1. **Products Evaluated:**

1.1. BASF HP+ Wall XR Series utilizing WALLTITE® v.3 medium density Spray Polyurethane Foam (SPF) in combination with NEOPOR® Expanded Polystyrene (EPS) Foam Plastic Insulating Sheathing (FPIS) with 50 mm x 50 mm (2" x 2") horizontal Z-bar girts, Hat Channels or timber girts.

1.2. For the most recent version of this Technical Evaluation Report (TER), visit drjengineering.org. For more detailed provincial professional engineering and code compliance legal requirements and references, visit drjengineering.org/statelaw. DrJ is fully compliant with all provincial professional engineering and code compliance laws.

1.3. Requiring an evaluation report from a specific organization (ICC-ES, IAPAMO, CCMC, DrJ, etc.) is a violation of international, federal, state, provincial and local anti-trust and free trade regulations and constitutes restraint of trade. Building code regulations require that evaluation reports are provided by an approved agency meeting specific requirements. Any agency accredited in accordance with ANSI ISO/IEC 17065 meets this requirement within ANSI’s scope of accreditation. For a list of accredited agencies, visit ANSI’s website. For more information, see drjcertification.org
1.4. This TER can be used to obtain product approval in any country that is an IAF MLA Signatory (all countries found [here](#)) and covered by an IAF MLA Evaluation per the Purpose of the MLA (as an example, see letter to ANSI from the Standards Council of Canada). Manufacturers can go to jurisdictions in the U.S., Canada and other IAF MLA Signatory Countries and have their products readily approved by authorities having jurisdiction using DrJ's ANSI accreditation.

2. **Applicable Codes and Standards:**

   2.1. 2015 National Building Code of Canada (NBC)
   
   2.2. CAN/CSA O86-09 Engineering design in wood
   
   2.3. Engineering Guide for Wood Frame Construction, Canadian Wood Council (CWC), 2009
   
   2.4. CAN/ULC-S102 – Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies
   
   2.5. CAN/ULC-S102.2 – Standard Method of Test for Surface Burning Characteristics of Flooring, Floor Coverings, and Miscellaneous Materials and Assemblies
   
   
   2.7. CAN/ULC-S701 – Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering
   
   
   2.9. CAN/ULC-S705.2 – Standard for Thermal Insulation - Spray Applied Rigid Polyurethane Foam, Medium Density - Application
   
   
   2.11. ASTM D1622 – Standard Test Method for Apparent Density of Rigid Cellular Plastics
   
   
   
   
   2.15. ASTM D6226 – Standard Test Method for Open Cell Content of Rigid Cellular Plastics
   
   2.16. ASTM E72 – Standard Test Methods of Conducting Strength Tests of Panels for Building Construction
   
   
   2.18. 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
   
   
   2.20. ASTM E564 – Standard Practice for Static Load Test for Shear Resistance of Framed Walls for Buildings
   
   

3. **Performance Evaluation:**

   3.1. BASF HP+ Wall XR Series was evaluated to determine:

   1 Unless otherwise noted, code references are to the 2010 version of the NBC. This product is also approved for use with the 2005 NBC and the standards referenced therein.
3.1. Structural performance under lateral load conditions in accordance with:

3.1.1. NBC Division B, Subsection 9.23.13 Bracing to Resist Lateral Loads Due to Wind and Earthquake.


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

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

3.1.5. Performance for use as a component of the air barrier in accordance with NBC Division B Section 5.4 and Subsection 9.25.3.

3.1.6. Flame-spread rating and smoke developed classification complying with the provisions of NBC Division B Subsection 3.1.12 and Article 9.10.3.2.

3.2. 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 TER.

3.3. 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 TER.

3.3.1. The term normal construction process 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.

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

3.5. All other code compliance assessments or evaluations are outside the scope of this TER. Consult the manufacturer for other code compliance issues.

4. Product Description and Materials:

4.1. BASF HP+ Wall XR Series is a proprietary wall system consisting of WALLTITE® v.3 SPF combined with NEOPOR® FPIS, and horizontal Z-bar girts (or hat channel furring also called Omega bar) installed on wood studs.

