CODE EVALUATION REPORT

CERUS-1021

PUBLISHED: January 2025
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PRODUCT: **TechPanel™ Structurally Insulated Panels (SIPs)**

REPORT HOLDER: ZS2 Technologies Ltd.

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CSI DIVISION: 06 00 00 – Wood, Plastics, and Composites

CSI SECTION: 06 12 00 – Structural Panels

APPLICABLE CODES:
2021, 2018, 2015 International Building Code (IBC)
2021, 2018, 2015 International Residential Code (IRC)
2023 Florida Building Code (FBC)
2022 California Building Code (CBC)

EVALUATED:
Structural Capacity
Surface Burning Characteristics
Thermal Barrier
Impact and Cycling Resistance

IAS ACCREDITED Product Certification Agency PCA-118

1.0 APPROVED FOR FOLLOWING:

APPROVED TYPES OF CONSTRUCTION:	Types VB
APPROVED USE:	Load-bearing and non-load bearing exterior and interior wall assemblies.
APPROVED INSTALLATIONS:	Exterior and interior walls, including use in areas prone to wind-borne debris.

2.0 DESCRIPTION:

2.1 General:

TechPanel™ are structurally insulated panels (SIPs) for use as interior and exterior load-bearing and non-load bearing wall assemblies. TechPanel™ are of minimum 6.5 inches (165 mm) thickness, composed of ½-inch (13 mm) TechBoard™ Magnesium Oxide (MgO) skins, laminated to a minimum 5.5-inch (140 mm) thickness expanded polystyrene (EPS) core. TechPanel™ are manufactured to incorporate recesses for the installation of lumber elements on the jobsite to create studs (splines), sill plates and header plates, connecting adjacent panels to create the wall assembly. TechPanel™ can include electrical chases of maximum 1-1/4-inches (31 mm) diameter, spaced as outlined in Section 8.2 of this report. See Section 8.2 of this report for additional TechPanel™ details.

TechPanel™ comply for use in Type VA construction, including use in fire-resistance rated construction as defined by the 2021 2018 / 2015 IBC. Where TechPanel™ are used in construction governed by the 2021 / 2018 / 2015 IRC, Engineering Design in accordance with Section R301.1.3 is required. Installation of TechPanel™ following the 2021 / 2018 / 2015 IRC Section R610 is outside the scope of this report. See Section 4.3 and Section 8.3 of this report for details of installation where TechPanel™ is used in fire-resistance rated construction.

TechPanel™ are manufactured in SIP panel options as noted in Table 1:

Table 1. TechPanel™ SIP Configurations

THICKNESS		WIDTH		HEIGHT	
inches	**mm**	**inches**	**mm**	**ft**	**mm**
6.5	165	48	1219	8	2438
				9	2743
				10	3048
10	254	48	1219	8	2438
				9	2743
				10	3048
12	305	48	1219	8	2438
				9	2743
				10	3048

TechPanel™ is available in alternate sizes to those listed in Table 1 above. However, heights greater than 10 ft (3048 mm) and thicknesses less than 6.5 inches (165 mm) are outside the scope of this report.

TechPanel™ comply for use in exterior walls when constructed in accordance with this report and the applicable code, including use in High Velocity Hurricane Zones as defined by the 2023 / 2020 Florida Building Code and 2023 / 2020 Florida Building Code, Residential. See Section 9 of this report for further details.

TechPanel™ facers are classified as *ignition resistant* material per NFPA 1144 for use in reducing structure ignition hazard resulting from wildfire. TechPanel™ where used as exterior walls comply with requirements of CBC Section 707A.4 for resisting building ignition in areas defined as *Wildland-Urban Interface* (WUI) or in any Fire Hazard Severity Zone within state responsibility areas. TechPanel™ exterior wall panels comply as exterior wall assemblies with Sectio 707A.4 of the 2022 California Building Code, based on evaluation to ASTM E2707.

2.2 PRODUCT COMPONENTS

2.2.1 EPS Foam Plastic Thermal Insulation:

TechPanel™ includes an expanded polystyrene (EPS) *foam plastic* thermal insulation core molded at 6.5 to 12 inches (165-305 mm) thicknesses. The EPS *foam plastic* component has a flame spread index of 25 or less and a smoke developed index of 450 or less at a nominal density of 1.0 lbs/ft^3 (16 kg/m^3) when tested and evaluated following UL 723 and complies with 2021 / 2018 / 2015 IBC Section 2603.3 and 2021 / 2018 / 2015 IRC Section 316.3 for thicknesses noted. The EPS foam plastic core has a spontaneous ignition temperature > 650^{o}F (343^{o}C) when evaluated in accordance with ASTM D1929. After installation, the EPS core is protected by an alternate thermal barrier TechBoard™, as outlined in Section 4.2.2 of this report.

The EPS foam is listed by an *approved agency* and complies with Type I specifications per ASTM C578 for use as thermal insulation.

TechPanel™'s include labeling for the EPS foam plastic in accordance with 2021 / 2018 / 2015 IBC 2603.2 and 2021 / 2018 / 2015 IRC R316.2

2.2.2 Skins / Facers

TechPanel™ include TechBoard™ MgO skins, as detailed in QAI Code Evaluation Report CER$_{US}$-1009. TechBoard™ is approved for use as interior wall and ceiling finish in dry applications as a tileable base as outlined in Section 2509.2 of the 2021 / 2018 /2015 IBC, and as backer board material as outlined in Section R702.4.2 of the 2021 / 2018 / 2015 IRC. TechBoard™ is approved for use with dryset Portland cement and latex-based Portland cement mortars. TechBoard™ is not intended as interior finish in areas defined as wet per Section 2509.1 of the 2021 / 2018 / 2015 IBC. Installation in wet area applications requires finishing with materials of smooth, hard nonabsorbent surface. TechBoard™ is classified as resistant to fungi growth when evaluated in accordance with ASTM G21.

