

Project #: 240814.0

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To whom this may concern:

**Re: Building Science Assessment of the Use of 936 Connect on RTM House,
Westman Region, MB**

The following is our report summarizing our analysis of the Quik-Therm Insulation Solutions Inc. 936 Connect exterior sheathing system for use on a house design to be built in the Westman Region of Manitoba. This report is intended to assist the Authority having Jurisdiction (AHJ) with the application of specific Code requirements.

PROJECT CONTEXT

Frontenac Building Science Inc. (Frontenac BS) understands that the project is to be a single-storey, single family house of approximately 120 m² floor area, of wood frame construction. An outline of the house layout is provided in Figure 1 below for reference.

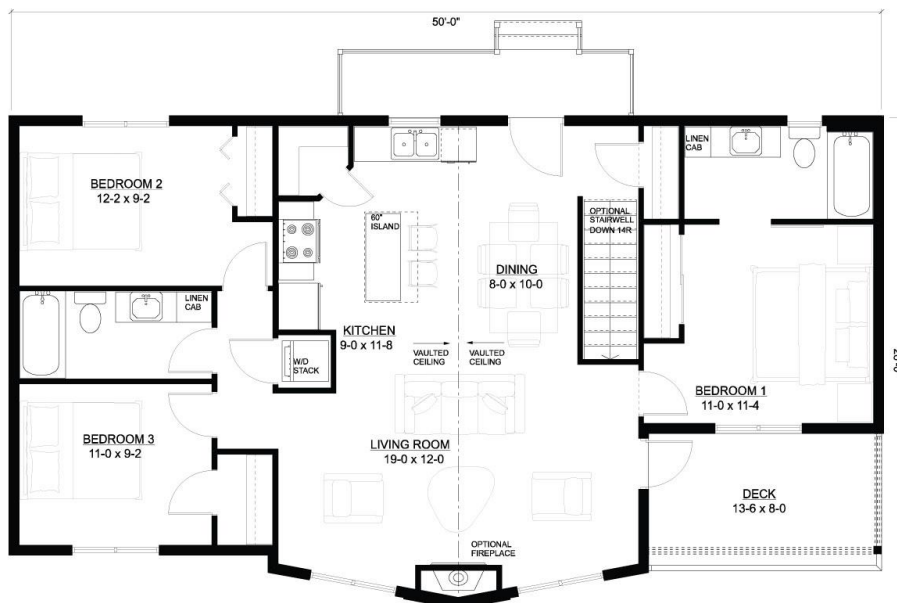


Figure 1: Typical Single-Storey House Layout

The Manitoba Building Act, Regulation 78/2023, adopted the 2020 version of the National Building Code for projects starting after December 31, 2023. Given its size, this building will fall

under National Building Code (NBC) Division B, Part 9. This report will focus on the requirements under NBC, Division B, Section 9.25 *Heat Control, Air Leakage and Condensation Control*.

The Quik-Therm 936 Connect system is intended for use as an exterior insulation to be installed on the exterior side of the 2x4 wood frame structural studs. It is intended to provide a layer of insulation, the primary building vertical above grade air barrier material, and the secondary plane of protection against incidental precipitation penetration.

The Westman Region of Manitoba can be represented by Brandon, MB for climate data. 2020 NBC, Division B, Appendix C2 identifies Heating Degree-Days as HDD₁₈ 5,760.

REFERENCE DOCUMENTATION

In preparing this report, Frontenac BS has reviewed, and will reference, the following documentation, either as provided to us by Quik-Therm or as publicly available:

- Ref 1. *2020 National Building Code Canada*, National Research Council Canada
- Ref 2. *2015 National Building Code Canada*, National Research Council Canada
- Ref 3. Roppel, P. and Mercier, S., *Hygrothermal Analysis of Quik-Therm 936 Connect Wall*, Evoke Buildings Engineering Inc., June 2, 2021
- Ref 4. *Technical Data, Code Compliance and Testing for 936 Connect on Low Rise Wood Framed Structures*, Quik-Therm Insulation Solutions Inc., July 2021
- Ref 5. *Technical Data, Code Compliance, Application Instructions and Best Practices for Installing 936 Connect on Low Rise Wood Framed Structures*, Quik-Therm Insulation Solutions Inc., July 2021
- Ref 6. *Technical Data Sheet, Quik-Therm Perforated & Vented Connect*, Quik-Therm Insulation Solutions Inc., March 2021
- Ref 7. *CCMC 13393-L Standard Compliance Evaluation*, Canadian Construction Materials Centre, National Research Council Canada, November 8, 2023
- Ref 8. *CCMC 13457-L Standard Compliance Evaluation*, Canadian Construction Materials Centre, National Research Council Canada, November 8, 2023
- Ref 9. *CCMC 14062-L Standard Compliance Evaluation*, Canadian Construction Materials Centre, National Research Council Canada, November 8, 2023
- Ref 10. *936 Connect – Composite Wall Weatherization System Test Report*, Building Efficiency Technology Access Centre, Red River College, undated although testing completed in 2021.
- Ref 11. White, D.C., Email on Results of ASTM C518 Testing, Architectural Testing Inc., undated.
- Ref 12. *Test Report No: T1035-3*, QAI Laboratories, June 30, 2017.
- Ref 13. *Test Report No: T1035-5*, QAI Laboratories, May 24, 2019.