4.1.1. The BASF HP+ Wall XR Series described in this TER contains a combination of the following materials:

4.1.1.1. WALLTITE® v.3 SPF - 64 mm (2.5") or 76 mm (3").

4.1.1.2. NEOPOR® FPIS – minimum thickness: 25 mm (1") to 50 mm (2").

4.1.1.2.1. Field: fastened with minimum #7 screw with plastic cap 300 mm (12") on center (o.c.) into horizontal Z-bar girts.

4.1.1.2.2. Top/Bottom: fastened with minimum 3.3 mm (0.131") x 89 mm (3.5") nail with plastic cap 150 mm (6") o.c.

4.1.1.3. 50 mm x 50 mm (2"x2") horizontal Z-bar girts, galvanized 60, 20 gauge, at 600 mm (24") o.c.

4.1.1.3.1. Fastened to framing with one of the following:

4.1.1.3.1.1. Minimum 3.3 mm (0.131") x 63 mm (2.5") ring shank nail.

4.1.1.3.1.2. Minimum No.8- 4.2 mm dia. (0.164") x 50 mm (2") wood screw.

4.1.1.3.2. Two fasteners per stud.

4.1.1.4. As an alternate to Section 4.1.1.3, hat channel furring (also called Omega bar) up to 50 mm (2") in depth, galvanized 60, 20 gauge, at 600 mm (24") o.c.

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

4.1.1.4.1.1. Minimum 3.3 mm (0.131") x 63 mm (2.5") ring shank nail.
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4.1.1.4.1.2. Minimum No.8- 4.2 mm dia. (0.164") x 50 mm (2") wood screw.

4.1.1.4.2. Two fasteners per stud.

4.1.1.5. As an alternate to **Section 4.1.1.3**, rough wood or sawn wood studs measuring 1.75" x 3.75", rough cut or sawn wood timber girts measuring 1.75" x 3.75" at (24") o.c. may be fastened horizontally to studs with two 0.131" x 3.25" nails at each stud intersection. Total thickness of the stud plus girt is 5.5".

4.1.1.6. As an alternate to **Section 4.1.1.3**, nominal 2x4 studs (1.5" x 3.5"), rough cut or sawn wood timber girts measuring a full 2"x4" (at 24") o.c. may be fastened horizontally to studs with two 0.131" x 3.25" nails at each stud intersection. Total thickness of the stud plus girt is 5.5".

4.1.1.7. As an alternate to **Section 4.1.1.3**, 2"x4" (1.5" x 3.5") finished timber girts may be installed horizontally at (24") o.c. with ½" plywood strips (minimum 3.5" wide).

4.1.1.7.1. Fastened to framing with two 0.131" x 3.25" nails at each stud intersection.

4.1.1.8. 2x Wood Framing

4.1.1.8.1. 2x4 Studs – minimum stud grade SPF or greater.

4.1.1.8.2. Each stud fastened to top and bottom plates with minimum three (3) 3.3 mm (0.131") x 83 mm (3.25") nails.

4.1.1.8.3. 2x6 Top (single or double) and Bottom Plates – minimum #2 SPF or greater.

5. **Applications:**

5.1. **General**

5.1.1. BASF HP+ Wall XR Series are 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:

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

5.1.1.2. Transverse load resistance (positive and negative wind pressure) for braced BASF HP+ Wall XR Series panels used in wood frame construction.

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

5.1.2. BASF HP+ Wall XR Series is used to provide thermal resistance in the exterior wall component of the building thermal envelope in accordance with NBC Division B Part 5 and Subsection 9.25.2.

5.1.3. BASF HP+ Wall XR Series is used to provide resistance to air leakage in the exterior wall component of the building envelope in accordance with NBC Division B Part 5 and Subsection 9.25.3.

5.1.4. BASF HP+ Wall XR Series may be used in buildings designed in accordance with NBC Division B Part 4 Structural Loads and Procedures or the CWC Engineering Guide for Wood Frame Construction.

