Technical Evaluation Report™ - Canada

A Duly Authenticated Report from an Approved Agency

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BASF HP+™ Wall XR Series Utilizing WALLTITE® v.5 in Combination with Neopor® FPIS and Horizontal Girts - Canada

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CSI Designations:

DIVISION: 06 00 00 - WOOD, PLASTICS AND COMPOSITES

Section: 06 12 00 - Structural Panels

Section: 06 12 19 - Shear Wall Panels

Section: 06 16 00 - Sheathing

DIVISION: 07 00 00 - THERMAL AND MOISTURE PROTECTION

Section: 07 21 00 - Thermal Insulation

Section: 07 25 00 - Water-Resistive Barriers/Weather Barriers

1 Innovative Product Evaluated[1]

1.1 BASF HP+ Wall XR Series

2 Product Description and Materials

2.1 The innovative product evaluated in this report is shown in **Figure 1**.

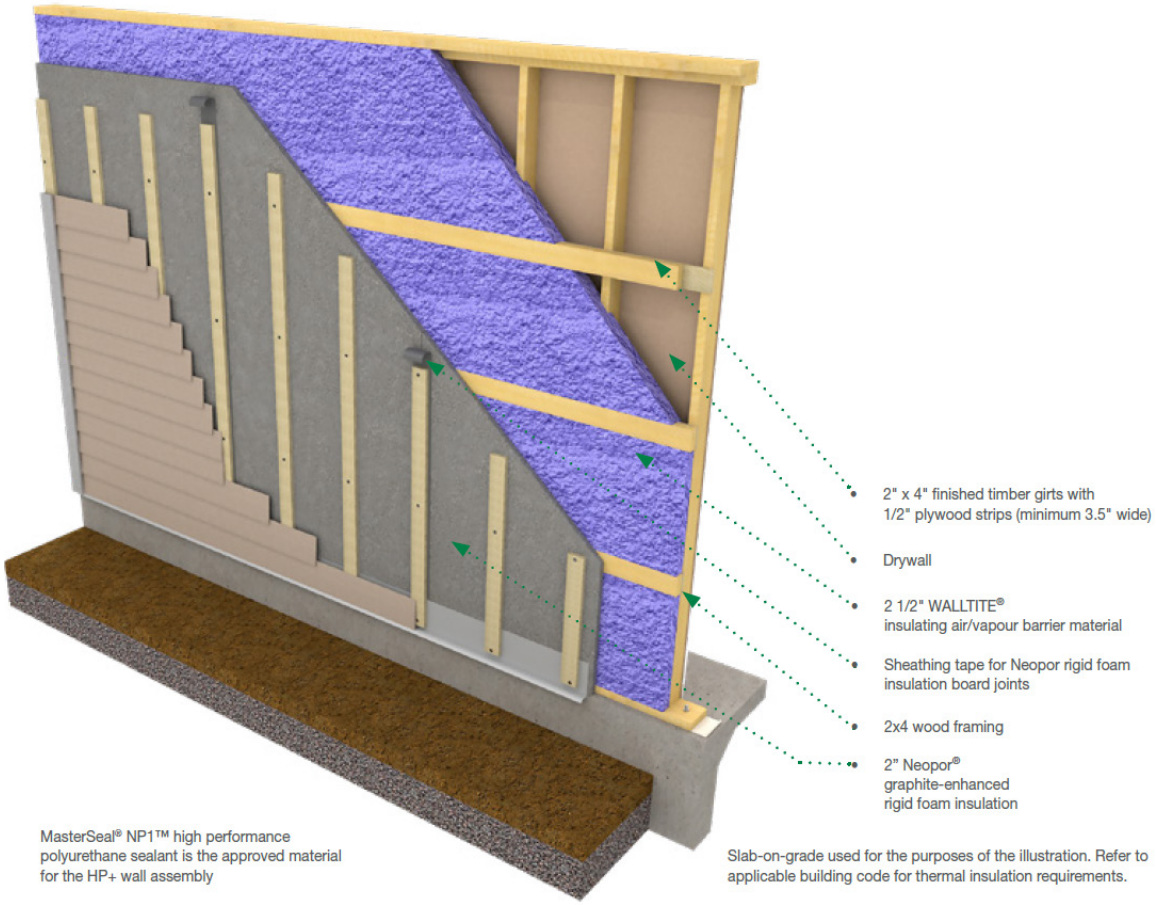

Figure 1. Illustration of BASF HP+ Wall XR Series

2.2 BASF HP+ Wall XR Series is a proprietary wall system consisting of WALLTITE v.5 Spray Polyurethane Foam (SPF) combined with Neopor Foam Plastic Insulating Sheathing (FPIS) and horizontal Z-bar girts (or hat channel furring, also called Omega bars) installed on wood studs.

2.2.1 The BASF HP+ Wall XR Series described in this report contains a combination of the following materials:

2.2.1.1 *Spray Polyurethane Foam (SPF):*

2.2.1.1.1 WALLTITE v.5 SPF: 38 mm

2.2.1.2 *Neopor FPIS:*

2.2.1.2.1 Minimum Thickness: 25 mm or 51 mm

2.2.1.2.2 *Field:*

2.2.1.2.2.1 Fastened with minimum No. 7 screw with plastic cap spaced at 300 mm o.c. into horizontal Z bar girts.

2.2.1.2.3 *Top and Bottom of Each Panel:*

2.2.1.2.3.1 Fastened with 3.3 mm x 89 mm nails at 150 mm o.c., directly into the 2 x 6 plates (See **Section 2.2.1.4.2**).