Where referenced in the discussion below, the items above will be identified by item number using this format – “Ref #”.

CODE REQUIREMENTS & THE 936 CONNECT SYSTEM

Table 1 outlines the key Code requirements under NBC, Div B, Section 9.25 and reference information for 936 Connect, indicating compliance.

Table 1: Code Requirements and Compliance Statements

2020 NBC Code Provision	936 Connect Compliance Statement	Applicable Reference Item	Frontenac BS Comment
9.25.1.1 Scope and Application	Meets Article	See below for specific items	-
9.25.2.1 Required Insulation	Meets Article	Ref 3	Detailed hygrothermal analysis contained in Ref 3 demonstrates the 936 Connect system's contributions towards this Provision.
9.25.2.2.(1) Insulation Materials	Meets Clause (d)	Ref 6, 8, 11	936 Connect panels that are two inches thick have a reported thermal performance of R4.18 (hr·sqft·°F)/Btu when tested to ASTM C518 and meet CAN/ULC S701.1
9.25.2.3 Installation of Thermal Insulation	Meets Sentences (1) & (3) - other sentences do not apply	Ref 3, 5, 10, 12, 13	936 Connect is intended to be installed in a continuous manner on the exterior of the wood stud framing. It is intended as the primary air barrier material on the vertical exterior wall surface.
9.25.2.4 & 9.25.2.5	Do not apply	-	-
9.25.3.1 Required Barrier to Air Leakage	Meets Sentence (1)	Ref 3, 5, 10, 12, 13	Reference 3 identifies detailed hygrothermal analysis that demonstrates that 936 Connect, when installed per the Quik-Therm application and installation guidelines, addresses this Provision's requirements for minimizing condensation.
9.25.3.2 Air Barrier System Properties	Meets Sentence (1)	Ref 3, 5, 10, 12, 13	When installed per the Quik-Therm application and installation guidelines, including identified accessories, 936 Connect meets the requirements for an air barrier assembly. Integration of this air barrier assembly into the other assemblies of the house is the responsibility of the builder.

2020 NBC Code Provision	936 Connect Compliance Statement	Applicable Reference Item	Frontenac BS Comment
9.25.3.3 Continuity of the Air Barrier System	Meets Sentences (1), (3) & (6) - other sentences do not apply	Ref 3, 5, 10, 12, 13	Continuity of the 936 Connect air barrier system is provided using the Quik-Therm application and installation guidelines, including identified accessories.
9.25.3.4, 9.25.3.5 & 9.25.3.6	Do not apply	-	-
9.25.4.1 Required Barrier to Vapour Diffusion	Per Sentence (1)	Ref 5	936 Connect has a reported vapour permeance $>60 \text{ ng}/(\text{Pa}\cdot\text{s}\cdot\text{m}^2)$ and is therefore not considered a vapour barrier material under 9.25.4.2.(1). Quik-Therm identifies the need for a separate vapour barrier on the interior side of the wood stud cavity batt insulation.
9.25.4.2 & 9.25.4.3	Do not apply	-	-
9.25.5.1 Properties and Position of Materials in the Building Envelope	Meets Sentence (4) - 9.25.5.1. (1) does not apply	Ref 3	The intended installation of 936 Connect for this project in Westman Region, the $\text{HDD}_{18} < 6,000$ and therefore Sentence (4) applies.

DISCUSSION

The detailed analysis in Ref 3 (Evoke hygrothermal analysis report) identifies the performance and material requirements needed to meet Code provisions in the Westman Region, MB:

- Air Barrier** - It is important that installation of the 936 Connect system follows the Quik-Therm specification, application and installation guidelines in order to achieve the required air barrier performance. This air barrier performance expectation is the same for any air barrier system in this Region. Quik-Therm has good information to guide the builder on proper application of the 936 Connect system.
- Vapour Barrier** - Ref 3 identifies that a vapour barrier on the interior side of the wood stud cavity, with a vapour permeance of between $35\text{-}60 \text{ ng}/(\text{Pa}\cdot\text{s}\cdot\text{m}^2)$, is sufficient to address the risks of condensation when using 936 Connect in this Region. The report also identifies that when this interior vapour barrier has at least $35 \text{ ng}/(\text{Pa}\cdot\text{s}\cdot\text{m}^2)$ it will support some drying of incidental water within the cavity towards the interior during suitable weather periods. We note that polyethylene sheet vapour barriers have a vapour permeance that is much lower than $35 \text{ ng}/(\text{Pa}\cdot\text{s}\cdot\text{m}^2)$.

The Quik-Therm 935 Connect system addresses the 2020 NBC provisions as identified in Table 1 when applied according to the Quik-Therm application and installation guidelines.

We trust this addresses the intended use and application. If you have any questions relating to the content of the above, please contact David Kayll, FMA, P.Eng. at (m) 613-978-7119.

Sincerely,

FRONTENAC BUILDING SCIENCE INC.



David Kayll, FMA, P.Eng.
President, Sr. Building Science Guy



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