TechBoard™ has a flame spread index of 10 or less and a smoke developed index of 5 or less in accordance with ASTM E84 meeting Class A requirements. TechBoard™ has a flame spread index of less than 25 with no evidence of significant progressive combustion with a maximum flame front of less than 10.5 feet when evaluated to ASTM E84 continued for an additional 20 minutes. TechBoard™ is classified as Ignition Resistant per NFPA 1144 for use in reducing structure ignition hazard resulting from wildland fire.

2.2.3 Adhesives:

2.2.3.1 Core to Panel Adhesive: TechPanel™ are manufactured with a durable polyurethane moisture cured adhesive approved for use in the lamination of EPS. Approved adhesives are outlined in ZS2 approved quality control documentation.

2.2.3.2 TechPanel™ to Lumber Elements (Shear Walls): Where installation requires adhesive application for bonding of wood elements together, or bonding of wood elements to TechPanel™ as specified in Table 4 of this report, LePage PL Premium adhesive is required.

Bonding of wood elements is to comply with Section 2.2.4 of this report. Bonding of wood elements to the TechBoard™ facer requires both surfaces to be clean and free of debris. A 3/8-inch (10 mm) width bead of adhesive is applied in a zigzag pattern across the surfaces of the wood element in contact with TechPanel™ facers and core. The lumber elements complying with Section 2.2.4 of this report are then installed snugly, following fasteners are installed to connect the skins to wood elements.

Optional: Additional foam-in-place sealants can be applied during installation between TechPanel™ and lumber elements to improve building envelope performance.

2.2.4 Wood Elements

TechPanel™ incorporates a minimum 2'' x 6'' (38 mm x 140 mm) nominal Spruce-Pine-Fir (SPF) Grade 2 lumber bearing the stamp of an accredited lumber grading agency. The lumber elements are used to create the internal studs (splines), the double sill plate, and double header plate components.

Standard panel installation includes double splines, single sill plate and double header plate elements. Shear wall and applications in areas defined as high-velocity hurricane zones require double splines, double sill plates, and double header plates. Where double lumber elements are used, the lumber are connected together by applying a LePage PL Premium adhesive between the wood elements in a zigzag pattern across the lumber elements to create the glue line applied on the jobsite to bond the lumber together, following two (2) rows of 2.5-inch (64 mm) length ring shank nails are applied in a staggered pattern to fasten the wood elements prior to installation into the TechPanel™. See Section 8.2 of this report for additional details.

2.2.5 Fasteners

TechPanel™ is connected to the double splines, double sill plates and double headers with minimum 2.5-inch (64 mm) length ring shank nails. The ring shank nails are applied in two (2) rows along the perimeter of the TechPanel™, with fasteners spaced at maximum 3 inches (76 mm) on center spacing for each row, with each row anchored into a layer of the underlying wood member. Rows are required staggered during installation and are to start and terminate 2.5 inches (64 mm) from panel corners with a minimum of ½-inch (13 mm) spacing to panel skin edges.

3.0 DESIGN:

Service loads to be resisted by TechPanel™ shall be determined in accordance with the applicable building codes and shall not exceed the allowable loads outlined in Section 8.1 of this report for the assemblies described. Use of TechPanel™ to resist loads greater than those described are outside the scope of this report.

TechPanel™ base anchorage to the foundation, and connection of elements to TechPanel™ are outside of this report and are to be designed by a Registered Design Professional and comply with the Engineering Design.

Where used in fire-resistance rated construction, TechPanel™ installation is to comply with Section 4.3 and Section 8.3 of this report.

Allowable loads outlined in Section 8.1 of this report for TechPanel™ may be applied to shorter panel heights and thicker panel options where supported by Engineering Design. Engineering Design is to consider load paths and anchorage of the TechPanel™ assembly, which are outside the scope of this report.

Extrapolation of allowable loads is not permitted under this report.

4.0 INSTALLATIONS:

4.1 General:

Installation of TechPanel™ must comply with the manufacturer's published installation instructions, this report, and the applicable code(s). Where differences are found, this report and the applicable building code shall govern.

TechPanel™ is intended for installation at the jobsite in accordance with the approved Engineering Design and the details outlined in Table 2 through Table 5, and Sections 8.2 and 8.3 of this report.

4.1.1 Special Inspection:

Where TechPanel™ is used in applications as a main wind force resisting for wind Exposure Category B where the basic design wind speed *V* is 150 mph (241 km/h) or greater, or in wind Exposure Category C or D where *V* is 140 mph (225 km/h) or greater unless exempted by 2021 / 2018 / 2015 IBC Section 1704.2. *Continuous special inspection* shall include the following but not limited to: field adhesive application, nailing, anchoring of panel, and hold-downs in accordance with Engineering Design and Section 8.1 of this report.

Where TechPanel™ is used as seismic force-resisting systems in *Seismic Design Category* C, *Continuous special inspection* of field adhesive application is required. *Periodic special inspection* for nailing, anchoring of panel, and hold-downs in accordance with Engineering Design and Section 8.1 of this report is required.

4.1 Interior:

4.1.1 General:

TechPanel™ EPS foam plastic core is to be separated from the interior space in accordance with Section 4.1.2 and 4.1.3 of this report, as appropriate. Connection of interior decorum, furniture and cabinetry are outside the scope of this report and are to be installed in accordance with the manufacturer's installation instructions.

