Evaluation Report
CCMC 13355-R

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Eco-Pan Panels

1. Opinion

It is the opinion of the Canadian Construction Materials Centre (CCMC) that "Eco-Pan Panels", when used as insulated exterior wall panels in accordance with the conditions and limitations stated in Section 3 of this Report, complies with the National Building Code 2010:

- Clause 1.2.1.1.(1)(a), Division A, using the following acceptable solutions from Division B:
  - Article 4.3.1.1. Design Basis for Wood
  - Clause 9.25.2.2.(1)(c) Insulation Materials
- Clause 1.2.1.1.(1)(b), Division A, as an alternative solution that achieves at least the minimum level of performance required by Division B in the areas defined by the objectives and functional statements attributed to the following applicable acceptable solutions:
  - Sentence 9.23.10.1.(1) Stud Size and Spacing (alternative stud spacing)

This opinion is based on CCMC's evaluation of the technical evidence in Section 4.1 provided by the Report Holder.

2. Description

The product is manufactured by EnerSIP. The product's insulated wall panel system is currently manufactured by one licensee, EnerSIP of Dominion City, Manitoba.

The product is an insulated wall panel system that is installed with an alternate stud spacing to 38 mm x 140 mm (2 x 6) framing at 600 mm (24") on centre (o.c.). The product's panels are installed with 2 – 2 x 6 lumber studs spaced at 1.2 m o.c. at panel edges with top and bottom plates. The insulated wall panel is an expanded polystyrene insulation board that is bonded with an adhesive to 11-mm (7/16") oriented strandboard (OSB) sheathings. The panels and studs form a unit stiffened by stressed-skin action allowing for a wider stud spacing to 1.2 m o.c. beyond the Code-specified 600 mm o.c.

Typical details of the system are shown in Figures 1 and 2.

The two studs spaced at 1220 mm o.c. are 2 – 38-mm x 140-mm, S-dry S-P-F No.1/2. The panels that have been evaluated are 162 mm thick with a standard height of 2440 mm and a standard width of 1220 mm. The studs,

continuous bottom plate and two top plates shall be installed in the field as per the manufacturer's drawings for the CCMC-evaluated panel system. The qualified panels had no electrical chases within the foam core.

Alternative panel configurations that may be offered by the manufacturer do not form part of this evaluation and shall not bear the CCMC number.

EPS Core

The panel core is a Type 1 EPS that is 140 mm thick. The EPS insulation is certified by Intertek testing Services (ITS) NA Ltd. (see CCMC 13393-L) to confirm compliance to CAN/ULC-S701-05, "Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering."

OSB Specification

The OSB is 11.1 mm thick, certified to CSA O325-07, "Construction Sheathing," to a span rating of 1R24/ 2F16/W24. The OSB panels are certified by APA to CSA O325 and APA Product Report PR-N610, "Qualified OSB Facing Materials for Structural Insulated Panels," revised August 22, 2011. The OSB is installed with the strong axis oriented vertically on both the interior and exterior surfaces of the panels.

Adhesive – EPS to OSB

The adhesive used to bond the EPS boards to the OSB panels is a moisture-cured urethane laminating adhesive. Specifically, the MOR-AD™ M-647 manufactured by the Dow Chemical Co. (formerly Rohm and Haas Chemicals LLC) (see ICC-ES Report ESR-1023).

