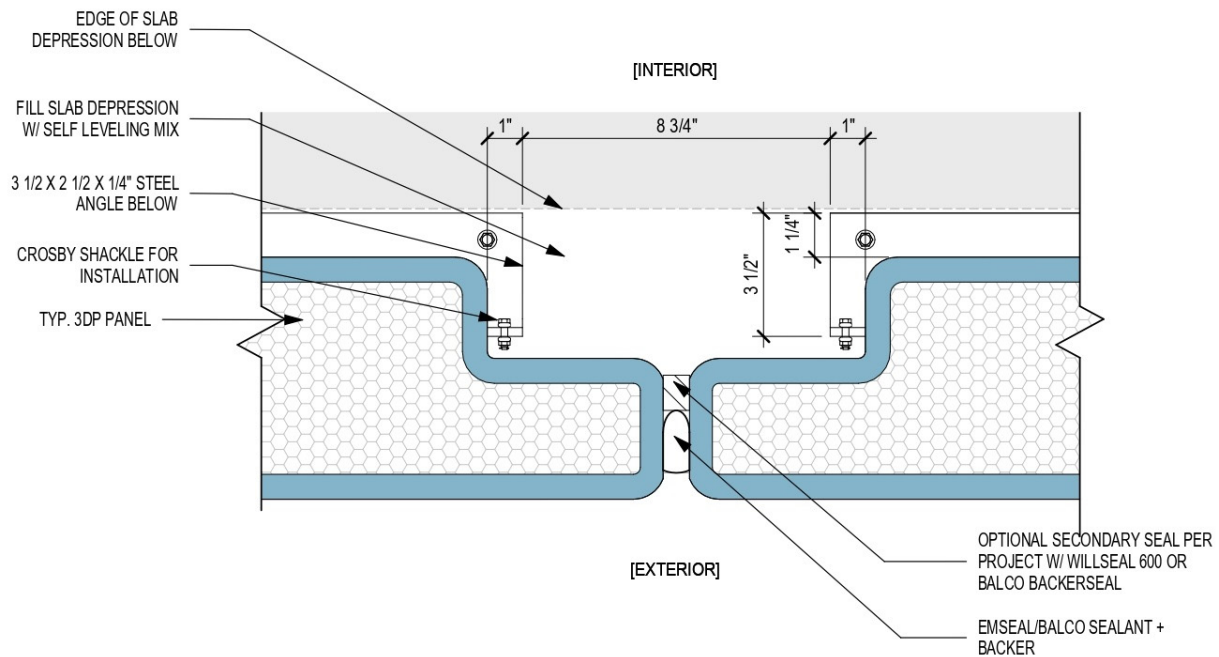


FIGURE 2B.—TYPICAL MB MKS PANEL ELEVATION (TYPE I)