4.1.2 Occupied Space:

4.1.2.1 Use with a Code Prescribed Thermal Barrier.

TechPanel™ does not require installation of a code prescribed thermal barrier over the TechBoard™ facers and EPS core based on compliance with Section 4.1.2.2 below.

4.1.2.2 Use Without a Code Prescribed Thermal Barrier.

TechPanel™ complies with requirements of the 2021 / 2018 / 2015 IBC Section 2603.9 *Special Approval* when evaluated in accordance with NFPA 286 when installed in accordance with this report.

4.1.3 Attic and Crawlspace:

4.1.3.1 Use with a Code Prescribed Ignition Barrier:

TechPanel™ does not require installation of a code prescribed ignition barrier over the TechBoard™ facers and EPS core where used in areas of attics and crawlspaces based on compliance with Section 4.1.3.2 below.

4.1.3.2 Use Without a Code Prescribed Ignition Barrier:

TechPanel™ complies with requirements of the 2021 / 2018 / 2015 IBC Section 2603.9 *Special Approval* and 2021 / 2018 / 2015 IRC Section R316.6 *Specific Approval* for use without a code prescribed thermal barrier, qualifying TechPanel™ for use without a code prescribed ignition barrier when used in attic and crawlspaces as defined by the 2021 / 2018 / 2015 IBC Section 2603.4.1.6 and the 2021 / 2018 / 2015 IRC Sections R316.5.3 and R316.5.4.

4.2 Exterior Walls:

4.2.1 Above Grade:

4.2.1.1 Weather Protection:

TechPanel™ used as exterior walls require installation with a code prescribed weather-resistive barrier, exterior cladding and flashings for providing weather protection in accordance with 2021 / 2018 IBC Section 1402.2 and 2015 IBC / 2023 FBC Section 1403.2 and Section R703.1.1 of the 2021 / 2018 / 2015 IRC. Water-resistive barriers and exterior cladding materials shall comply with 2021 / 2018 IBC Section 1403 or 2015 IBC / 2023 FBC Section 1404 and or 2021 / 2018 / 2015 IRC Section R703.3 as appropriate. Water resistive barriers and cladding components shall be installed in accordance with the applicable code, the manufacturer's installation instructions and the Engineering Design.

4.2.1.2 Vapor Retarders:

TechPanel™ EPS component is a Type I EPS providing vapor retarder at thicknesses 6.5 inches (165 mm) or greater, so where a Class II vapor retarder is required, this can be omitted.

4.2.1.3 Termite Protection:

Where TechPanel™ are installed in areas defined as "very heavy" as indicated in Figure 2603.8 of the 2021 / 2018 / 2015 IBC, 2023 FBC and Figure R301.2(6) of the 2021 / 2018 / 2015 IRC and where the EPS foam component is located within 6-inches (152 mm) above grade from exposed earth, construction is to follow Section 2603.8 of the 2021 / 2018 / 2015 IBC, 2023 FBC and R318.4 of the 2021 / 2018 / 2015 IRC. This construction requires all structural elements of walls, floors, ceilings and roofs to be of noncombustible materials or preservative-treated wood, unless an approved method of protecting the foam plastic from subterranean termite damage is provided to the authority having jurisdiction.

4.2.2 Below Grade:

The use of TechPanel™ for below grade has not been evaluated and is outside the scope of this report.

4.3 Shear Walls:

Where TechPanel™ are installed as shear walls, double lumber splines, double sill plates, and double header plates are required. See Section 2.2.4 of this report for double lumber element preparation.

Where Engineering Design requires bonding of the lumber elements to the TechBoard™ facer, see Section 2.2.3 of this report for lumber element to facer preparation.

4.4 Fire-Resistance-Rated Construction:

4.4.1 1-Hour Load-Bearing Assemblies:

TechPanel™ is approved for use in 1-hour fire-resistance rated construction where the load is limited (restricted) to 62% allowable axial loads outlined in Section 8.1 of this report. Where fire-resistance rating is required for interior facing fire, a single layer of minimum 5/8-inch (16 mm) thick Type X gypsum board complying with ASTM C1396 is to be installed over the interior TechPanel™ surface, with gypsum joints offset from TechPanel™ joints by 24-inches (610 mm). Where fire-resistance rating is required for exterior facing fire, a single layer of minimum 5/8-inch (16 mm) thick Type X gypsum board complying with ASTM C1396 is to be installed over the exterior TechPanel™ surface, with gypsum joints offset from TechPanel™ joints by 24-inches (610 mm). Where fire-resistance ratings for interior and exterior are required, a single layer of minimum 5/8-inch (16 mm) thick Type X gypsum board on each surface is required with gypsum joints offset from TechPanel™ joints by 24-inches (610 mm). Gypsum is to be anchored to TechPanel™ with minimum 2-1/8-inch length collated nails at 6-inches (152 mm) on center spacing around the perimeter penetrating into the underlying top plate, lumber splines and bottom plate and along intermediate splines located in the gypsum field. The interior gypsum joints are to be finished at minimum Level 2 in accordance with ASTM C840.

For additional details, see Section 8.3 of this report.

4.5 Type I-IV (Non-combustible) Construction

TechPanel™ are limited to use as exterior walls of Types I-IV (non-combustible) for buildings of maximum one-story height complying with the 2021 / 2018 / 2015 IBC Section 2603.4.1.4.