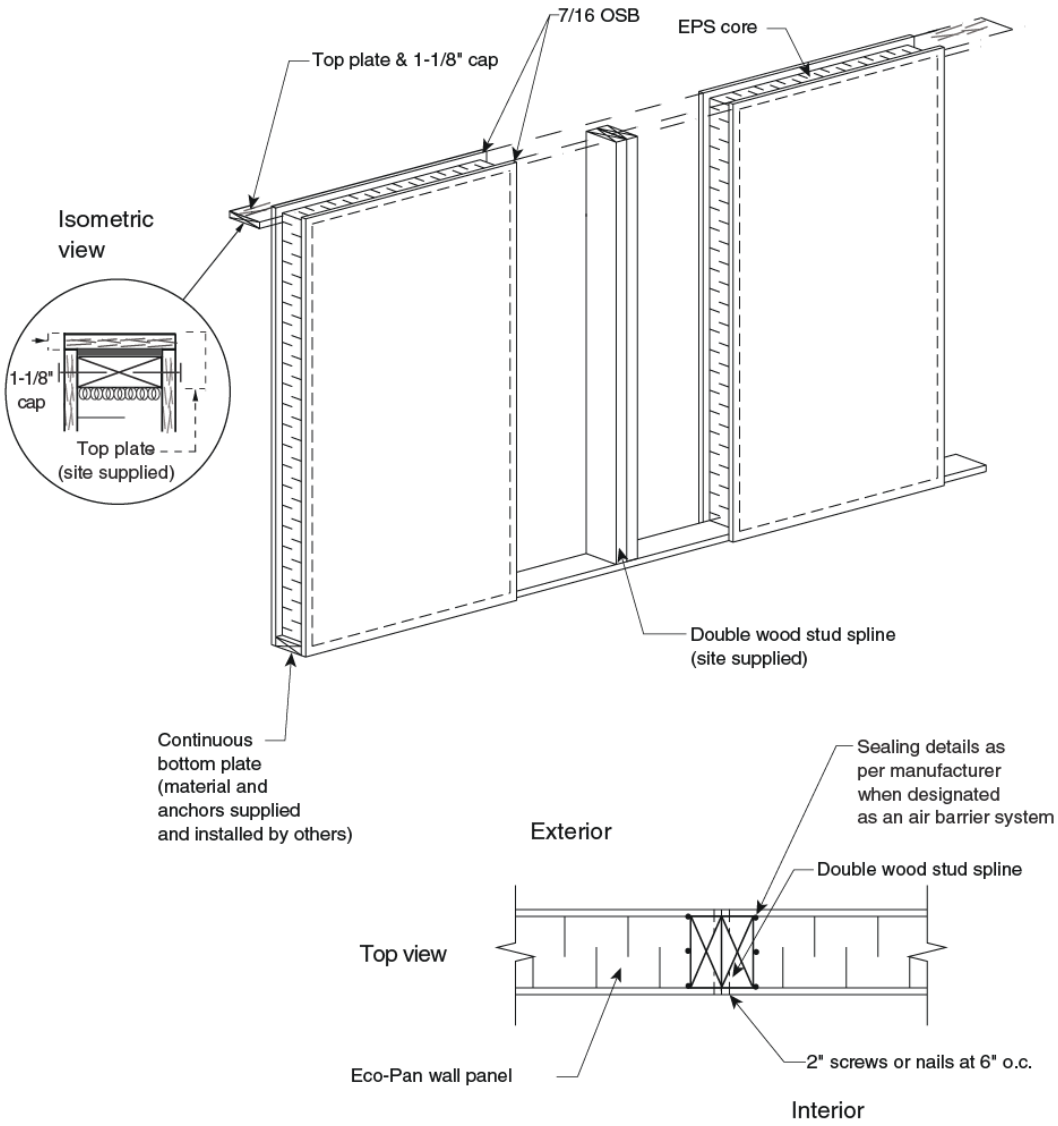

Figure 1. Isometric view and horizontal cross-section

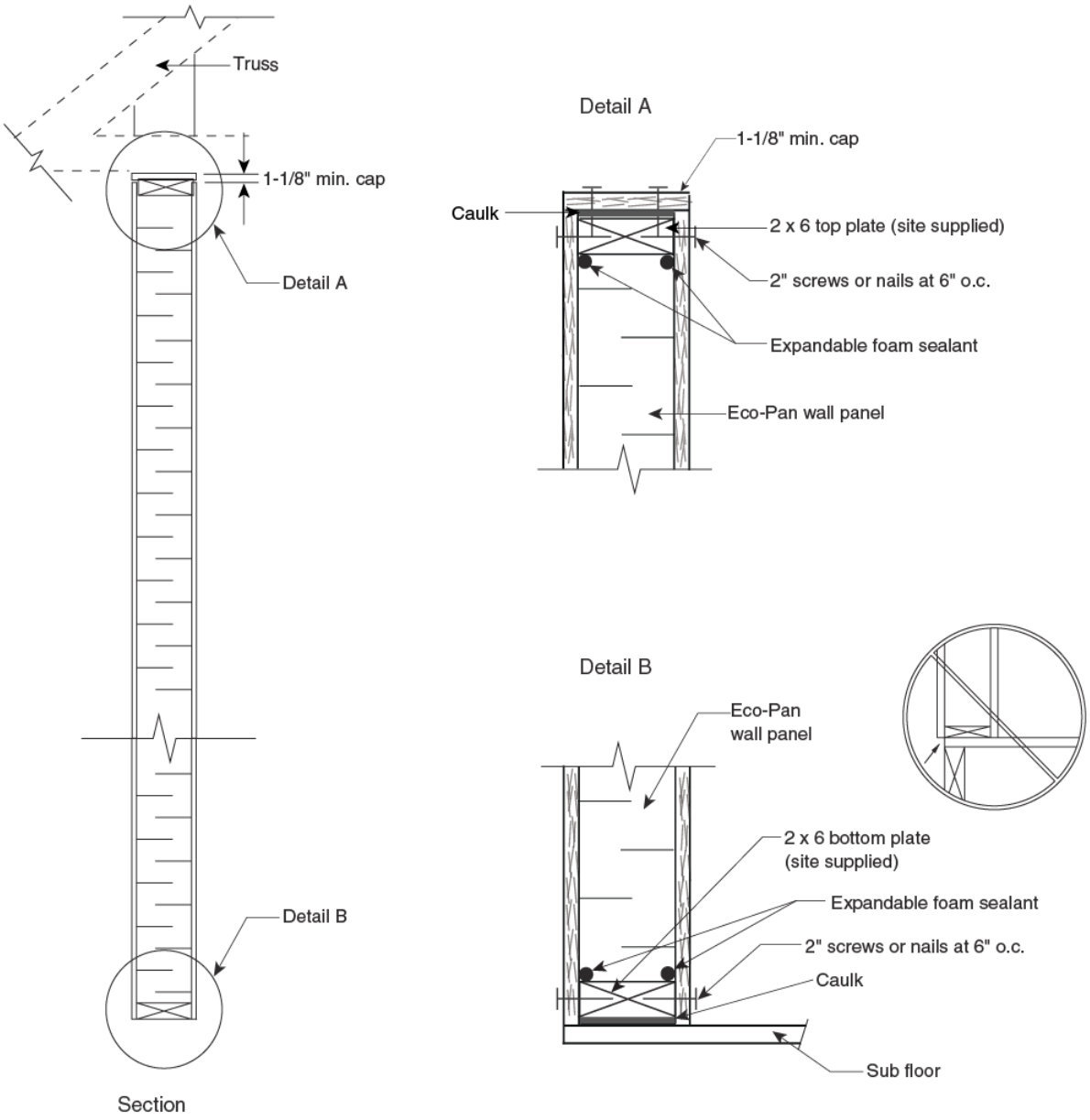

Figure 2. Vertical cross-section

3. Conditions and Limitations

CCMC's compliance opinion in Section 1 is bound by the “Eco-Pan Panels” being used in accordance with the conditions and limitations set out below.

- The wall panel system is intended for dry service applications only.(1)

(1) All lumber, wood-based panels and proprietary engineered wood products are intended for dry service conditions. “Dry service” is defined as the in-service environment under which the equilibrium moisture

content (MC) of lumber is 15% or less over a year and does not exceed 19% at any time. Wood contained within the interior of dry, heated or unheated buildings has generally been found to have a MC between 6% and 14% according to season and location. During construction, all wood-based products should be protected from the weather to ensure that the 19% MC is not exceeded in accordance with Article 9.3.2.5., Moisture Content, of Division B of the NBC 2010.

- The wall panel system is limited to buildings that fall within the scope of Part 9 of Division B of the NBC 2010. These panels are intended for buildings where combustible construction is permitted.
- The wall panel system has not been evaluated to replace braced walls when required by Subsection 9.23.13., Bracing to Resist Lateral Loads Due to Wind and Earthquake, of Division B of the NBC 2010.