5.2. **Structural Applications**

5.2.1. **General Structural Provisions**

5.2.1.1. Except as otherwise described in this TER, BASF HP+ Wall XR Series shall be installed in accordance with the applicable building codes listed in **Section 2** using the provisions set forth therein for the design and installation of wood structural panels (WSP) and this TER.

5.2.1.2. BASF HP+ Wall XR Series are permitted to be designed in accordance with NBC Division B Part 9 Articles 9.23.13.1, 9.23.13.2 and 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 9.23.17.2.A and 9.23.13.6 as follows:

5.2.1.2.1. Equivalent to 12.5 mm (0.5") sheathing fastened at a maximum of 150 mm (6") o.c. at edges and 300 mm (12") o.c. along intermediate supports using a minimum 3.3 mm (0.131") diameter fastener having a penetration of at least 38 mm (1.5"), on framing spaced a maximum of 600 mm (24") o.c.
5.2.1.3. BASF HP+ Wall XR Series are permitted to be designed in accordance with Engineering Guide for Wood Frame Construction, Section 10 for the design of lateral-load-resisting systems using the methods and conditions set forth therein for equivalence to Table 10.2.10A or CAN/CSA O86 Table 9.5.1A as follows:

5.2.1.3.1. Equivalent to 12.5 mm (0.5") sheathing fastened at a maximum of 150 mm (6") o.c. at edges and 300 mm (12") o.c. along intermediate supports using a minimum 3.3 mm (0.131") diameter fastener having a penetration of at least 38 mm (1.5"), on framing spaced a maximum of 600 mm (24") o.c.

5.2.1.4. 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.

5.2.1.4.1. For buildings with two or more floors supported by frame walls that are in areas where the seismic spectral response acceleration, \( S_d(0.2) \), is not greater than 0.70 or where the 1-in-50 hourly wind pressure is equal to or greater than 0.80 kPa (16.7 psf) but not greater than 1.20 kPa (25 psf), two anchor bolts per braced wall panel are required.

5.2.1.4.1.1. Anchor bolt diameter shall not be less than 15.9 mm (0.625"), located within 0.5 m (19.75") of the end of the foundation and spaced not more than 2.4 m (7'-10") o.c. or

5.2.1.4.1.2. Anchor bolt diameter shall not be less than 12.7 mm (0.5"), located within 0.5 m (19.75") of the end of the foundation and spaced not more than 1.7 m (5'-7") o.c.

5.2.1.4.2. For buildings supported by frame walls that are in areas where the seismic spectral response acceleration, \( S_d(0.2) \), 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 (25 psf), two anchor bolts per braced wall panel are required and spaced in accordance with Table 9.23.6.1.

5.2.1.4.3. Where the seismic spectral response acceleration, \( S_d(0.2) \), is greater than 1.2 or the 1-in-50 hourly wind pressure is equal to or greater than 1.2 kPa (25 psf), anchorage shall be designed according to Part 4.

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

5.2.1.6. The minimum full height panel width shall be 600 mm (24"). Panels may be installed vertically or horizontally.

5.2.1.7. NEOPOR® panel top and bottom edges shall be supported with a minimum 38 mm (1.5") framing member.

5.2.1.8. 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 (2") to one side of the studs.

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

5.2.2. Acceptable Solutions in accordance with NBC Division B Part 9 Bracing Applications

5.2.2.1. 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 9.23.17.2.A Wall Sheathing Thickness and Specifications as follows:

5.2.2.1.1. Supports 400 mm (16") o.c. – 6.0 mm (0.24") minimum sheathing thickness

5.2.2.1.2. Supports 600 mm (24") o.c. – 7.5 mm (0.3") minimum sheathing thickness

5.2.2.2. 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 Design or the CWC Engineering Guide for Wood Frame Construction in accordance with NBC Division B Sentence 9.23.13.1(2)(b) (ii & iii) as follows:

5.2.2.2.1. Equivalent to OSB, O-1 or O-2 Grades in NBC Division B Table 9.23.13.6: supports 600 mm (24") o.c. – 12.5 mm (0.5") minimum sheathing thickness with fasteners spaced 150 mm (6") o. c. at edges and 300 mm (12") o.c. in field using a 3.3 mm (0.131") diameter fastener having a penetration of at least 38 mm (1.5").
5.2.2.2. Or using the design values given in Table 1.