5.0 LIMITATIONS

- TechPanel™ requires Engineering Design submitted to the authority having jurisdiction, considering anticipated loading, the complete load path from the roof to the foundation, connection details and calculations in accordance with the applicable building code. Anticipated loads shall not exceed allowable loads specified in this report.
- Connection details are outside the scope of this report, and are to be in accordance with the Engineering Design approved by the Authority Having Jursidication.
- Installation of TechPanel™ is to match this report, the Engineering Design and site specifications.
- TechPanel™ where used in fire-resistance rated construction is to comply with Section 4.4 and Section 8.3 of this report for maximum loading of 62% design loads outlined in Table 3 of this report.
- TechPanel™ may include electrical chases of maximum 1-1/4-inches (31 mm) diameter at spacings as shown in Section 8.2 of this report while maintaining allowable load bearing capacities. Increased electrical chase sizes or increased electrical chase numbers are outside the scope of this report. Electrical wiring installation is outside the scope of this report and is to be done in accordance with the applicable code.
- TechPanel™ requires covering with a code-compliant water-resistive barrier and cladding when installed on the exterior of the building above grade. Installation of these wall components are to comply with the applicable code, and the manufacturer's installation instruction and the Engineering Design.
- TechPanel™ where installed in accordance with this report are approved for use in areas defined as high-velocity hurricane zones comply for use in maximum wind pressures of Table 5. Exterior cladding installed over the TechPanel™ is outside the scope of this report and is to comply with Engineering Design for resisting anticipated wind loads.
- TechPanel™ installed in termite activity areas defined as "very heavy" require protection in accordance with Section 2603.8 of IBC and FBC or Section R318.4 of IRC as applicable, as outlined in Section 4.3.1.4 of this report.
- Special inspections are required as per Section 1705 of the 2021 / 2018 / 2015 IBC in accordance with Section 4.1.1 of this report.
- TechPanel™ are manufactured in Calgary, Alberta with inspections by QAI Laboratories.

6.0 SUPPORTING INFORMATION:

The following substantiating data has been evaluated for TechPanel™:

- Data for use as Type I thermal insulation in accordance with ASTM C578 *Standard Specification for Cellular, Expanded Polystyrene Thermal Insulation*.
- Data for determining surface burning characteristics determined in accordance with UL 723 *Standard for Test for Surface Burning Characteristics of Building Materials*.
- Data for strength testing of products per ASTM E72 *Standard Test Methods for Conducting strength Tests of Panels for Building Construction*.
- Data outlining details for use in load-bearing fire-resistance rated construction per ASTM E119 *Standard Test Methods for Fire Tests of Building Construction and Materials*.
- Data outlining evaluation for impact and cyclic pressure loading resistance per TAS 201, TAS 202 and TAS 203 protocols.
- Ignition resistance evaluation of TechBoard™ exterior and interior facers per ASTM E84 extended an additional 20 minutes.
- Fire Penetration Resistance of TechPanel™ when evaluated to exterior direct flame impingement exposure per ASTM E2707.
- Evaluation as an alternate to code prescribed thermal barrier conducted in accordance with NFPA 286.
- Quality documentation outlining manufacturing of TechPanel™ including approved components and manufacturer quality testing plan.

7.0 MARKING:

Figure 1. Example of TechPanel™ Finished Product Label

8.0 RESULTS / RATINGS:

8.1 TechPanel™ Allowable Load Capacities:

Table 2. TechPanel™ Transverse Loading Capacities[1,2,3]:

MINIMUM PANEL THICKNESS Inches (mm)	MAXIMUM PANEL HEIGHT ft (m)	PANEL TO LUMBER ELEMENT CONNECTIONS	ALLOWABLE SERVICE LOADS (DEFLECTION LIMIT) psf (kPa)			ALLOWABLE LOAD STRENGTH psf (kPa)
			L/360	L/240	L/180	
6.5 (165 mm)	10 (3.05)	Minimum 2.5-inch (64 mm) ring shank nails installed as: a) Two (2) rows at 3-inches (76 mm) spacing along header plates with rows offset and, b) One (1) row spaced at 3-inches (76 mm) on center along spline and sill plate edges. Fasteners are located a minimum 2.5-inches (76 mm) from corners and ½-inches (13 mm) from panel edges. Optional: Adhesive bonding of lumber to TechPanel™ facers per Section 2.2.3.	72 (3.5)	83[4] (4.0)	83[4] (4.0)	83[5] (4.0)

1. Transverse load capacities noted were determined with attachment of the TechPanel™ sill plate to underlying structure with ½-inch (13 mm) diameter anchor bolts, spaced at maximum 24 inches (610 mm) on center along centerline of bottom plate. The top plate is attached with ½-inch (13 mm) diameter x 4-1/2-inch (114 mm) length lag bolts, spaced at maximum 24-inch (610 mm) on center spacing attached along top plate center line.
2. Transverse load capacities apply to bearing conditions at top and bottom of wall.
3. Connection details for including but not limited to attachment of TechPanel™ to the underlying substrate, attachment of claddings, roof and flooring elements attachments are outside the scope of this report and are to comply with the applicable code and Engineering Design.
4. Service limit loads are based off allowable strength loads.
5. Allowable strength loads are based off ultimate load with a factor of safety of 3 applied.