- The number of storeys must be in accordance with Table 9.23.10.1. of Division B of the NBC 2010 for 38 x 140-mm studs at 600 mm o.c. for the respective thickness and alternate stud spacing of the proposed panels with 2 – 38 mm x 140 mm studs at 1.2 m o.c. spacing, specifically:

Conventional Stud Frame Size at 600 mm o.c. Spacing	**Eco-Pan Double Wood Stud Spline at 1.2 m o.c.**	**Building Height (max. storey height)**
38 mm x 140 mm	2 – 38-mm x 140-mm studs	Two-storey (2.4 m max. storey height)

- The framing of window and door openings must be as per conventional construction for lintel spans and supports as per the NBC 2010.
- The panels are to be mechanically-fastened to studs and plates in accordance with the manufacturer's specific instructions, but not less than the NBC 2010 nailing schedule contained in Tables 9.23.3.4 and 9.23.3.5.
- The junction between the panels and the junction between the panel and the top and bottom plates must be caulked or sealed as per the manufacturer's details.
- Air leakage and vapour diffusion control must be accomplished by installing a 6-mil polyethylene air and vapour barrier conforming to the NBC 2010.
- The installation of the CCMC-evaluated wall panels must be in accordance with the manufacturer's installation manual, entitled " Installation Manual - Wall Panels - EnerSIP Structural Insulated Panels" dated July 2012. The manufacturer may have other panels available that are not within the scope of this evaluation and must not bear the CCMC mark or CCMC number.
- Only the proposed wall panels that have the specified recesses to accept 2 – 38-mm x 140-mm studs at 1.2 m o.c. must be used and bear the CCMC 13355-R mark.

