



# 936 Connect

## Composite Wall Weatherization System

July 2021

The following document, Technical Data, Code Compliance, Application Instructions and Best Practices for Installing 936 Connect on Low Rise Wood Framed Structures is a living, work in progress document. 936 Connect is arguably the most technologically advanced wall weatherization system in North America. 936 achieves NBCC compliance. Technical updates will be added as they become available. Thank you for your interest in the composite 936 Connect Wall Weatherization System. Questions, please contact Ted Cullen ... ted@quiktherm.com

### Who is Quik-Therm?

Over the past 12 years Quik-Therm Insulation Solution Inc. (QT) has collaborated with many of North America's finest Building Science engineering and testing organizations. QT has conducted 70+ ASTM standard test procedures - including 30+ C1363 effective R-value tests, numerous hygrothermal analyses - physical wall drainage and drying assembly tests.

As a consequence of our investment in building science and research, Quik-Therm has been able to design and develop several physics based, multi-functional weatherization/insulation technologies (systems). QT systems most often cost less, install faster and perform better than status quo insulation products and installation methods.

Quik-Therm weatherization technologies have been utilized in Canada's largest and second largest Passive House Buildings and the Home of Tomorrow. The Nuutsumuut Lelum, Nanaimo Aboriginal Centre Passive House project may well be the lowest cost, best performing Passive House building in Canada.

## Technical Data, Code Compliance and Testing for 936 Connect on Low Rise Wood Framed Structures

**Components:** Perforated metallic polymer facers - laminated over Type 2 expanded polystyrene with Inherent 3/4 x 2 1/2" wide plywood furring/nailling strips every 16" O.C.

**Dimensions:** 4' x 8' Rigid Sheets - 2 1/2" Thick

**CCMC Listing:** 13457-L

### A. Product Description

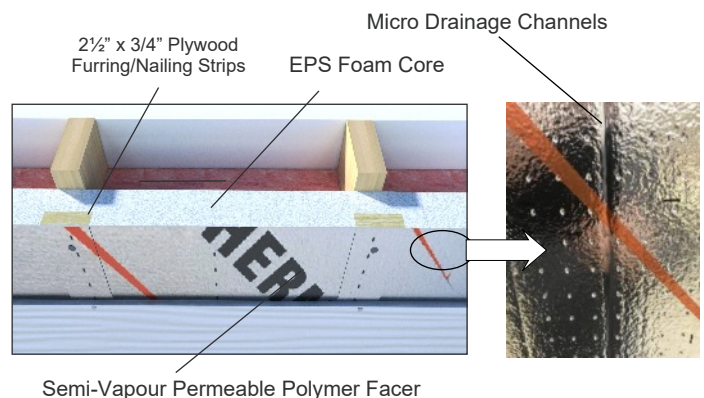
936 Connect is a composite Lean Construction, low cost, energy and carbon saving wall weatherization system. 2x4 framed 936 Connect walls cost less, install faster and provide 30%+ superior effective R-value performance compared to 2x6 minimum code wall assemblies. In Canada, 9.36 applies to energy efficiency code requirements as they apply to construction of new homes and small buildings. 936 Connect is 9.36 National Building Code compliant.

### B. Scope & Purpose

This document describes the recommended best practices for installing 936 Connect (936) in wood framed structures. Specific installation conditions and environment may warrant digression from these instructions. In all instances, refer to the notes included with each installation schematic to ensure the technical advantages of the product are maintained. \*\*\*\* Adhere to local building codes.

### C. Technical Advantages

Moisture resistant, semi-vapour permeable continuous insulation system consisting of just three fundamental components. There is no requirement for exterior substrate sheathing, house wrap or 6 mil poly. The pre-tension clamping design seals the all-encompassing air, vapour and thermal control layer to the wall framing system. The service stud bays contain 3.5" cavity batt insulation. Perforated polymer facers allow the wall assembly to dry (diffuse) vapour both outward (winter) and inward (summer). There is no potential for a double vapour barrier. Exterior vertical micro drainage channels and furring that is 2mm proud of the exterior facer promote gravity induced drainage and drying between 936 Connect and exterior cladding. Tongue and Groove connections aide in structure and panel alignment. Cladding is mechanically fastened to inherent plywood furring/nailling strips.





Quik-Therm Insulation Solutions Inc.