Table 3. TechPanel™ Axial Loading Capacities:

PANEL THICKNESS Inches (mm)	MAXIMUM SPLINE SPACING Inches (mm)	MAXIMUM HEIGHT ft (m)	PANEL TO LUMBER ELEMENT CONNECTIONS	LOAD @ COMPRESSION LIMIT Δ = 1/8 inch (3 mm) lbs/ft (kN/m)	ALLOWABLE LOAD STRENGTH lbs/ft (kN/m)
6.5 (165)	48 (1219)	10 (3.05)	Minimum 2.5-inch (64 mm) ring shank nails installed as: a) Two (2) rows at 3-inches (76 mm) spacing along header plates with rows offset and, b) One (1) row spaced at 3-inches (76 mm) on center along spline and sill plate edges. Fasteners are located a minimum 2.5-inches (76 mm) from corners and ½-inches (13 mm) from panel edges. Optional: Adhesive bonding of lumber to TechPanel™ facers per Section 2.2.3.	3,586[4] (52.3)	3,586[5] (52.3)

1. Axial load capacities are determined for uniformly distributed load TechPanel™. For point loads, additional reinforcing may be added where supported by Engineering Design and approved by the authority having jurisdiction.
2. Axial load capacities are determined for TechPanel™ without claddings.
3. Connection details including attachment of floor and roof panels, and connection of TechPanel™ to the underlying structure is outside the scope of this report and is to be in accordance with Engineering Design and project specifications.
4. Service limit loads are based off allowable strength loads.
5. Allowable strength loads are based off ultimate load with a factor of safety of 3 applied.

Table 4. TechPanel™ Racking Shear Capacities for Seismic Categories A, B, C[1,2,3,4]:

PANEL THICKNESS Inches (mm)	MAXIMUM SPLINE SPACING Inches (mm)	MAXIMUM HEIGHT ft (m)	MAXIMUM ASPECT RATIO Height:Width	PANEL TO LUMBER ELEMENT CONNECTIONS	LOAD @ DRIFTLIMIT Δ = 1/8 inch (3 mm) lbs/ft (kN/m)	ALLOWABLE LOAD STRENGTH lbs/ft (kN/m)
6.5 (165)	48 (1219)	10 (3.05)	2 : 1	Minimum 2.5-inch (64 mm) ring shank nails installed as: a) Two (2) rows at 3-inches (76 mm) spacing along double header and double sill plates with rows offset and, b) One (1) row spaced at 3-inches (76 mm) on center along spline edges. Fasteners are located a minimum 2.5-inches (76 mm) from corners and ½-inches (13 mm) from panel edges. Required: Adhesive bonding of wood elements to TechPanel™ facers per Section 2.2.3.	562[5] (8.2)	562[6] (8.2)
			1.25 : 1		607[5] (8.9)	607[6] (8.9)
6.5 (165)	48 (1219)	10 (3.05)	2 : 1	Minimum 2.5-inch (64 mm) ring shank nails installed as: a) Two (2) rows at 3-inches (76 mm) spacing along double header and double sill plates with rows offset and, b) One (1) row spaced at 3-inches (76 mm) on center along spline edges. Fasteners are located a minimum 2.5-inches (76 mm) from corners and ½-inches (13 mm) from panel edges. Optional: Adhesive bonding of wood elements to TechPanel™ facers per Section 2.2.3.	195[7] (2.8)	195[8] (2.8)
			1 : 1		501[7] (7.3)	501[8] (7.3)

1. Hold downs are required at each wall end.
2. Racking shear load capacities are determined for TechPanel™ without claddings where panels are connected to lumber framing as outlined. Where adhesive is required to achieve racking shear capacity values, see Section 2.2.3.1 of this report for approved adhesive details. Application of the adhesive for this application requires *Special Inspection* per IBC 1703.
3. Racking shear capacities is based off TechPanel™ attachment to substrate with ½-inch (13 mm) diameter carriage bolts spaced at 24-inches (610 mm) spacing, starting and terminating 1.75-inches (44 mm) from the end of sill plate.
4. Connection details including attachment of floor and roof panels, and connection of TechPanel™ to the underlying structure is outside the scope of this report and is to be in accordance with Engineering Design and project specifications.
5. Service limit loads are based off allowable strength loads.
6. Allowable strength loads are based off ultimate load with a factor of safety of 3 applied.
7. Service limit loads are based off drift limit of 1/8-inches (3 mm) deflection.
8. Allowable strength loads are based off drift limit of 1/8-inches (3 mm) deflection.

Table 5. Impact Resistant TechPanel™ Allowable Design Pressures = High Velocity Hurricane Zones (FBC)[1,2,3]:

MINIMUM PANEL THICKNESS Inches (mm)	MAXIMUM PANEL HEIGHT ft (m)	PANEL TO LUMBER ELEMENT CONNECTIONS	DESIGN PRESSURE, psf (kPa)
6.5 (165 mm)	10 (3.05)	Minimum 2.5-inch (64 mm) ring shank nails installed as: c) Two (2) rows at 3-inches (76 mm) spacing along header plates and double sill plates, with rows offset and, d) One (1) row spaced at 3-inches (76 mm) on center along spline and sill plate edges. Fasteners are located a minimum 2.5-inches (76 mm) from corners and ½-inches (13 mm) from panel edges. Optional: Adhesive bonding of lumber to TechPanel™ facers per Section 2.2.3.	110 (5.3)

1. Anchorage of TechPanel™ to substrate is outside the scope of this report and is to follow the Engineering Design.
2. Connection details including connection of structural elements to TechPanel™ and cladding to TechPanel™ is outside the scope of this report and is to follow the Engineering Design and applicable code.
3. Design Pressure is determined for TechPanel™ only and does not consider contribution from cladding materials.
4. Assembly described complies with large missile impact requirements when evaluated in accordance with test protocols TAS 201 and TAS 203.
5. Design Pressure is based off maximum panel capacity with a factor of safety of 1.5 applied based on evaluation to TAS 202, TAS 201, and TAS 203.