2.2.1.3 *Horizontal Z-Bar Girts:*

2.2.1.3.1 51 mm x 51 mm, galvanized G60 (0.60 oz/square foot), 20-gauge, at 600 mm o.c.

2.2.1.3.2 Fastened to framing with one of the following:

2.2.1.3.2.1 Minimum 3.3 mm x 63 mm ring-shank nail

2.2.1.3.2.2 Minimum No. 8, 4.2 mm dia. x 51 mm wood screw

2.2.1.3.3 Two Fasteners per stud.

2.2.1.4 *Nominal 2x Wood Framing:*

2.2.1.4.1 2 x 4 studs (38 x 89 mm), Stud-grade 2 Spruce-Pine-Fir (SPF) or better

2.2.1.4.1.1 Each stud fastened to top and bottom plates with three (3) 3.3 mm x 83 mm nails

2.2.1.4.2 2 x 6 top (single or double) and bottom plates – No. 2 SPF or better

2.2.2 The following may be used as an alternative to **Section 2.2.1.3**:

2.2.2.1 Hat-channel furring (Omega bars) up to 51 mm in depth, galvanized G60, 20-gauge, at 600 mm o.c.

2.2.2.1.1 Each side of channel fastened to framing with one of the following:

2.2.2.1.1.1 Minimum 3.3 mm x 63 mm ring-shank nail

2.2.2.1.1.2 Minimum No. 8, 4.2 mm x 51 mm wood screw

2.2.2.1.2 Two fasteners per stud.

2.2.2.2 With rough-cut or sawn wood studs measuring 44 mm x 95 mm, rough cut or sawn wood timber girts, measuring 44 mm x 95 mm at 600 mm o.c., may be fastened horizontally to studs with two 3.3 mm x 83 mm nails at each stud / girt intersection. Total thickness of the stud (89 mm) and girt (44 mm) is 133 mm.

2.2.2.3 With nominal 2 x 4 studs (38 x 89 mm), rough-cut or sawn wood timber girts measuring a full 51 mm x 102 mm at 600 mm o.c., may be fastened horizontally to studs with two 3.3 mm x 83 mm nails at each stud / girt intersection. Total thickness of the stud (89 mm) and girt (38 mm) is 127 mm.

2.2.2.4 Nominal 2 x 4 (38 x 89 mm) finished timber girts may be installed horizontally at 600 mm o.c. with 12.7 mm plywood strips (minimum 89 mm wide) fastened to framing with two 3.3 mm x 83 mm nails at each stud / girt intersection. Total thickness of the stud (89 mm) and girt (51 mm) is 140 mm.

2.3 As needed, review material properties for design in **Section 4** and the regulatory evaluation in **Section 5**.

3 Applicable Codes and Standards[2]

3.1 *Codes*

3.1.1 *NBC—10, 15, 20: National Building Code of Canada*

3.1.2 *NECB—17, 20: National Energy Code of Canada for Buildings*

3.1.3 *O Reg. 332/24: Ontario Building Code (OBC)*[3]

3.2 *Standards and Referenced Documents*

3.2.1 *ASTM C518: Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus*

3.2.2 *ASTM C578: Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation*

3.2.3 *ASTM D1622: Standard Test Method for Apparent Density of Rigid Cellular Plastics*

3.2.4 *ASTM D1623: Standard Test Method for Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics*

3.2.5 *ASTM D2126: Standard Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging*

3.2.6 *ASTM D2842: Standard Test Method for Water Absorption of Rigid Cellular Plastics*

3.2.7 *ASTM D6226: Standard Test Method for Open Cell Content of Rigid Cellular Plastics*

3.2.8 *ASTM E72: Standard Test Methods of Conducting Strength Tests of Panels for Building Construction*

3.2.9 *ASTM E283: Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen*

3.2.10 *ASTM E330: Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights, and Curtain Walls by Uniform Static Air Pressure Difference*

3.2.11 *ASTM E564: Standard Practice for Static Load Test for Shear Resistance of Framed Walls for Buildings*

3.2.12 *ASTM E2126: Standard Test Methods for Cyclic (Reversed) Load Test for Shear Resistance of Vertical Elements of the Lateral Force Resisting Systems for Buildings*

3.2.13 *ASTM E2178: Standard Test Method for Air Permeance of Building Materials*

3.2.14 *CAN/ULC-S102.2: Test for Surface Burning Characteristics of Flooring, Floor Coverings, and Miscellaneous Materials and Assemblies*

3.2.15 *CAN/ULC-S701: Standard for Thermal Insulation, Polystyrene, Boards, and Pipe Covering*

3.2.16 *CAN/ULC-S705.1: Standard for Thermal Insulation - Spray Applied Rigid Polyurethane Foam, Medium Density - Material Specification*

3.2.17 *CSA O86-24: Engineering Design in Wood*

3.2.18 *CWC: Engineering Guide for Wood Frame Construction 2014 Edition*

4 Tabulated Properties Generated from Nationally Recognized Standards

4.1 BASF HP+ Wall XR Series is used in buildings constructed in accordance with NBC Division B Section 9.23 for wood frame construction. BASF HP+ Wall XR Series is used to provide:

4.1.1 Lateral-load resistance (wind and seismic) for braced BASF HP+ Wall XR Series panels used in wood frame construction.

