



# Listing and Technical Evaluation Report

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## SMARTci™ Exterior Wall Continuous Insulation System Utilizing GreenGirt™

Trade Secret Report Holder:

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### CSI Designations:

DIVISION: 07 00 00 - THERMAL AND MOISTURE PROTECTION

Section: 07 20 00 - Thermal Protection

Section: 07 27 23 - Board Product Air Barriers

Section: 07 21 00 - Thermal Insulation

Section: 07 48 00 - Exterior Wall Assemblies

### 1 Innovative Product Evaluated<sup>i</sup>

- 1.1 SMARTci™ Exterior Wall Continuous Insulation System

### 2 Product Description and Materials

- 2.1 SMARTci™ is a continuous insulation system consisting of a Z girt (GreenGirt™) and Polyisocyanurate (polyiso) insulation. GreenGirt™ acts as a thermal spacer between exterior cladding and interior framing, which prevents thermal bridging.
- 2.2 The innovative product evaluated in this report is shown in **Figure 1** and **Figure 2**.

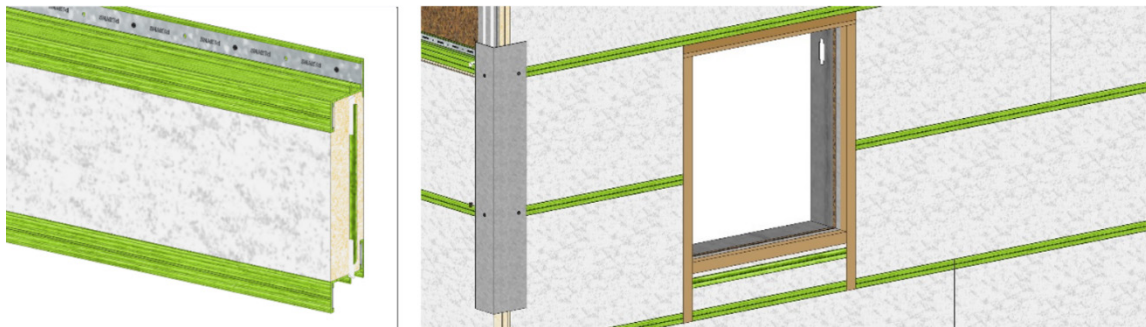
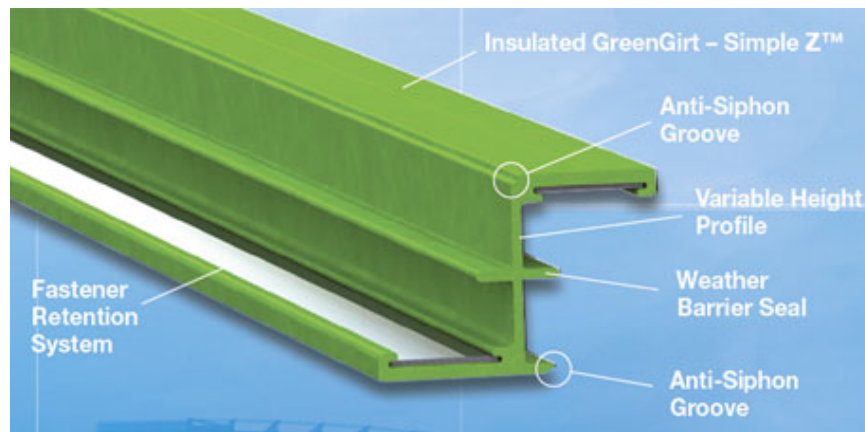


Figure 1. SMARTci™ System



**Figure 2.** GreenGirt™

2.3 GreenGirt™ Adjustable Wall System consists of the same FRP material as GreenGirt™, but allows in/out adjustment of the depth of the girt. GreenGirt™ Adjustable Wall System has a range of depths that girt can expand to meet.

2.4 *Materials*

2.4.1 *GreenGirt™:*

- 2.4.1.1 Fiber-reinforced polymer optimized for structural, hygrothermal, and fire resistance formed into a structural “Z” shape as shown in **Figure 2**.
- 2.4.1.2 Two 16-gauge 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 pullout capacities of fasteners, as shown in **Figure 1**.

2.4.1.3 *Material Availability:*

- 2.4.1.3.1 Depth:
  - 2.4.1.3.1.1 1½", 2", 2½", 3", 3½", 4", 4½", 5", 5½", 6" and 8"
- 2.4.1.3.2 Standard Length:
  - 2.4.1.3.2.1 8'

2.4.2 *Insulation:*

- 2.4.2.1 Any of the following insulation materials may be used in the SMARTci™ Exterior Wall Continuous Insulation System:
  - 2.4.2.1.1 Atlas EnergyShield® Pro, EnergyShield® Pro 2 and Rboard® Pro
  - 2.4.2.1.2 Carlisle R2+® Panels
  - 2.4.2.1.3 Dow Thermax™ Panels
  - 2.4.2.1.4 Hunter Xci Panels
  - 2.4.2.1.5 Rmax® TSX-8500, TSX-8510, or TSX-8520
  - 2.4.2.1.6 Firestone Enverge™ CI Panels
  - 2.4.2.1.7 Mineral wool meeting the following requirements:
    - 2.4.2.1.7.1 Minimum 1½" thick
    - 2.4.2.1.7.2 Minimum 4 pcf density
    - 2.4.2.1.7.3 No facer
    - 2.4.2.1.7.4 Noncombustible in accordance with ASTM E136

2.5 As needed, review material properties for design in Section 6 and to regulatory evaluation in Section 8.



### 3 Definitions

- 3.1 New Materials<sup>ii</sup> are defined as building materials, equipment, appliances, systems or methods of construction not provided for by prescriptive and/or legislatively adopted regulations, known as alternative materials.<sup>iii</sup> The design strengths and permissible stresses shall be established by tests<sup>iv</sup> and/or engineering analysis.<sup>v</sup>
- 3.2 Duly Authenticated Reports<sup>vi</sup> and Research Reports<sup>vii</sup> are test reports and related engineering evaluations, which are written by an approved agency<sup>viii</sup> and/or an approved source.<sup>ix</sup>
  - 3.2.1 These reports contain intellectual property and/or trade secrets, which are protected by the Defend Trade Secrets Act (DTSA).<sup>x</sup>
- 3.3 An approved agency is “approved” when it is ANAB ISO/IEC 17065 accredited. DrJ Engineering, LLC (DrJ) is listed in the ANAB directory.
- 3.4 An approved source is “approved” when a professional engineer (i.e., Registered Design Professional [RDP]) is properly licensed to transact engineering commerce. The regulatory authority governing approved sources is the state legislature via its professional engineering regulations.<sup>xi</sup>
- 3.5 Testing and/or inspections conducted for this Duly Authenticated Report were performed by an ISO/IEC 17025 accredited testing laboratory, an ISO/IEC 17020 accredited inspection body and/or a licensed RDP.
  - 3.5.1 The Center for Building Innovation (CBI) is ANAB<sup>xii</sup> ISO/IEC 17025 and ISO/IEC 17020 accredited.
- 3.6 The regulatory authority shall enforce<sup>xiii</sup> the specific provisions of each legislatively adopted regulation. If there is a non-conformance, the specific regulatory section and language of the non-conformance shall be provided in writing<sup>xiv</sup> stating the nonconformance and the path to its cure.
- 3.7 The regulatory authority shall accept Duly Authenticated Reports from an approved agency and/or an approved source with respect to the quality and manner of use of new materials or assemblies as provided for in regulations regarding the use of alternative materials, designs or methods of construction.<sup>xv</sup>
- 3.8 ANAB is an International Accreditation Forum (IAF) Multilateral Recognition Arrangement (MLA) signatory where recognition of certificates, validation and verification statements issued by conformity assessment bodies accredited by all other signatories of the IAF MLA with the appropriate scope, shall be approved.<sup>xvi</sup> Therefore, all ANAB ISO/IEC 17065 Duly Authenticated Reports are approval equivalent.<sup>xvii</sup>
- 3.9 Approval equity is a fundamental commercial and legal principle.<sup>xviii</sup>

### 4 Applicable Standards for the Listing; Regulations for the Regulatory Evaluation<sup>xix</sup>

- 4.1 *Standards*
  - 4.1.1 *AAMA 501.1: Standard Test Method for Exterior Windows, Curtain Walls, and Doors for Water Penetration Using Dynamic Pressure*
  - 4.1.2 *ANSI/ASHRAE/IES 90.1: Energy Standard for Buildings Except Low-Rise Residential Buildings*
  - 4.1.3 *ASCE/SEI 7: Minimum Design Loads and Associated Criteria for Buildings and Other Structures*
  - 4.1.4 *ASTM C1289: Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board*
  - 4.1.5 *ASTM D638: Standard Test Method for Tensile Properties of Plastics*
  - 4.1.6 *ASTM D790: Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials*
  - 4.1.7 *ASTM D792: Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement*
  - 4.1.8 *ASTM D1761: Standard Test Methods for Mechanical Fasteners in Wood*
  - 4.1.9 *ASTM D1929: Standard Test Method for Determining Ignition Temperature of Plastics*
  - 4.1.10 *ASTM D2990: Standard Test Methods for Tensile, Compressive, and Flexural Creep and Creep-Rupture of Plastics*
  - 4.1.11 *ASTM E72: Standard Test Methods for Conducting Strength Tests of Panels for Building Construction*



- 4.1.12 *ASTM E84: Standard Test Method for Surface Burning Characteristics of Building Materials*
- 4.1.13 *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*
- 4.1.14 *ASTM E330: Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference*
- 4.1.15 *ASTM E331: Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference*
- 4.1.16 *ASTM G155: Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Non-Metallic Materials*
- 4.1.17 *NFPA 285-12: Standard Fire Test Method for the Evaluation of Fire Propagation Characteristics of Exterior Nonload-bearing Wall Assemblies Containing Combustible Components<sup>xx</sup>*
- 4.2 **Regulations**
  - 4.2.1 *IBC – 15, 18, 21: International Building Code®*
  - 4.2.2 *IRC – 15, 18, 21: International Residential Code®*
  - 4.2.3 *IECC – 15, 18, 21: International Energy Conservation Code®*
  - 4.2.4 *CBC—16, 19: California Building Code<sup>xxi</sup>*
  - 4.2.5 *CRC—16, 19: California Residential Code<sup>xxi</sup>*
  - 4.2.6 *FBC-B—20, 23: Florida Building Code – Building<sup>xxii</sup>*
  - 4.2.7 *FBC-R—20, 23: Florida Building Code – Residential<sup>xxii</sup>*

## 5 Listed<sup>xxiii</sup>

- 5.1 A nationally recognized testing laboratory such as CBI, states that the materials, designs, methods of construction and/or equipment have met nationally recognized standards and/or have been tested and found suitable for use in a specified manner.