## 936 Connect Composite Wall Weatherization System

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Code Compliance

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### National Building Code Canada

Canadian Provinces typically adopt the National Building Code of Canada (NBCC) as their Provincial codes; however, some Provinces and Municipalities may add additional information reflecting modifications, to their Provincial code, to meet local needs and concerns. Compliance with the code is achieved by complying with the acceptable solutions of Division B of the code. Division B lays out the steps that must be followed, beginning with the geographic location where the build is taking place.

#### 1a. Can a Part 9 building be constructed in Canada with rigid foam plastic insulation sheathing in lieu of plywood, OSB or exterior gypsum?

**Yes!** Article 9.23.17.1. Required Sheathing Table 9.23.17.2.-A, Wall Sheathing and Thickness and Specifications lists permitted materials for use as sheathing in a Part 9 building. Polystyrene, expanded polystyrene (EPS) Types 1 and 2, meeting the CAN/ULC - S701.1 Material Standard are permitted in lieu of plywood, OSB and gypsum sheathing in a Part 9 building.

#### 1b. Does Quik-Therm 936 Connect meet the requirements of NBCC Articles 9.23.13.1. Requirements for Low and Moderate Wind and Seismic Forces?

**Yes!** 936 meets the requirements of NBCC Article 9.23.13.1.(1) by complying with the design data in Table C-2, applicable geographic zones. 936 also meets the requirements of sentence 9.23.13.1(2). by complying with Sub-clause 9.23.13.1.(2)(a)(iii).

#### 1c. Can foam sheathing be used on the exterior of a Part 9 building?

**Yes!** Yes. Foam plastics can be used on the exterior and interior of a Part 9 building as long as it is protected from adjacent space in the building by a thermal barrier as outlined in NBCC Article 9.10.17.10. Protection of Foamed Plastics. 936 Connect meets this requirement by complying with Clause 9.10.17.10.(1)(a).

**Quik-Therm Testing:**    *ASTM E330/E330M*    Structural Performance of Windows, Doors, Skylights and Curtain Walls.  
                                   *TAS 1 24-95*                                    Adhesion Testing for Laminated Polymer Films.

### 2. Does the NBCC require 2x6 studs when constructing a Part 9 building?

**No!** Article 9.23.10.1. Stud Size and Spacing Article 9.23.10.1. Stud size and Spacing in the NBCC, defines stud size and spacing allowed in Part 9 construction. Table 9.23.10.1. lists supported loads, minimum stud size, maximum stud spacing and the maximum unsupported height (of the stud), for use in interior and exterior walls. For exterior walls supporting a "Roof with or without attic storage plus one floor", 2x4 studs, spaced 16" O.C., to a maximum unsupported height (length of the wall stud) of 3.0 meters, are permitted for use in a Part 9 building.

**Quik-Therm Testing:**    *ASTM E330/E330M*    Structural Performance of Windows, Doors, Skylights and Curtain Walls.

### 3. Is polyethylene required for use as a vapour barrier in Part 9 construction?

**No!** Article 9.25.4.2. Vapour Barrier Materials Thermally insulated, heated buildings must have a vapour control layer incorporated into the building envelope (exterior walls) of a building, to prevent water vapour diffusion from the interior of the building, entering into the wall spaces. Article 9.25.4.2. of the NBCC describes a vapour barrier as a material having a vapour permeance, not greater than 60 ng/(Pa.s.m<sup>2</sup>) and requires it to be installed on the interior (warm side) of insulated walls, floors and roof spaces. Sentence four [9.25.4.2.(4)] permits the use of coatings to the drywall, such as vapour barrier paints with a vapour permeance ranging from between 45-60 ng/(Pa.s.m<sup>2</sup>) to act as the vapour control layer of the building envelope, in lieu of six mill poly.

**Quik-Therm Testing:**    *ASTM E96*    Water Vapour Permeance.  
                                   *ASTM E331*    Water Penetration of Exterior Windows, Skylights, Doors and Curtain Walls.  
                                   *Hygrothermal Analysis of Quik-Therm 936 Connect Wall.*

### 4. Is an Air Barrier required in Part 9 Construction?

**Yes!** Article 9.25.3.1. Required Barrier to Air Leakage and 5.4.1.2. Air Barrier System Properties. An air barrier is required in wall, ceiling, and floor assemblies separating a heated space from an unconditioned space. Air barrier systems must create an effective barrier to air infiltration and exfiltration when exposed to a differential air pressure, from, stack effect, mechanical system's or wind. Materials used as an air barrier must have an air leakage of not greater than 0.02 L/(s.m<sup>2</sup>) measured at a pressure difference of 75 pascals (Pa), when tested in accordance to ASTM E 2178. Note: Quik-Therm performed two ASTM 2178 air permeance tests - one with laminates not breached and the other with laminates breached. The results from both tests met the requirements of an air barrier, as outlined in Section 5.4.1.2. in Division B, of the NBCC.

