Technical Evaluation Report

TER 1501-06

SMARTci™ Exterior Wall Continuous Insulation System Utilizing GreenGirt™

A2P LLC

Product:
SMARTci™ Exterior Wall Continuous Insulation System

Issue Date:
June 30, 2015

Revision Date:
November 12, 2019

Subject to Renewal:
July 1, 2020
1 PRODUCT EVALUATED

1.1 SMARTci™ Exterior Wall Continuous Insulation System

2 APPLICABLE CODES AND STANDARDS

2.1 Codes

2.1.1 IBC—12, 15, 18: International Building Code®

2.1.2 IRC—12, 15, 18: International Residential Code®

2.1.3 IECC—12, 15, 18: International Energy Conservation Code®

2.1.4 CBC—13, 16: California Building Code

2.1.5 FBC—10, 14: Florida Building Code

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1 Building codes require data from valid research reports be obtained from approved sources. Agencies who are accredited through ISO/IEC 17065 have met the code requirements for approval by the building official. DrJ is an ISO/IEC 17065 ANSI-Accredited Product Certification Body – Accreditation #1133.

Through ANSI accreditation and the IAF MLA, DrJ certification 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.”

Building official approval of a licensed registered design professional (RDP) is performed by verifying the RDP and/or their business entity complies with all professional engineering laws of the relevant jurisdiction. Therefore, the work of licensed RDPs is accepted by building officials, except when plan (i.e. peer) review finds an error with respect to a specific section of the code. Where this TER is not approved, the building official responds in writing stating the reasons for disapproval.

For more information on any of these topics or our mission, product evaluation policies, product approval process, and engineering law, visit drjcertification.org or call us at 608-310-6748.

2 Unless otherwise noted, all references in this code-compliant TER are from the 2018 version of the codes and the standards referenced therein (e.g., ASCE 7, NDS, ASTM). This alternative material, design, or method of construction also complies with the 2000-2015 versions of the referenced codes and the standards referenced therein.

3 All terms defined in the applicable building codes are italicized.
2.2 Standards andReferenced Documents

2.2.1 AAMA 501.1: Standard Test Method for Exterior Windows, Curtain Walls, and Doors for Water Penetration Using Dynamic Pressure

2.2.2 ANSI/ASHRAE/IES 90.1: Energy Standard for Buildings Except Low-Rise Residential Buildings

2.2.3 ASCE/SEI 7: Minimum Design Loads and Associated Criteria for Buildings and Other Structures

2.2.4 ASTM C1289: Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board

2.2.5 ASTM D1761: Standard Test Methods for Mechanical Fasteners in Wood

2.2.6 ASTM D1929: Standard Test Method for Determining Ignition Temperature of Plastics

2.2.7 ASTM D2990: Standard Test Methods for Tensile, Compressive, and Flexural Creep and Creep-Rupture of Plastics

2.2.8 ASTM D638: Standard Test Method for Tensile Properties of Plastics

2.2.9 ASTM D790: Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials

2.2.10 ASTM D792: Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement

2.2.11 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


2.2.13 ASTM E331: Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference

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

2.2.15 ASTM E84: Standard Test Method for Surface Burning Characteristics of Building Materials

2.2.16 ASTM G155: Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Non-Metallic Materials


3 PERFORMANCE EVALUATION

3.1 The SMARTci™ Exterior Wall Continuous Insulation System was evaluated to determine:

3.1.1 Structural performance under transverse load conditions for wind loading in accordance with IBC Section 1609, specifically Section 1609.4.3.

3.1.2 Performance for use in exterior walls of buildings of any height and of Type I-V construction in accordance with IBC Section 2603.5 and IRC Section R316.5.12.

3.1.3 Performance for use in exterior walls of buildings as an air barrier in accordance with IECC Section C402.5.1.

3.1.4 Performance for use in exterior walls of buildings as a water-resistive barrier (WRB) in accordance with IBC Section 1404.2 and IRC Section R703.2.

3.1.5 Performance in accordance with ASTM E84 for flame spread and smoke development ratings in accordance with IBC Section 2603.5.4 and IRC Section R316.3.

3.1.6 Thermal performance as a continuous insulation system in accordance with IECC Section C402 and ASHRAE 90.1.

3.1.7 Use as part of NFPA 285 wall assembly designs, in accordance with IBC Section 2603.5.5.
3.1.8 Fire resistance rated wall assemblies in accordance with IBC Section 2603.5.1 are outside the scope of this TER.