## 6 Tabulated Properties Generated from Nationally Recognized Standards

### 6.1 General

- 6.1.1 SMARTci™ can be installed over substrates including cold-formed steel wall studs, masonry, concrete or roof decks.
- 6.1.2 SMARTci™ is used in buildings constructed in accordance with IBC/IRC requirements for Type I-V construction.
- 6.1.3 SMARTci™ provides the following, when used to attach exterior cladding to the building envelope:
  - 6.1.3.1 Transverse load resistance (wind and seismic)
  - 6.1.3.2 Thermal resistance (provides a thermal break between the cladding and wall framing)
  - 6.1.3.3 Resistance to gravity loads induced by the weight of the cladding materials

### 6.2 Cladding Allowable Loading

- 6.2.1 The SMARTci™ system GreenGirt™ can be installed horizontally or vertically on the exterior side of stud-framed walls at 16", 24", 36", and 48" o.c.



6.2.2 *Brittle Finishes:*

6.2.2.1 For brittle finish exterior cladding, GreenGirt™ 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**

GreenGirt™ Span (Stud Spacing) (in)	GreenGirt™ Spacing (in)	Design Values <sup>1,2,3,4,5</sup> (psf)						
		Cladding Weight (psf)						
		0	3	5	7	9	10	15
16	16	96	96	96	96	96	96	92
	24	64	64	64	64	64	61	59
	36	42	-	-	-	-	-	-
	48	32	32	31	30	30	25	21
24	16	68	68	68	68	68	68	68
	24	45	45	45	45	45	45	43
	36	30	-	-	-	-	-	-
	48	23	23	23	21	19	17	9
36	16	36	36	36	36	36	36	36
	24	24	24	24	24	24	24	21
	36	16	-	-	-	-	-	-
	48	12	12	12	11	9	7	-
48	16	20	20	20	20	20	20	18
	24	13	13	13	13	12	12	10
	36	9	-	-	-	-	-	-
	48	7	7	6	5	3	-	-

SI: 1" = 25.4 mm, 1 psf = 0.0479 kN/m<sup>2</sup>

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 7-16 and ASCE 7-22 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**

GreenGirt™ Span (Stud Spacing) (in)	GreenGirt™ Spacing (in)	Design Values <sup>1,2,3,4,5</sup> (psf)						
		Cladding Weight (psf)						
		0	3	5	7	9	10	15
16	16	175	175	175	175	175	175	168
	24	116	116	116	116	116	112	108
	36	77	-	-	-	-	-	-
	48	58	58	56	54	54	45	39
24	16	124	124	124	124	124	124	124
	24	83	83	83	83	83	83	78
	36	55	-	-	-	-	-	-
	48	41	41	41	39	34	31	16
36	16	65	65	65	65	65	65	65
	24	43	43	43	43	43	43	39
	36	29	-	-	-	-	-	-
	48	22	22	22	20	16	13	-
48	16	36	36	36	36	36	36	33
	24	24	24	24	24	23	22	18
	36	16	-	-	-	-	-	-
	48	12	12	11	9	5	-	-

SI: 1" = 25.4 mm, 1 psf = 0.0479 kN/m<sup>2</sup>

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 7-16 and ASCE 7-22 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.



6.2.3 Flexible Finishes:

6.2.3.1 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

GreenGirt™ Span (Stud Spacing) (in)	GreenGirt™ Spacing (in)	Design Values <sup>1,2,3,4,5</sup> (psf)						
		Cladding Weight (psf)						
		0	3	5	7	9	10	15
16	16	185	179	174	170	166	163	152
	24	124	117	113	109	105	100	91
	36	82	-	-	-	-	-	-
	48	62	56	50	45	42	40	30
24	16	121	120	118	117	117	114	103
	24	81	79	78	76	71	68	57
	36	54	-	-	-	-	-	-
	48	40	39	34	29	25	23	11
36	16	57	54	53	52	51	50	48
	24	38	35	34	33	32	32	29
	36	25	-	-	-	-	-	-
	48	19	17	16	15	12	9	-
48	16	32	30	29	28	27	26	24
	24	21	19	19	18	17	16	13
	36	14	-	-	-	-	-	-
	48	11	9	8	7	4	3	-

SI: 1" = 25.4 mm, 1 psf = 0.0479 kN/m<sup>2</sup>

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 7-16 and ASCE 7-22 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**

GreenGirt™ Span (Stud Spacing) (in)	GreenGirt™ Spacing (in)	Design Values <sup>1,2,3,4,5</sup> (psf)						
		Cladding Weight (psf)						
		0	3	5	7	9	10	15
16	16	252	243	237	231	226	222	207
	24	168	159	154	148	142	136	123
	36	112	-	-	-	-	-	-
	48	84	76	68	62	57	54	40
24	16	164	163	161	160	158	155	140
	24	110	108	106	103	96	93	78
	36	73	-	-	-	-	-	-
	48	55	53	47	39	34	31	16
36	16	77	73	72	70	69	68	65
	24	52	48	47	45	44	43	40
	36	34	-	-	-	-	-	-
	48	26	23	22	20	16	13	-
48	16	43	41	40	38	37	36	33
	24	29	26	25	24	23	22	18
	36	19	-	-	-	-	-	-
	48	14	13	11	9	5	4	-

SI: 1" = 25.4 mm, 1 psf = 0.0479 kN/m<sup>2</sup>

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 7-16 and ASCE 7-22 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.





6.3 *Transverse Loads*

6.3.1 SMARTci™ is permitted to resist transverse wind load forces using the allowable transverse loads (in pounds per square foot) set forth in **Table 5** when installed with Hunter Xci Class A or Rmax® TSX 8500 Foam Plastic Insulating Sheathing (FPIS).

**Table 5.** SMARTci™ Transverse Loads and Wind Speeds<sup>1,2</sup>

Product Name	Minimum Insulation Thickness (in)	Maximum Stud Spacing (in)	Maximum GreenGirt™ Spacing (in)	Allowable Pressure (psf)	Allowable Wind Speed per ASCE 7-05 (V <sub>asd</sub> ) (mph)	Allowable Wind Speed per ASCE 7-16 and 7-22 (V <sub>ult</sub> ) (mph)	Comments
SMARTci™	2	24	24	33.3	120	150	SMARTci™ on open studs. Panel joints allowed between studs.

SI: 1" = 25.4 mm, 1 psf = 0.0479 kN/m<sup>2</sup>, 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' and located in Exposure B, Wall Zone 5 and 10-ft<sup>2</sup> area. Adjustments for height and exposure shall be in accordance with IRC Table R301.2(3).

6.4 *Air Barrier*

6.4.1 SMARTci™ meets the requirements of IECC Section C402.5.1 for use as an air barrier assembly when used with Hunter Xci Class A or Rmax® TSX 8500 FPIS.

6.4.1.1 FPIS shall be installed in accordance with Advanced Architectural Products' installation instructions and this report. See **Table 6** for SMARTci™ Air Barrier properties.

**Table 6.** SMARTci™ Air Barrier Properties

Product Name	Minimum Insulation Thickness <sup>2</sup> (in)	Maximum Stud Spacing (in)	Maximum GreenGirt™ Spacing (in)	Pressure <sup>1</sup> (psf)	Result (cfm/ft <sup>2</sup> )	Comments
SMARTci™	2	24	24	20	< 0.04	SMARTci™ on open studs. Panel joint between studs. Includes perforations and taped seams.

SI: 1" = 25.4 mm, 1 psf = 0.0479 kN/m<sup>2</sup>

1. Tested in accordance with ASTM E283.

2. Products less than 2" thick are not certified for use as air barriers.



6.5 Water-Resistive Barrier (WRB)

- 6.5.1 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 as shown in **Table 7**.
- 6.5.2 Maximum 24" wide insulation boards shall be installed horizontally over exterior framing spaced a maximum of 24" (610 mm) o.c.
- 6.5.3 Seams are not required to be taped.
- 6.5.4 Flashing of all sheathing penetrations is required and shall comply with the applicable code.

**Table 7.** SMARTci™ Water-Resistance Barrier (WRB) Properties

Product Name	Minimum Insulation Thickness <sup>3</sup> (in)	Maximum Stud Spacing (in)	Maximum GreenGirt™ Spacing (in)	Pressure (psf)	Duration of Test (min)	Result	Comments
SMARTci™	2	24	24	10	15	No Leakage	SMARTci™ on open studs. Panel joint between studs. 3" 16-gauge strapping at 24" o.c. No tape on joints. <sup>1</sup>
	2	16	24	20	15	No Leakage	SMARTci™ on open studs. Panel joint between studs. No tape at joints. <sup>1</sup>
	2	24	24	20	15	No Leakage	SMARTci™ on open studs. Panel joint between studs. Includes perforations and taped seams. <sup>1</sup>
	2	24	24	15	15	No Leakage	SMARTci™ on open studs. Panel joint between studs. <sup>2</sup>

SI: 1" = 25.4 mm, 1 psf = 0.0479 kN/m<sup>2</sup>

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.

6.6 Surface Burn Characteristics

- 6.6.1 GreenGirt™, Rmax® TSX-8500, and Hunter 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 8.** Fire Performance of SMARTci™

Product Name	Flame Spread <sup>3</sup>	Smoke Developed <sup>3</sup>
GreenGirt™ <sup>1</sup>	≤ 25	< 200
Rmax® TSX-8500 <sup>2</sup>	≤ 25	< 450
Hunter Xci Class A <sup>2</sup>	≤ 25	< 450

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.