4.1.2 Transverse-load resistance for braced BASF HP+ Wall XR Series panels used in wood frame construction.

4.1.3 Resistance to uplift and gravity loads in single-top-plate applications for BASF HP+ Wall XR Series assemblies used in wood frame construction in accordance with NBC Division B Article 9.23.11.3.

4.2 BASF HP+ Wall XR Series is used to provide thermal resistance in the exterior wall of the building thermal envelope in accordance with NBC Division B Subsection 5.3.1 and Subsection 9.25.2.

4.3 BASF HP+ Wall XR Series is used to provide resistance to air leakage in the exterior wall of the building envelope in accordance with OBC Division B Section 5.4 and Subsection 9.25.3.

4.4 BASF HP+ Wall XR Series may be used in buildings designed in accordance with NBC Division B Section 4.1 Structural Loads and Procedures or the Engineering Guide for Wood Frame Construction.

4.5 *Structural Applications*

4.5.1 Except as otherwise described in this report, BASF HP+ Wall XR Series shall be installed in accordance with the applicable building codes listed in **Section 3** using the provisions set forth herein for the design and installation of Wood Structural Panels (WSP) and this report.

4.5.2 BASF HP+ Wall XR Series is permitted to be designed in accordance with NBC Division B Part 9, Article 9.23.13.1, Article 9.23.13.2, and Article 9.23.13.3 for the design of lateral-load-resisting systems using the methods and conditions set forth therein for equivalence to the sheathing requirements in Tables 9.23.13.6 and 9.23.17.2.-A as follows:

4.5.2.1 Equivalent to 12.7 mm sheathing using fasteners conforming to NBC Division B Table 9.23.3.1, Sentence A 9.23.3.1.(2), and Table 9.23.3.5.-A, -B, or -C, as appropriate, and with a minimum penetration of 41 mm into framing, spaced at 150 mm o.c. along edges and at 300 mm o.c. in the field, on framing spaced at a maximum of 600 mm o.c., except as specifically allowed in this report.

4.5.3 Anchorage for in-plane shear shall be provided to transfer the induced shear force into and out of each shear wall in accordance with NBC Division B Subsection 9.23.6.

4.5.3.1 For buildings with two or more floors supported by frame walls that are in areas where the seismic spectral response acceleration, $S_a(0.2)$, is not greater than 0.70 or where the 1-in-50 hourly wind pressure is equal to or greater than 0.80 kPa but not greater than 1.20 kPa, two anchor bolts per braced wall panel are required.

4.5.3.1.1 Anchor bolts shall have a diameter not less than 15.9 mm, be located within 0.5 m of the end of the foundation, and be spaced not more than 2.4 m o.c., or

4.5.3.1.2 Anchor bolts shall have a diameter not less than 12.7 mm, be located within 0.5 m of the end of the foundation, and be spaced not more than 1.7 m o.c.

4.5.3.2 For buildings supported by frame walls that are in areas where the seismic spectral response acceleration, $S_a(0.2)$, is greater than 0.70 but not greater than 1.8 and the 1-in-50 hourly wind pressure is not greater than 1.20 kPa, two anchor bolts per braced wall panel are required and spaced in accordance with Table 9.23.6.1.

4.5.3.3 Where the seismic spectral response acceleration, $S_a(0.2)$, is greater than 1.8 or the 1-in-50 hourly wind pressure is equal to or greater than 1.2 kPa, anchorage shall be designed according to Part 4.

4.5.4 The maximum aspect ratio for full-height BASF HP+ Wall XR Series braced wall segments shall be 4:1.

4.5.5 The minimum full-height panel width shall be 600 mm. Panels may be installed vertically or horizontally.

4.5.6 Neopor panel top and bottom edges shall be attached to the top and bottom plates of a minimum thickness of 38 mm. Abutting panel edges shall be generally centered on the framing member.

4.5.7 Installation is permitted for single-top-plate or double-top-plate applications in accordance with NBC Division B Article 9.23.11.3, where concentrated loads from ceilings, floors, and roofs are not more than 50 mm to one side of the studs.

4.5.8 Where the application exceeds the limitations set forth herein, design shall be permitted in accordance with accepted engineering procedures, experience, and technical judgment.

4.6 *Acceptable Solutions in Accordance with NBC Division B Part 9 Bracing Applications*

4.6.1 BASF HP+ Wall XR Series may be used to brace walls of buildings as an equivalent to OSB, O-2 Grade in NBC Division B Table 9.23.13.6 Minimum Thicknesses of Cladding, Sheathing, or Interior Finish for Braced Wall Panels as follows:

4.6.1.1 Supports at 400 mm o.c.: 11 mm minimum sheathing thickness

4.6.1.2 Supports at 600 mm o.c.: 12.5 mm minimum sheathing thickness

4.6.2 Where a building, or portion thereof, does not comply with one or more of the bracing requirements within the acceptable solutions of NBC Part 9, those portions shall be designed and constructed in accordance with NBC Division B Part 4 Structural Loads and Procedures or the Engineering Guide for Wood Frame Construction in accordance with NBC Division B Subclause 9.23.13.1.(2)(b)(ii & iii) as one of the following:

4.6.2.1 As an equivalent to OSB, O-1 or O-2 Grades in NBC Division B Table 9.23.13.6, with supports at 400 mm o.c.: 11 mm minimum sheathing thickness using fasteners conforming to NBC Division B Table 9.23.3.1, Sentence A-9.23.3.1.(2), and Table 9.23.3.5.-A, -B, or -C as appropriate and with a minimum penetration of 41 mm into framing, spaced 150 mm o.c. along edges and 300 mm o.c. in field.