3.1.9 Use of SMARTci™ with other forms of insulation, including mineral wool, polystyrene, fiberglass, and spray foam, is outside the scope of this TER.

3.2 Any code compliance issues not specifically addressed in this section are outside the scope of this TER.

4 PRODUCT DESCRIPTION AND MATERIALS

4.1 SMARTci™ is a continuous insulation system (Figure 1) consisting of a Z girt (GreenGirt™) and Polyisocyanurate (Polyiso) insulation. GreenGirt™ (Figure 2) acts as a thermal spacer between exterior cladding and interior framing, which prevents thermal bridging.

4.2 Materials

4.2.1 GreenGirt™:

4.2.1.1 Fiber reinforced polymer optimized for structural, hygrothermal, and fire resistance formed into a structural "Z" shape as shown in Figure 2.

4.2.1.2 Two 16 ga. high-strength steel inserts are slid into the top and bottom flanges of the GreenGirt™ to provide added strength in resisting service loads and to act as retention cleats for fasteners while increasing the pull-out capacities of fasteners, as shown in Figure 1.
4.2.1.3 Material Availability
4.2.1.3.1 Depth: 1½", 2", 2½", 3", 3½", 4", 4½", 5", 5½", 6", and 8"
4.2.1.3.2 Standard Length: 8'

4.2.2 Insulation:
4.2.2.1 Polyisocyanurate
4.2.2.1.1 Rmax TSX 8500 and Hunter XCI Class A
4.2.2.1.2 Thickness: 2" (50.8 mm) through 4" (101.6 mm)

5 APPLICATIONS

5.1 General
5.1.1 SMARTci™ can be installed over substrates including cold-formed steel wall studs, masonry, concrete, or roof decks.
5.1.2 SMARTci™ is used in buildings constructed in accordance with IBC/IRC requirements for Type I-V construction.
5.1.3 SMARTci™ provides the following, when used to attach exterior cladding to the building envelope:
   5.1.3.1 Transverse load resistance (wind and seismic)
   5.1.3.2 Thermal resistance (provides a thermal break between the cladding and wall framing)
   5.1.3.3 Resistance to gravity loads induced by the weight of the cladding materials
5.1.4 Where the application exceeds the limitations set forth herein, design shall be permitted in accordance with accepted engineering procedures, experience, and technical judgment.

5.2 Cladding Allowable Loading
5.2.1 The SMARTci™ system GreenGirts™ can be installed horizontally or vertically on the exterior side of stud-framed walls at 16", 24", 36", and 48" o.c.
5.2.2 Brittle Finishes:
   5.2.2.1 For brittle finish exterior cladding, GreenGirts™ can support cladding out of plane lateral loading as shown in Table 1 for the 1.5" profile and Table 2 for the 2" profile. (Contact manufacturer for other profile sizes.)
### Table 1. SMARTci™ GreenGirt™ Design Values for Brittle Finish Cladding – 1.5” Profile

<table>
<thead>
<tr>
<th>GreenGirt™ Span (Stud Spacing) (in)</th>
<th>GreenGirt™ Spacing (in)</th>
<th>Design Values (psf)</th>
<th>Cladding Weight (psf)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>16</td>
<td>16</td>
<td>96</td>
<td>96</td>
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<td>16</td>
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<td>42</td>
<td>-</td>
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<tr>
<td>16</td>
<td>48</td>
<td>32</td>
<td>32</td>
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<td>16</td>
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<td>24</td>
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<td>36</td>
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<tr>
<td>36</td>
<td>36</td>
<td>16</td>
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<td>36</td>
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<tr>
<td>48</td>
<td>48</td>
<td>7</td>
<td>7</td>
</tr>
</tbody>
</table>

SI: 1” = 25.4 mm, 1 psf = 0.0479 kN/m²

1. Analysis is for GreenGirt™ only; it does not include insulation.
2. Design values are based on live load deflections of L/240 and total load deflection of L/120.
3. Deflection limits are based on ASCE 7-10 and ASCE 7-16 Components and Cladding loads multiplied by 0.42.
4. Allowable loading is based on allowable stress design with a material stress safety factor > 2.0.
5. Specific project application and details, and the connection design, may limit the allowable loads further.
## Table 2. SMARTci™ GreenGirt™ Design Values for Brittle Finish Cladding – 2” Profile