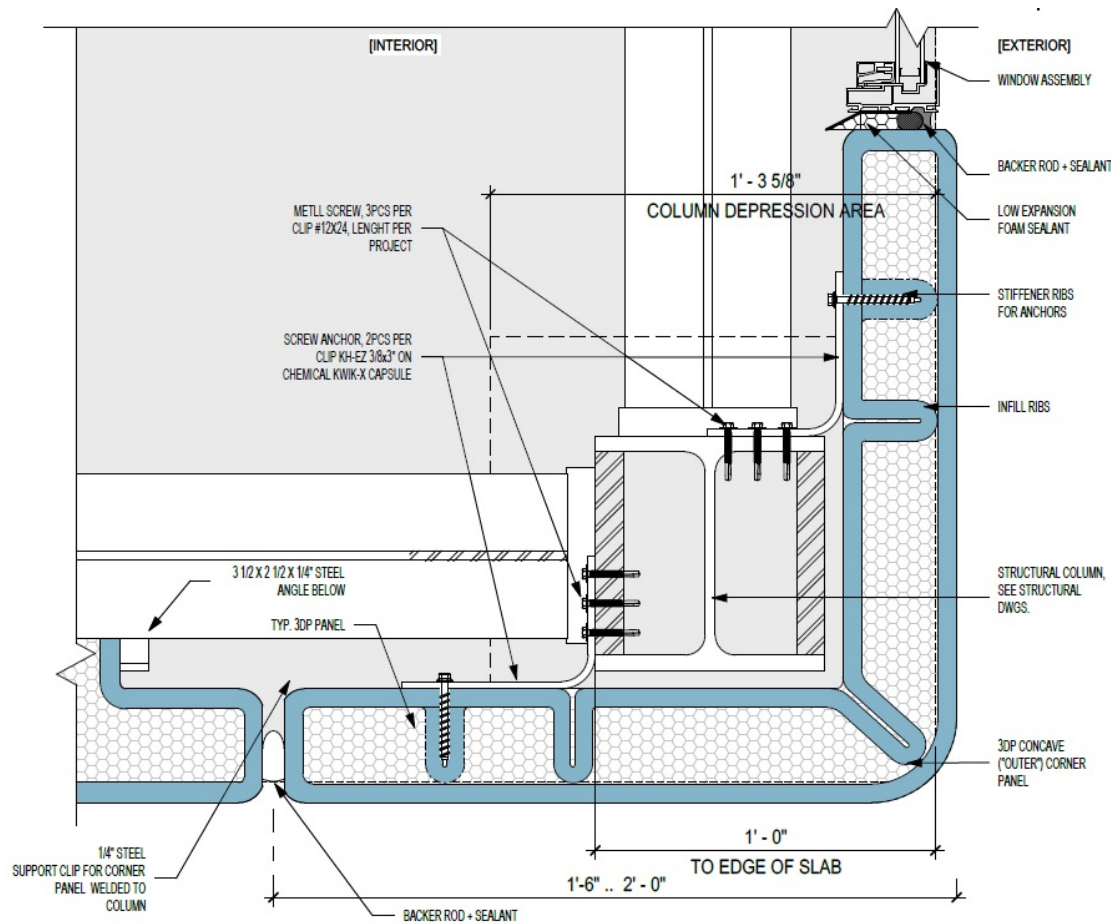


3DP PANEL TO PANEL CONNECTION W/ COLUMN



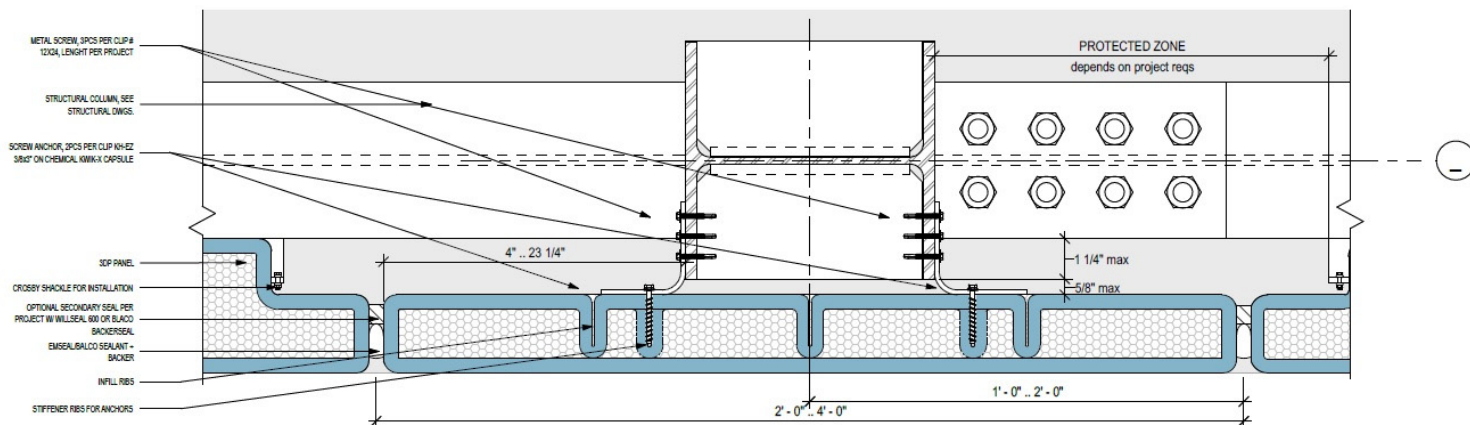
3DP PANEL TO PANEL CONNECTION W/ CHASE

FIGURE 3A.—TYPICAL MB MKS PANEL SECTION (TYPE II)



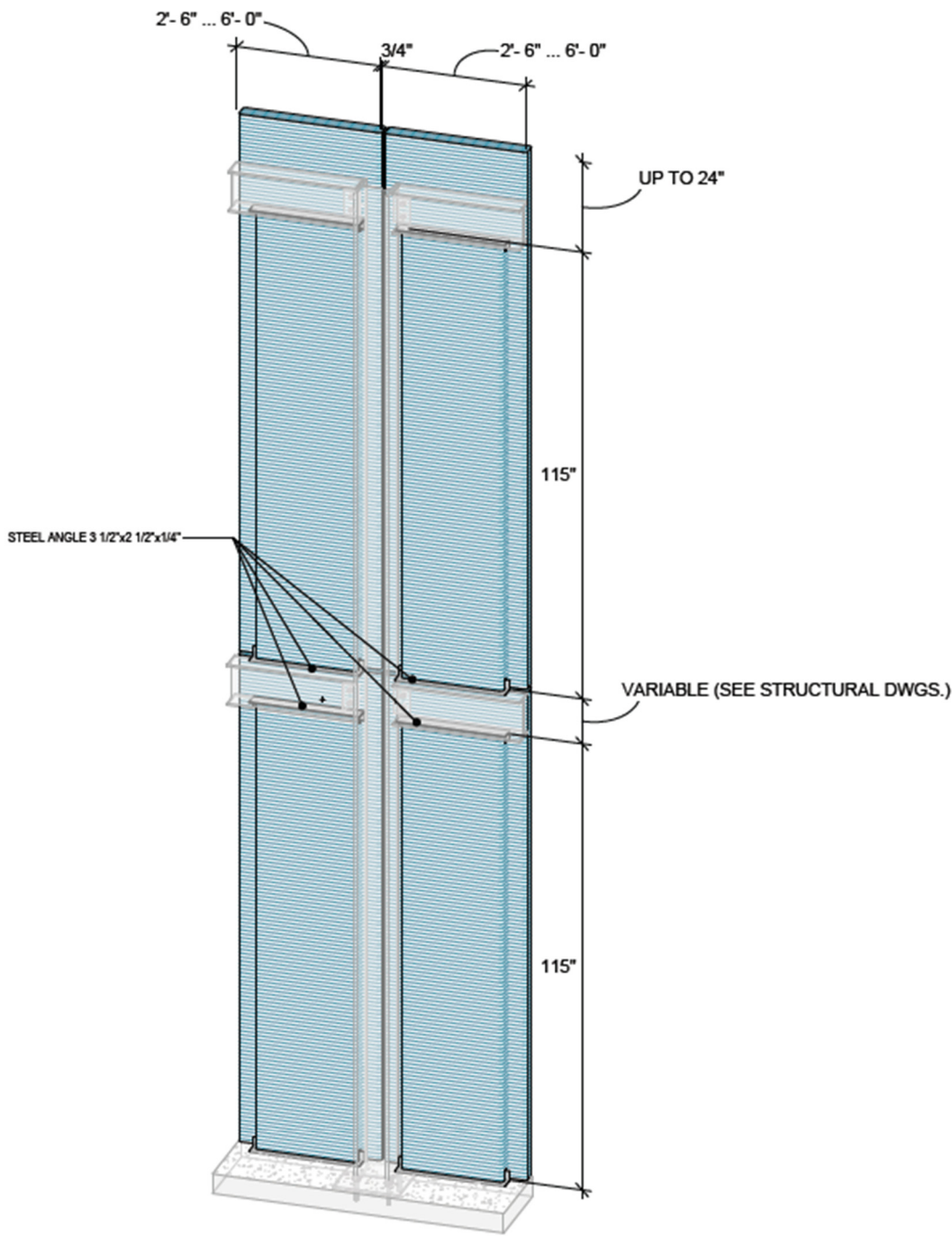
OUTER CORNER W/ COLUMN

FIGURE 3B.—TYPICAL MB MKS OUTER CORNER PANEL SECTION (TYPE II)



COLUMN TO BEAM CONNECTION

FIGURE 3C.—TYPICAL MB MKS OUTER COLUMN HIDER PANEL SECTION (TYPE II)



ISO_PANEL TO PANEL

SCALE:

FIGURE 3D.—TYPICAL MB MKS PANEL ELEVATION (TYPE II)