6.7 Thermal Performance

6.7.1 SMARTci™ was evaluated for its thermal properties as shown in **Table 9**.

6.7.1.1 Values were derived from 3D modeling using SOLIDWORKS® Simulation software with a steady state conduction model when installed with polyisocyanurate insulation.

**Table 9.** SMARTci™ Thermal Performance with & without Exterior Sheathing<sup>1,3</sup>

Steel Stud Spacing (in)	FRP Girt Spacing (in)	FRP Girt Size/Exterior Insulation Thickness (in)	Fastener Spacing (in)	Sheathing on Exterior Wall (5/8" DensGlass)	Nominal	Effective		% Efficiency <sup>2</sup>
					Assembly R Value (hr-ft <sup>2</sup> ·°F/BTU)	Assembly U Factor (BTU/hr-ft <sup>2</sup> ·°F)	Assembly R Value (hr-ft <sup>2</sup> ·°F/BTU)	GreenGirt™
16	16	2.0	16	N	15.8	0.069	14.6	92.62
				Y	16.3	0.066	15.1	92.71
16	16	2.5	16	N	19.1	0.057	17.7	92.76
				Y	19.6	0.055	18.2	92.99
16	16	3.0	16	N	22.3	0.048	20.7	92.75
				Y	22.8	0.047	21.2	92.87
16	16	3.5	16	N	25.6	0.042	23.6	92.34
				Y	26.1	0.041	24.2	92.75
16	16	4.0	16	N	28.8	0.037	26.7	92.66
				Y	29.3	0.037	27.1	92.51
24	24	2.0	24	N	15.8	0.066	15.1	95.37
				Y	16.3	0.064	15.6	95.69
24	24	2.5	24	N	19.1	0.055	18.1	95.19
				Y	19.6	0.054	18.7	95.40
24	24	3.0	24	N	22.3	0.047	21.2	95.15
				Y	22.8	0.046	21.8	95.38
24	24	3.5	24	N	25.6	0.041	24.3	95.11
				Y	26.1	0.040	24.8	95.22
24	24	4.0	24	N	28.8	0.037	27.4	95.10
				Y	29.3	0.036	27.9	95.32
24	48	2.0	24	N	15.8	0.065	15.5	97.84
				Y	16.3	0.062	16.1	98.61
24	48	2.5	24	N	19.1	0.054	18.6	97.74
				Y	19.6	0.052	19.2	98.05
24	48	3.0	24	N	22.3	0.046	21.8	97.69
				Y	22.8	0.045	22.3	97.94
24	48	3.5	24	N	25.6	0.040	25.0	97.64
				Y	26.1	0.039	25.5	97.80

**Table 9. SMARTci™ Thermal Performance with & without Exterior Sheathing<sup>1,3</sup>**

Steel Stud Spacing (in)	FRP Girt Spacing (in)	FRP Girt Size/Exterior Insulation Thickness (in)	Fastener Spacing (in)	Sheathing on Exterior Wall ( <sup>5</sup> / <sub>8</sub> " DensGlass)	Nominal	Effective		% Efficiency <sup>2</sup>
					Assembly R Value (hr-ft <sup>2</sup> -°F/BTU)	Assembly U Factor (BTU/hr-ft <sup>2</sup> -°F)	Assembly R Value (hr-ft <sup>2</sup> -°F/BTU)	GreenGirt™
24	48	4.0	24	N	28.8	0.036	28.1	97.61
				Y	29.3	0.035	28.6	97.76
16	24	2.0	16	N	15.8	0.067	15.1	95.27
				Y	16.3	0.064	15.6	95.51
16	24	2.5	16	N	19.1	0.055	18.2	95.26
				Y	19.6	0.054	18.7	95.46
16	24	3.0	16	N	22.3	0.047	21.2	95.21
				Y	22.8	0.046	21.8	95.49
16	24	3.5	16	N	25.6	0.041	24.3	95.11
				Y	26.1	0.040	24.8	95.28
16	24	4.0	16	N	28.8	0.037	27.4	95.01
				Y	29.3	0.036	27.9	95.17

SI: 1" = 25.4 mm, 1 psi = 0.00689 MPa

- Nominal assembly R-values based on ASHRAE 90.1.
- Computed by dividing the effective R-value of the wall assembly by the nominal R-value of the assembly
- 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.

## 6.8 Vertical and Lateral Fire Propagation

### 6.8.1 SMARTci™:

- 6.8.1.1 SMARTci™ was tested to assess its performance regarding vertical and lateral fire propagation in accordance with NFPA 285 and IBC Section 2603.5.5 in a wall configuration consisting of polyiso insulation over a metal stud wall without exterior sheathing with Aluminum Composite Material (ACM) cladding (see **Figure 3**). Testing with this configuration is considered worst-case for two reasons:
- 6.8.1.1.1 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.
  - 6.8.1.1.2 Testing with no exterior sheathing creates a large air gap that can spread flames worse than a system that uses exterior sheathing.
- 6.8.1.2 SMARTci™ was found to not contribute to overall flame spread of a wall assembly.
- 6.8.1.3 SMARTci™ was found to withstand fire propagation, allowing the cladding system to remain attached.
- 6.8.1.4 SMARTci™ can be used with NFPA 285-approved insulations as shown in Section **11.2.6**.
- 6.8.1.5 SMARTci™ can be used with noncombustible mineral fiber insulation meeting minimum requirements listed in Section **2.4.2.1.7**.

6.8.1.6 SMARTci™ can be used with the polyiso insulations listed in Section 2.4.2.

6.8.1.6.1 Consult the NFPA 285 approvals ([DRR 1202-04](#) or [TER 1407-01](#)) for these manufacturers to determine if the system is approved for use with no exterior sheathing or if exterior sheathing must be used.

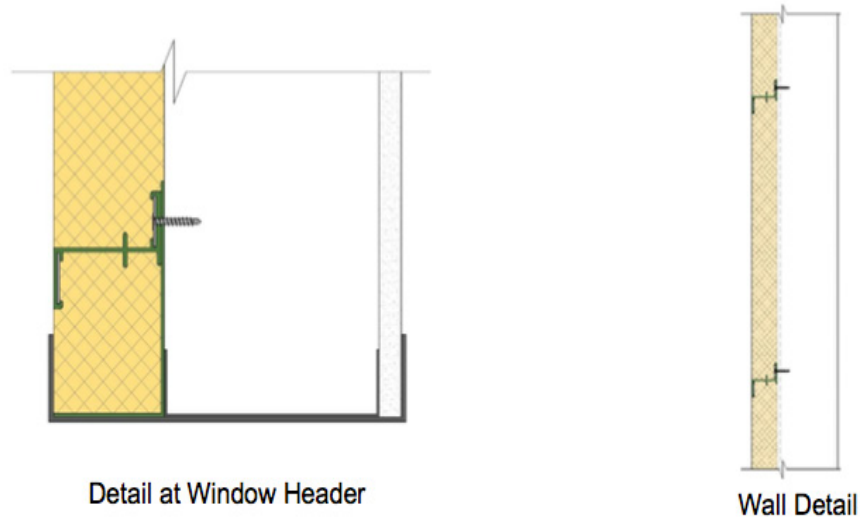


Figure 3. SMARTci™ System Detail

6.8.1.7 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:

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

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

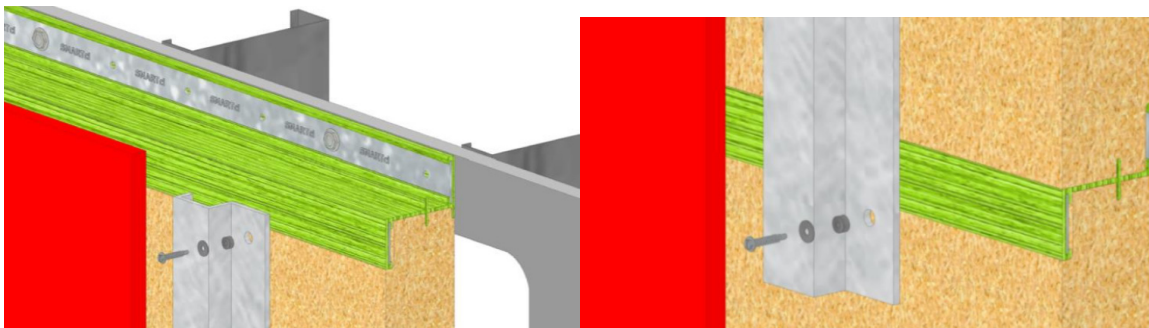
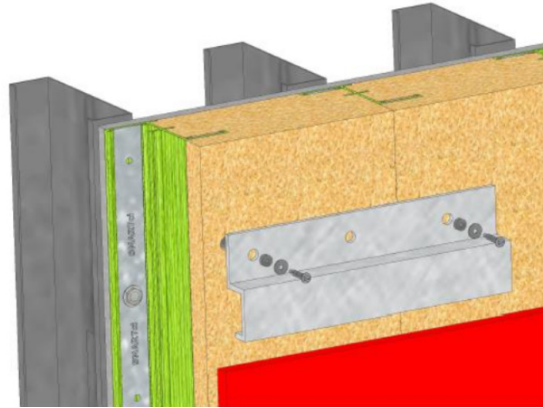


Figure 4. SMARTci™ System Detail of Horizontal Installation with HPL Cladding



**Figure 5.** SMARTci™ System Detail of Vertical Installation with HPL Cladding

### 6.8.2 GreenGirt™ Adjustable Wall System:

6.8.2.1 GreenGirt™ Adjustable Wall System was evaluated to assess its performance with regard to vertical and lateral fire propagation in accordance with NFPA 285 and [IBC Section 2603.5.5](#) in wall configurations complying with the following limitations:

6.8.2.1.1 For use only with mineral wool exterior insulation meeting minimum requirements in Section **2.4.2.1.7**.

6.8.2.1.2 For use with claddings approved for use with the polyiso insulations listed in Section **2.4.2**.

6.8.2.1.3 For use with WRBs installed under the insulation and approved for use under the polyiso insulations listed in Section **2.4.2**.

6.8.2.1.3.1 If mineral wool is 2" thick and meets minimum density requirement, any WRB can be used under the mineral wool.