<table>
<thead>
<tr>
<th>BASF HP+ Wall XR System Design Values</th>
<th>Type of Girt</th>
<th>Maximum Stud Spacing o.c., mm (in)</th>
<th>Interior Gypsum Board Minimum Thickness mm (in)</th>
<th>Gypsum Board Fastener Spacing Maximum edge/field, mm (in)</th>
<th>Specified Shear Strength kN/m (plf)</th>
<th>Ductility Factor $R_d$</th>
<th>Overstrength Factor, $R_o$</th>
</tr>
</thead>
<tbody>
<tr>
<td>BASF 50 mm (2&quot;) NEOPOR® + 75 mm (3&quot;) SPF</td>
<td>Z-Bar or Hat Channel</td>
<td>400 (16)</td>
<td>None</td>
<td>n/a</td>
<td>6.67 (460)</td>
<td>2.0</td>
<td>1.7</td>
</tr>
<tr>
<td>BASF 50 mm (2&quot;) NEOPOR® + 63.5 mm (2.5&quot;) SPF</td>
<td>Z-Bar or Hat Channel</td>
<td>400 (16)</td>
<td>12.7 (0.5)</td>
<td>300/300 (12/12)</td>
<td>6.88 (470)</td>
<td>3.0</td>
<td>1.7</td>
</tr>
<tr>
<td>BASF 50 mm (2&quot;) NEOPOR® + 75 mm (3&quot;) SPF</td>
<td>Z-Bar or Hat Channel</td>
<td>400 (16)</td>
<td>12.7 (0.5)</td>
<td>300/300 (12/12)</td>
<td>6.95 (480)</td>
<td>3.0</td>
<td>1.7</td>
</tr>
<tr>
<td>BASF 29 mm (1.125&quot;) NEOPOR® + 63.5 mm (2.5&quot;) SPF</td>
<td>Z-Bar or Hat Channel</td>
<td>400 (16)</td>
<td>12.7 (0.5)</td>
<td>300/300 (12/12)</td>
<td>6.26 (430)</td>
<td>3.0</td>
<td>1.7</td>
</tr>
<tr>
<td>BASF 25.4 mm (1&quot;) NEOPOR® + 63.5 mm (2.5&quot;) SPF</td>
<td>Z-Bar or Hat Channel</td>
<td>400 (16)</td>
<td>12.7 (0.5)</td>
<td>300/300 (12/12)</td>
<td>6.16 (425)</td>
<td>3.0</td>
<td>1.7</td>
</tr>
<tr>
<td>BASF 50 mm (2&quot;) NEOPOR® + 63.5 mm (2.5&quot;) SPF</td>
<td>Z-Bar or Hat Channel</td>
<td>600 (24)</td>
<td>None</td>
<td>n/a</td>
<td>5.71 (390)</td>
<td>2.0</td>
<td>1.7</td>
</tr>
<tr>
<td>BASF 50 mm (2&quot;) NEOPOR® + 63.5 mm (2.5&quot;) SPF</td>
<td>Z-Bar or Hat Channel</td>
<td>600 (24)</td>
<td>12.7 (0.5)</td>
<td>300/300 (12/12)</td>
<td>6.61 (450)</td>
<td>2.5</td>
<td>1.7</td>
</tr>
<tr>
<td>BASF 50 mm (2&quot;) NEOPOR® + 50 mm (2&quot;) SPF</td>
<td>Z-Bar or Hat Channel</td>
<td>400 (16)</td>
<td>12.7 (0.5)</td>
<td>300/300 (12/12)</td>
<td>6.67 (410)</td>
<td>2.5</td>
<td>1.7</td>
</tr>
<tr>
<td>BASF 50 mm (2&quot;) NEOPOR® + 50 mm (2&quot;) SPF</td>
<td>Timber-See Sections 4.1.1.5 through 4.1.1.7</td>
<td>400 (16)</td>
<td>12.7 (0.5)</td>
<td>300/300 (12/12)</td>
<td>6.88 (420)</td>
<td>1.5</td>
<td>1.7</td>
</tr>
</tbody>
</table>