4. Technical Evidence

The Report Holder has submitted technical documentation for CCMC's evaluation. Testing was conducted at laboratories recognized by CCMC. The corresponding technical evidence for this product is summarized below.

4.1 Performance Requirements

Table 4.1.1 Performance tests – Empirical method for alternative solution

CCMC Technical Guide Requirement[1]	Tested Specimens[2]	Result	
		Strength	**Deformation Criterion**
Axial Capacity and Deformation			
		Average Ultimate Load	**Maximum Service Load at Permitted Deformation 3 mm (1/8")**
Alternative Solution: 5 pairs of "Eco-Pan" panels with 2 studs every 1.2 m.	3 – 1.2 m x 162 mm x 2.44 m panels with studs	210.4 kN/m (14 418 lb/ft)	26.25 kN/m (1800 lb/ft)
Acceptable Solution: 3 pairs of conventional wood frame	3 conventional 38-mm x 140-mm lumber studs at 600 mm o.c. and 2.44 m high with OSB sheathing and drywall	169.9 kN/m (11 644 lb/ft)	11.47 kN/m (786 lb/ft)
Alternative Solution ≥ Acceptable Solution		210.4 kN/m ≥ 169.9 kN/m Pass	26.25 kN/m ≥ 11.47 kN/m Pass
Bending Capacity and Deformation			
		Average Ultimate Load	**Maximum Load at L/360 center span deflection**
Alternative Solution: 5 pairs of panels with 2 studs every 1.2m	3 – 1.2 m x 162 mm x 2.44 m panels with studs at 1.2 m o.c.	41.12 kN	5.95 kN
Acceptable Solution: 3 pairs of conventional wood frame	3 conventional 38-mm x 140-mm lumber studs at 600 mm o.c. and 1.2 m wide x 2.44 m high with OSB sheathing and drywall	28.14 kN	4.14 kN
Alternative Solution ≥ Acceptable Solution		41.12 kN ≥ 28.14 kN Pass	5.95 kN ≥ 4.14 kN Pass
Lateral Load Capacity and Deformation			
		Average Ultimate Load	**Deflections of panel at 5 kN lateral load**

Table 4.1.1 Performance tests – Empirical method for alternative solution (cont.)

Alternative Solution: 5 pairs of panels with 2 studs every 1.2 m	3 separate – 1.2 m x 162 mm x 2440 mm panels with studs	31.6 kN	10.69 mm
Acceptable Solution: 3 pairs of conventional wood frame	3 conventional 38-mm x 140-mm lumber studs at 600 mm o.c. and 1.2 m wide x 2.44 m high with OSB sheathing and drywall	11.6 kN	22.56 mm
Alternative Solution ≥ Acceptable Solution		31.6 kN ≥ 11.6 kN Pass	10.69 mm ≤ 22.56 mm Pass

Notes to Table 4.1.1:

(1) Equivalency to conventional lumber wall construction: Insulated panels with 2 studs at 1.2 m o.c. shall be equal to or better than 1 stud every 600 mm (24") o.c. Equal or better strength and lower deformation results.

(2) The "Eco-Pan" panels were tested as single panels instead of pairs of panels due to laboratory equipment limitations. This deviation from the CCMC Technical Guide does not affect the evaluation of the results.

Table 4.1.2 Material and component qualification

CCMC Technical Guide Requirement	Tested Specimen	Result
Adhesive qualification – Appendix III of ICC-ES AC05 Type 2, Class II	MOR-AD™ M-647 manufactured by Dow Chemical Co. (formerly Rohm and Haas Chemicals LLC)(see ICC-ES Report ESR-1023).	Dow Chemical Co. test data confirmed compliance of the entire MOR-AD™ 600 series, which is in the same open time range of MOR-AD™ M-647, as a Type 2, Class II of ICC-ES AC05.
Expanded Polystyrene Meets CAN/ ULC-S701 – ITS Certification Program	N/A	See CCMC 13393-L
OSB Panels Meet CSA O325 – APA Certification Program	N/A	Certified by APA to CSA O325 and PR-N610. Span rating of 1R24/2F16/W24

Report Holder: ECOPAN Corporation
Box 215
100-1039 17th Avenue SW.
Calgary, AB T2T 0B2
Tel: 403-277-4000
Fax: 403-277-4001

Plant(s): Dominion City, MB