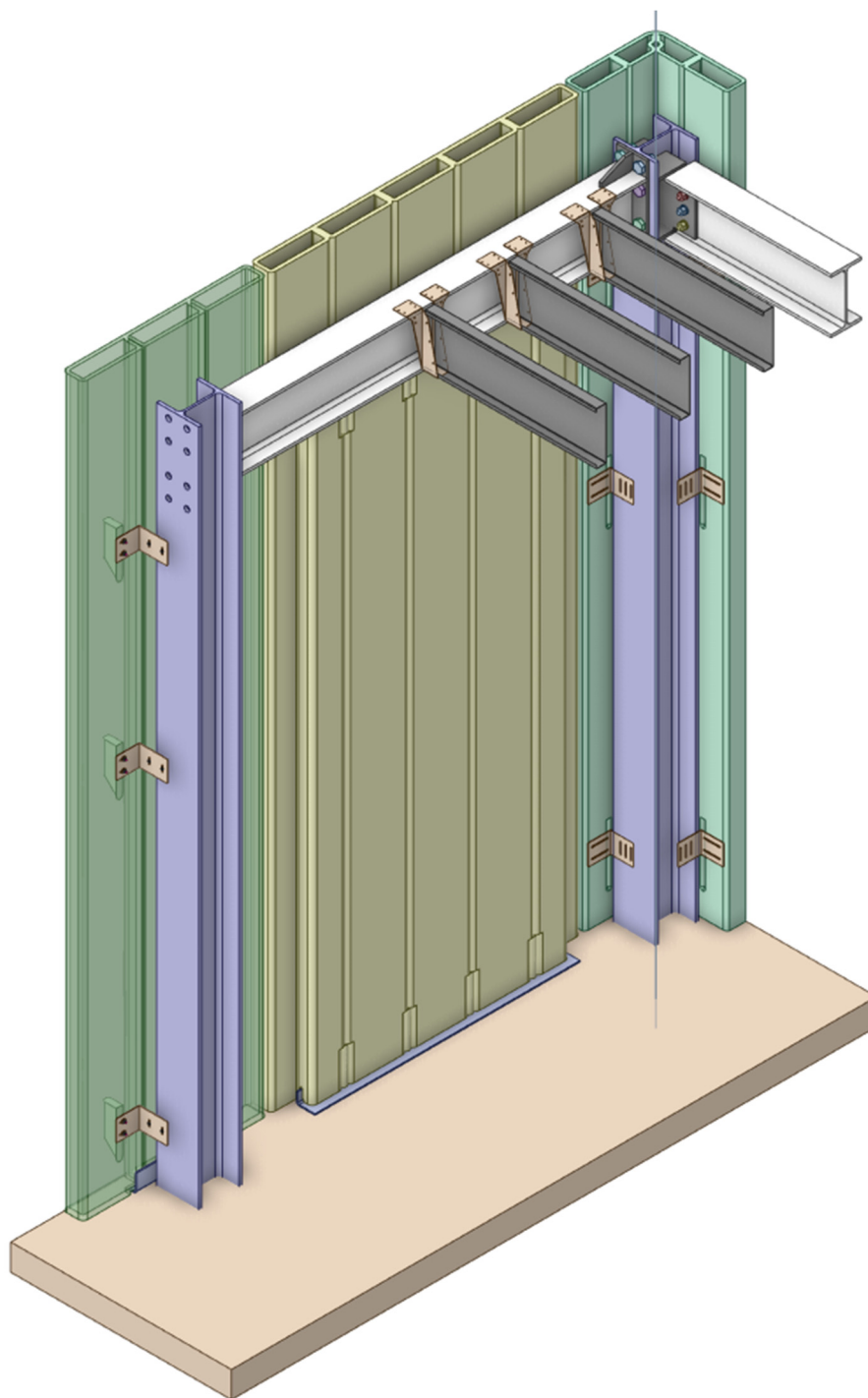


FIGURE 3E.—TYPICAL MB MKS PANEL ASSEMBLY ELEVATION (TYPE II)