<table>
<thead>
<tr>
<th>GreenGirt™ Span (Stud Spacing) (in)</th>
<th>GreenGirt™ Spacing (in)</th>
<th>Design Values (psf)</th>
<th>Cladding Weight (psf)</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>16</td>
<td>175</td>
<td>175</td>
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<td>24</td>
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<td>116</td>
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<td>48</td>
<td>48</td>
<td>12</td>
<td>12</td>
</tr>
</tbody>
</table>

SI: 1” = 25.4 mm, 1 psf = 0.0479 kN/m²
1. Analysis is for GreenGirt™ only; it does not include insulation.
2. Design values are based on live load deflections of L/240 and total load deflection of L/120.
3. Deflection limits are based on ASCE 7-10 and ASCE 7-16 Components and Cladding loads multiplied by 0.42.
4. Allowable loading is based on allowable stress design with a material stress safety factor > 2.0.
5. Specific project application and details, and the connection design, may limit the allowable loads further.
5.2.3 Flexible Finishes:

5.2.3.1 For flexible finish exterior cladding, SMARTci™ can resist cladding out of plane lateral loading as shown in Table 3 for the 1.5” profile and Table 4 for the 2” profile. (Contact manufacturer for other profile sizes.)

**TABLE 3. SMARTci™ GREENGIRT™ DESIGN VALUES FOR FLEXIBLE FINISH CLADDING – 1.5” PROFILE**

<table>
<thead>
<tr>
<th>GreenGirt™ Span (Stud Spacing) (in)</th>
<th>GreenGirt™ Spacing (in)</th>
<th>Cladding Weight (psf)</th>
<th>Design Values (psf)</th>
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<tbody>
<tr>
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<td></td>
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<td>48</td>
<td>11</td>
<td>9</td>
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</table>

SI: 1” = 25.4 mm, 1 psf = 0.0479 kN/m²

1. Analysis is for GreenGirt™ only; it does not include insulation.
2. Design values are based on live load deflections of L/120 and total load deflection of L/90.
3. Deflection limits are based on ASCE 7-10 and ASCE 7-16 Components and Cladding loads multiplied by 0.42.
4. Allowable loading is based on allowable stress design with a material stress safety factor > 2.0.
5. Specific project application and details, and the connection design, may limit the allowable loads further.
TABLE 4. SMARTci™ GREENGIRT™ DESIGN VALUES FOR FLEXIBLE FINISH CLADDING – 2” PROFILE

<table>
<thead>
<tr>
<th>GreenGirt™ Span (Stud Spacing) (in)</th>
<th>Design Values (psf)</th>
<th>Cladding Weight (psf)</th>
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<tbody>
<tr>
<td></td>
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<td>48</td>
<td>14</td>
</tr>
</tbody>
</table>

SI: 1" = 25.4 mm, 1 psf = 0.0479 kN/m²

1. Analysis is for GreenGirt™ only; it does not include insulation.
2. Design values are based on live load deflections of L/120 and total load deflection of L/90.
3. Deflection limits are based on ASCE 7-10 and ASCE 7-16 Components and Cladding loads multiplied by 0.42.
4. Allowable loading is based on allowable stress design with a material stress safety factor > 2.0.
5. Specific project application and details, and the connection design, may limit the allowable loads further.

5.3 Transverse Loads

5.3.1 SMARTci™ is permitted to resist transverse wind load forces using the allowable transverse loads (in pounds per square foot) set forth in Table 5.

TABLE 5. SMARTci™ TRANSVERSE LOADS & WIND SPEEDS

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Minimum Insulation Thickness (in)</th>
<th>Maximum Stud Spacing (in)</th>
<th>Maximum GreenGirt™ Spacing (in)</th>
<th>Allowable Pressure (psf)</th>
<th>Allowable Wind Speed per ASCE 7-05 (Vass) (mph)</th>
<th>Allowable Wind Speed per ASCE 7-10 and 7-16 (Vult) (mph)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMARTci™</td>
<td>2</td>
<td>24</td>
<td>24</td>
<td>33.3</td>
<td>120</td>
<td>150</td>
<td>SMARTci™ on open studs. Panel joints allowed between studs.</td>
</tr>
</tbody>
</table>

SI: 1" = 25.4 mm, 1 psf = 0.0479 kN/m², 1 mph = 1.61 km/h
1. Tested in accordance with ASTM E330.
2. Allowable wind speed based on Components and Cladding loads for a building with a mean roof height of 30' located in Exposure B. Adjustments for height and exposure shall be in accordance with IRC Table R301.2(3).
5.4 Air Barrier

5.4.1 SMARTci™ meets the requirements of **IECC Section C402** for use as an air barrier assembly when used with Hunter Xci Class A or Rmax TSX 8500 foam plastic insulating sheathing (FPIS).

