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Canadian Construction Materials Centre
Centre canadien de matériaux de construction



NRC-CMRC

9410/12889-R

21 June 2000

PRIORITY POST

Mr. Manuel Jorge
General Manager
Energy Wall & Building Products Ltd.
P.O. Box 638
Yellowknife, NT
X1A 2N5

Dear Mr. Jorge:

We are pleased to inform you that the attached Evaluation Report, Number 12889-R, has been prepared for your product **Energy Wall System**.

Please communicate your acceptance at your earliest convenience so that we may publish it in the next edition of our Registry of Product Evaluations. If within thirty (30) days we have not been advised of any changes you may wish to make to this report, we will assume it is satisfactory and consider it as the current official CCMC version.

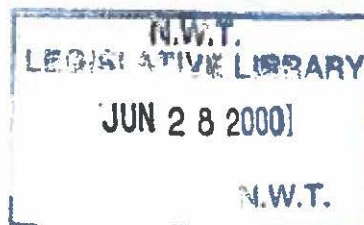
The issuance and continued validity of this report are subject to the terms and conditions forming part of the evaluation contract. Note in particular that the product must bear the CCMC identification.

To remain valid, this report must be reaffirmed on an annual basis and the product must be re-evaluated at 3 year intervals. CCMC will maintain the validity of your report on the annual remittance of a completed reaffirmation notice, provided the product exhibits satisfactory field performance, remains in commercial production and is unchanged from the sample on which the Evaluation Report is based. An affidavit form, on which you will be able to affirm that the foregoing conditions remain true, will be sent to you by us at the appropriate time each year.

You may be interested to know that effective 1 July 1993, Section 29 of Ontario's Building Code Act, 1992 authorizes the Minister of Housing to make rulings approving the use of innovative materials, systems or building designs evaluated by a materials evaluation body designated in the Ontario Building Code.

Ottawa, Canada
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Canada

A ruling of the Minister of Housing under Section 29 of the Building Code Act, 1992 authorizes the use of the approved material, system or building design in all of Ontario unless the ruling states otherwise. CCMC has been designated in the Ontario Building Code as a materials evaluation body for the purposes of these rulings.

If you are interested in obtaining a ruling from the Ministry of Housing in connection with "«productname»", you may request CCMC to do so on your behalf by returning a signed copy of this letter to signify your intent. We will then formally request a Minister's Ruling and, as needed, provide technical information based on our Evaluation Report for your product. There will be no charge for our involvement.

Please note that the Registry of Product Evaluations is available free of charge on a subscription basis. You may reproduce the enclosed Evaluation Report provided it is reproduced in its entirety without alteration. Alternatively, you may refer to this report using the following phrase: "CCMC # 12889-R".

We wish you every success with your building product.

Yours truly,



Gilles F. Poirier, P. Eng.
Evaluation Officer
Telephone: (613) 993-6623

Attach.

/lm

Yes, we request that CCMC act on our behalf to obtain a ruling from the Ministry of Housing in connection with "Energy Wall System », CCMC Evaluation Report No. 12889-R.

Energy Wall & Building Products Ltd.



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CCMC 12889-R

CCMC

EVALUATION
REPORT

DIVISION 06462

Issued 1999-04-17

Re-evaluation due 2002-04-17

Energy Wall System

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1. Purpose of Evaluation

The manufacturer sought confirmation from the Canadian Construction Materials Centre (CCMC) that the "Energy Wall System," a panelized wall system, can serve as an insulated exterior wall assembly conforming to the intent of the National Building Code of Canada (NBC) for use in the Canadian north.

2. Opinion

The technical assessments provided by the manufacturer show that "Energy Wall System" complies with CCMC's Technical Guide for Prefabricated, Conventional Wood-Frame Wall Panel Systems, MasterFormat number 06462, dated 1998-01-28. If used in accordance with the limitations and conditions stated in this report, "Energy Wall System" provides a level of performance equivalent to that required in:

- National Building Code of Canada, 1995, Section 9.4., Structural Requirements, Section 9.23., Wood-Frame Construction and Subsection 9.25.2., Thermal Insulation.

This report contains no endorsement, warranty, or guarantee, expressed or implied, on the part of NRC. NRC accepts no responsibility for the performance of any product or system described herein if manufactured and/or used outside the purpose of this evaluation report.