For SI: 1" = 25.4 mm 1 lb/ft = 0.0146 kN/m
1. BASF HP+ Wall XR Series fastening per Section 4.1.1
2. Interior Gypsum wall board attached to framing with minimum 2.14 mm (0.086") nail or #6 Type W screw fasteners. Minimum penetration of nails or screws into framing is 19 mm (3/4"). Fastener spacing shall be as required above. Note: NBC Table 9.23.13.6 requires 15.9 mm thick gypsum with framing 600 mm o.c.

Table 1: Specified Shear Design Values for BASF HP+ Wall XR Series – Wind or Seismic

5.3. Axial loading

5.3.1. BASF HP+ Wall XR Series will perform the same as prescriptive wall assemblies.

5.3.2. 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).

5.4. Transverse Wind Loading

5.4.1. BASF HP+ Wall XR Series installed over exterior framing spaced a maximum of 600 mm (24") o.c. without an interior covering can resist allowable 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.
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Summary of Transverse Load Capacity of BASF HP+ Wall XR Series

<table>
<thead>
<tr>
<th>SPF &amp; Sheathing Material (Minimum)</th>
<th>Transverse Wind Load Resistance</th>
<th>Hourly Wind Pressure (1-in-50) kPa(psf)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Transverse Load Resistance</td>
<td>Hourly Wind Pressure (1-in-50) kPa(psf)</td>
</tr>
<tr>
<td></td>
<td>Specified Average Pressure kPa (psf)</td>
<td>Specified Average Pressure kPa (psf)</td>
</tr>
<tr>
<td>SPF + NEOPOR® 25.4 (1&quot;)</td>
<td>3.2 (67)</td>
<td>3.1 (65)</td>
</tr>
</tbody>
</table>

For SI: 1 psf = 0.04788 kPa
1. NEOPOR® attached to 2-bar girt 300 mm (12") o.c. and to top and bottom plates with 3.3 mm (0.131") x 89 mm (3.5") nails at 150 mm (6") o.c.
2. Hourly Wind Pressure (1-in-50) for selected locations can be located in NBC Division B, Appendix C, Table C-2.

NOTE: The attachment of the sheathing to the framing is primarily through the adhesion of the SPF to the framing and NEOPOR® sheathing.

<table>
<thead>
<tr>
<th>Component</th>
<th>Thickness, mm (in)</th>
<th>RSI/R-Value (m²K/W) / (ft²·hr·°F/Btu)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NEOPOR®</td>
<td>25.4 (1)</td>
<td>0.81 (4.6)</td>
</tr>
<tr>
<td>NEOPOR®</td>
<td>50.8 (2)</td>
<td>1.62 (9.2)</td>
</tr>
<tr>
<td>WALLTITE® v.3</td>
<td>63.5 (2.5)</td>
<td>2.78 (15.8)</td>
</tr>
<tr>
<td>WALLTITE® v.3</td>
<td>76.2 (3)</td>
<td>3.38 (19.2)</td>
</tr>
</tbody>
</table>

For SI: 1 m²K/W = 5.678 hr·ft²·°F/Btu

<table>
<thead>
<tr>
<th>Component</th>
<th>Air Permeance</th>
</tr>
</thead>
<tbody>
<tr>
<td>WALLTITE® v.3</td>
<td>≤ 0.02 l/s/m² @ 75 Pa</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Component</th>
<th>Air Permeance</th>
</tr>
</thead>
<tbody>
<tr>
<td>WALLTITE® v.3</td>
<td>≤ 0.02 l/s/m² @ 75 Pa</td>
</tr>
</tbody>
</table>

5.5. **Thermal Resistance**

5.5.1. BASF HP+ Wall XR Series complies with the continuity of insulation requirements of NBC Division B Article 9.36.2.5.