5.4.1.1 FPIS shall be installed in accordance with Advanced Architectural Products’ installation instructions and this TER (Table 6).

### TABLE 6. SMARTci™ AIR BARRIER PROPERTIES

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Minimum Insulation Thickness² (in)</th>
<th>Maximum Stud Spacing (in)</th>
<th>Maximum GreenGirt™ Spacing (in)</th>
<th>Pressure (psf)</th>
<th>Result (cfm/ft²)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMARTci™</td>
<td>2</td>
<td>24</td>
<td>24</td>
<td>20</td>
<td>&lt; 0.04</td>
<td>SMARTci™ on open studs. Panel joint between studs. Includes perforations and taped seams.</td>
</tr>
</tbody>
</table>

SI: 1” = 25.4 mm, 1 psf = 0.0479 kN/m²
1. Tested in accordance with ASTM E283.
2. Products less than 2” thick are not certified for use as air barriers.

5.5 Water-Resistive Barrier

5.5.1 SMARTci™ is approved for use as a WRB when installed with Hunter Xci Class A or Rmax TSX 8500 FPIS as prescribed in **IBC Section 1404.2** and **IRC Section R703.2** when installed on exterior walls as described in this section and shown in Table 7.

5.5.2 Maximum 24”-wide insulation boards shall be installed horizontally over exterior framing spaced a maximum of 24” (610 mm) o.c.

5.5.3 Seams are not required to be taped.

5.5.4 Flashing of all sheathing penetrations is required and shall comply with the applicable code.

### TABLE 7. SMARTci™ WATER-RESISTANCE BARRIER (WRB) PROPERTIES

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Minimum Insulation Thickness³ (in)</th>
<th>Maximum Stud Spacing (in)</th>
<th>Maximum GreenGirt™ Spacing (in)</th>
<th>Pressure (psf)</th>
<th>Duration of Test (min)</th>
<th>Result</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMARTci™</td>
<td>2</td>
<td>24</td>
<td>24</td>
<td>10</td>
<td>15</td>
<td>No Leakage</td>
<td>SMARTci™ on open studs. Panel joint between studs. 3&quot; 16 ga. strapping at 24&quot; o.c. No tape on joints.¹</td>
</tr>
<tr>
<td>SMARTci™</td>
<td>2</td>
<td>16</td>
<td>24</td>
<td>20</td>
<td>15</td>
<td>No Leakage</td>
<td>SMARTci™ on open studs. Panel joint between studs. No tape at joints.¹</td>
</tr>
<tr>
<td>SMARTci™</td>
<td>2</td>
<td>24</td>
<td>24</td>
<td>20</td>
<td>15</td>
<td>No Leakage</td>
<td>SMARTci™ on open studs. Panel joint between studs. Includes perforations and taped seams.¹</td>
</tr>
<tr>
<td>SMARTci™</td>
<td>2</td>
<td>24</td>
<td>24</td>
<td>15</td>
<td>15</td>
<td>No Leakage</td>
<td>SMARTci™ on open studs. Panel joint between studs.²</td>
</tr>
</tbody>
</table>

SI: 1” = 25.4 mm, 1 psf = 0.0479 kN/m²
1. Tested in accordance with ASTM E331.
2. Tested in accordance with AAMA 501.1.
3. Products less than 2” thick are not certified for use as WRBs.
5.6 Fire Safety Performance

5.6.1 Surface Burn Characteristics:

5.6.1.1 GreenGirt™, TSX-8500, and Xci Class A were evaluated to assess performance with regard to flame spread and smoke developed indexes in accordance with ASTM E84 (Table 8).

<table>
<thead>
<tr>
<th>Table 8. Fire Performance of SMARTci™</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Product Name</strong></td>
</tr>
<tr>
<td>GreenGirt™</td>
</tr>
<tr>
<td>TSX-8500</td>
</tr>
<tr>
<td>Xci Class A</td>
</tr>
</tbody>
</table>

1. GreenGirt™ tested in accordance with ASTM E84.
2. Foam core tested in accordance with ASTM E84.
3. Flame spread and smoke developed numbers are shown for comparison purposes only and are not intended to represent the performance under actual fire conditions.