Canada Mortgage and Housing Corporation permits the use of this product in construction financed or insured under the National Housing Act.

3. Description

"Energy Wall System" is a panelized double wall system. The panels are prefabricated in plant and then shipped and assembled on site. The system consists of eight wall panel models, and each model is composed of two distinct wood-frame wall assemblies. The exterior portion of the panels consists of PlastiSpan Thermal Lock Wall Insulation System (CCMC 11835-R). The interior portion consists of conventional wood framing insulated with either glass fibre batt insulation or ISOFOAM SS-1300/CHEM-SEAL (CCMC 12563-R). The construction of each wall model is described in Figure 1 and Table 1.

"Energy Wall System" is prefabricated in panels on a project-specific basis conforming to a proprietary design manual for specific geographical areas. The "Energy Wall System" design manual includes structural and environmental separation requirements to address the climatic conditions in the Canadian north where applicable (i.e., temperature, snow loads, high wind loads, seismic). The panels are manufactured in varying lengths to a maximum length of 4 875 mm. "Energy Wall System" is designed for installation with conventional sawn lumber floor structures.

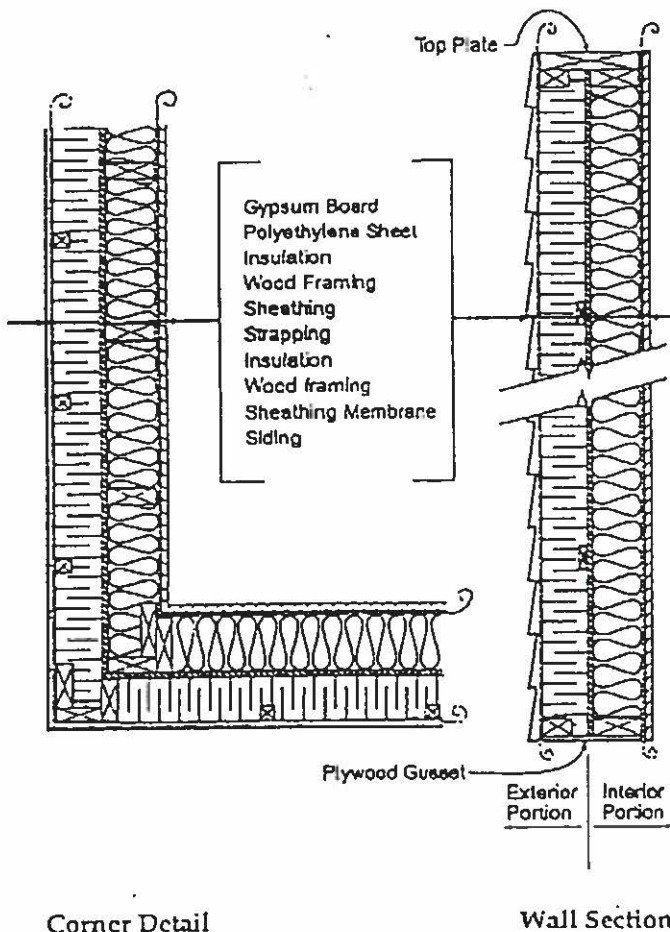


Figure 1. Typical corner detail and wall panel section of "Energy Wall System." (The interior portion is the loadbearing wall.)

Table 1. Description of the Main Components of Each Wall Model.