4.6.2.2 As an equivalent to OSB, O-1 or O-2 Grades in NBC Division B Table 9.23.13.6, with supports at 600 mm o.c.: 12.5 mm minimum sheathing thickness using fasteners conforming to NBC Division B Table 9.23.3.1, Sentence A-9.23.3.1.(2), and Table 9.23.3.5.-A, -B, or -C as appropriate and with a minimum penetration of 41 mm into framing, spaced 150 mm o.c. along edges and 300 mm o.c. in the field.

4.6.2.3 Using the design values given in **Table 1**.

Table 1. Shear Resistance (Limit States Design) for BASF HP+ Wall XR Series – Wind or Seismic[1,4,6]

Wall Assembly	Type of Girt	Maximum Stud Spacing (mm)	Interior Gypsum Wallboard (GWB) Minimum Thickness (mm)	Maximum Gypsum Board Fastener[2] Spacing (edge/field) (mm)	Specified Shear Strength, kN/m	Ductility Factor, R_d[5,6]	Overstrength Factor, R_o
51 mm Neopor + 76 mm SPF	Z-Bar or Hat Channel	400	None	N/A	6.7	2.0	1.7
51 mm Neopor + 64 mm SPF		400	12.7	300/300	6.9	3.0	1.7
51 mm Neopor + 76 mm SPF		400	12.7	300/300	7.0	3.0	1.7
29 mm Neopor + 64 mm SPF		400	12.7	300/300	6.3	3.0	1.7
25 mm Neopor + 64 mm SPF		400	12.7	300/300	6.2	3.0	1.7
51 mm Neopor + 64 mm SPF		600	None	N/A	5.7	2.0	1.7
51 mm Neopor + 64 mm SPF		600	12.7	300/300	6.6	2.5	1.7
51 mm Neopor + 51 mm SPF		400	None	N/A	6.67	2.5	1.7
51 mm Neopor + 51 mm SPF	Timber[7]	400	None	N/A	6.88	1.5	1.7

Imperial Units: 1 mm = 0.039 in, 1 kN/m = 68.52 lb/ft

1. BASF HP+ Wall XR Series fastening per **Section 5.2** and **Section 6**.
2. Interior gypsum wallboard attached to framing with minimum 2.14 mm nail or #6 Type W screw fasteners. Minimum penetration of nails or screws into framing is 19 mm. Fastener spacing shall be as required above.
3. NBC Table 9.23.13.6 requires 15.9 mm thick gypsum with framing 600 mm o.c.
4. Building Height Limitations Above Grade:
   a. IEFaSa(0.2) < 0.2 – No Limit
   b. 0.2 ≤ IEFaSa(0.2) < 0.35 – No Limit
   c. IEFaSa(0.2) ≥ 0.35 – 20 m
   d. IEFaSa(1.0) > 0.3 – 20 m
5. Response modification coefficient, Rd, for use throughout the NBC.
6. For combinations of different types of SFRS acting in the same direction in the same storey, R_dR_o shall be taken as the lowest value of R_dR_o corresponding to these systems. See NBC Division B Article 4.1.8.9.
7. See **Section 2.2.2.2** through **Section 2.2.2.4**.

4.7 *Axial Loading*

4.7.1 BASF HP+ Wall XR Series will perform the same as corresponding equivalent prescriptive wall assemblies.

4.7.2 Designs shall have a load path capable of transferring loads from their point of origin to their final point of resistance in accordance with NBC Division C Sentence 2.2.4.3.(1).

4.8 *Transverse Wind Loading*

4.8.1 BASF HP+ Wall XR Series installed over exterior framing spaced at a maximum of 600 mm o.c. without an interior covering can resist specified wind loads as shown in **Table 2**. Hourly wind pressures (1-in-50) to be resisted are found in NBC Division B, Appendix C, Table C-2, for selected locations.

Table 2. Specified Wind Pressure[1,2]

Wall Assembly	Maximum Stud Spacing (mm)	Hourly 1-in-50 Wind Pressure, kPa
BASF HP+ Wall XR Series with 38 mm SPF + 33 mm Neopor	600 o.c.	2.8

Imperial Units: 1 mm = 0.039 in, 1 kPa = 20.88 psf

1. Neopor attached to Z-bar girt at 300 mm o.c. and to top and bottom plates with 3.3 mm x 89 mm nails at 150 mm o.c. The attachment of the sheathing to the framing is primarily through the adhesion of the SPF to the framing and Neopor sheathing.
2. Hourly Wind Pressure (1 in 50) for selected locations can be found in NBC Division B, Appendix C, Table C-2.