5.7 Thermal Performance

5.7.1 SMARTci™ was evaluated for its thermal properties, as shown in Table 9.

5.7.1.1 Values were derived from 3D modeling using Solidworks Simulation software with a steady state conduction model.

<p>| Table 9. SMARTci™ Thermal Performance with &amp; without Exterior Sheathing |
|-------------------------------|-------------------|-------------------|-------------------|-------------------|
| <strong>Steel Stud Spacing (in)</strong> | <strong>FRP Girt Spacing (in)</strong> | <strong>FRP Girt Size/Exterior Insulation Thickness (in)</strong> | <strong>Fastener Spacing (in)</strong> | <strong>Nominal Assembly R Value (hr*ft²-°F/BTU)</strong> | <strong>Nominal Assembly U Factor (BTU/hr*ft²-°F)</strong> | <strong>Nominal Assembly R Value (hr*ft²-°F/BTU)</strong> | <strong>% Efficiency</strong> |
| 16 | 16 | 2.0 | 16 | N | 15.8 | 0.069 | 14.6 | 92.62 |
| 16 | 16 | 2.5 | 16 | N | 19.1 | 0.057 | 17.7 | 92.76 |
| 16 | 16 | 3.0 | 16 | N | 22.1 | 0.248 | 21.2 | 92.75 |
| 16 | 16 | 3.5 | 16 | N | 25.5 | 0.042 | 23.6 | 92.34 |
| 16 | 16 | 4.0 | 16 | N | 29.8 | 0.037 | 27.1 | 92.51 |
| 24 | 24 | 2.0 | 24 | N | 15.8 | 0.066 | 15.1 | 95.37 |
| 24 | 24 | 2.5 | 24 | N | 19.1 | 0.055 | 18.1 | 95.69 |
| 24 | 24 | 3.0 | 24 | N | 22.3 | 0.047 | 21.2 | 95.15 |
| 24 | 24 | 3.5 | 24 | N | 27.8 | 0.037 | 26.7 | 95.38 |</p>
<table>
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<tr>
<th>Steel Stud Spacing (in)</th>
<th>FRP Girt Spacing (in)</th>
<th>FRP Girt Size/Exterior Insulation Thickness (in)</th>
<th>Fastener Spacing (in)</th>
<th>Sheathing on Exterior Wall (5/8″ DensGlass)</th>
<th>Nominal Assembly R Value (hr<em>ft²</em>°F/BTU)</th>
<th>Effective Assembly U Factor (BTU/hr<em>ft²</em>°F)</th>
<th>Nominal Assembly R Value (hr<em>ft²</em>°F/BTU)</th>
<th>Effective Assembly U Factor (BTU/hr<em>ft²</em>°F)</th>
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</table>

SI: 1" = 25.4 mm, 1 psi = 0.00689 MPa
1. Nominal assembly R-values based on ASHRAE 90.1.
2. Computed by dividing the effective R-value of the wall assembly by the nominal R-value of the assembly.
3. Steel studs used in this model are more conductive than other options such as wood studs, concrete walls, masonry walls, and large member steel framing. Therefore, the results in this table may be conservatively extended to those other types of wall substrates.
5.8 **Vertical and Lateral Fire Propagation**

5.8.1 SMARTci™ was tested to assess its performance, with regard to vertical and lateral fire propagation in accordance with *NFPA 285* and *IBC Section 2603.5.5*, in a wall configuration consisting of polyisocyanurate insulation over a metal stud wall without exterior sheathing with ACM cladding (Figure 3). Testing with this configuration is considered worst case for two reasons:

5.8.1.1 Testing with ACM is considered by fire experts as a cladding that easily melts and can spread flames, allowing the underlying insulation to ignite and spread flames via the air gap between the insulation and cladding.

5.8.1.2 Testing with no exterior sheathing creates a large air gap that can spread flames worse than a system which uses exterior sheathing.

5.8.2 SMARTci™ was found to not contribute to overall flame spread of a wall assembly.

5.8.3 SMARTci™ was found to withstand fire propagation, allowing the cladding system to remain attached.

5.8.4 SMARTci™ can be used with *NFPA 285*-approved insulations that include the following manufacturers: Atlas, Rmax, Hunter Xci, Carlisle R2+, Dow Thermax, and Firestone Enverge Ci Panels.