Wall Model	Exterior Portion			Interior Portion ⁽¹⁾		
	Framing	Insulation	Strapping	Sheathing	Framing	Insulation
1	38x89 @ 400 mm o.c.	EPS - Type 1 RSI - 3.64	19x89 @ 813 mm o.c.	9.5 mm OSB or plywood	38x89 @ 400 mm o.c.	glass fibre batt RSI - 2.1
2	38x89 @ 400 mm o.c.	EPS - Type 1 RSI - 3.64	19x89 @ 813 mm o.c.	9.5 mm OSB or plywood	38x89 @ 400 mm o.c.	urethane foam RSI - 2.1
3	38x38 @ 400 mm o.c.	EPS - Type 1 RSI - 2.31	19x89 @ 600 mm o.c.	9.5 mm OSB or plywood	38x89 @ 400 mm o.c.	urethane foam RSI - 2.1
4	38x38 @ 400 mm o.c.	EPS - Type 1 RSI - 2.31	19x89 @ 600 mm o.c.	9.5 mm OSB or plywood	38x89 @ 400 mm o.c.	glass fibre batt RSI - 2.1
5	38x89 @ 400 mm o.c.	EPS - Type 1 RSI - 3.64	19x89 @ 813 mm o.c.	9.5 mm OSB or plywood	38x140 @ 400 mm or 600 mm o.c.	glass fibre batt RSI - 3.5
6	38x89 @ 400 mm o.c.	EPS - Type 1 RSI - 3.64	19x89 @ 813 mm o.c.	9.5 mm OSB or plywood	38x140 @ 400 mm or 600 mm o.c.	urethane foam RSI - 2.1
7	38x38 @ 400 mm o.c.	EPS - Type 1 RSI - 2.31	19x89 @ 600 mm o.c.	9.5 mm OSB or plywood	38x140 @ 400 mm or 600 mm o.c.	urethane foam RSI - 2.1
8	38x38 @ 400 mm o.c.	EPS - Type 1 RSI - 2.31	19x89 @ 600 mm o.c.	9.5 mm OSB or plywood	38x140 @ 400 mm or 600 mm o.c.	glass fibre batt RSI - 3.5

¹ The interior portion is the loadbearing wall of the "Energy Wall System."

4. Usage and Limitations

The pre-engineered panels of "Energy Wall System" may be used for the construction of buildings where combustible construction is permitted. The panels are designed to comply with the requirements of Subsections 9.23.10., 9.23.11., 9.23.12. and 9.25.2. of the NBC 1995. The pre-engineered panels may be used for the construction of residential dwellings within the following limitations:

- The wall panels and their interface to other components of the building envelope and structure must be designed and built in accordance with the "Energy Wall & Building Products Ltd. Design Manual" that was prepared by Ferguson Simek Clark Engineers & Architects, 17 April 2000. See figures 2 to 5 for typical wall assembly, fastening connections and attachment to roof, floors and foundation.