5.5.2. BASF HP+ Wall XR Series components have the thermal resistance as shown on Table 3.

5.6. **Air Barrier Compliance**

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

5.7. **Thermal Barrier Requirements**

5.7.1. 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, crawl spaces, and wall and ceiling assemblies by an approved thermal barrier as required by NBC Division B Article 3.1.4.2 and 9.10.17.10.
5.8. Fire Resistance Properties

5.8.1. Surface Burning Characteristics

5.8.1.1. BASF HP+ Wall XR Series panels have the flame spread characteristics shown in Table 5.

<table>
<thead>
<tr>
<th>Flame Spread Rating of WALLTITE® v.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>WALLTITE® v.3</td>
</tr>
<tr>
<td>1. Tested in accordance with CAN/ULC-S102 including CAN/ULC-S127.</td>
</tr>
</tbody>
</table>

Table 5: Flame Spread Rating of WALLTITE® v.3

6. Installation

6.1. General

6.1.1. BASF HP+ Wall XR Series shall be installed in accordance with the manufacturer’s published installation instructions and this TER. In the event of conflict between the manufacturer’s installation instructions and this TER, the more restrictive shall govern.

6.1.2. WALLTITE® Eco v.3 must be installed in accordance with standard CAN/ULC-S705.2, Canadian Construction Materials Centre (CCMC) listing 13588-L and BASF Canada’s Quality Assurance and Training Program (QATP) manual by installers licensed through the QATP and certified by Morrison Hershfield (MH).

6.1.3. A copy of the manufacturer’s published installation instructions shall be available at all times on the jobsite during installation.

6.1.4. Where required, gypsum wallboard shall be a minimum 12.7 mm (0.5”) thickness.

6.2. Orientation

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

6.2.2. BASF HP+ Wall XR Series Z-bar girts or hat channel furring must be installed over studs, with framing that has a thickness of not less than 38 mm (1.5”) and spaced a maximum of 600 mm (24”) o.c.

6.3. Fasteners

6.3.1. NEOPOR®

6.3.1.1. #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 3 threads.

6.3.1.2. Top/Bottom (at the 2x6 plates): 3.3 mm (0.131”) x 89 mm (3.5”) nail with plastic cap and a minimum of 38 mm (1.5”) penetration into framing.

6.3.2. Z-bar Girt or Hat Channel Furring

6.3.2.1. Minimum 3.3 mm (0.131”) x 63 mm (2.5”) ring shank nail.

6.3.2.2. Minimum No.8 (0.164” dia. x 2”) wood screw.

6.3.2.3. Two (2) fasteners into each framing member

6.3.3. Rough Cut Timber

6.3.3.1. As an alternate to Section 6.3.2, full 2” x 4” (1.75” x 3.75”) rough cut timber girts at 24” o.c., fastened to framing with two 0.131” x 3.25” nails at each stud intersection.

6.3.4. Finished Timber

6.3.4.1. As an alternate to Section 6.3.2, 2” x 4” (1.5” x 3.5”) timber girts installed horizontally at 24” o.c. with ½” plywood strips (minimum 3.5” wide), fastened to framing with two 0.131” x 3.25” nails at each stud intersection.

6.3.5. Gypsum Wallboard
6.3.5.1. Where required, interior gypsum wallboard shall be installed in accordance with NBC Division B Subsection 9.29.5 except No. 6 x 32 mm (1 1/4") Type W or S wood screw, or equivalent is permitted where a fire-resistance rating is not required.

6.4. Fastener Spacing

6.4.1. BASF HP+ Wall XR Series (NEOPOR® sheathing)

6.4.1.1. Maximum of 150 mm (6") o.c. along the edges and 300 mm (12") o.c. in the field.

6.4.2. Gypsum Wallboard

6.4.2.1. For NBC Division B Part 9 applications, gypsum nail fasteners shall be spaced a maximum of 150 mm (6") o.c. along edges and 300 mm (12") o.c. along intermediate supports.

6.4.2.2. For NBC Division B Part 9 applications, gypsum screw fasteners shall be spaced a maximum of 150 mm (6") o.c. along edges and 300 mm (12") o.c. along intermediate supports.