4.9 *Thermal Resistance*

4.9.1 BASF HP+ Wall XR Series meets the continuous insulated sheathing requirements complying with the provisions of NBC Division B Article 9.36.2.5.

4.9.2 BASF HP+ Wall XR Series components have the thermal resistances shown in **Table 3**.

Table 3. Thermal Resistance Properties

Product	Thickness (mm)	RSI / R-Value $m^2 \cdot K/W$ ($ft^2 \cdot hr \cdot °F/Btu$)
Neopor	25.4	0.83 (4.7)
	51	1.66 (9.4)
WALLTITE v.5	38	1.48 (8.4)

Imperial Units: 1 mm = 0.039 in, 1 $m^2 \cdot K/W$ = 5.678 $hr \cdot ft^2 \cdot °F/Btu$

4.10 *Air Barrier*

4.10.1 BASF HP+ Wall XR Series components have the air-permeance properties shown in **Table 4** in accordance with NBC Division B Article 5.4.1.2 and Subsection 9.25.3.

Table 4. Air-Barrier Properties

Product	Air Permeance [$L/(s \cdot m^2)$]
WALLTITE v.5	≤ 0.02

Imperial Units: 1 $L/(s \cdot m^2)$ = 0.2 cfm/ft^2

1. Tested in accordance with ASTM E2178.

4.11 *Surface Burning Characteristics*

4.11.1 BASF HP+ Wall XR Series panels have the surface-burning characteristics (flame spread) as shown in **Table 5**.

Table 5. Flame-Spread Characteristics

Product	Flame-Spread Rating
WALLTITE v.5	≤ 500
1. Tested in accordance with CAN/ULC-S102 including CAN/ULC-S127.	

4.12 *Thermal Barrier Requirements*

4.12.1 Foam plastics that form part of a wall or ceiling assembly in combustible construction shall be protected from adjacent spaces in the building, other than adjacent concealed spaces within attic or roof spaces, crawlspaces, and wall assemblies by an approved thermal barrier as required by NBC Division B Article 3.1.4.2 and Article 9.10.17.10.

4.13 Where the application falls outside of the performance evaluation, conditions of use, and/or installation requirements set forth herein, alternative techniques shall be permitted in accordance with accepted engineering practice and experience. This includes but is not limited to the following areas of engineering: mechanics or materials, structural, building science, and fire science.

5 Regulatory Evaluation and Accepted Engineering Practice

5.1 BASF HP+ Wall XR Series complies with the following adopted codes and/or accepted engineering practice for the following reasons:

5.1.1 Structural performance under lateral-load conditions in accordance with:

5.1.1.1 NBC Division B Subsection 9.23.13 Bracing to Resist Lateral Loads Due to Wind and Earthquake

5.1.1.2 NBC Section 4.1 Structural Loads and Procedures and the Engineering Guide for Wood Frame Construction

5.1.2 Structural performance under uplift and gravity loads for use with single top plates in accordance with NBC Division B Article 9.23.11.3.

5.1.3 Structural performance under transverse-load conditions for use to resist factored external wind loads in accordance with NBC Division B Subsection 9.23.13.

5.1.4 Continuous insulated sheathing requirements complying with the provisions NBC Division B Part 5 and Subsection 9.25.2.

5.1.5 Performance for use as a component of the air barrier, including for the control of soil gas infiltration, in accordance with NBC Division B Section 5.4 and Subsection 9.25.3.

5.1.6 Flame-spread rating and smoke-developed classification complying with the provisions of NBC Division B Subsection 3.1.12.

5.2 Performance of BASF HP+ Wall XR Series or any of its component materials for use as a Water-Resistive Barrier (WRB) assembly, or WRB material is outside the scope of this report.

5.3 Performance of BASF HP+ Wall XR Series or any of its component materials as used in the normal construction process is outside the scope of this report.

5.3.1 This includes storage, weather conditions, durability considerations, handling, installing, restraining, and bracing of BASF HP+ Wall XR Series through the shipping, storing, and construction means and methods process.

5.4 Use of BASF HP+ Wall XR Series in a portal frame is outside the scope of this report.

5.5 Any engineering evaluation conducted for this report was performed on the dates provided in this report and within DrJ's professional scope of work.

5.6 Kevin Below, P. Eng., has collaborated with DrJ through the review of this report.

5.7 Any building code, regulation and/or accepted engineering evaluations (i.e., research reports, duly authenticated reports, etc.) that are conducted for this report were performed by DrJ, which is an ISO/IEC 17065 accredited certification body and a professional engineering company operated by RDP or approved sources. DrJ is qualified[4] to practice product and regulatory compliance services within its scope of accreditation and engineering expertise,[5] respectively.

5.8 Testing and related engineering evaluations are defined as intellectual property and/or trade secrets.[6]

5.9 Engineering evaluations are conducted with DrJ's ANAB accredited ICS code scope of expertise that is also its areas of professional engineering competence.[7]

5.10 Any code specific issues not addressed in this section are outside the scope of this report.

6 Installation

6.1 Installation shall comply with the approved construction documents, the manufacturer installation instructions, this report, and the applicable building code.

6.2 In the event of a conflict between the manufacturer installation instructions and this report, contact the manufacturer for counsel on the proper installation method.