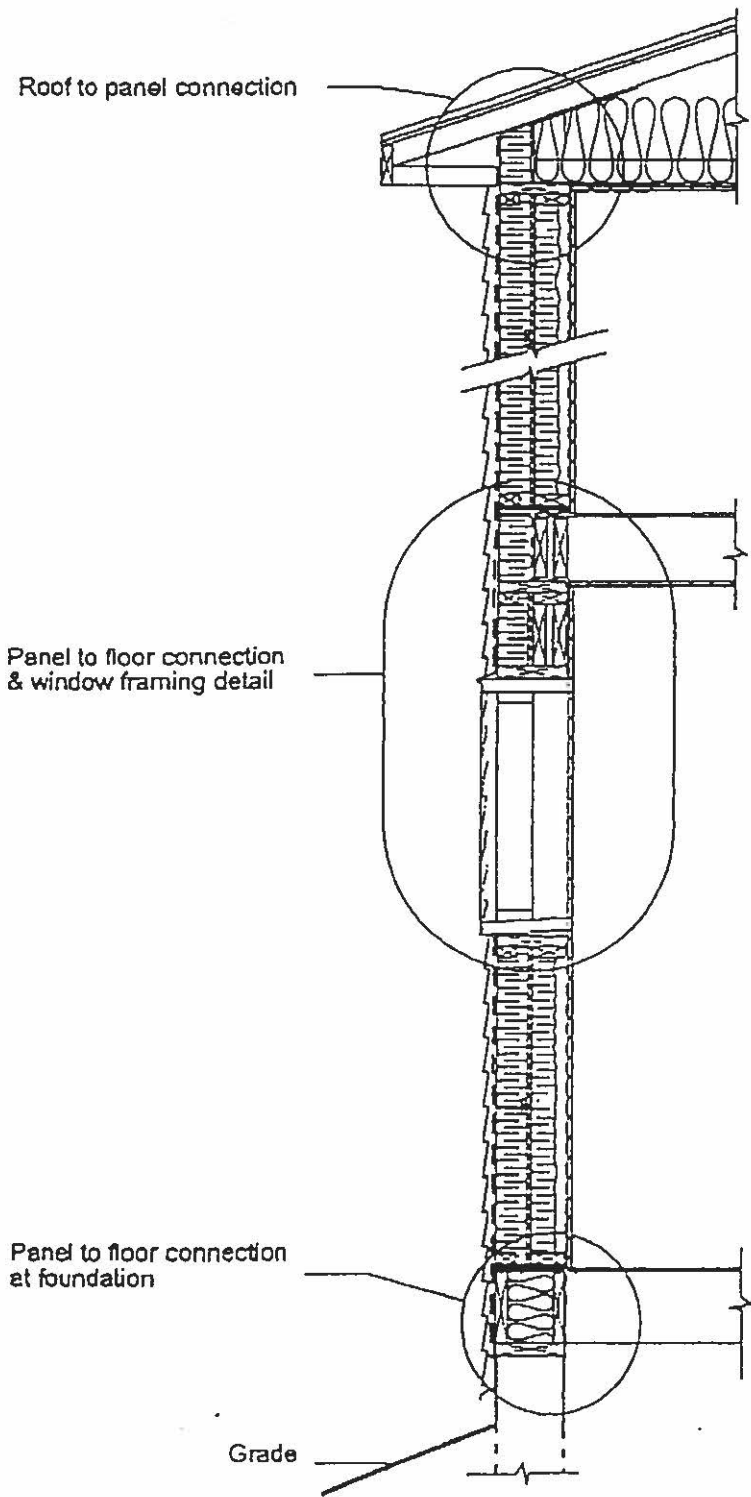
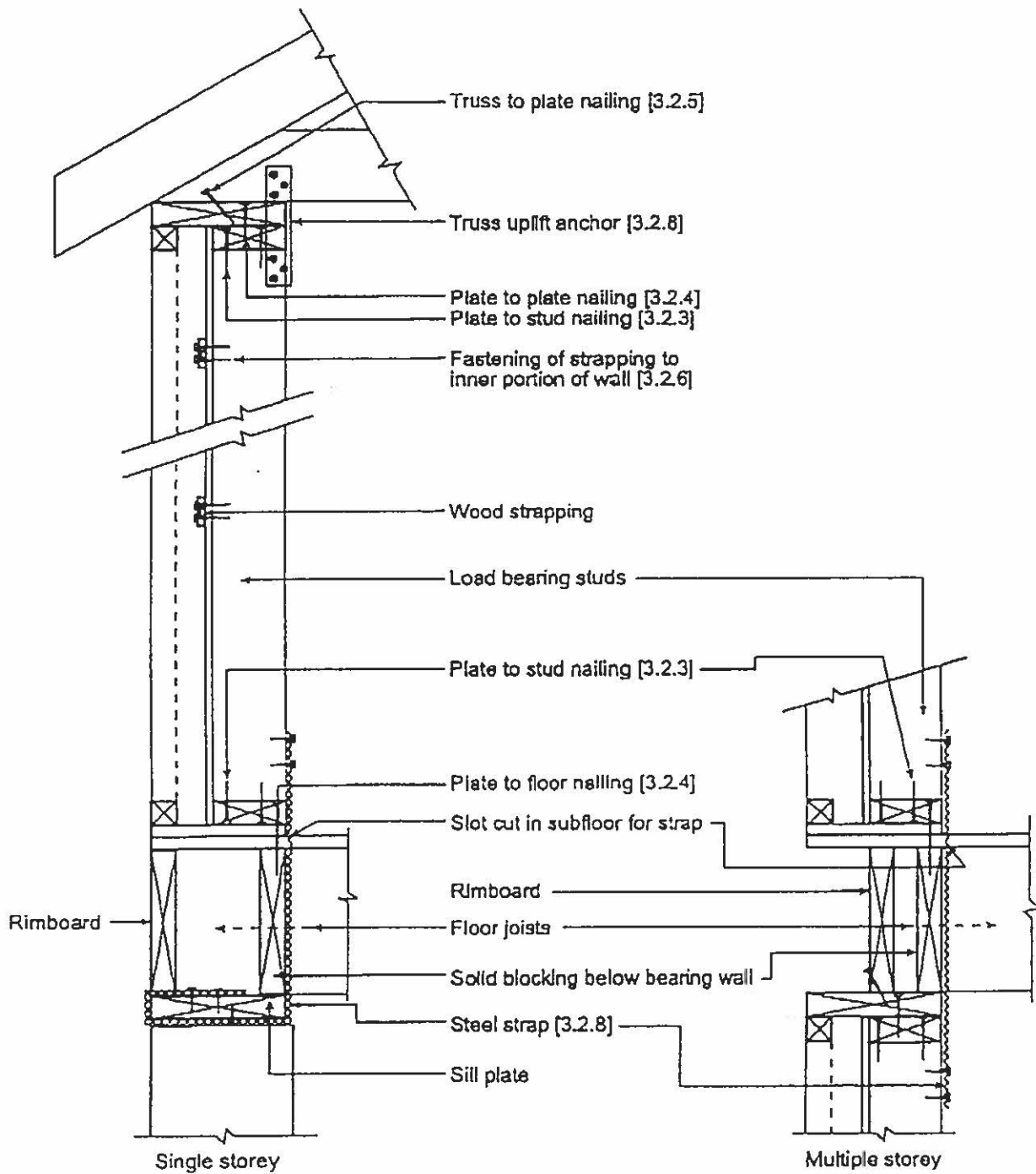