6.8.2.1.4 For use with NFPA 285-approved claddings such as ACM with the maximum air gap as tested or approved.

6.8.2.1.5 For use with noncombustible claddings with any size air gap.

6.8.2.2 GreenGirt™ Adjustable Wall System was found to not contribute to overall flame spread of a wall assembly.

6.8.2.3 GreenGirt™ Adjustable Wall System was found to withstand fire propagation, allowing the cladding system to remain attached.

6.9 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.

## 7 Certified Performance<sup>xxiv</sup>

7.1 All construction methods shall conform to accepted engineering practices to ensure durable, livable and safe construction and shall demonstrate acceptable workmanship reflecting journeyman quality of work of the various trades.<sup>xxv</sup>

7.2 The strength and rigidity of the component parts and/or the integrated structure shall be determined by engineering analysis or by suitable load tests to simulate the actual loads and conditions of application that occur.<sup>xxvi</sup>



## 8 Regulatory Evaluation and Accepted Engineering Practice

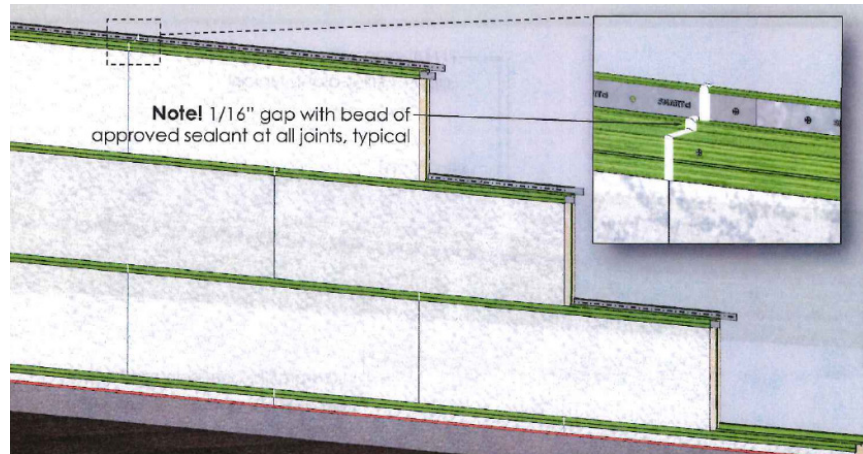
- 8.1 SMARTci™ Exterior Wall Continuous Insulation System was evaluated to determine:
- 8.1.1 Structural performance under transverse load conditions for wind loading in accordance with IBC Section 1609, specifically IBC Section 1609.4.3.<sup>xxvii</sup>
  - 8.1.2 Performance for use in exterior walls of buildings of any height and of Type I-V construction in accordance with IBC Section 2603.5 and IRC Section R316.5.12.
  - 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 water-resistive barrier (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 Thermal performance as a continuous insulation system in accordance with IECC Section C402.5.1 and ASHRAE 90.1.
  - 8.1.7 Use as part of NFPA 285 wall assembly designs, in accordance with IBC Section 2603.5.5.
  - 8.1.8 Fire resistance rated wall assemblies in accordance with IBC Section 2603.5.1 are outside the scope of this TER.
- 8.2 The GreenGirt™ Adjustable Wall System was evaluated to determine:
- 8.2.1 Use as part of NFPA 285 wall assembly designs, in accordance with IBC Section 2603.5.5.
  - 8.2.2 Fire resistance rated wall assemblies in accordance with IBC Section 2603.5.1 are outside the scope of this TER.
- 8.3 Any building code, regulation and/or accepted engineering evaluations (i.e., research reports, duly authenticated reports, etc.) that are conducted for this Listing were performed by DrJ Engineering, LLC (DrJ), an ISO/IEC 17065 accredited certification body and a professional engineering company operated by RDP/approved sources. DrJ is qualified<sup>xxviii</sup> to practice product and regulatory compliance services within its scope of accreditation and engineering expertise, respectively.
- 8.4 Engineering evaluations are conducted with DrJ's ANAB accredited ICS code scope of expertise, which are also its areas of professional engineering competence.
- 8.5 Any regulation specific issues not addressed in this section are outside the scope of this report.

## 9 Installation

- 9.1 Installation shall comply with the approved construction documents, the manufacturer installation instructions, this report and the applicable building code.
- 9.2 In the event of a conflict between the manufacturer installation instructions and this report, the more restrictive shall govern.
- 9.3 SMARTci™ shall only be installed under the direct supervision of an experienced craftsman, trained in the proper application of its diverse offering of products and services.
- 9.4 Installation shall comply with the manufacturer installation instructions and this TER. In the event of a conflict between the manufacturer installation instructions and this TER, the more restrictive shall govern.
- 9.5 Do not stack other objects on top of SMARTci™ insulation panels or GreenGirt™ packages.
- 9.6 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.

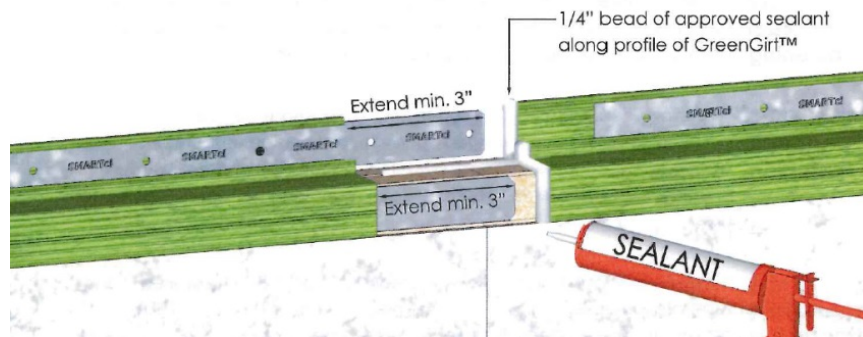
9.7 Installation Procedure

- 9.7.1 Cut bottom, starting insulation panel to size and shim to level. Allow for 1/2" gap between the panel and the base (if applicable) for approved expandable sealant.
- 9.7.2 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 as shown in **Figure 6**.



**Figure 6.** Installation Detail

- 9.7.3 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.
- 9.7.4 Apply two continuous 1/4" minimum beads of approved sealant at all transitions and terminations and onto GreenGirt™ behind insulation panels before installing them, as shown in **Figure 7**.

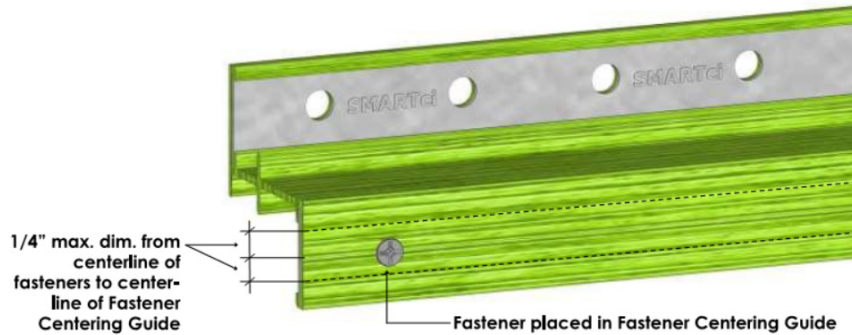


**Figure 7.** Proper Sealing of GreenGirt™



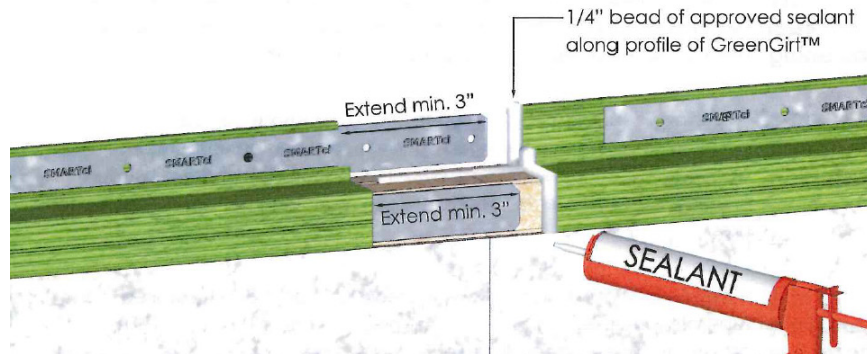
9.7.5 When fastening GreenGirt™ to substrate, the following steps must be taken:

- 9.7.5.1 The edge distance of any fastener hole (to the side of the GreenGirt™) shall be a minimum of 1/2" from the edge of the profile to the closest side of the fastener hole, as demonstrated in **Figure 8**.
- 9.7.5.2 Minimum clear distance in between holes is 5x the diameter.
- 9.7.5.3 Minimum end (end of profile to edge of hole) distance in the longitudinal direction is 3x the diameter.
- 9.7.5.4 Minimum edge (edge of profile to edge of hole) distance in the transverse direction is 2x the diameter.



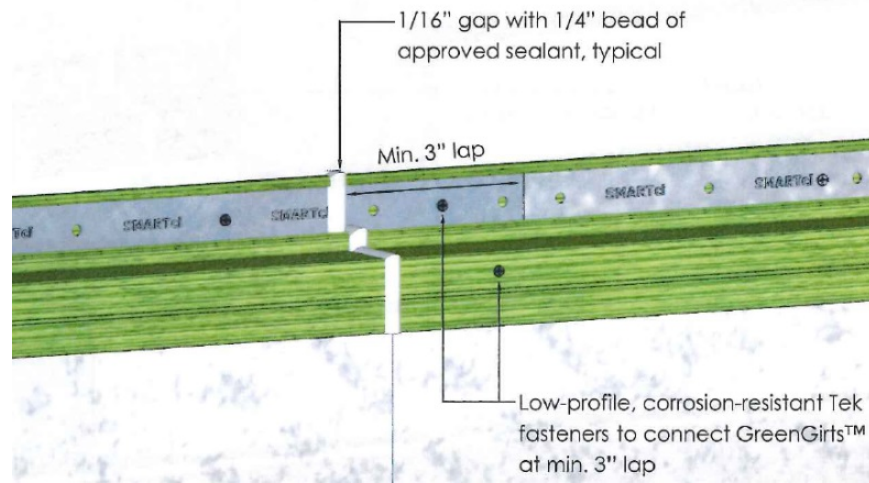
**Figure 8.** Correct Fastener Position in GreenGirt™

9.7.5.5 Slide galvanized metal inserts into backside of GreenGirt™, with 1/4" minimum continuous bead of approved sealant applied to the adjoining end, with a minimum 3" overlap as shown in **Figure 9**.