8.2 TechPanel™ Details:

8.2.1 Standard TechPanel™

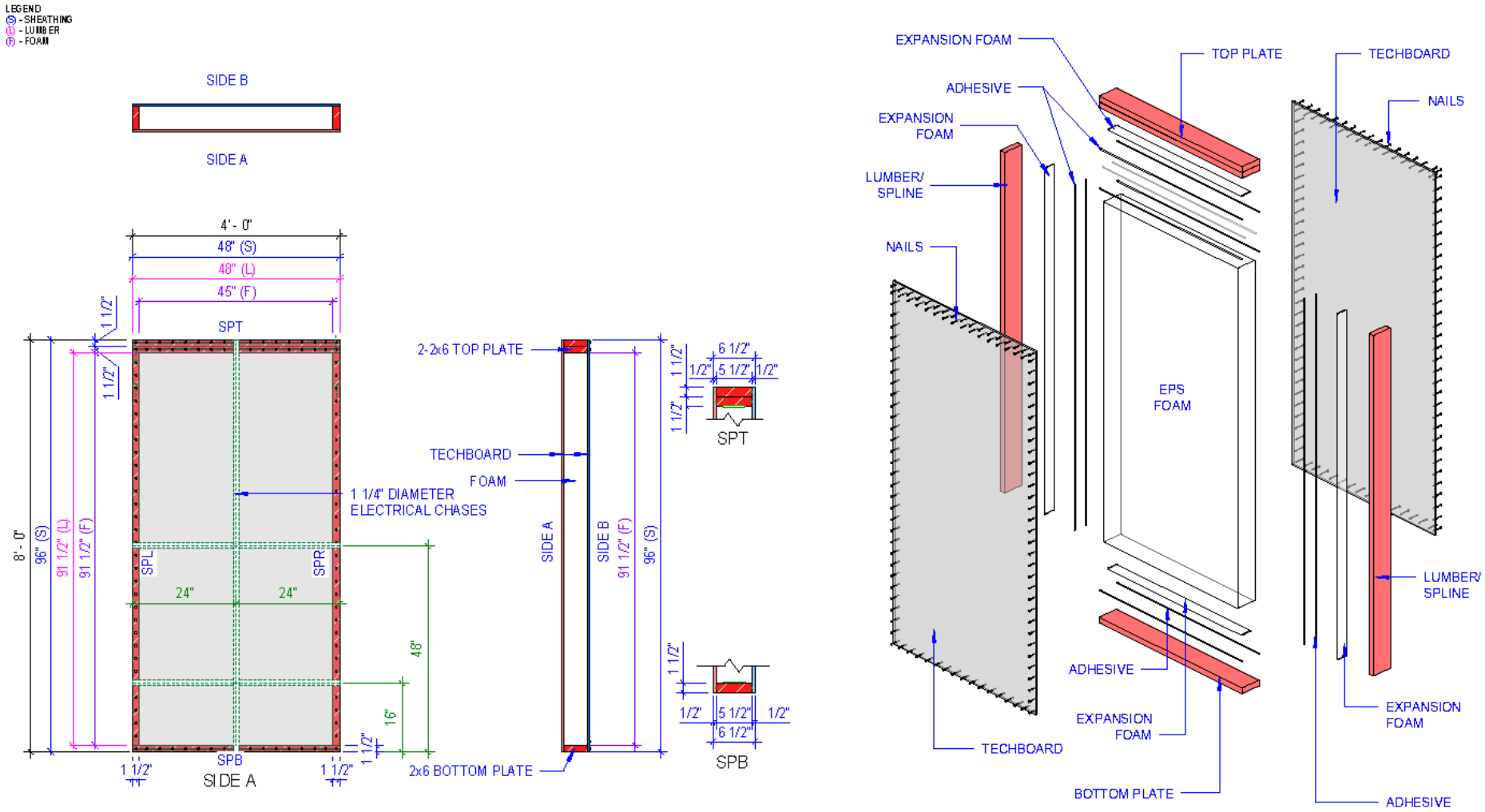


Figure 2. Standard TechPanel™ Exploded View of Components