**Quik-Therm Testing:**    *ASTM E2178*    Product Air Barrier Testing.  
                                   *ASTM E2357*    Air Leakage Rate of Air Barrier Assemblies.  
                                   *ASTM E1186*    Air Leakage Detection in Building Envelopes and Air Barrier Systems.  
                                   *ASTM E331*    Water Penetration of Exterior Windows, Skylights, Doors and Curtain Walls.  
                                   *Hygrothermal Analysis of Quik-Therm 936 Connect Wall.*



Quik-Therm Insulation Solutions Inc.

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Testing & Analytical Studies

July 2021

### Inspired by Building Science

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Tested By Canadian Accredited Laboratories. Supported By Building Science

#### Air Barrier & Air Leakage Testing

**ASTM E2178** Product Air Barrier Testing. QAI Laboratories. Semi-permeable (breached/perforated polymer films) meets the requirements of an air barrier as outlined in Section 5.4.1.2 (Division B) of the National Building Code of Canada.

**ASTM E2357** Air Leakage Rate of Air Barrier Assemblies. Red River College (BETAC).

**ASTM E1186** Air Leakage Detection in Building Envelopes and Air Barrier Systems. Red River College (BETAC).

#### Hygrothermal Analysis

**Hygrothermal Analysis of Quik-Therm 936 Connect Wall.** Patrick Roppel, P.Eng., Sophie Mercier, P.Eng. Building Science Specialists, Evoke Buildings Engineering Inc.

The Quik-Therm 936 Connect wall meets the prescriptive requirements in the 2015 NBC for thermal insulation (925.2), air barrier system (9.25.3), vapour barriers (9.25.4), and position of materials in the building envelope (9.25.5).

#### Tape Peel Adhesion Testing

**Tested to ASTM D 3330, Method A.** 3M considers the bond of 3M 3015, Air and Vapour Barrier tape to Quik-Therm insulation to be adequate and the products to be compatible.

#### Water and Vapour Barrier Testing

**ASTM E96** Water Vapour Permeance. QAI Laboratories. Average water vapour permeance of 87.30 ng/Pa·s·m<sup>2</sup> (1.53 US perms). Perforated 936 Connect is deemed vapour semi-permeable.

**ASTM E331** Water Penetration of Exterior Windows, Skylights, Doors and Curtain Walls. Red River College (BETAC). Detects water leakage utilizing high pressure water. Simulates driving rain.

#### Structural Testing

**ASTM E330/E330M** Structural Performance of Windows, Doors, Skylights and Curtain Walls, Red River College (BETAC). Withstood 1500 pascals. Equivalent to 178 km/h sustained wind speed. Minimal deflection. No drywall, exterior sheathing or cladding. Just 2" thick 936 Connect nailed over 2x4 framing @16" OC. No Bracing.

**TAS 1 24-95** Adhesion Testing for Laminated Polymer Films. QCA Building Envelope Ltd. Three test samples. Averaged pull resistance 257 psi / 1,029 psf.

### Effective Thermal Resistance

In addition to nominal R-Value testing as per ASTM C518, standard prescriptive calculation methods and independent evaluations, Quik-Therm Insulation Solutions Inc. has undertaken a program of full-scale thermal performance testing to ASTM C1363-05 "Standard Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus."

Method	Test Company	Test Assembly	R-Value
ASTM C-518	ATI/Intertek	1" Type 2 Quik-Therm Connect	4.18
ASTM C-1363	ATI/Intertek	3/8 drywall, 6 mil poly vapour barrier, empty 2x4 cavity, 7/16" OSB, 2" Connect, 1/4" cement board siding	13.2
ASTM C-1363	ATI/Intertek	3/8" drywall, 6 mil poly vapour barrier, R-13 batt (2x4 cavity), 7/16" OSB, 2" Connect, 1/4" cement board siding	23.1
Canadian Effective R-Value Evaluation	Morrison Hershfield	1/2" drywall, R-12 batt, 7/16" OSB, 2" Connect, cement board	22.1
Prescriptive Effective R-Value Calculation	Minimum R-value Calculations	Interior Air Film (R-0.17) + 1/2" drywall (R-0.45) + R-12 fiberglass (R-9.8) + 2 1/2" Type 2 Connect (R-10.45) + typical cladding materials (R-0.4) + Exterior Air film (R-.68)	22.0