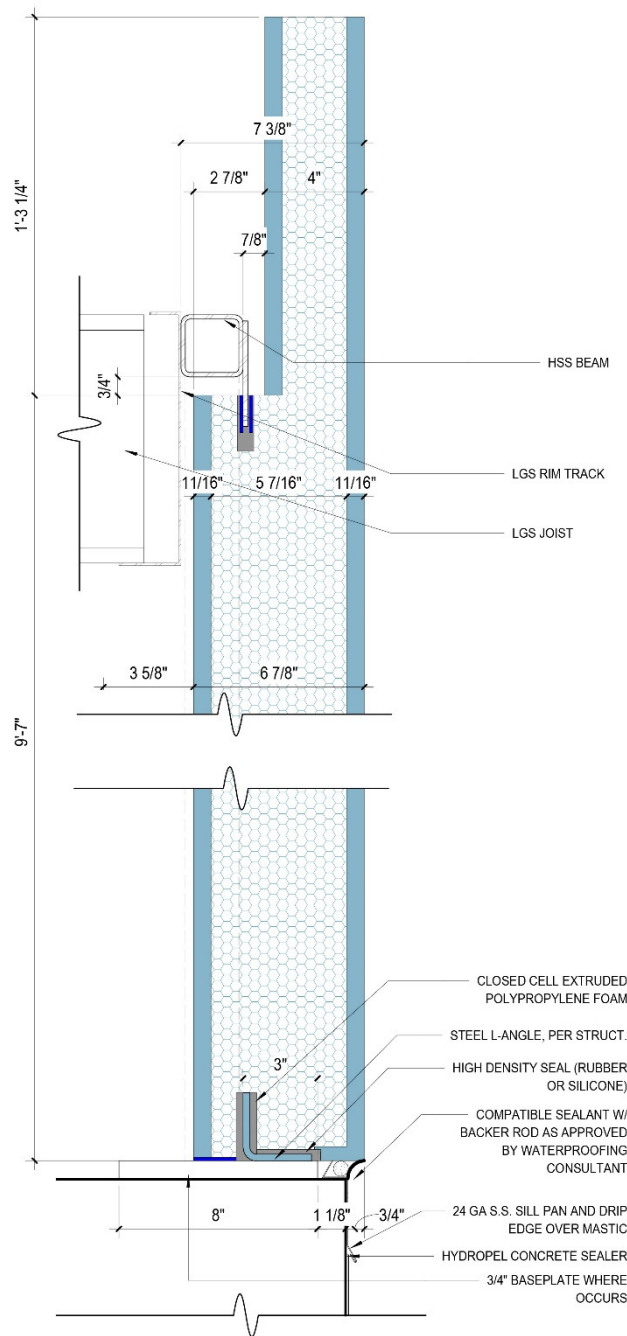
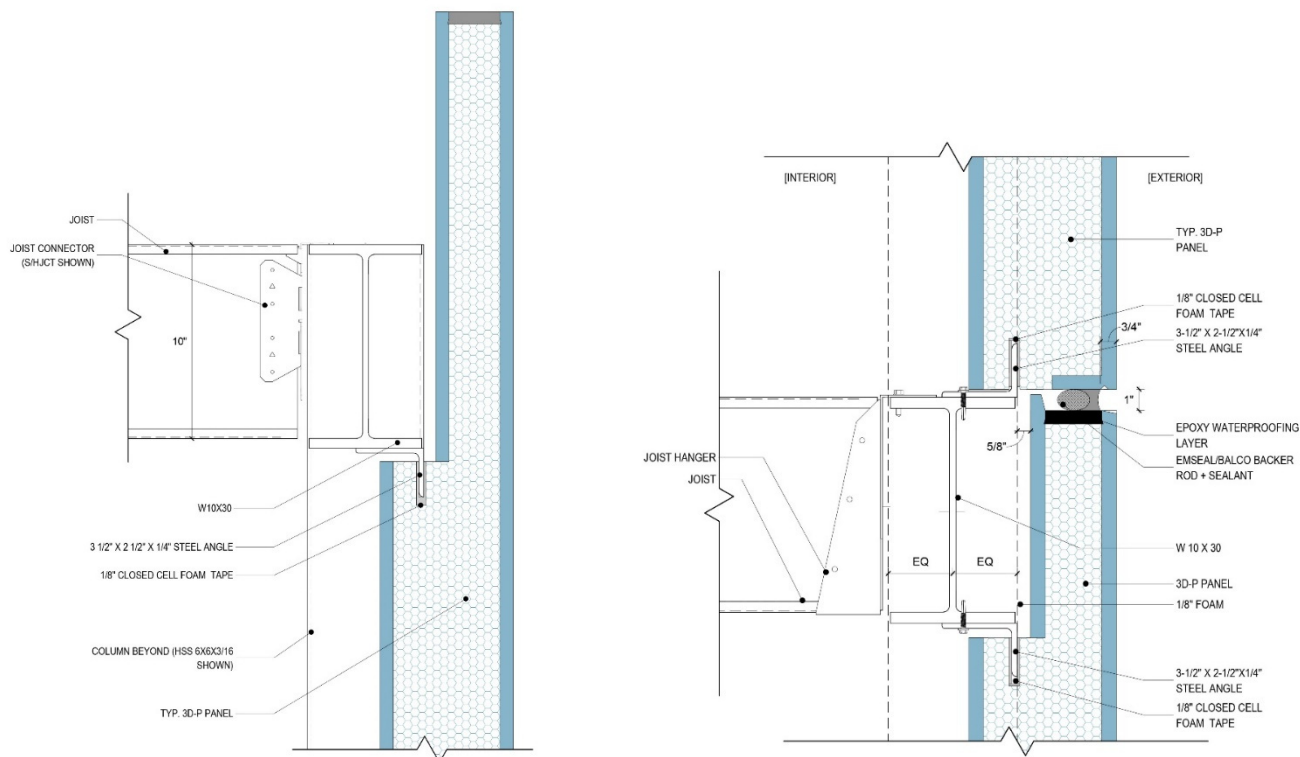


FIGURE 4A.—TOP AND BOTTOM OF MB MKS PANEL TO STRUCTURAL STEEL FRAMING CONNECTION (TYPE I)

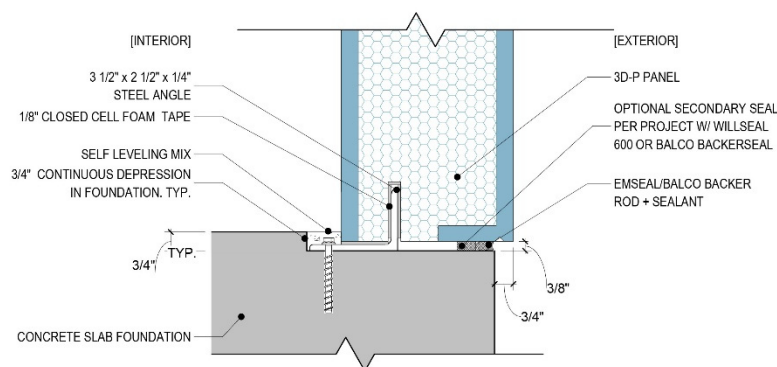


3DP PARAPET & ROOF ASSEMBLY - SECTION

SCALE: 3" = 1'-0"