5.8.5 SMARTci™ can be used with noncombustible mineral fiber insulation minimum 2" thick, 4 pcf, no facer, meeting *ASTM E136*.

5.8.5.1 Consult the *NFPA 285* approvals for these manufacturers to determine if the system is approved for use with no exterior sheathing or if exterior sheathing must be used, DRR No. 1404-03 or TER No. 1407-01.

5.8.6 SMARTci™ can be used in assemblies incorporating High Pressure Laminate (HPL) claddings only when the window header design is *NFPA 285*-approved for use with HPL claddings, and the SMARTci™ girt is installed in accordance with the following conditions:

5.8.6.1 Horizontal Applications: the SMARTci™ girt may be left exposed (not covered by mineral fiber insulation) as shown in Figure 4.

5.8.6.2 Vertical Applications: the SMARTci™ girt is covered by at least 1" of mineral fiber insulation as shown in Figure 5.
6 INSTALLATION

6.1 General

6.1.1 Installation shall comply with the manufacturer’s installation instructions and this TER. In the event of a conflict between the manufacturer’s installation instructions and this TER, the more restrictive shall govern.

6.1.2 SMARTci™ shall only be installed under the direct supervision of an experienced craftsperson, trained in the proper application of its diverse offering of products and services.

6.1.3 Installation shall comply with the manufacturer’s installation instructions and this TER. In the event of a conflict between the manufacturer’s installation instructions and this TER, the more restrictive shall govern.

6.1.4 Do not stack other objects on top of SMARTci™ insulation panels or GreenGirt™ packages.

6.1.5 GreenGirt™ may not be cut with plywood or toothed blades. Use only abrasive chop saw/hand saw blades. Do not use actuated fasteners, impact hammers, or impact drills.

6.2 Installation Procedure

6.2.1 Cut bottom, starting insulation panel to size and shim to level. Allow for ½” gap between the panel and the base (if applicable) for approved expandable sealant.

6.2.2 Ensure the first GreenGirt™ is level and plumb. The height above the top of foundation is determined by project specific factors. In most cases, the first GreenGirt™ will be installed above the first (bottom) row of insulation panels (Figure 6).
6.2.3 Starting at a transition or termination point, install first (bottom) GreenGirt™ by gently tamping it down in place along the (top) length of the panel. Ensure that the air seal rib of the GreenGirt™ aligns with the coordinating channel at the top of the insulation panel to prevent damage, before tamping.

6.2.4 Apply two continuous ¼” min. beads of approved sealant at all transitions and terminations, and onto GreenGirts™, behind insulation panels before installing them (Figure 7).

6.2.5 When fastening GreenGirt™ to substrate, the following steps must be taken:

6.2.5.1 The edge distance of any fastener hole (to the side of the GreenGirt™) shall be a minimum of ½” from the edge of the profile to the closest side of the fastener hole (Figure 8).

6.2.5.2 Minimum clear distance in between holes is 5x the diameter.

6.2.5.3 Minimum end (end of profile to edge of hole) distance in the longitudinal direction is 3x the diameter.

6.2.5.4 Minimum edge (edge of profile to edge of hole) distance in the transverse direction is 2x the diameter.

6.2.5.5 Slide galvanized metal inserts into backside of GreenGirt™, with ¼” min. continuous bead of approved sealant applied to the adjoining end, with a minimum 3” overlap, Figure 9.
6.2.5.6 Lap metal inserts at least 3', with a continuous bead of approved sealant in the $\frac{1}{16}$" gap between, and fasten to stabilize, Figure 10.

6.2.5.7 Fasten GreenGirt™ through the overlapped galvanized metal inserts into the substrate with approved Tek® fasteners, and remove any debris or moisture before installing panels.

6.2.5.8 Self-drilling fasteners of sufficient diameter and loading capacity for the application (dependent upon cladding) can be utilized to fasten girt to steel studs. Use pre-drilled holes in retention plates.