6.3 WALLTITE v.5 SPF must be installed in accordance with standard CAN/ULC-S705.2, ULC Evaluation Report ER41037, and BASF Canada's Quality Assurance and Training Program (QATP) manual by installers licensed through the QATP and certified by Caliber Quality Solutions.

6.4 A copy of the manufacturer installation instructions shall be available at all times on the jobsite during installation.

6.5 BASF HP+ Wall XR Series Z-bar girts or hat-channel furring (Omega bars) must be installed over studs, with framing that has a width of not less than 38 mm and is spaced at a maximum of 600 mm o.c.

6.6 Where gypsum wallboard is required, it shall have a minimum thickness of 12.7 mm.

6.7 *Orientation*

6.7.1 BASF HP+ Wall XR Series sheathing panels must be installed vertically with the long dimension of the panels parallel to the framing behind and perpendicular to the Z-bar girts or hat-channel furring (Omega bars).

6.8 *Fasteners*

6.8.1 *Neopor:*

6.8.1.1 No. 7 (0.151" dia.) screws with plastic cap. Screw must be long enough to penetrate Neopor sheathing and Z-bar girt or hat-channel furring, plus three threads.

6.8.1.2 Top / Bottom (at the 2 x 6 plates): 3.3 mm x 89 mm nail with a minimum penetration of 38 mm into framing.

6.8.2 *Z-Bar Girt or Hat-Channel Furring:*

6.8.2.1 Minimum 3.3 mm x 63 mm ring-shank nail

6.8.2.2 Minimum No. 8 (0.164") x 51 mm wood screw

6.8.2.3 Two (2) fasteners into each framing member

6.8.3 *Rough-Cut Timber:*

6.8.3.1 As an alternative to **Section 6.5**, 44 x 95 mm rough-cut timber girts at 600 mm o.c., fastened to framing as indicated in **Section 2.2.2.2**.

6.8.4 *Full-Size Rough-Cut Timber:*

6.8.4.1 As an alternative to **Section 6.5**, 51 x 102 mm rough-cut timber girts at 600 mm o.c., fastened to framing as indicated in **Section 2.2.2.3**.

6.8.5 *Finished Timber:*

6.8.5.1 As an alternative to **Section 6.5**, 38 x 89 mm timber girts installed horizontally at 600 mm o.c. with 12.7 mm plywood strips (minimum 89 mm wide), fastened to framing as indicated in **Section 2.2.2.4**.

6.8.6 *Gypsum Wallboard:*

6.8.6.1 Where gypsum wallboard is required, it shall be installed in accordance with NBC Division B Subsection 9.29.5.

6.9 *Fastener Spacing*

6.9.1 *BASF HP+ Wall XR Series (Neopor Sheathing):*

6.9.1.1 Maximum of 150 mm o.c. along edges and 300 mm o.c. in the field.

6.9.2 *Z-Bar Girts or Hat-Channel Furring (Omega Bars):*

6.9.2.1 Two fasteners into each framing member.

6.9.3 *Gypsum Wallboard:*

6.9.3.1 For NBC Division B Part 9 applications, gypsum nail fasteners shall be spaced a minimum of 200 mm o.c. on all vertical wall supports and top and bottom plates.

6.9.3.2 For NBC Division B Part 9 applications, gypsum screw fasteners shall be spaced a maximum of 300 mm o.c. on all vertical wall supports and top and bottom plates.

6.9.3.3 For engineered design, see **Table 1**.

6.10 *Fastener Edge Distance*

6.10.1 For NBC Division B Part 9 applications, fastener edge distance is a minimum of 10 mm for both BASF HP+ Wall XR Series and gypsum board in accordance with Division B, Article 9.29.5.8. and Article 9.29.5.9.

6.11 *Neopor Attachment with Furring Installed on the Exterior Side*

6.11.1 Install the plastic cap screws at the corners of each Neopor panel only, then install minimum 19 mm x 63 mm (nominal 1" x 3") wood furring using a screw going through the furring strip, through the Neopor and finally into the hat furring or Z-bar. The wood furring and its connection shall be designed to support the cladding weight and transfer any required loads to the framing members.

7 Substantiating Data

7.1 Testing has been performed under the supervision of a professional engineer and/or under the requirements of ISO/IEC 17025 as follows:

7.1.1 Lateral-load testing in accordance with ASTM E2126

7.1.2 Transverse wind-load testing in accordance with ASTM E330

7.1.3 Uplift load testing in accordance with ASTM E72

7.1.4 Gravity load testing for single-top-plate applications in accordance with ASTM E72

7.1.5 Material property testing in accordance with ASTM C578

7.1.6 Neopor FPIS surface burning characteristics testing in accordance with CAN/ULC-S102.2

7.1.7 WALLTITE SPF surface burning characteristics testing in accordance with CAN/ULC-S102 and CAN/ULC S127

7.1.8 Neopor FPIS material property testing in accordance with CAN/ULC-S701

7.1.9 WALLTITE SPF material property testing in accordance with CAN/ULC-S705.1

7.1.10 WALLTITE v.5 product listing per ULC ER41037

7.2 Information contained herein is the result of testing and/or data analysis by sources that conform to the evaluation requirements of NBC Volume 1 Relationship of the NBC to Standards Development and Conformity Assessment and/or professional engineering regulations. DrJ relies upon accurate data to perform its ISO/IEC 17065 evaluations.