PANEL TO PANEL, INCL. FLOOR ASSEMBLY - SECTION

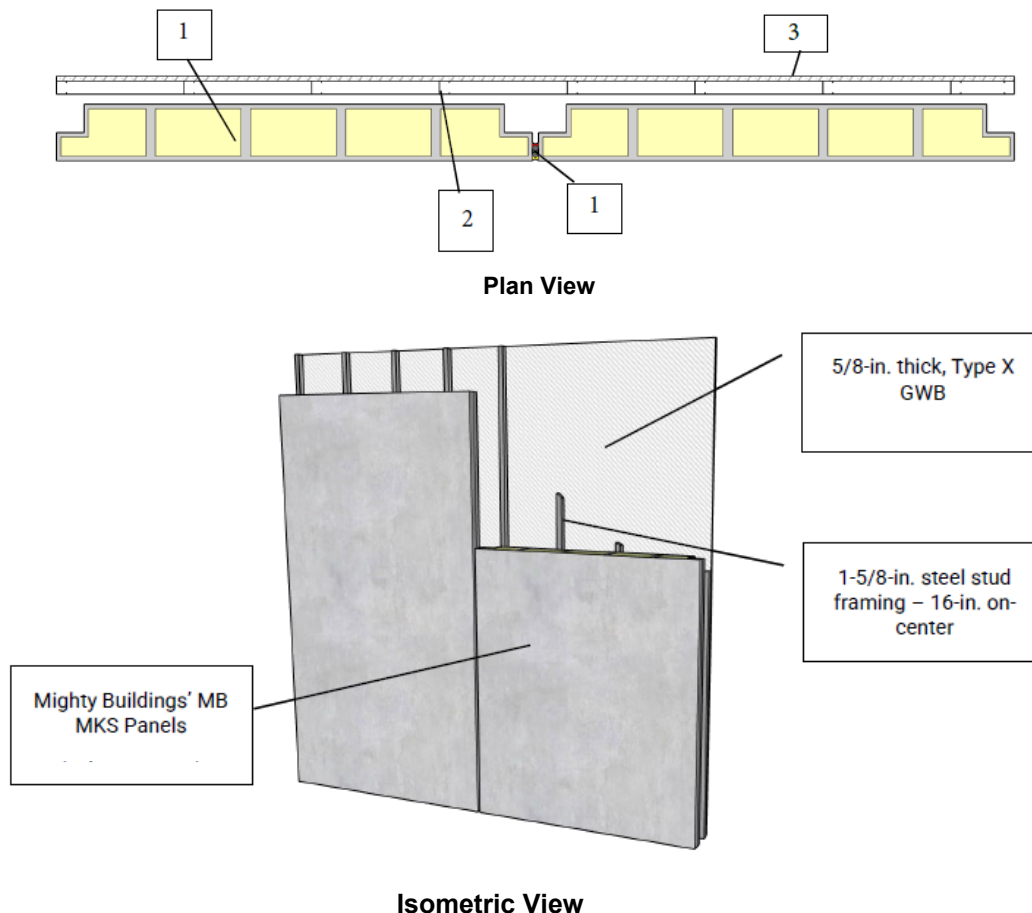
SCALE: 3" = 1'-0"



3DP PANEL TO FOUNDATION - SECTION

SCALE: 3" = 1'-0"

FIGURE 4B.—TOP AND BOTTOM OF MB MKS PANEL TO STRUCTURAL STEEL FRAMING CONNECTION (TYPE II)

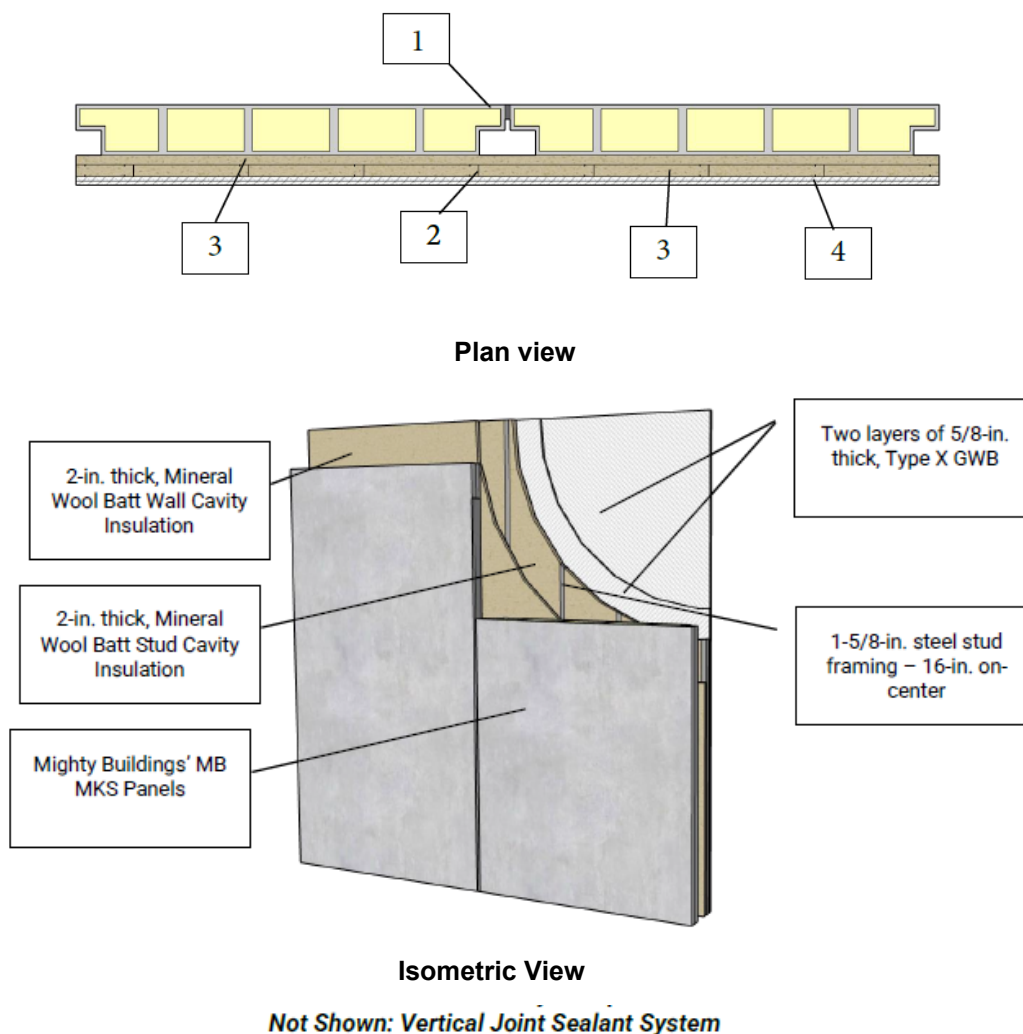


Not Shown: Vertical Joint Sealant System

COMPONENTS OF CONSTRUCTION:

1. **EXTERIOR – MB MKS PANEL:** A 3D printed exterior cladding panel with a nominal overall thickness of either 4 inches (101 mm) or 6 $\frac{7}{8}$ inches (175 mm). The panels contain cells that are filled with DOW® VORACOR™ CD 2101HE Polyol / CE 108 Isocyanate polyurethane spray foam insulation. Between each panel, there is a nominal $\frac{3}{4}$ -inch (19 mm) gap that is sealed using 3M Fire Barrier Sealant from the interior side of the joint. The exterior side of the joint is sealed using Sikaflex 1a elastomeric joint sealant.
2. **FURRING WALL FRAMING:** Minimum 16 gage (54 mil) 1 $\frac{5}{8}$ -inch (41 mm) deep steel studs (162S162-54) spaced 16 inches on-center (406 mm). The steel studs are fastened to minimum 16 gage (54 mil) 1 $\frac{5}{8}$ -inch (41 mm) deep steel tracks (162T125-54) with #8- $\frac{1}{2}$ inch (12 mm) long self-drilling pan head framing screws. The furring wall is installed with a nominal 1 $\frac{1}{2}$ inch (38 mm) air gap between the backside of the MB MKS panel and the interior side of the cold-formed steel framing.
3. **INTERIOR SHEATHING:** One layer of minimum $\frac{5}{8}$ -inch (15.9 mm) Type X gypsum wallboard in accordance with ASTM C1396. All boards are installed vertically oriented and must be secured to the steel stud framing on the interior side of the wall assembly. The face layer must be secured to the steel stud framing with #6-1 $\frac{1}{4}$ inch (32 mm) long self-drilling bugle head drywall screws spaced 8 inches (203.2 mm) on center along the perimeter and 12 inches (305 mm) on center in the field of the gypsum wallboard. The fasteners around the perimeter of the gypsum wallboard are spaced $\frac{3}{8}$ -inch (9.5 mm) from the edge of the board. All face layer seams are treated with a level 2 finish consisting of nominal 2-inch (51 mm) wide paper tape and joint compound. All fastener heads are covered with one layer of joint compound.

**FIGURE 5A.—ASTM E119 ONE-HOUR FIRE-RESISTANCE-RATED NON-LOADBEARING WALL ASSEMBLY
(RATED FOR BOTH SIDES)**



COMPONENTS OF CONSTRUCTION:

4. **EXTERIOR – MB MKS PANEL:** A 3D printed exterior cladding panel with a nominal overall thickness of either 4 inches (101 mm) or 6 ⁷/₈ inches (175 mm). The panels contain cells that are filled with DOW® VORACOR™ CD 2101HE Polyol / CE 108 Isocyanate polyurethane spray foam insulation. Between each panel, there is a nominal ³/₄-inch (19 mm) gap that is sealed using BALCO® MetaBLOCK® mechanical joint system. The MetaBLOCK® is spliced together at the panel seams and installed per the manufacturer's specifications using Ram-Tack™ spray adhesive.
5. **FURRING WALL FRAMING:** Minimum 16 gage (54 mil) 1 ⁵/₈-inch (41 mm) deep steel studs (162S162-54) spaced 16 inches on-center (406 mm). The steel studs are fastened to minimum 16 gage (54 mil) 1 ⁵/₈-inch (41 mm) deep steel tracks (162T125-54) with #8-¹/₂ inch (12 mm) long self-drilling pan head framing screws. The furring wall is installed with a nominal 1 ¹/₂ inch (38 mm) air gap between the backside of the MB MKS panel and the interior side of the cold-formed steel framing.
6. **INSULATION:** Owens Corning® Thermafiber® Commercial SAFB™ mineral wool insulation batt with a nominal thickness of 2 inches (51 mm), a minimum width of 16 inches (406 mm), and a minimum nominal density of 2.5 lbs./ft³ (40 kg/m³). The insulation is friction fit within each stud cavity and installed within the nominal 1 ¹/₂ inch (38 mm) air cavity between the backside of the MB-MKS panel and the interior side of the cold-formed steel framing; the air cavity insulation is secured to the steel stud framing with #6- 1 ⁷/₈ inch (47 mm) long self-drilling screws with 2 inch by 2 inch (51 mm by 51 mm) insulation washers.
7. **INTERIOR SHEATHING:** Two layers of minimum ⁵/₈-inch (15.9 mm) Type X gypsum wallboard in accordance with ASTM C1396. All boards are installed vertically oriented and must be secured to the steel stud framing on the interior side of the wall assembly. The base layer must be secured to the steel stud framing with #6-1 ¹/₄ inch (32 mm) long self-drilling bugle head drywall screws spaced 8 inches (203.2 mm) on center along the perimeter and 12 inches (305 mm) on center in the field of the gypsum wallboard. The fasteners around the perimeter of the gypsum wallboard are spaced ³/₈-inch (9.5 mm) from the edge of the board. All base layer seams are left exposed. The face layer is staggered from the base layer to prevent overlapping of seams through the layers and is fastened to the steel studs through the base layer using #6-1 ⁵/₈-inch (41 mm) long self-drilling bugle head drywall screws spaced 8 inches (203 mm) on center along the perimeter and 12 inches (305 mm) on center in the field of the gypsum wallboard. The face layer fasteners are offset 4 inches (102 mm) from the base layer fasteners to avoid contact. The fasteners around the perimeter of the gypsum wallboard are spaced ³/₈-inch (9.5 mm) from the edge of the board. All face layer seams are treated with a level 2 finish consisting of nominal 2-inch (51 mm) wide paper tape and joint compound. All fastener heads are covered with two layers of joint compound.

**FIGURE 5B.—ASTM E119 TWO-HOUR FIRE-RESISTANCE-RATED NON-LOADBEARING WALL ASSEMBLY
(RATED FOR BOTH SIDES)**

ICC-ES Evaluation Report

ESR-4841 LABC and LARC Supplement

Issued December 2022

Revised October 2023

This report is subject to renewal December 2023.

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A Subsidiary of the International Code Council®

DIVISION: 07 00 00—THERMAL AND MOISTURE PROTECTION

Section: 07 42 00—Wall Panels

Section: 07 42 43—Composite Wall Panels

REPORT HOLDER:

MIGHTY BUILDINGS, INC.

EVALUATION SUBJECT:

MIGHTY KIT SYSTEM 3D PRINTED PANELS (MB MKS PANELS)

1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that MB MKS Panels, described in ICC-ES evaluation report [ESR-4841](#), have also been evaluated for compliance with the codes noted below as adopted by the Los Angeles Department of Building and Safety (LADBS).

Applicable code editions:

- 2023 *City of Los Angeles Building Code* (LABC)
- 2023 *City of Los Angeles Residential Code* (LARC)

2.0 CONCLUSIONS

The MB MKS Panels, described in Sections 2.0 through 7.0 of the evaluation report [ESR-4841](#), comply with the LABC and the LARC, and are subjected to the conditions of use described in this supplement.