6.4.2.3. For engineered design, see Table 1.

6.5. Fastener Edge Distance

6.5.1. For NBC Division B Part 9 applications, fastener edge distance is a minimum of 10 mm (3/8") for both BASF HP+ Wall XR Series and gypsum.

6.6. NEOPOR® Attachment where Furring is installed on the exterior side

6.6.1. Install nails or screws with plastic caps 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® FPIS 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. Test and Engineering Substantiating Data:

7.1. Lateral load testing conducted by Structural Building Components Research Institute (SBCRI), based on ASTM E2126.

7.2. Transverse wind load testing conducted by SBCRI, based on ASTM E330.

7.3. Uplift load testing conducted by SBCRI, based on ASTM E72.

7.4. Gravity load testing for single top plate applications conducted by SBCRI, based on ASTM E72.

7.5. Surface burning characteristics testing conducted by:

7.5.1. Underwriters’ Laboratories of Canada, based on CAN/ULC-S102.2 for NEOPOR® FPIS, and

7.5.2. Exova Canada, based on CAN/ULC-S102 for WALLTITE SPF.

7.6. Material property testing conducted by

7.6.1. QAI Laboratories, based on CAN/ULC-S701 for NEOPOR® FPIS, and

7.6.2. Exova Canada, based on CAN/ULC-S705.1 for WALLTITE SPF.

7.7. WALLTITE® v.3 product listing per CCMC 13588-L.

7.8. The product(s) evaluated by this TER falls within the scope of one or more of the model, provincial, or local building codes for building construction. The testing and/or substantiating data used in this TER is limited to buildings, structures, building elements, construction materials and civil engineering related specifically to buildings.

7.9. The provisions of model, provincial, or local building codes for building construction do not intend to prevent the installation of any material or to prohibit any design or method of construction. Alternatives shall use consensus standards, performance-based design methods or other engineered alternative means of compliance. This TER assesses compliance with defined standards, generally accepted engineering analysis, performance-based design methods, etc. in the context of the pertinent building code requirements.

7.10. Some information contained herein is the result of testing and/or data analysis by other sources, which DrJ relies on to be accurate as it undertakes its engineering analysis.
7.11. DrJ has reviewed and found the data provided by other professional sources are credible. This information has been approved in accordance with DrJ’s procedure for acceptance of data from approved sources.

7.12. DrJ’s responsibility for data provided by approved sources is in accordance with professional engineering law.

7.13. Where appropriate, DrJ relies on the derivation of design values, which have been codified into law through the codes and standards (e.g., NBC, CAN/CSA O86, etc.). This includes review of code provisions and any related test data that helps with comparative analysis or provides support for equivalency to an intended end-use application.

8. Findings:

8.1. When installed in accordance with the manufacturer’s installation instructions and this TER, BASF HP+ Wall XR Series complies with, or is a suitable alternative to, the applicable sections of the codes listed in Section 2 for the following applications.

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

8.1.2. Transverse wind load resistance in accordance with Table 2.

8.1.3. Thermal resistance properties in accordance with Table 3.

8.1.4. Air permeance performance in accordance with Table 4.

8.1.5. Fire resistance properties in accordance with Table 5.

8.2. NBC Division A, Subsection1.2.1 states:

1.2.1.1 Compliance with this Code

1) Compliance with this Code shall be achieved by
   a) complying with the applicable acceptable solutions in Division B (see Note A-1.2.1.1.(1)(a)), or
   b) using alternative solutions that will achieve at least the minimum level of performance required by Division B in the areas defined by the objectives and functional statements attributed to the applicable acceptable solutions (see Note A-1.2.1.1.(1)(b)).

2) For the purposes of compliance with this Code as required in Clause 1.2.1.1.(1)(b), the objectives and functional statements attributed to the acceptable solutions in Division B shall be the objectives and functional statements referred to in Subsection 1.1.2. of Division B.