8.2.2 Shear wall TechPanel™ Configuration

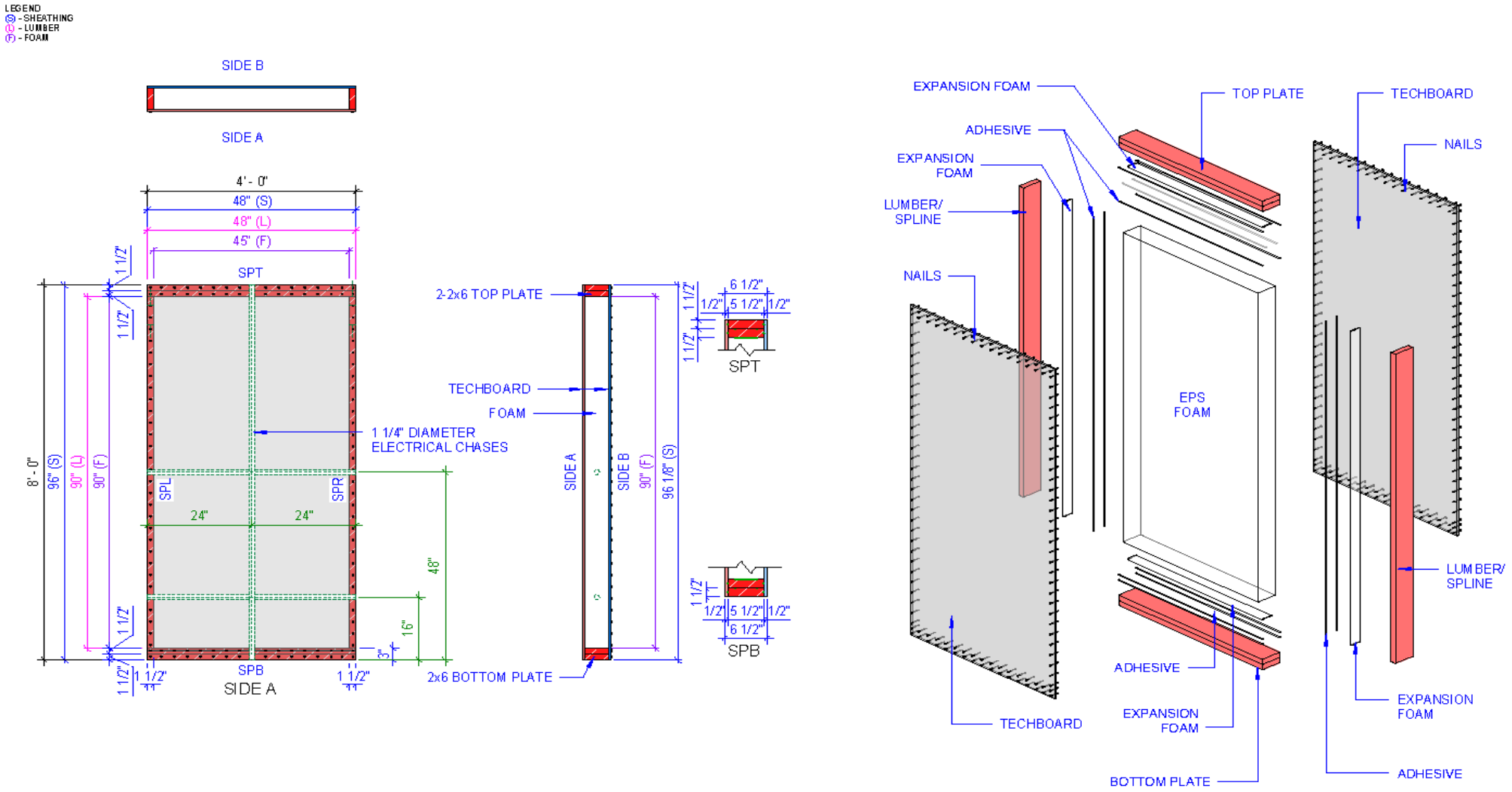
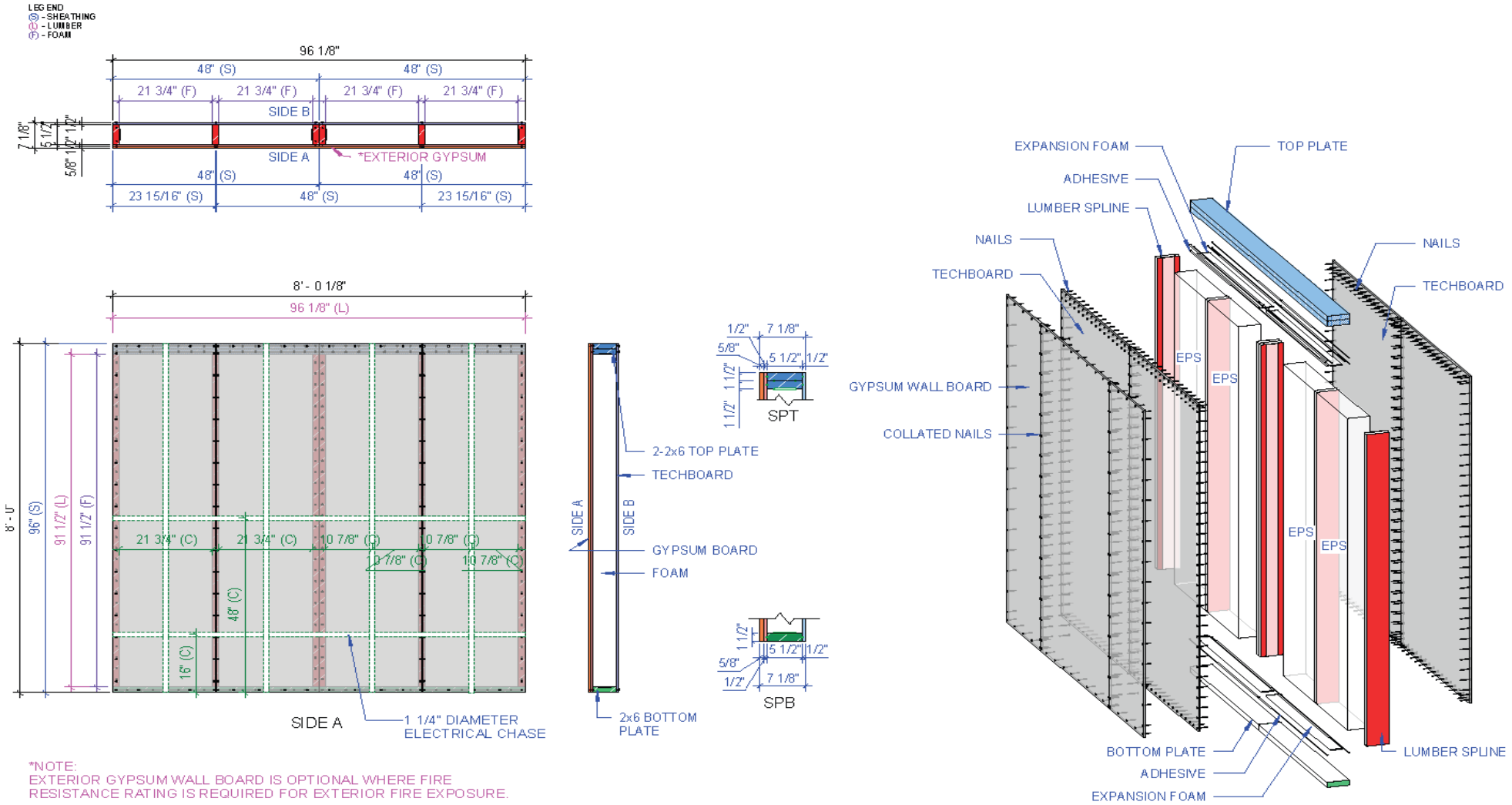