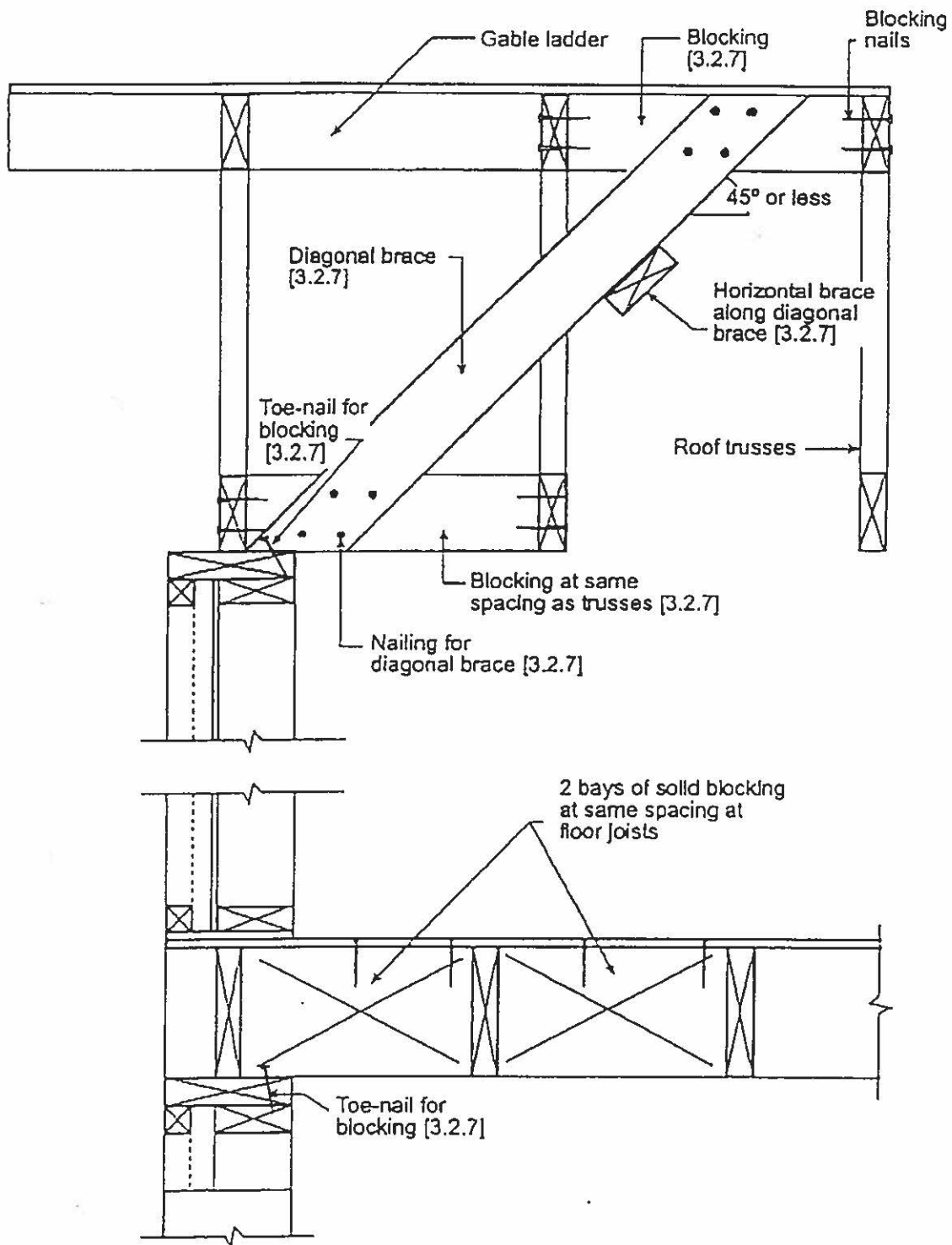
Figure 2. Typical wall section of the assembly of the "Energy Wall System."