7.3 Where appropriate, DrJ's analysis is based on provisions that have been codified into law through provincial, territorial, or local adoption of codes and standards. The developers of these codes and standards are responsible for the reliability of published content. DrJ analysis may use code-adopted provisions as a control sample. A control sample versus a test sample establishes a product as being equivalent to that prescribed in this code in quality, strength, effectiveness, fire resistance, durability and safety.

7.4 The accuracy of the provisions provided herein may be reliant upon the published properties of raw materials, which are defined by the grade mark, grade stamp, mill certificate, listings, certified reports, duly authenticated reports from approved agencies, and research reports prepared by approved agencies and/or approved sources provided by the suppliers of products, materials, designs, assemblies and/or methods of construction. These are presumed to be minimum properties and relied upon to be accurate. The reliability of DrJ's engineering practice, as contained in this report, may be dependent upon published design properties by others.

7.5 *Testing and Engineering Analysis*

7.5.1 The strength, rigidity and/or general performance of component parts and/or the integrated structure are determined by suitable tests that simulate the actual conditions of application that occur and/or by accepted engineering practice and experience.

7.6 Where additional condition of use and/or code compliance information is required, please search for BASF HP+ Wall XR Series on the DrJ Certification website.

8 Findings

8.1 As outlined in **Section 4**, BASF HP+ Wall XR Series has performance characteristics that were tested and/or meet applicable regulations. In addition, they are suitable for use pursuant to its specified purpose.

8.2 When used and installed in accordance with this duly authenticated report and the manufacturer installation instructions, BASF HP+ Wall XR Series shall be approved for the following applications:

8.2.1 Lateral-load resistance due to wind and seismic loads carried by shear walls in accordance with **Table 1**.

8.2.2 Specified wind-load resistance in accordance with **Table 2**.

8.2.3 Thermal resistance properties in accordance with **Table 3**.

8.2.4 Air-permeance performance in accordance with **Table 4**.

8.2.5 Material fire properties in accordance with **Table 5**.

8.3 Any application specific issues not addressed herein can be engineered by an RDP. Assistance with engineering is available from BASF Corporation.

8.4 This innovative product has been evaluated in the context of the codes listed in **Section 3** and is compliant with all known provincial, territorial, and local building codes. Where there are known variations in provincial, territorial, or local codes applicable to this report, they are listed here:

8.4.1 No known variations

8.5 NBC Volume 1 Relationship of the NBC to Standards Development and Conformity Assessment:

> **Certification**
>
> Certification is the confirmation by an independent organization that a product, service, or system meets a requirement…Certification bodies publish lists of certified products and companies…Several organizations, including the Canadian Construction Materials Centre (CCMC), offer such evaluation services.
>
> **Evaluation**
>
> An evaluation is a written opinion by an independent professional organization that a product will perform its intended function. An evaluation is very often done to determine the ability of an innovative product, for which no standards exist, to satisfy the intent of the Code requirement...

8.6 ISO/IEC 17065 accredited third-party certification bodies,[8] including but not limited to, Standards Council of Canada (SCC)[9] and ANSI National Accreditation Board (ANAB),[10] confirm that product certification bodies have the expertise to provide technical evaluation services within their scope of accreditation. All SCC and ANAB product certification bodies meet NBC requirements to offer evaluation services for alternative solutions.[11]

8.6.1 DrJ is an ISO/IEC 17065 ANAB-Accredited Product Certification Body – Accreditation #1131[12] and employs professional engineers.[13]

8.7 Through ANAB accreditation and the IAF Multilateral Agreements, this report can be used to obtain product approval in any jurisdiction or country that has IAF MLA Members & Signatories to meet the Purpose of the MLA – "*certified once, accepted everywhere*." IAF specifically says, "*Once an accreditation body is a signatory of the IAF MLA, it is required to recognise certificates and validation and verification statements issued by conformity assessment bodies accredited by all other signatories of the IAF MLA, with the appropriate scope*."[14]

8.8 Product certification organizations, accredited by the SCC and ANAB, are defined as equivalent evaluation services:

8.8.1 Canada-United States-Mexico Agreement (CUSMA), Article 11.6 Conformity Assessment confirms mutual recognition by stating, "*...each Party shall accord to conformity assessment bodies located in the territory of another Party treatment no less favorable than that it accords to conformity assessment bodies located in its own territory or in the territory of the other Party*."

8.8.2 The SCC National Conformity Assessment Principles states, "*SCC is a member of a number of international organizations developing voluntary conformity assessment agreements that help ensure the international acceptance of Canadian conformity assessment results. Signatories to these agreements (like SCC) recognize each other's accreditations as being equivalent to their own*."[15]

8.9 Building official approval of a licensed professional engineer is performed by verifying the professional engineer and/or their business entity are listed by the engineering regulators of the relevant jurisdiction.

9 Conditions of Use

9.1 Material properties shall not fall outside the boundaries defined in **Section 4**.

9.2 As defined in **Section 4**, where material and/or engineering mechanics properties are created for load resisting design purposes, the resistance to the applied load shall not exceed the ability of the defined properties to resist those loads using the principles of accepted engineering practice.