**Figure 9.** Assembly of GreenGirt™ with Metal Insert and Sealant

9.7.5.6 Lap metal inserts at least 3", with a continuous bead of approved sealant in the 1/16" gap between, and fasten to stabilize, see **Figure 10**.



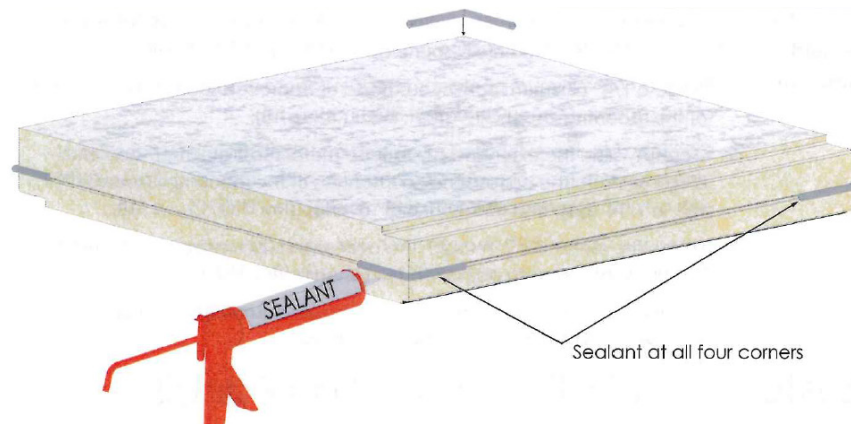
**Figure 10.** Correct Final Installation of GreenGirt™

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

9.7.5.8 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.

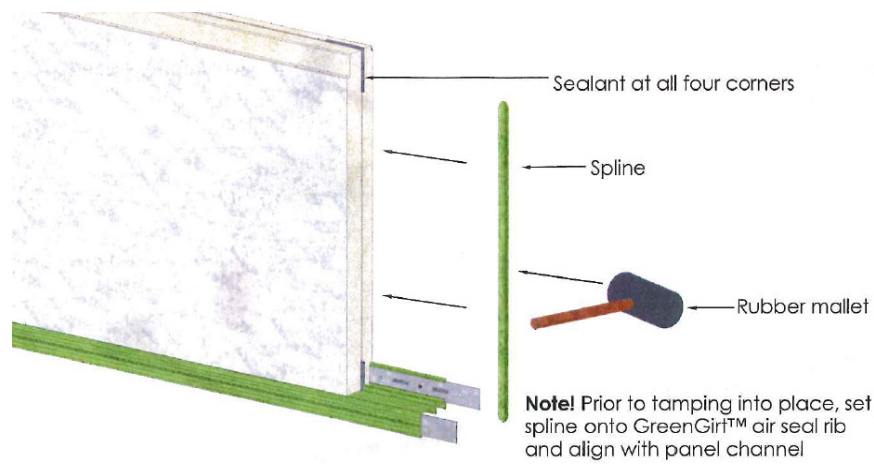
9.7.5.9 Threaded concrete fasteners can be used to fasten pre-drilled GreenGirt™ metal inserts to concrete substrate.

9.7.6 Continue by installing the second panel to the top track of the first (bottom) GreenGirt™. Apply a 1/4" minimum 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, as shown in **Figure 11**.



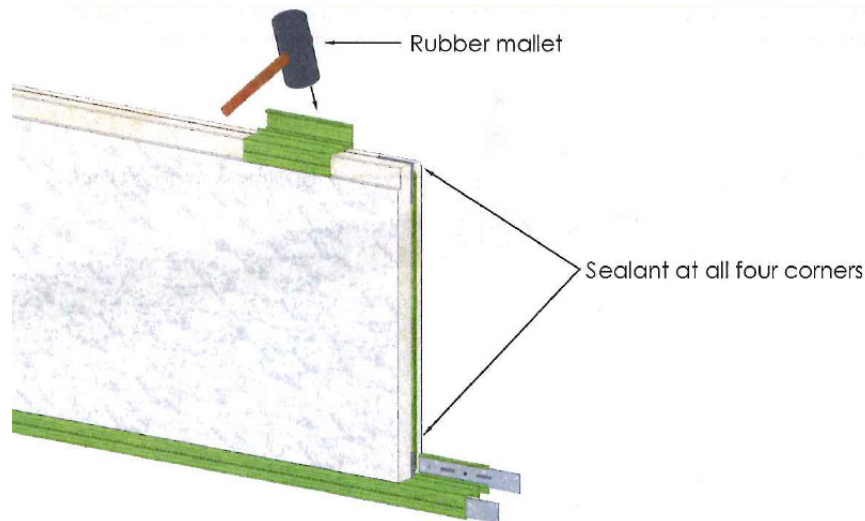
**Figure 11.** Proper Sealing of Insulation Panel

9.7.7 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 as established in **Figure 12**.



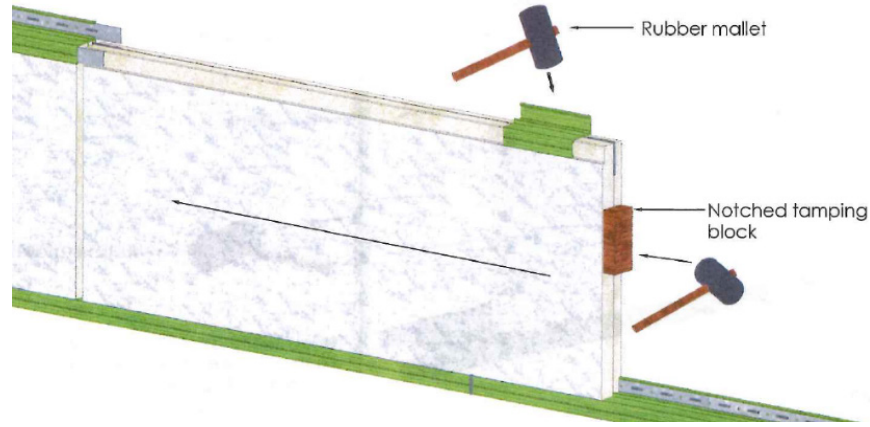
**Figure 12.** Inserting the Spline into the Insulation Panel

9.7.8 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 that no damage is done to the panel edge, see **Figure 13**.



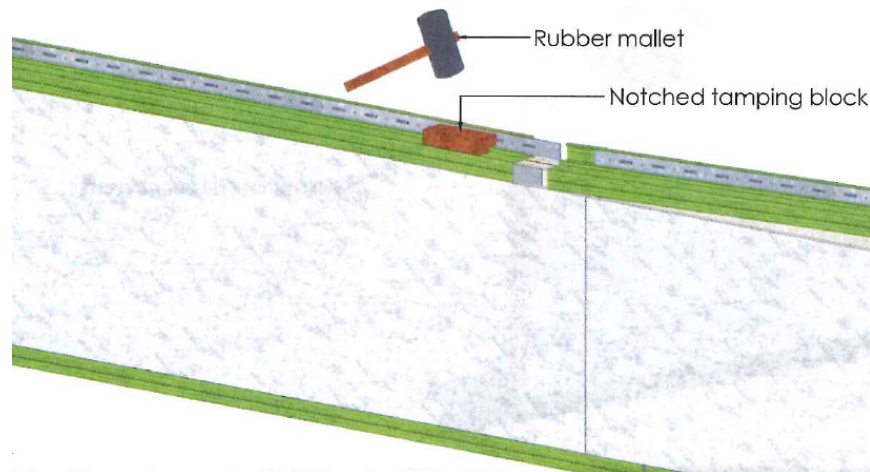
**Figure 13.** Using a Mallet to Tap the Insulation Panel into Place

9.7.9 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, see **Figure 14**.



**Figure 14.** Install the Adjacent Panel by Tapping into Place, Not Sliding

9.7.10 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, as seen in **Figure 15**.



**Figure 15.** Properly Installing the Next GreenGirt™ Using the Mallet



## 10 Substantiating Data

- 10.1 Testing has been performed under the supervision of a professional engineer and/or under the requirements of ISO/IEC 17025 as follows:
  - 10.1.1 Transverse wind load testing in accordance with ASTM E330
  - 10.1.2 Water penetration properties testing in accordance with ASTM E331
  - 10.1.3 Air leakage properties testing in accordance with ASTM E283
  - 10.1.4 Surface burning testing in accordance with ASTM E84
  - 10.1.5 Tensile strength testing in accordance with ASTM D638
  - 10.1.6 Vertical and lateral fire propagation testing in accordance with NFPA 285
- 10.2 Engineering evaluation of five NFPA 285 tests using A2P SMARTci™ System in approved assemblies, performed by Priest & Associates Consulting, LLC.
- 10.3 Manufacturer technical data sheets and installation instructions.
- 10.4 Manufacturer quality control manual and evidence of approved agency inspections.
- 10.5 Information contained herein may include the result of testing and/or data analysis by sources that are approved agencies, approved sources and/or RDPs. Accuracy of external test data and resulting analysis is relied upon.
- 10.6 Where pertinent, testing and/or engineering analysis are based upon provisions that have been codified into law through state or local adoption of regulations and standards. The developers of these regulations and standards are responsible for the reliability of published content. DrJ's engineering practice may use a regulation-adopted provision as the control. A regulation-endorsed control versus a simulation of the conditions of application to occur establishes a new material as being equivalent to the regulatory provision in terms of quality, strength, effectiveness, fire resistance, durability and safety.
- 10.7 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, or duly authenticated reports from approved agencies and/or approved sources provided by the supplier. These are presumed to be minimum properties and relied upon to be accurate. The reliability of DrJ's engineering practice, as contained in this duly authenticated report, may be dependent upon published design properties by others.
- 10.8 Testing and engineering analysis: 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.<sup>xxix</sup>
- 10.9 Where additional condition of use and/or regulatory compliance information is required, please search for SMARTci™ on the DrJ Certification website.