3.0 CONDITIONS OF USE

The MB MKS Panels described in this evaluation report supplement must comply with all of the following conditions:

- All applicable sections in the evaluation report [ESR-4841](#).
- The design, installation, conditions of use and identification of the MB MKS Panels are in accordance with the 2021 *International Building Code*® (IBC) or the 2021 *International Residential Code*® (IRC), as applicable, provisions noted in the evaluation report [ESR-4841](#).
- The design, installation and inspection are in accordance with additional requirements of LABC Chapters 16 and 17, as applicable.
- Under the LARC, an engineered design in accordance with LARC Section R301.1.3 must be submitted.
- The MB MKS Panels may be used in the exterior design and construction of new buildings located in a Fire Hazard Severity Zone within State Responsibility Areas or any Wildland–Urban Interface Fire Area, provided installation is in accordance with the 2021 *International Building Code*® (IBC) provisions noted in the evaluation report and the additional requirements of Sections 701A.3 and 707A.3 of the LABC. The MB MKS Panels, when used as part of an assembly as shown in Figures 5A and 5B of the evaluation report ESR-4841, comply with the performance requirements of Section 707A.3 when tested in accordance with ASTM E119 in accordance with Item 5 of LABC Section 707A.4 and may be used in the exterior design and construction of exterior wall assemblies in new buildings located in a Fire Hazard Severity Zone within State Responsibility Areas or any Wildland–Urban Interface Fire Area.
- The MB MKS Panels may be used in the exterior design and construction of new buildings located in a Fire Hazard Severity Zone within State Responsibility Areas or any Wildland–Urban Interface Fire Area, provided installation is in accordance with the 2021 *International Residential Code*® (IRC) provisions noted in the evaluation report and the additional requirements of Sections R337.1.3 and R337.7.3 of the LARC. The MB MKS Panels, when used as part of an assembly as shown in Figures 5A and 5B of the evaluation report ESR-4841, comply with the performance requirements of Section R337.7.3 when tested in accordance with ASTM E119 in accordance with Item 5 of LARC Section R337.7.4 and may be used in the exterior design and construction of exterior wall assemblies in new buildings located in a Fire Hazard Severity Zone within State Responsibility Areas or any Wildland–Urban Interface Fire Area.

This supplement expires concurrently with the evaluation report, issued December 2022 and revised October 2023.

ICC-ES Evaluation Report

ESR-4841 CBC and CRC Supplement

Issued December 2022

Revised October 2023

This report is subject to renewal December 2023.

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A Subsidiary of the International Code Council®

DIVISION: 07 00 00—THERMAL AND MOISTURE PROTECTION

Section: 07 42 00—Wall Panels

Section: 07 42 43—Composite Wall Panels

REPORT HOLDER:

MIGHTY BUILDINGS, INC.

EVALUATION SUBJECT:

MIGHTY KIT SYSTEM 3D PRINTED PANELS (MB MKS PANELS)

1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that MB MKS Panels, described in ICC-ES evaluation report [ESR-4841](#), have also been evaluated for compliance with the code(s) noted below.

Applicable code edition(s):

- 2022 California Building Code (CBC)

For evaluation of applicable chapters adopted by the California Office of Statewide Health Planning and Development (OSHPD) AKA: California Department of Health Care Access and Information (HCAI) and the Division of State Architect (DSA), see Sections 2.1.1 and 2.1.2 below.

- 2022 California Residential Code (CRC)

2.0 CONCLUSIONS

2.1 CBC:

The MB MKS Panels, described in Sections 2.0 through 7.0 of the evaluation report [ESR-4841](#), comply with CBC Chapters 8 and 14, provided the design and installation are in accordance with the 2021 *International Building Code*® (IBC) provisions noted in the evaluation report and the additional requirements of 16 and 17, as applicable.

The MB MKS Panels may be used in the exterior design and construction of new buildings located in a Fire Hazard Severity Zone within State Responsibility Areas or any Wildland–Urban Interface Fire Area, provided installation is in accordance with the 2021 *International Building Code*® (IBC) provisions noted in the evaluation report and the additional requirements of Sections 701A.3 and 707A.3 of the CBC. The MB MKS Panels, when used as part of an assembly as shown in Figures 5A and 5B of the evaluation report ESR-4841, comply with the performance requirements of Section 707A.3 when tested in accordance with ASTM E119 in accordance with Item 5 of CBC Section 707A.4 and may be used in the exterior design and construction of exterior wall assemblies in new buildings located in a Fire Hazard Severity Zone within State Responsibility Areas or any Wildland–Urban Interface Fire Area.

2.1.1 OSHPD: The applicable OSHPD Sections of the CBC are beyond the scope of this supplement.

2.1.2 DSA: The applicable DSA Sections of the CBC are beyond the scope of this supplement.

2.2 CRC:

The MB MKS Panels, described in Sections 2.0 through 7.0 of the evaluation report [ESR-4841](#), comply with CRC Chapter 7, provided the design and installation are in accordance with the 2021 *International Residential Code*® (IRC) provisions noted in the evaluation report.

The MB MKS Panels may be used in the exterior design and construction of new buildings located in a Fire Hazard Severity Zone within State Responsibility Areas or any Wildland–Urban Interface Fire Area, provided installation is in accordance with

the 2021 *International Residential Code*® (IRC) provisions noted in the evaluation report and the additional requirements of Sections R337.1.3 and R337.7.3 of the CRC. The MB MKS Panels, when used as part of an assembly as shown in Figures 5A and 5B of the evaluation report ESR-4841 comply with the performance requirements of Section R337.7.3 when tested in accordance with ASTM E119 in accordance with Item 5 of CRC Section R337.7.4 and may be used in the exterior design and construction of exterior wall assemblies in new buildings located in a Fire Hazard Severity Zone within State Responsibility Areas or any Wildland–Urban Interface Fire Area.

This supplement expires concurrently with the evaluation report, issued December 2022 and revised October 2023.

DIVISION: 07 00 00—THERMAL AND MOISTURE PROTECTION

Section: 07 42 00—Wall Panels

Section: 07 42 43—Composite Wall Panels

REPORT HOLDER:

MIGHTY BUILDINGS, INC.

EVALUATION SUBJECT:

MIGHTY KIT SYSTEM 3D PRINTED PANELS (MB MKS PANELS)

1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that MB MKS panels, described in ICC-ES evaluation report ESR-4841, has also been evaluated for compliance with the codes noted below.