9.3 Loads applied shall not exceed those recommended by the manufacturer as follows:

9.3.1 Shear loads shall not exceed values in **Table 1**, as applicable.

9.3.2 Axial loads shall not exceed values in **Section 4.7**.

9.3.3 Specified wind loads shall not exceed values in **Table 2**.

9.4 When required by regulation and enforced by the building official, also known as the Authority Having Jurisdiction (AHJ) in which the project is to be constructed:

9.4.1 Any calculations incorporated into the construction documents shall conform to accepted engineering practice and, when prepared by an approved source, shall be approved when signed and sealed.

9.4.2 This report and the installation instructions shall be submitted at the time of permit application.

9.4.3 This innovative product has an internal quality control program and a third-party quality assurance program.

9.4.4 At a minimum, this innovative product shall be installed per **Section 6** of this report.

9.4.5 This report shall be reviewed for code compliance by the AHJ in concert with the duties and powers granted to the building official by the provincial regulations governing such duties and powers.

9.4.6 The application of this innovative product in the context of this report is dependent upon the accuracy of the construction documents, implementation of installation instructions, inspections, and any other regulatory requirements that may apply.

9.5 Design loads shall be determined in accordance with the building code adopted by the jurisdiction in which the project is to be constructed and/or by the building designer (i.e., owner).

9.6 The actual design, suitability, and use of this report for any particular building, is the responsibility of the owner or the authorized agent of the owner.

10 Identification

10.1 BASF HP+ Wall XR Series, as listed in **Section 1.1**, is identified by a label on the board or packaging material bearing the manufacturer name, product name, this report number, and other information to confirm code compliance.

10.2 Additional technical information can be found at walltite.basf.ca/home/hp-xr.

11 Review Schedule

11.1 This report is subject to periodic review and revision. For the latest version, visit www.drjcertification.org.

11.2 For information on the status of this report, please contact DrJ Certification.

Notes

1 For more information, visit drjcertification.org or call us at 608-310-6748.

2 Unless otherwise noted, all references in this report are from the 2020 version of the NBC. This alternative solution is also approved for use with the 2010 and 2015 NBC and the standards referenced therein.

3 References in this report to the National Building Code of Canada (NBC) apply to the Ontario Building Code (OBC), unless noted otherwise.

4 Qualification is performed by a legislatively defined Accreditation Body. ANSI National Accreditation Board (ANAB) is the largest independent accreditation body in North America and provides services in more than 75 countries. DrJ is an ANAB accredited product certification body.

5 https://anabpd.ansi.org/Accreditation/product-certification/AllDirectoryDetails?prgID=1&orgID=2125&statusID=4#:~:text=Bill%20Payment%20Date-,Accredited%20Scopes,-13%20ENVIRONMENT.%20HEALTH

6 18 U.S. Code § 1831 - Economic espionage - Whoever, intending or knowing that the offense will benefit any foreign government, foreign instrumentality, or foreign agent, knowingly steals, or without authorization appropriates, takes, carries away, or conceals, or by fraud, artifice, or deception obtains a trade secret shall be fined not more than $5,000,000 or imprisoned not more than 15 years, or both. Any organization that commits any offense described shall be fined not more than the greater of $10,000,000 or 3 times the value of the stolen trade secret to the organization, including expenses for research and design and other costs of reproducing the trade secret that the organization has thereby avoided. https://www.law.cornell.edu/uscode/text/18/part-I/chapter-90.

7 ANAB is part of the USMCA and IAF MLA, where the purpose of these agreements are to ensure mutual recognition of accredited certification and validation/verification statements between agreement signatories, and subsequent acceptance of ANAB accredited certification and validation/verification statements by professional engineers based upon having one universal approval process for the timely approval of innovative materials, products, designs, services, assemblies and/or methods of construction.

8 https://anabpd.ansi.org/Accreditation/product-certification/DirectoryListingAccredited?menuID=1&prgID=1

9 https://iaf.nu/en/member-details/?member_id=91

10 https://iaf.nu/en/member-details/?member_id=14

11 NBC Division A Clause A-1.2.1.1.(1)(b) provides information on code compliance via alternative solutions and defines alternative solutions as *"...achiev[ing] at least the minimum level of performance required by Division B."* NBC Division C Section 2.3 includes additional guidance for documentation of alternative solutions.

12 https://anabpd.ansi.org/Accreditation/product-certification/AllDirectoryDetails?&prgID=1&OrgId=2125&statusID=4

13 Through ANAB accreditation and the IAF MLA, DrJ certification can be used to obtain material, product, design, or method of construction approval in any jurisdiction or country that has IAF MLA Members & Signatories to meet the Purpose of the MLA – "*certified once, accepted everywhere*".

14 https://iaf.nu/en/about-iaf-mla/#:~:text=required%20to%20recognise

15 The National Conformity Assessment Principles states, "*Product regulations and standards may vary from country to country. If these are set arbitrarily, they could be deemed as protectionist. The World Trade Organization (WTO) Agreement on Technical Barriers to Trade (TBT Agreement) is intended to ensure that technical regulations, standards and conformity assessment procedures of member countries do not create unnecessary obstacles to trade. Under the TBT Agreement, members of the WTO agree to use international standards, including conformity assessment standards and guides, as a basis for their technical requirements.*"