- The wall panels shall be installed on site in accordance with "Energy Wall & Building Products Ltd. Installation Manual." The manual is produced on a project-specific basis. However, all manuals must be produced based on the model document that was prepared by Ferguson Simek Clark Engineers & Architects, 17 April 2000.
 - The "Energy Wall System" is designed for the construction of buildings with overall dimensions of 10 m by 15 m or less. The pre-engineered panels were not designed for use in the construction of narrow buildings in exposed locations with large openings located on the short sides.
 - The maximum span between the "Energy Wall System" exterior bearing walls is limited to 7.65 m for wall models 1, 2, 3 and 4 and to 10 m for wall models 5, 6, 7 and 8. The height of wall panel is limited to 3.0 m for models 1, 2, 3 and 4 and to 3.2 m for models 5, 6, 7 and 8.
 - Wall models 1, 2, 3 and 4 can be used for the construction of one-storey dwellings whereas wall models 5, 6, 7 and 8 can be used for two-storey dwellings.
 - The pre-engineered panels can only be used for the construction of residential dwelling in geographical areas covered by the "Energy Wall & Building Products Ltd. Design Manual" where the hourly wind pressure (1/30) is less than 0.65 kPa.
 - The roof and floor assembly connecting to the "Energy Wall System" must be designed to provide diaphragm shear resistance as required in Subsection 9.23.9., 9.23.13. and 9.23.14. of the NBC 1995.
 - At least one layer of sheathing membrane must be installed on the exterior surface of the wall panels. The sheathing membrane material and installation shall conform to Subsection 9.23.17. of the NBC 1995.
 - The interior portion of the wall panel must contain an exterior sheathing conforming to CSA standards O151-M1978 or O437.0-93, Grade O-1 or O-2.
 - A polyethylene sheet conforming to CAN/CGSB-51.34-M86 must be installed on the interior surface of the wall panels for air leakage and water vapour flow control. The polyethylene sheet in combination with the interior finish must be installed to comply with Subsection 9.25.3. of the NBC 1995.
 - The glass fibre batt insulation installed in the interior portion of the wall system shall conform to CSA standard A101-M1983.
 - No insulation shall be installed between the header and joist blocking of the second floor framing as the polyethylene sheet is wrapped outside the header.
 - The "Energy Wall System" was designed with 12.7-mm gypsum board as interior finish. The gypsum boards and their installation shall conform to Subsection 9.29.5. of the NBC 1995.
 - When the design of the "Energy Wall System" is beyond the scope of the above mentioned limitations, the design of the wall system must be approved and sealed by a professional engineer qualified in the field of wood-frame design and licensed to practise engineering in Canada under the appropriate provincial or territorial legislation.
 - The exterior surface of the expanded polystyrene insulation of each wall panel must be identified with the following information:
 - the manufacturer's logo,
 - the CCMC # 12889-R; and
 - the CCMC # 11835-R.
- The "Energy Wall System" contains sufficient thermal insulation to meet the condensation requirements of Article 9.25.2.1. of the NBC for use in the construction of buildings with interior operating climatic conditions of 23°C and 50% relative humidity in geographical area with 2.5% January design temperature of -48°C.



[The numbers in bracket indicate the applicable sections of the design manual.]

Figure 3. Typical fastening connections at floor and roof to resist wind uplift



[The numbers in bracket indicate the applicable sections of the design manual.]