6.2.5.9 Threaded concrete fasteners can be used to fasten pre-drilled GreenGirt™ metal inserts to concrete substrate.

6.2.6 Continue by installing the second panel to the top track of the first (bottom) GreenGirt™. Apply a $\frac{1}{4}$" min. continuous bead of approved sealant, at least 2" long in each direction, at all four corners of the panel, inside the pre-formed center profile channel, Figure 11.
6.2.7 After cleaning debris and moisture from top channel of GreenGirt™, place insulation panel into channel, aligning the air seal rib into the groove properly. Insert the GreenGirt™ spline into the end vertical channel of the insulation panel with a rubber mallet, gently tamping to ensure a snug fit with the corner sealant beads, Figure 12.

6.2.8 Using a spare cutoff of GreenGirt™ as a buffer, gently tamp down on the insulation panel with a rubber mallet. Ensure a firm bond and no damage is done to the panel edge, Figure 13.

6.2.9 When installing the next adjacent panel, DO NOT SLIDE THE PANEL INTO PLACE. Use the spare cutoff of GreenGirt™ to gently tamp it into place along the length of the top. Use the provided notched tamping block to gently tamp the two panels together to create a firm bond with the spline between them. Continue installing panels in this way, bottom to top, ensuring vertical joints are staggered from row to row and adjacent panel joints are fitted tight, Figure 14.
6.2.10 Once one row has been completed, install the next GreenGirt™ by using the provided notched tamping block and rubber mallet, ensuring a firm bond between the bottom channel of the girt and top edge of the insulation panel, Figure 15.

7 TEST ENGINEERING SUBSTANTIATING DATA

7.1 Test reports and data supporting the following material and structural properties:
7.1.1 Transverse wind load testing witnessed by Chaves Associates, Inc., in accordance with ASTM E330.
7.1.2 Water penetration properties testing witnessed by Chaves Associates, Inc., in accordance with ASTM E331.
7.1.3 Air leakage properties testing witnessed by Chaves Associates, Inc., in accordance with ASTM E283.
7.1.4 Surface burning testing conducted by Commercial Testing Company, in accordance with ASTM E84.
7.1.5 Tensile strength Testing conducted by Ashland Inc., in accordance with ASTM D638.
7.1.6 Vertical and lateral fire propagation testing conducted by Intertek, in accordance with NFPA 285.
7.1.7 Engineering evaluation of NFPA 285 Approved HPL Assemblies, performed by Priest & Associates Consulting, LLC, Project No. 10316A, Revision 1c.
7.1.8 Engineering evaluation of five NFPA 285 tests using A2P SMARTci System in approved assemblies, performed by Priest & Associates Consulting, LLC, Project No. 10353, Revision 8.

7.2 Manufacturer technical data sheets and installation instructions.
7.3 Manufacturer quality control manual and evidence of approved agency inspections.
7.4 Some information contained herein is the result of testing and/or data analysis by other sources which conform to 
*IBC Section 1703* and relevant professional engineering law. DrJ relies on accurate data from these sources to 
perform engineering analysis. DrJ has reviewed and found the data provided by other professional sources to be 
credible.

7.5 Where appropriate, DrJ’s analysis is based on design values that have been codified into law through codes and 
standards (e.g., *IBC*, *IRC*, *NDS®*, and *SDPWS*). This includes review of code provisions and any related test data 
that aids in comparative analysis or provides support for equivalency to an intended end-use application. Where 
the accuracy of design values provided herein is reliant upon the published properties of commodity materials 
(e.g., lumber, steel, and concrete), DrJ relies upon the grade mark, stamp, and/or design values provided by raw 
material supplier to be accurate and conforming to the mechanical properties defined in the relevant material 
standard.

8 FINDINGS

8.1 When used and installed in accordance with this TER and the manufacturer’s installation instructions, the 
product(s) listed in Section 1.1 are approved for the following:

8.1.1 Structural performance under transverse load conditions in accordance with *IBC Section 1609*, specifically 
Section 1609.4.3\(^5\).

8.1.2 Performance for use in exterior walls of buildings of any height and of Type I-IV construction in accordance 
with *IBC Section 2603.5* and *IRC Section R316.5.12*, and Type V construction in accordance with *IBC Section 
2603.2, 2603.3* and 2603.4.

8.1.3 Performance for use in exterior walls of buildings as an air barrier in accordance with *IECC Section C402.5.1*.

8.1.4 Performance for use in exterior walls of buildings as a WRB in accordance with *IBC Section 1404.2* and *IRC 
Section R703.2*.