## 11 Findings

- 11.1 As outlined in Section 6, SMARTci™ has performance characteristics that were tested and/or meet applicable regulations and is suitable for use pursuant to its specified purpose.
- 11.2 When used and installed in accordance with this duly authenticated report and the manufacturer installation instructions, SMARTci™ shall be approved for the following applications:
  - 11.2.1 Structural performance under transverse load conditions in accordance with IBC Section 1609, specifically IBC Section 1609.4.3.<sup>xxx</sup>
  - 11.2.2 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, IBC Section 2603.3 and IBC Section 2603.4.
  - 11.2.3 Performance for use in exterior walls of buildings as an air barrier in accordance with IECC Section C402.5.1.



- 11.2.4 Performance for use in exterior walls of buildings as a WRB in accordance with IBC Section 1404.2 and IRC Section R703.2.
- 11.2.5 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.
- 11.2.6 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:
  - 11.2.6.1 Atlas EnergyShield® Pro, EnergyShield® Pro 2, and Rboard® Pro
  - 11.2.6.2 Carlisle R2+ Panels
  - 11.2.6.3 Dow Thermax™ Panels
  - 11.2.6.4 Hunter Xci Panels
  - 11.2.6.5 Rmax® TSX-8500, TSX-8510, or TSX-8520
  - 11.2.6.6 Firestone Enverge™ CI Panels
- 11.2.7 Mineral wool meeting the following requirements:
  - 11.2.7.1 Minimum 1½" thick
  - 11.2.7.2 Minimum 4 pcf density
  - 11.2.7.3 No facer
  - 11.2.7.4 Noncombustible in accordance with ASTM E136
- 11.3 When used and installed in accordance with the manufacturer installation instructions, the GreenGirt™ Adjustable Wall System is approved for the following:
  - 11.3.1 As the attachment method of the exterior insulation layer when used in the approved NFPA 285 wall assemblies in Section **6.8.2**.
- 11.4 Any application specific issues not addressed herein can be engineered by an RDP. Assistance with engineering is available from A2P, LLC.
- 11.5 IBC Section 104.11 (IRC Section R104.11 and IFC Section 104.10<sup>xxxii</sup> are similar) in pertinent part 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. 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.
- 11.6 **Approved:**<sup>xxxii</sup> Building regulations require that the building official shall accept duly authenticated reports.<sup>xxxiii</sup>
  - 11.6.1 An approved agency is “approved” when it is ANAB ISO/IEC 17065 accredited.
  - 11.6.2 An approved source is “approved” when an RDP is properly licensed to transact engineering commerce.
  - 11.6.3 Federal law, Title 18 US Code Section 242, requires that where the alternative product, material, service, design, assembly and/or method of construction is not approved, the building official shall respond in writing, stating the reasons why the alternative was not approved. Denial without written reason deprives a protected right to free and fair competition in the marketplace.
- 11.7 DrJ is a licensed engineering company, employs licensed RDPs and is an ANAB-Accredited Product Certification Body – Accreditation #1131.
- 11.8 Through the IAF Multilateral Agreements (MLA), this Duly Authenticated Report can be used to obtain product approval in any jurisdiction or country because all ANAB ISO/IEC 17065 Duly Authenticated Reports are equivalent.<sup>xxxiv</sup>



## 12 Conditions of Use

- 12.1 Material properties shall not fall outside the boundaries defined in Section 6.
- 12.2 As defined in Section 6, 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.
- 12.3 When required by adopted legislation and enforced by the building official, also known as the authority having jurisdiction (AHJ) in which the project is to be constructed:
  - 12.3.1 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.
  - 12.3.2 This report and the installation instructions shall be submitted at the time of permit application.
  - 12.3.3 This innovative product has an internal quality control program and a third-party quality assurance program.
  - 12.3.4 At a minimum, this innovative product shall be installed per Section 9 of this report.
  - 12.3.5 The review of this report by the AHJ shall comply with IBC Section 104 and IBC Section 105.4.
  - 12.3.6 This innovative product has an internal quality control program and a third party quality assurance program in accordance with IBC Section 104.4, IBC Section 110.4, IBC Section 1703, IRC Section R104.4 and IRC Section R109.2.
  - 12.3.7 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, inspection as required by IBC Section 110.3, IRC Section R109.2 and any other regulatory requirements that may apply.
- 12.4 The approval of this report by the AHJ shall comply with IBC Section 1707.1, where legislation states in part, “*the building official shall accept duly authenticated reports from approved agencies in respect to the quality and manner of use of new material or assemblies as provided for in Section 104.11” , all of IBC Section 104 and IBC Section 105.4.*
- 12.5 Design loads shall be determined in accordance with the regulations adopted by the jurisdiction in which the project is to be constructed and/or by the building designer (i.e., owner or RDP).
- 12.6 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.

## 13 Identification

- 13.1 The innovative product 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.
- 13.2 Additional technical information can be found at www.greengirt.com.

## 14 Review Schedule

- 14.1 This report is subject to periodic review and revision. For the latest version, visit drjcertification.org.
- 14.2 For information on the status of this report, please contact DrJ Certification.

## 15 Approved for Use Pursuant to U.S. and International Legislation Defined in Appendix A

- 15.1 SMARTci™ Exterior Wall Continuous Insulation System is included in this report published by an approved agency that is concerned with evaluation of products or services, maintains periodic inspection of the production of listed materials or periodic evaluation of services. This report states either that the material, product, or service meets recognized standards or has been tested and found suitable for a specified purpose. This report meets the legislative intent and definition of being acceptable to the AHJ.



## Appendix A

### 1 Legislation that Authorizes AHJ Approval

- 1.1 **Fair Competition:** State legislatures have adopted Federal regulations for the examination and approval of building code referenced and alternative products, materials, designs, services, assemblies and/or methods of construction that:
  - 1.1.1 Advance Innovation,
  - 1.1.2 Promote competition so all businesses have the opportunity to compete on price and quality in an open market on a level playing field unhampered by anticompetitive constraints, and
  - 1.1.3 Benefit consumers through lower prices, better quality and greater choice.
- 1.2 **Adopted Legislation:** The following local, state and federal regulations affirmatively authorize this innovative product to be approved by AHJs, delegates of building departments and/or delegates of an agency of the federal government:
  - 1.2.1 Interstate commerce is governed by the Federal Department of Justice to encourage the use of innovative products, materials, designs, services, assemblies and/or methods of construction. The goal is to “protect economic freedom and opportunity by promoting free and fair competition in the marketplace.”
  - 1.2.2 Title 18 US Code Section 242 affirms and regulates the right of individuals and businesses to freely and fairly have new products, materials, designs, services, assemblies and/or methods of construction approved for use in commerce. Disapproval of alternatives shall be based upon non-conformance with respect to specific provisions of adopted legislation and shall be provided in writing stating the reasons why the alternative was not approved, with reference to the specific legislation violated.
  - 1.2.3 The federal government and each state have a public records act. In addition, each state also has legislation that mimics the federal Defend Trade Secrets Act 2016 (DTSA),<sup>xxxv</sup> where providing test reports, engineering analysis and/or other related IP/TS is subject to prison of not more than ten years<sup>xxxvi</sup> and/or a \$5,000,000 fine or 3 times the value of<sup>xxxvii</sup> the Intellectual Property (IP) and Trade Secrets (TS).
    - 1.2.3.1 Compliance with public records and trade secret legislation requires approval through the use of Listings, certified reports, Technical Evaluation Reports, duly authenticated reports and/or research reports prepared by approved agencies and/or approved sources.
  - 1.2.4 For new materials<sup>xxxviii</sup> that are not specifically provided for in any regulation, the design strengths and permissible stresses shall be established by tests, where suitable load tests simulate the actual loads and conditions of application that occur.
  - 1.2.5 The design strengths and permissible stresses of any structural material shall conform to the specifications and methods of design using accepted engineering practice.<sup>xxxix</sup>
  - 1.2.6 The commerce of approved sources (i.e., registered PEs) is regulated by professional engineering legislation. Professional engineering commerce shall always be approved by AHJs, except where there is evidence provided in writing, that specific legislation has been violated by an individual registered PE.
  - 1.2.7 The AHJ shall accept duly authenticated reports from approved agencies in respect to the quality and manner of use of new materials or assemblies as provided for in IBC Section 104.11.<sup>xl</sup>





- 1.3 **Approved<sup>xli</sup> by Los Angeles:** The Los Angeles Municipal Code (LAMC) states in pertinent part that the provisions of LAMC are not intended to prevent the use of any material, device, or method of construction not specifically prescribed by LAMC. The Department shall use Part III, Recognized Standards in addition to Part II, Uniform Building Code Standards of Division 35, Article 1, Chapter IX of the LAMC in evaluation of products for approval where such standard exists for the product or the material and may use other approved standards that apply. Whenever tests or certificates of any material or fabricated assembly are required by Chapter IX of the LAMC, such tests or certification shall be made by a testing agency approved by the Superintendent of Building to conduct such tests or provide such certifications. The testing agency shall publish the scope and limitation(s) of the listed material or fabricated assembly.<sup>xlii</sup> The Superintendent of Building Approved Testing Agency Roster is provided by the Los Angeles Department of Building and Safety (LADBS). The Center for Building Innovation (CBI) Certificate of Approval License is TA24945. Tests and certifications found in a DrJ Listing are LAMC approved. In addition, the Superintendent of Building shall accept duly authenticated reports from approved agencies in respect to the quality and manner of use of new materials or assemblies as provided for in the California Building Code (CBC) Section 1707.1.<sup>xliii</sup>
- 1.4 **Approved by Chicago:** The Municipal Code of Chicago (MCC) states in pertinent part that an Approved Agency is a Nationally Recognized Testing Laboratory (NRTL) acting within its recognized scope and/or a certification body accredited by the American National Standards Institute (ANSI) acting within its accredited scope. Construction materials and test procedures shall conform to the applicable standards listed in the MCC. Sufficient technical data shall be submitted to the building official to substantiate the proposed use of any product, material, service, design, assembly and/or method of construction not specifically provided for in the MCC. This technical data shall consist of research reports from approved sources (i.e., MCC defined Approved Agencies).
- 1.5 **Approved by New York City:** The 2022 NYC Building Code (NYCBC) states in part that an approved agency shall be deemed<sup>xliv</sup> an approved testing agency via ISO/IEC 17025 accreditation, an approved inspection agency via ISO/IEC 17020 accreditation and an approved product evaluation agency via ISO/IEC 17065 accreditation. Accrediting agencies, other than federal agencies, must be members of an internationally recognized cooperation of laboratory and inspection accreditation bodies subject to a mutual recognition agreement<sup>xlv</sup> (i.e., ANAB, International Accreditation Forum (IAF), etc.).
- 1.6 **Approved by Florida:** Statewide approval of products, methods, or systems of construction shall be approved, without further evaluation by:
- 1.6.1 A certification mark or listing of an approved certification agency,
  - 1.6.2 A test report from an approved testing laboratory,
  - 1.6.3 A product evaluation report based upon testing or comparative or rational analysis, or a combination thereof, from an approved product evaluation entity, or
  - 1.6.4 A product evaluation report based upon testing, comparative or rational analysis, or a combination thereof, developed, signed and sealed by a professional engineer or architect, licensed in Florida.
- 1.7 For local product approval, products or systems of construction shall demonstrate compliance with the structural wind load requirements of the Florida Building Code (FBC) through one of the following methods;
- 1.7.1 A certification mark, listing or label from a commission-approved certification agency indicating that the product complies with the code,
  - 1.7.2 A test report from a commission-approved testing laboratory indicating that the product tested complies with the code,
  - 1.7.3 A product-evaluation report based upon testing, comparative or rational analysis, or a combination thereof, from a commission-approved product evaluation entity which indicates that the product evaluated complies with the code,
  - 1.7.4 A product-evaluation report or certification based upon testing or comparative or rational analysis, or a combination thereof, developed and signed and sealed by a Florida professional engineer or Florida registered architect, which indicates that the product complies with the code, or
  - 1.7.5 A statewide product approval issued by the Florida Building Commission.