Figure 3. TechPanel™ for Shear Wall Applications Exploded View of Components

8.3 Fire-Resistance-Rated Assembly Details:

8.3.1 TechPanel™ 1-hour Load Bearing Fire-Resistance-Rated Assemblies



*NOTE:
EXTERIOR GYPSUM WALL BOARD IS OPTIONAL WHERE FIRE RESISTANCE RATING IS REQUIRED FOR EXTERIOR FIRE EXPOSURE.

Figure 4.. TechPanel™ for Fire-Resistance Rated Applications, Interior OR Exterior Facing Fire Exploded View of Components (Gypsum Installation Required on Exposed Surface), Approved for 62% Design Load (based on Allowable Stress Design)

9.0 SUPPLEMENTAL CODES

9.1 2022 / 2019 California Building Code, 2022 / 2019 California Residential Code:

TechPanel™'s TechBoard™ skins comply with the requirements of Section 704A.3 of the 2022 / 2019 California Building Code and Section R337.4 of the 2022 / 2019 California Residential Code for use as *ignition-resistant materials* based on evaluation to ASTM E84 continued for an additional 20-minute period, where TechBoard™ was found to have a flame spread less than 25, and TechBoard™ did not exhibit a flame front progress more than 10-1/2 feet (3200 mm),beyond the burner centerline at any time during evaluation. TechPanel™ complies with the requirements of Section 707A.4 of the 2022 / 2019 California Building Code and Section R337.7.4 of the 2022 / 2019 California Residential Code for use as *Exterior Wall Assemblies* based on compliant testing in accordance with ASTM E2707. TechPanel™ products are eligible for use in areas identified by the state as a *Fire Hazard Severity Zone* or any *Wildland-Urban Interface (WUI)* designated by the enforcing agency when installed in accordance with this report.

9.2 2023 Florida Building Code

TechPanel™ products as detailed in Sections 2.0 through 8.0 comply with the 2023 Florida Building Code, Building and 2023 Florida Building Code, Residential when installed in accordance with the applicable building codes and this report.

TechPanel™ products comply as *Large Missile Impact Resistant* and *Small Missile Impact Resistant* in accordance with 2023 FBC Section 1626 when installed in accordance with Section 4.2 of this report for design pressures as outlined in Section 8.1 of this report.

TechPanel™ products EPS foam core comply with Section 2615 High Velocity Hurricane Zones – Plastics of the 2023 Florida Building Code.

10.0 ELIGIBILITY OF REPORT

QAI's Code Evaluation Report complies with the 2021 / 2018 / 2015 IBC Section 104.11 *Alternative materials, design and methods of construction and equipment* subsection 104.11.1 *Research Reports*. Supporting data has been evaluated by QAI for compliance of the noted materials and assemblies to the applicable code by QAI, and *approved* source as detailed below.

The attached report has been reviewed by a QAI Registered Professional Engineer approved by the specific state Board of Professional Engineers noted on the specific P.E. seal(s).

Per section 1703 of the IBC, QAI is an independent third-party testing, inspection and certification agency accredited by the International Accreditation Service, Inc. (IAS) for this specific scope (see IAS PCA-118). QAI can confirm that based on its IAS accreditation it meets IBC Section 1703.1 on Independence, Section 1703.1.2 on Equipment and Section 1703.1 on Personnel.

This Evaluation report has been designed to meet the performance requirements of IBC Section 1703.4 and contains the required information to show the product, material or assembly meets the applicable code requirements.

The product is labeled per section IBC 1703 and subject to follow-up inspection per IBC 1703.6 using QAI IAS accredited ISO/IEC 17020 inspection program (see IAS AA-723).

For more information regarding QAI Laboratories, please visit www.qai.org.

The above is an example of the QAI registered Listing mark. The Listing mark may only be used by the Report Holder per the QAI service agreement on products defined in this report. The 'us' indicator in the 4 o'clock position indicates the product complies with the properties evaluated with limitations outlined in this report for use in the US market. A 'c' indicator in the 8 o'clock position indicates the product has been evaluated for use in the Canadian market.

11. REFERENCED STANDARDS

NFPA 1144 *Standard for Reducing Structure Ignition Hazards from Wildland Fire*.
UL 723 *Test for Surface Burning Characteristics of Building Materials.*
ASTM C578 *Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation*.
NFPA 286 Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire *Growth*.
ASTM D1929 *Standard Test Method for Determining Ignition Temperature of Plastics.*
ASTM C1396/C1396M *Specification for Gypsum Board*.
ASTM E119 *Standard Test Methods for Fire Tests of Building Construction and Materials*.
ASTM E72 *Standard Test Methods of Conducting Strength Tests of Panels for Building Construction*.
TAS 201 *Impact Test Procedures.*
TAS 202 *Criteria for Testing Impact & Non-impact Resistant Building Envelope Components Using Uniform Static Air Pressure.*
TAS 203 *Criteria for Testing Products Subject to Cyclic Wind Pressure.*
ASTM E2707 *Standard Test Method for Determining Fire Penetration of Exterior Wall Assemblies Using a Direct Flame Impingement Exposure*.