8.3. NBC Division C, Section 2.3 includes additional guidance for Alternative Solutions.

8.4. This product has been evaluated with the codes listed in Section 2, and is compliant with all known state, provincial, and local building codes. Where there are known variations in provincial, or local codes that are applicable to this evaluation, they are listed here:

8.4.1. No known variations

8.5. This TER uses professional engineering law, the building code, ANSI/ASTM consensus standards and generally accepted engineering practice as its criteria for all testing and engineering analysis. DrJ’s professional engineering work falls under the jurisdiction of each state Board of Professional Engineers, when signed and sealed.

9. Conditions of Use:

9.1. Where required by the Authority Having Jurisdiction (AHJ) in which the project is to be constructed, this report and the installation instructions shall be submitted at the time of permit application.

9.2. Any generally accepted engineering calculations needed to show compliance with this TER shall be submitted to the code official for review and approval.

9.3. Design loads shall be determined in accordance with the building code adopted by the jurisdiction in which the project is to be constructed.

9.4. When BASF HP+ Wall XR Series are not installed for use as wall bracing, as described in this TER, the walls shall be braced by other materials, in accordance with the applicable code.

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

9.5.1. Allowable shear loads do not exceed values in Table 1, as applicable.
Technical Evaluation Report (TER)

9.5.2. Allowable axial loads do not exceed values in Section 5.3.

9.5.3. Allowable transverse loads do not exceed values in Table 2.

9.6. The manufacturer’s installation instructions shall be available on the jobsite for inspection.

9.7. All panel edges shall be supported by wall framing or solid blocking a minimum of 1.5" (38 mm) thickness.

9.8. NEOPOR® beads used to produce the FPIS are manufactured in Ludwigshafen, Germany, under a quality assurance program with inspections by QAI Laboratories.

9.9. The BASF SPF insulation components are manufactured in Toronto, Ontario and Blackie, Alberta, Canada under a quality control program. The Toronto plant is ISO 9001:2008 certified.

9.10. Design

9.10.1. Building Designer Responsibility

9.10.1.1. Unless the AHJ allows otherwise, the Construction Documents shall be prepared by a Building Designer (e.g., Owner, Registered Design Professional, etc.) for the Building and shall be in accordance with NBC Division C Sentence 2.2.4.3(1).

9.10.1.2. The Construction Documents shall be accurate and reliable and shall provide the location, direction and magnitude of all applied loads and shall be in accordance with NBC Division C Sentence 2.2.4.3(1) and Appendix Note A-2.2.6.2.(1).

9.10.2. Construction Documents

9.10.2.1. Construction Documents shall be submitted to the AHJ for approval and shall contain the plans, specifications and details needed for the AHJ to approve such documents.

9.11. Responsibilities

9.11.1. The information contained herein is a product, engineering or building code compliance research report performed in accordance with the referenced building codes, testing and/or analysis through the use of accepted engineering procedures, experience and technical judgment.

9.11.2. DrJ research reports provide an assessment of only those attributes specifically addressed in the Products Evaluated or Code Compliance Process Evaluated section.

9.11.3. The engineering evaluation was performed on the dates provided in this TER, within DrJ’s professional scope of work.

9.11.4. The actual design, suitability and use of this research report for any particular building is the responsibility of the Owner or the Owner’s authorized agent, and the report shall be reviewed for code compliance by the AHJ.

9.11.5. The use of this TER is dependent on the manufacturer’s in-plant QC, the ISO/IEC 17020 third-party inspection process, proper installation per the manufacturer’s instructions, the AHJ’s inspection and any other code requirements that may apply to assure accurate compliance with the applicable building code.

10. Identification:

10.1. Each NEOPOR® sheathing panel or package described in this TER is identified with information to confirm compliance with the applicable material standard or product listing.

10.2. BASF spray foam components are identified by a label on the containers bearing the manufacturer’s name, product name, and other information to confirm compliance with standard CAN/ULC-S705.1.

10.3. Additional technical information can be found at walltite.com.
11. Review Schedule:

11.1. This TER is subject to periodic review and revision. For the most recent version of this TER, visit drjengineering.org.

11.2. For information on the current status of this TER, contact DrJ Engineering.

- Mission and Professional Responsibilities
- Product Evaluation Policies
- Product Approval – Building Code, Administrative Law and P.E. Law