- 1.8 The Florida Department of Business and Professional Regulation (DBPR) website provides a listing of companies certified as a Product Evaluation Agency (i.e., EVLMiami 13692), a Product Certification Agency (i.e., CER10642) and as a Florida Registered Engineer (i.e., ANE13741).
- 1.9 **Approved by Miami-Dade County (i.e., Notice of Acceptance [NOA]):** A Florida statewide approval is an NOA. An NOA is a Florida local product approval. By Florida law, Miami-Dade County shall accept the statewide and local Florida Product Approval as provided for in Florida legislation 553.842 and 553.8425.
- 1.10 **Approved by New Jersey:** Pursuant to the 2018 Building Code of New Jersey in IBC Section 1707.1 General,<sup>xlvi</sup> it states: *“In the absence of approved rules or other approved standards, the building official shall accept duly authenticated reports from approved agencies in respect to the quality and manner of use of new materials or assemblies as provided for in the administrative provisions of the Uniform Construction Code (N.J.A.C. 5:23)”*.<sup>xlvii</sup> Furthermore N.J.A.C 5:23-3.7 states: *“Municipal approvals of alternative materials, equipment, or methods of construction.”*
  - 1.10.1 **Approvals:** Alternative materials, equipment, or methods of construction shall be approved by the appropriate subcode official provided the proposed design is satisfactory and that the materials, equipment, or methods of construction are suitable for the intended use and are at least the equivalent in quality, strength, effectiveness, fire resistance, durability and safety of those conforming with the requirements of the regulations.
    - 1.10.1.1 A field evaluation label and report or letter issued by a nationally recognized testing laboratory verifying that the specific material, equipment, or method of construction meets the identified standards or has been tested and found to be suitable for the intended use, shall be accepted by the appropriate subcode official as meeting the requirements of the above.
    - 1.10.1.2 Reports of engineering findings issued by nationally recognized evaluation service programs such as but not limited to, the Building Officials and Code Administrators (BOCA), the International Conference of Building Officials (ICBO), the Southern Building Code Congress International (SBCCI), the International Code Council (ICC) and the National Evaluation Service, Inc., shall be accepted by the appropriate subcode official as meeting the requirements of the above.
  - 1.10.2 The New Jersey Department of Community Affairs has confirmed that technical evaluation reports, from any accredited entity listed by ANAB, meets the requirements of item the previous paragraph, given that the listed entities are no longer in existence and/or do not provide *“reports of engineering findings”*.
- 1.11 **Approved by the Code of Federal Regulations Manufactured Home Construction and Safety Standards:** Pursuant to Title 24, Subtitle B, Chapter XX, Part 3282.14<sup>xlviii</sup> and Part 3280,<sup>xlix</sup> the Department encourages innovation and the use of new technology in manufactured homes. The design and construction of a manufactured home shall conform to the provisions of Part 3282 and Part 3280 where key approval provisions in mandatory language follow:
  - 1.11.1 *“All construction methods shall be in conformance with accepted engineering practices”*
  - 1.11.2 *“The strength and rigidity of the component parts and/or the integrated structure shall be determined by engineering analysis or by suitable load tests to simulate the actual loads and conditions of application that occur.”*
  - 1.11.3 *“The design stresses of all materials shall conform to accepted engineering practice.”*



- 1.12 **Approval by US, Local and State Jurisdictions in General:** In all other local and state jurisdictions, the adopted building code legislation states in pertinent part that:
- 1.12.1 For new materials that are not specifically provided for in this code, the design strengths and permissible stresses shall be established by tests.<sup>i</sup>
  - 1.12.2 For innovative alternatives and/or methods of construction, the building official shall accept duly authenticated reports from approved agencies with respect to the quality and manner of use of new materials or assemblies.<sup>ii</sup>
    - 1.12.2.1 An approved agency is “approved” when it is ANAB ISO/IEC 17065 accredited. DrJ Engineering, LLC (DrJ) is in the ANAB directory.
    - 1.12.2.2 An approved source is “approved” when an RDP is properly licensed to transact engineering commerce. The regulatory authority governing approved sources is the state legislature via its professional engineering regulations.<sup>iii</sup>
  - 1.12.3 The design strengths and permissible stresses of any structural material...shall conform to the specifications and methods of design of accepted engineering practice performed by an approved source.<sup>iiii</sup>
- 1.13 **Approval by International Jurisdictions:** The USMCA and GATT agreements provide for approval of innovative materials, designs, services and/or methods of construction through the Agreement on Technical Barriers to Trade and the IAF Multilateral Recognition Arrangement (MLA), where these agreements:
- 1.13.1 State that conformity assessment procedures (i.e., ISO/IEC 17020, 17025, 17065, etc.) are prepared, adopted and applied so as to grant access for suppliers of like products originating in the territories of other Members under conditions no less favourable than those accorded to suppliers of like products of national origin or originating in any other country, in a comparable situation.
  - 1.13.2 **Approved:** The purpose of the MLA is to ensure mutual recognition of accredited certification and validation/verification statements between signatories to the MLA and subsequently, acceptance of accredited certification and validation/verification statements in many markets based on one accreditation for the timely approval of innovative materials, designs, services and/or methods of construction.
  - 1.13.3 ANAB is an IAF-MLA signatory where recognition of certificates, validation and verification statements issued by conformity assessment bodies accredited by all other signatories of the IAF MLA, with the appropriate scope, shall be approved.<sup>iv</sup>
  - 1.13.4 Therefore, all ANAB ISO/IEC 17065 Duly Authenticated Reports are approval equivalent.<sup>iv</sup>
- 1.14 Approval equity is a fundamental commercial and legal principle.<sup>vi</sup>



Issue Date: June 30, 2015  
Subject to Renewal: July 1, 2024

## CBC and CRC Supplement to Report Number 1501-06

REPORT HOLDER: A2P, LLC

### 2 Evaluation Subject

2.1 SMARTci™ Exterior Wall Continuous Insulation System

### 3 Purpose and Scope

3.1 Purpose

3.1.1 The purpose of this report supplement is to indicate that SMARTci™ Exterior Wall Continuous Insulation System, recognized in report 1501-06, has also been evaluated for compliance with the codes noted below.

3.2 *Applicable Code Editions*

3.2.1 *CBC—16, 19: California Building Code (Title 24, Part 2)*

3.2.2 *CRC—16, 19: California Residential Code (Title 24, Part 2.5)*

### 4 Conclusions

4.1 SMARTci™ Exterior Wall Continuous Insulation System, described in report 1501-06, complies with the CBC and CRC and is subject to the conditions of use described in this supplement.

4.2 Where there are variations between the IBC and IRC and the CBC and CRC applicable to this TER, they are listed here:

4.2.1 No known variations

### 5 Conditions of Use

5.1 SMARTci™ Exterior Wall Continuous Insulation System, described in report 1501-06, must comply with all of the following conditions:

5.1.1 All applicable sections in report 1501-06.

5.1.2 The design, installation, and inspections are in accordance with additional requirements of the CBC and CRC, as applicable.



Issue Date: April 25, 2022  
Subject to Renewal: July 1, 2024

## FBC Supplement to Report Number 1501-06

REPORT HOLDER: A2P, LLC

### 1 Evaluation Subject

- 1.1 SMARTci™ Exterior Wall Continuous Insulation System

### 2 Purpose and Scope

- 2.1 Purpose
  - 2.1.1 The purpose of this Report Supplement is to show SMARTci™ Exterior Wall Continuous Insulation System, recognized in Report Number 1501-06, has also been evaluated for compliance with the codes listed below as adopted by the Florida Building Commission.
- 2.2 *Applicable Code Editions*
  - 2.2.1 *FBC-B—20, 23: Florida Building Code – Building*
  - 2.2.2 *FBC-R—20, 23: Florida Building Code – Residential*

### 3 Conclusions

- 3.1 SMARTci™ Exterior Wall Continuous Insulation System, described in Report Number 1501-06, complies with the FBC-B and FBC-R and is subject to the conditions of use described in this supplement.
- 3.2 Where there are variations between the IBC and IRC and the FBC-B and FBC-R applicable to this report, they are listed here:
  - 3.2.1 FBC-B Section 104.4 and Section 110.4 are reserved.
  - 3.2.2 FBC-R Section R104 and Section R109 are reserved.
  - 3.2.3 FBC-B Section 1405.2 replaces IBC Section 1404.2.
  - 3.2.4 FBC-B Section 1609.4.3 replaces IBC Section 1609.4.3.
  - 3.2.5 FBC-B Section 2603.3 replaces IBC Section 2603.3.
  - 3.2.6 FBC-B Section 2603.5 replaces IBC Section 2603.5.
  - 3.2.7 FBC-B Section 2603.5.4 replaces IBC Section 2603.5.4.
  - 3.2.8 FBC-R Section R316.3 replaces IRC Section R316.3.
  - 3.2.9 FBC-R Section R703.2 replaces IRC Section R703.2.