8.1.5 Performance in accordance with *ASTM E84* for flame spread and smoke development ratings in accordance 
with *IBC Section 2603.5.4* and *IRC Section R316.3*.

8.1.6 SMARTci™ is approved for use as the attachment method of the Exterior Insulation layer when used in the 
approved *NFPA 285* wall assemblies from the following polyisocyanurate manufacturers and their products:

8.1.6.1 Atlas Energy Shield® Pro, Energy Shield® Pro 2 and Rboard® Pro
8.1.6.2 Carlisle R2+ Panels
8.1.6.3 Dow Thermax panels
8.1.6.4 Hunter Xci panels
8.1.6.5 Rmax TSX-8500, TSX-8510 or TSX-8520
8.1.6.6 Firestone Enverge ci Panels
8.1.6.7 Mineral Wool meeting the following requirements:

8.1.6.7.1 Minimum 2” thick
8.1.6.7.2 Minimum 4 pcf density
8.1.6.7.3 No facer, noncombustible in accordance with *ASTM E136*

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\(^5\) *2015 IBC Section 1609.4.3* and *Section 1609.6.4.4.1*
8.2 **8.2.1 IBC Section 104.11 (IRC Section R104.11 and IFC Section 104.9 are similar) states:**

104.11 **Alternative materials, design and methods of construction and equipment.** The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been **approved**. An alternative material, design or method of construction shall be **approved** where the building official finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code. Where the alternative material, design or method of construction is not **approved**, the building official shall respond in writing, stating the reasons the alternative was not **approved**.

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

8.3.1 No known variations

9 **CONDITIONS OF USE**

9.1 Where required by the building official, also known as the authority having jurisdiction (AHJ) in which the project is to be constructed, this TER and the installation instructions shall be submitted at the time of permit application. Any generally accepted engineering calculations needed to show compliance with this TER shall be submitted to the AHJ 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 and/or by the Building Designer (e.g., owner or registered design professional).

9.4 At a minimum, this product shall be installed per Section 6 of this TER.

9.5 This product is manufactured under a third-party quality control program in accordance with **IBC Section 104.4 and 110.4** and **IRC Section R104.4 and R109.2**.

9.6 The actual design, suitability, and use of this TER, for any particular building, is the responsibility of the owner or the owner's authorized agent. Therefore, the TER shall be reviewed for code compliance by the building official for acceptance.

9.7 The use of this TER is dependent on the manufacturer's in-plant QC, the ISO/IEC 17020 third-party quality assurance program and procedures, proper installation per the manufacturer's instructions, the building official's inspection, and any other code requirements that may apply to demonstrate and verify compliance with the applicable building code.

10 **IDENTIFICATION**

10.1 The product(s) listed in Section 1.1 are identified by a label on the board or packaging material bearing the manufacturer's name, product name, TER number, and other information to confirm code compliance.

10.2 Additional technical information can be found at smartcisystems.com.

11 **REVIEW SCHEDULE**

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

11.2 For information on the current status of this TER, contact DrJ Certification.
CBC Supplement to TER No. 1501-06  
ISSUED: JUNE 30, 2015  
UPDATED: SEPTEMBER 28, 2016

DIVISION: 07 00 00 – THERMAL AND MOISTURE PROTECTION  
Section: 07 20 00 – Thermal Insulation  
Section: 07 21 00 – Thermal Insulation  
Section: 07 27 23 – Board Product Air Barriers  
Section: 07 48 00 – Exterior Wall Assemblies

REPORT HOLDER:  
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269-355-1818  
866-858-5568 (fax)  
zach.k@greengirt.com  
SMARTciSystems.com

EVALUATION SUBJECT:  
SMARTci™ EXTERIOR WALL CONTINUOUS INSULATION SYSTEM UTILIZING GREENGIRT™

1.0 Report Purpose and Scope  
The purpose of this technical evaluation report (TER) supplement is to indicate that SMARTci™ Exterior Wall Continuous Insulation System, recognized in TER No. 1501-06, has also been evaluated for compliance with the codes noted below.  
Applicable code editions:  
• 2013 and 2016 California Building Code

2.0 Conclusions  
SMARTci™ Exterior Wall Continuous Insulation System, described in Section 1 through 11 of TER No. 1501-06, comply with the California Building Code provided the design and installation are in accordance with the International Building Code® (IBC) provisions noted in the TER.  
This supplement is subject to renewal concurrently with TER No. 1501-06.