Applicable code editions:

- 2023 and 2020 *Florida Building Code—Building*
- 2023 and 2020 *Florida Building Code—Residential*

2.0 CONCLUSIONS

The MB MKS panels, described in Sections 2.0 through 7.0 of ICC-ES evaluation report ESR-4841, comply with the *Florida Building Code—Building* and the *Florida Building Code—Residential*. The design requirements must be determined in accordance with the *Florida Building Code—Building* or the *Florida Building Code—Residential*, as applicable. The installation requirements noted in ICC-ES evaluation report ESR-4841 for the 2021 and 2018 *International Building Code*® meet the requirements of the *Florida Building Code—Building* or the *Florida Building Code—Residential*, as applicable.

Use of the MB MKS panels has also been found to be in compliance with the High-Velocity Hurricane Zone provisions of the *Florida Building Code—Building* or the *Florida Building Code—Residential* with the following conditions:

- The allowable design wind loads must be in accordance with Table 1 of the evaluation report ESR-4841.
- Installation of the panels must be in accordance with Type I Panels (Figure 4a. of the evaluation report ESR-4841).
- Installation of the panels must be in accordance with Type II Panels and must be modified in accordance with Figures 1a and 1b of this supplement to comply with installation requirements under FBC Section 1626.4 Item 3.
- Outer corner panels have not been evaluated for compliance with the *Florida Building Code* Test Protocols for High-Velocity Hurricane Zones and are outside the scope of this report.

In addition to the data noted in Section 6.0 of the evaluation report ESR-4841, data in accordance with *Florida Building Code* Test Protocols for High-Velocity Hurricane Zones, TAS 202 and TAS 203 was submitted.

For products falling under Florida Rule 61G20-3, verification that the report holder's quality assurance program is audited by a quality assurance entity approved by the Florida Building Commission for the type of inspections being conducted is the responsibility of an approved validation entity (or the code official when the report holder does not possess an approval by the Commission).

This supplement expires concurrently with the evaluation report, issued December 2022 and revised October 2023.

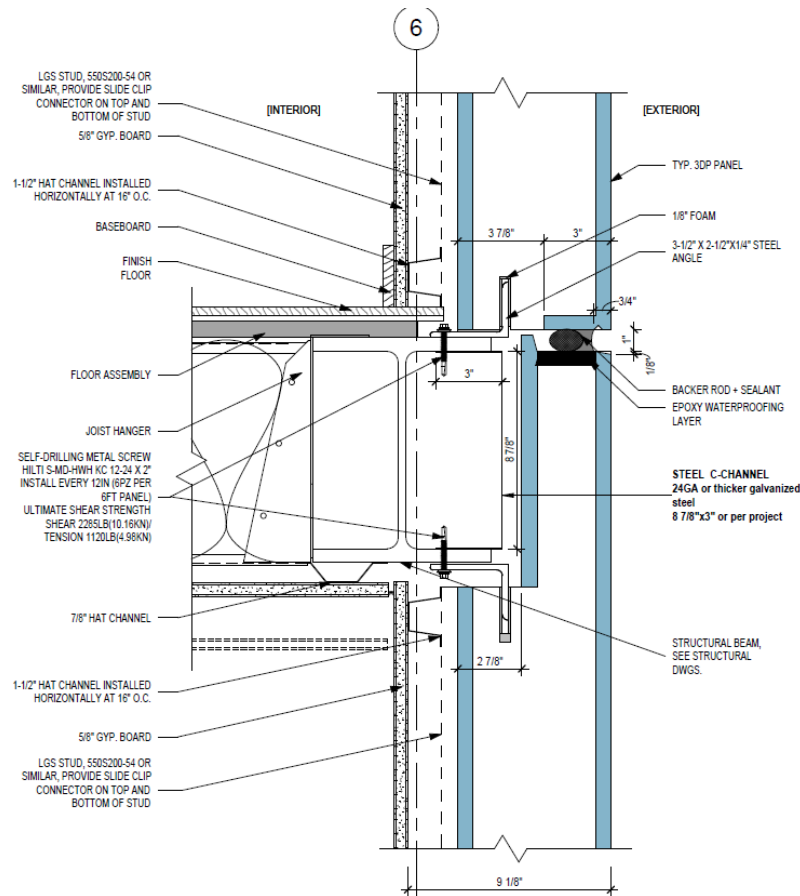


FIGURE 1A: TYPE II PANEL – INSTALLATION TO MEET REQUIREMENTS IN FBC SECTION 1626.4 ITEM 3

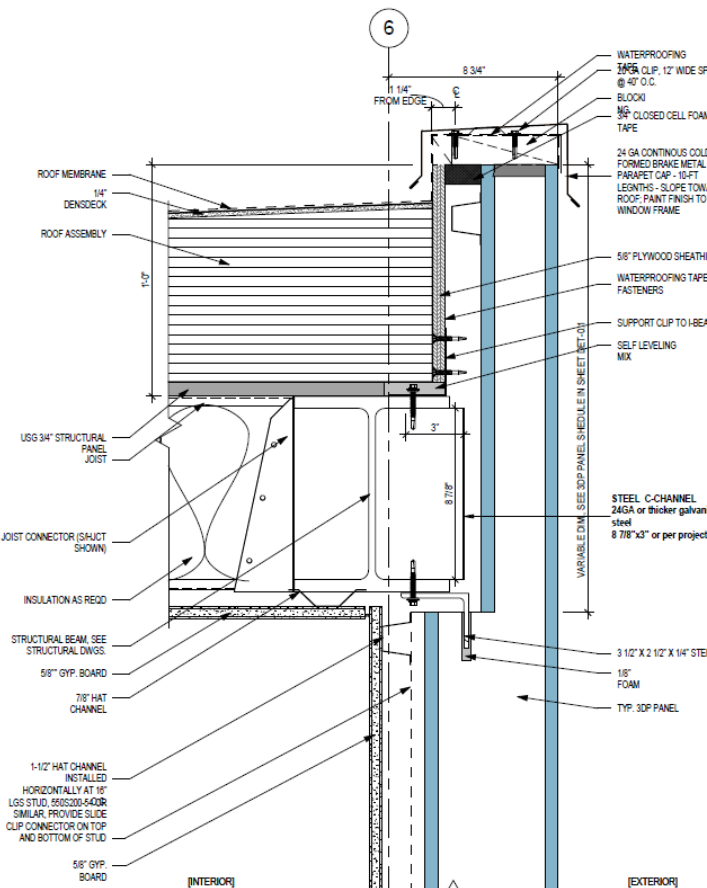


FIGURE 1B: TYPE II PANEL – INSTALLATION TO MEET REQUIREMENTS IN FBC SECTION 1626.4 ITEM 3