### 4 Conditions of Use

- 4.1 SMARTci™ Exterior Wall Continuous Insulation System, described in Report Number 1501-06, , must comply with all of the following conditions:
  - 4.1.1 All applicable sections in Report Number 1501-06.
  - 4.1.2 The design, installation, and inspections are in accordance with additional requirements of FBC-B Chapter 16 and Chapter 17, as applicable.



# Notes

- i For more information, visit [drjcertification.org](http://drjcertification.org) or call us at 608-310-6748.
- ii <https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1702>
- iii Alternative Materials, Design and Methods of Construction and Equipment: The provisions of any regulation code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by a regulation. Please review [https://www.justice.gov/atr/mission\\_and](https://www.justice.gov/atr/mission_and) <https://up.codes/viewer/colorado/ibc-2021/chapter/1/scope-and-administration#104.11>
- iv <https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1706>:-:text=the%20design%20strengths%20and%20permissible%20stresses%20shall%20be%20established%20by%20tests%20as
- v The design strengths and permissible stresses of any structural material shall conform to the specifications and methods of design of accepted engineering practice. <https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1706>:-:text=shall%20conform%20to%20the%20specifications%20and%20methods%20of%20design%20of%20accepted%20engineering%20practice
- vi <https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1707.1>:-:text=the%20building%20official%20shall%20accept%20duly%20authenticated%20reports%20from%20approved%20agencies
- vii <https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1703.4.2>
- viii [https://up.codes/viewer/wyoming/ibc-2021/chapter/2/definitions#approved\\_agency](https://up.codes/viewer/wyoming/ibc-2021/chapter/2/definitions#approved_agency)
- ix [https://up.codes/viewer/wyoming/ibc-2021/chapter/2/definitions#approved\\_source](https://up.codes/viewer/wyoming/ibc-2021/chapter/2/definitions#approved_source)
- x <https://www.law.cornell.edu/uscode/text/18/1832> (b) Any organization that commits any offense described in subsection (a) shall be fined not more than the greater of \$5,000,000 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. The federal government and each state have a public records act. To follow DTSA and comply state public records and trade secret legislation requires approval through ANAB ISO/IEC 17065 accredited certification bodies or approved sources. For more information, please review this website: [Intellectual Property and Trade Secrets](#).
- xi <https://www.nspe.org/resources/issues-and-advocacy/professional-policies-and-position-statements/regulation-professional> AND <https://apassociation.org/list-of-engineering-boards-in-each-state-archive/>
- xii <https://www.cbiteest.com/accreditation/>
- xiii <https://up.codes/viewer/colorado/ibc-2021/chapter/1/scope-and-administration#104>:-:text=to%20enforce%20the%20provisions%20of%20this%20code
- xiv <https://up.codes/viewer/colorado/ibc-2021/chapter/1/scope-and-administration#104.11>:-:text=Where%20the%20alternative%20material%20design%20or%20method%20of%20construction%20is%20not%20approved%20the%20building%20official%20shall%20respond%20in%20writing%20stating%20the%20reasons%20why%20the%20alternative%20was%20not%20approved AND <https://up.codes/viewer/colorado/ibc-2021/chapter/1/scope-and-administration#105.3.1>:-:text=If%20the%20application%20or%20the%20construction%20documents%20do%20not%20conform%20to%20the%20requirements%20of%20pertinent%20laws%20the%20building%20official%20shall%20reject%20such%20application%20in%20writing%20stating%20the%20reasons%20therefore
- xv <https://up.codes/viewer/colorado/ibc-2021/chapter/17/special-inspections-and-tests#1707.1>:-:text=the%20building%20official%20shall%20accept%20duly%20authenticated%20reports%20from%20approved%20agencies%20in%20respect%20to%20the%20quality%20and%20manner%20of%20use%20of%20new%20materials%20or%20assemblies%20as%20provided%20for%20in%20Section%20104.11
- xvi <https://iaf.nu/en/about-iaf-mia/#>:-:text=it%20is%20required%20to%20recognise%20certificates%20and%20validation%20and%20verification%20statements%20issued%20by%20conformity%20assessment%20bodies%20accredited%20by%20all%20other%20signatories%20of%20the%20IAF%20MLA%20with%20the%20appropriate%20scope
- xvii True for all ANAB accredited product evaluation agencies and all International Trade Agreements.
- xviii <https://www.justice.gov/crt/deprivation-rights-under-color-law> AND <https://www.justice.gov/atr/mission>
- xix Unless otherwise noted, all references in this Listing are from the 2021 version of the codes and the standards referenced therein. This material, product, design, service and/or method of construction also complies with the 2000-2021 versions of the referenced codes and the standards referenced therein.
- xx References to NFPA 285-12 in this report are code compliant through the 2018 version of the IBC.
- xxi All references to the CBC and CRC are the same as the 2018 IBC and 2018 IRC, respectively, unless otherwise noted in the supplement at the end of this TER.
- xxii All references to the FBC-B and FBC-R are the same as the 2021 IBC and 2021 IRC unless otherwise noted in the Florida Supplement at the end of this TER.
- xxiii <https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280#p-3280.2>(Listed%20or%20certified); <https://up.codes/viewer/colorado/ibc-2021/chapter/2/definitions#listed> AND <https://up.codes/viewer/colorado/ibc-2021/chapter/2/definitions#labeled>
- xxiv <https://up.codes/viewer/colorado/ibc-2021/chapter/17/special-inspections-and-tests#1703.4>
- xxv <https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280#>:-:text=All%20construction%20methods%20shall%20be%20in%20conformance%20with%20accepted%20engineering%20practices%20to%20insure%20durable%20livable%20and%20safe%20housing%20and%20shall%20demonstrate%20acceptable%20workmanship%20reflecting%20journeyman%20quality%20of%20work%20of%20the%20various%20trades
- xxvi <https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280#>:-:text=The%20strength%20and%20rigidity%20of%20the%20component%20parts%20and/or%20the%20integrated%20structure%20shall%20be%20determined%20by%20engineering%20analysis%20or%20by%20suitable%20load%20tests%20to%20simulate%20the%20actual%20loads%20and%20conditions%20of%20application%20that%20occur
- xxvii [2015 IBC Section 1609.4.3](#) and [2015 IBC Section 1609.6.4.4.1](#)
- xxviii 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.
- xxix See Code of Federal Regulations (CFR) Title 24 Subtitle B Chapter XX Part 3280 for definition.



- xxx [2015 IBC Section 1609.4.3 and 2015 IBC Section 1609.6.4.4.1](#)
- xxxi [2018 IFC Section 104.9](#)
- xxxii Approved is an adjective that modifies the noun after it. For example, Approved Agency means that the Agency is accepted officially as being suitable in a particular situation. This example conforms to IBC/IRC/IFC [Section 201.4](#) where the building code authorizes sentences to have an ordinarily accepted meaning such as the context implies.
- xxxiii <https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1707.1>
- xxxiv Multilateral approval is true for all ANAB accredited product evaluation agencies and all International Trade Agreements.
- xxxv <http://www.drjengineering.org/AppendixC> AND <https://www.drjcertification.org/cornell-2016-protection-trade-secrets>
- xxxvi <https://www.law.cornell.edu/uscode/text/18/1832#:~:text=imprisoned%20not%20more%20than%2010%20years>
- xxxvii <https://www.law.cornell.edu/uscode/text/18/1832#:~:text=Any%20organization%20that,has%20thereby%20avoided>
- xxxviii <https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1706.2>
- xxxix [IBC 2021, Section 1706.1 Conformance to Standards](#)
- xl [IBC 2021, Section 1707 Alternative Test Procedure, 1707.1 General](#)
- xli See [Section 11](#) for the distilled building code definition of **Approved**
- xlii [Los Angeles Municipal Code, SEC. 98.0503. TESTING AGENCIES](#)
- xliiii <https://up.codes/viewer/california/ca-building-code-2022/chapter/17/special-inspections-and-tests#1707.1>
- xliv [New York City, The Rules of the City of New York, § 101-07 Approved Agencies](#)
- xlv [New York City, The Rules of the City of New York, § 101-07 Approved Agencies](#)
- xlvi [https://up.codes/viewer/new\\_jersey/ibc-2018/chapter/17/special-inspections-and-tests#1707.1](https://up.codes/viewer/new_jersey/ibc-2018/chapter/17/special-inspections-and-tests#1707.1)
- xlvii <https://www.nj.gov/dca/divisions/codes/codreg/ucc.html>
- xlviii <https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3282/subpart-A/section-3282.14>
- xlvi <https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280>
- i [IBC 2021, Section 1706 Design Strengths of Materials, 1706.2 New Materials.](#) Adopted law pursuant to IBC model code language 1706.2.
- ii [IBC 2021, Section 1707 Alternative Test Procedure, 1707.1 General.](#) Adopted law pursuant to IBC model code language 1707.1.
- iii <https://www.nspe.org/resources/issues-and-advocacy/professional-policies-and-position-statements/regulation-professional> AND <https://apassociation.org/list-of-engineering-boards-in-each-state-archive/>
- iiii [IBC 2021, Section 1706 Design Strengths of Materials, Section 1706.1 Conformance to Standards](#) Adopted law pursuant to IBC model code language 1706.1.
- lv <https://iaf.nu/en/about-iaf-mia/#:~:text=it%20is%20required%20to%20recognise%20certificates%20and%20validation%20and%20verification%20statements%20issued%20by%20conformity%20assessment%20bodies%20accredited%20by%20all%20other%20signatories%20of%20the%20IAF%20MLA%2C%20with%20the%20appropriate%20scope>
- lv True for all ANAB accredited product evaluation agencies and all International Trade Agreements.
- lvi <https://www.justice.gov/crt/deprivation-rights-under-color-law> AND <https://www.justice.gov/atr/mission>