Figure 4. Typical fastening connections at gable end to maintain diaphragm action

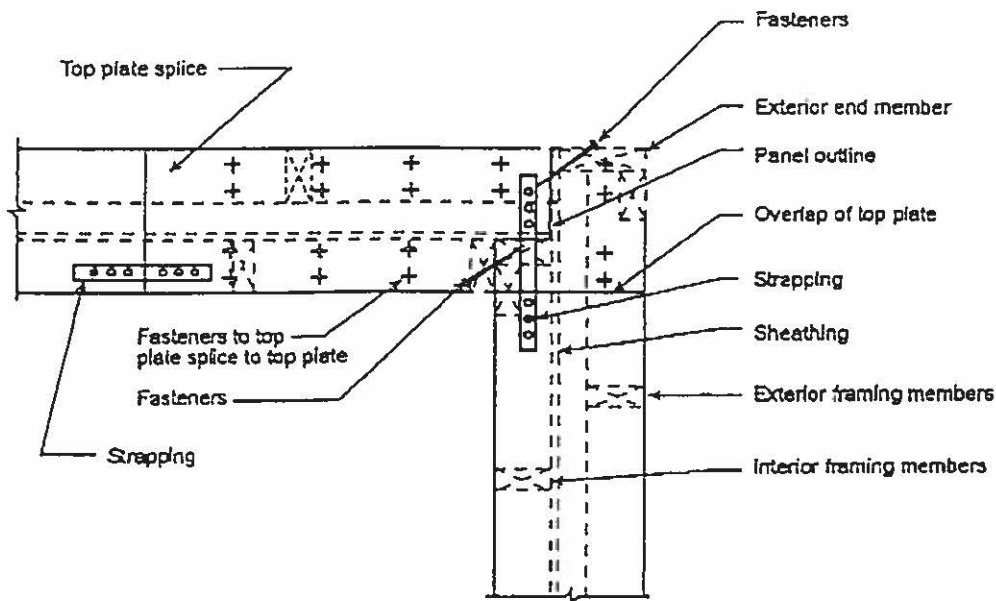


Figure 5. Typical fastening connection of the top plates and at corners for continuity and stability (top view)

5. Performance

"Energy Wall System" was evaluated based on structural and hygrothermal analysis conducted by qualified third party recognized by CCMC.

Since the base materials used in the system are covered by established standards referenced in the NBC or by CCMC product evaluation, no laboratory testing was required.

Structural Analysis

The structural design of the pre-engineered panels was analyzed for specific geographical areas in the Canadian north (i.e., snow load, wind load, seismic). Examples of assumptions that were taken in the structural analysis are:

- i) building maximum dimensions, 10 m by 15 m
- ii) number of storeys, one-storey for 38x89 framing, two-storey for 38x140 framing
- iii) lumber, S-P-F no. 2, untreated
- iv) stud spacing, 0.4 m for 38x89 studs, 0.4 m or 0.6 m for 38x140 studs
- v) truss/ceiling joist spacing, 0.6 m
- vi) roof dead load, 1.0 kPa
- vii) floor dead load, 1.0 kPa
- viii) floor live load, 2.4 kPa.

Refer to the "Energy Wall & Building Products Ltd. Design Manual" that was prepared by Ferguson Simek Clark Engineers & Architects, 17 April 2000, for more details on the analysis and the fastening requirements for the "Energy Wall System."

Hygrothermal Analysis

All wall models were analyzed for use where the interior climatic conditions is 50% relative humidity and 23°C and the exterior temperature is -48°C. The effective thermal resistance and the minimum interior surface temperature of each wall model are summarized for these climatic conditions in Table 2.

Table 2. Thermal performance of each wall model for 23°C on the interior and -48°C on the exterior

Wall Model	Effective Thermal Resistance RSI-Value (m ² ·K/W) (1)(2)	Interior surface temperature (minimum) °C
1	5.22	18.4
2	4.86	18.4
3	3.82	17.4
4	3.92	17.4
5	6.07	19.0
6	5.10	19.0
7	4.03	18.7
8	4.89	18.3

¹ Includes interior and exterior finishes, 0.08 m²·K/W and 0.11 m²·K/W respectively.

² Includes ASHRAE's standard interior and exterior air film, 0.12 m²·K/W and 0.03 m²·K/W respectively.

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Johu Berndt, P.Eng.
Manager, CCMC

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