



**CERTIFICATION**



Approved. Sealed. Code Compliant.

## **Technical Evaluation Report**

**TER 1905-02**

StarRStruc Plus Structural Insulating  
Sheathing

**StarRFoam Manufacturing Inc**

### **Products:**

**StarRStruc Plus R3**  
**StarRStruc Plus R5**

Issue Date:

December 20, 2019

Revision Date:

May 6, 2020

Subject to Renewal:

January 1, 2021





COMPANY  
INFORMATION:

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DIVISION: 06 00 00 - WOOD, PLASTICS AND COMPOSITES

SECTION: 06 12 00 - Structural Panels

SECTION: 06 12 19 - Shear Wall Panels

SECTION: 06 16 00 - Sheathing

DIVISION: 07 00 00 - THERMAL AND MOISTURE PROTECTION

SECTION: 07 21 00 - Thermal Insulation

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

SECTION: 07 27 00 - Air Barriers

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## 1 PRODUCTS EVALUATED<sup>1</sup>

- 1.1 StarRStruc Plus R3  
StarRStruc Plus R5

## 2 APPLICABLE CODES AND STANDARDS<sup>2,3</sup>

### 2.1 Codes

- 2.1.1 *IBC—12, 15, 18: International Building Code®*
- 2.1.2 *IRC—12, 15, 18: International Residential Code®*

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<sup>1</sup> 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 #1131.

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](http://drjcertification.org) or call us at 608-310-6748.

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

<sup>3</sup> All terms defined in the applicable building codes are italicized.





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

## 2.2 Standards and Referenced Documents

2.2.1 *AATCC TM127: Water Resistance: Hydrostatic Pressure Test*

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

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

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

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

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

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

2.2.8 *ASTM E96: Standard Test Methods for Water Vapor Transmission of Materials*

## 3 PERFORMANCE EVALUATION

3.1 StarRStruc Plus R3 and R5 were evaluated to determine the following:

- 3.1.1 Structural performance under lateral load conditions for wind loading for use as an alternative to the *IRC* Intermittent Wall Bracing provisions of [IRC Section R602.10](#) Method WSP.
- 3.1.2 Structural performance under lateral load conditions for wind loading for use with the *IRC* Continuous Wall Bracing provisions of [IRC Section R602.10.4](#) Method CS-WSP and CS-PF.
- 3.1.3 Structural performance under lateral load conditions for use as an alternative to the *IRC* Continuous Wall Bracing provisions of [IRC Section R602.10.6.2](#) Method PFH.
- 3.1.4 Structural performance under lateral load conditions for wind loading for use with the *IBC* performance-based provisions, [Section 2306.1](#) and [Section 2306.3](#), for light-frame wood wall assemblies.
- 3.1.5 Structural performance under lateral load conditions for use as an alternative to the *IRC* simplified bracing provisions of [IRC Section R602.12](#).
- 3.1.6 Structural performance under lateral load conditions for use as an alternative to *SDPWS* Section 4.3 Wood-Frame Shear Walls.
- 3.1.7 Resistance to transverse loads for wall assemblies used in light-frame wood construction in accordance with [IBC Section 1609.1.1](#) and [IRC Section R301.2.1](#).
- 3.1.8 Performance for use as insulated sheathing in accordance with the [IECC Section C402.1](#) and [IECC Section R402.1](#).
- 3.1.9 Performance for use as a water-resistive barrier (WRB) in accordance with the [IBC Section 1403.2](#)<sup>4</sup> and [IRC Section R703.2](#).
- 3.1.10 Performance for use as a vapor retarder in accordance with [IBC Section 202](#) and [Section 1404.3](#),<sup>5</sup> and [IRC Section R202](#) and [Section R702.7](#).
- 3.1.11 Performance for use as an air barrier in accordance with [IRC Section N1102.4.1.1](#) and [IECC Section C402.5.1.2.1](#).<sup>6</sup>
- 3.1.12 Surface burning characteristics in accordance with [IBC Section 2603.3](#) and [IRC Section R316.3](#).

<sup>4</sup> [2015 IBC Section 1404.2](#)

<sup>5</sup> [2015 IBC Section 1405.3](#)

<sup>6</sup> [2012 IECC Section C402.4.1.2.1](#)

- 3.2 Performance under seismic loading is outside the scope of this TER.
- 3.3 Use with steel studs is outside the scope of this TER.
- 3.4 Any code compliance issues not specifically addressed in this section are outside the scope of this TER.
- 3.5 Any engineering evaluation conducted for this TER was performed on the dates provided in this TER and within Dr.J's professional scope of work.

#### 4 PRODUCT DESCRIPTION AND MATERIALS

- 4.1 The product evaluated in this TER is shown in Figure 1.



FIGURE 1. STARRSTRUC PLUS PRODUCT

- 4.2 StarRStruc Plus is structural insulating sheathing product composed of Neopor® Rigid Foam Insulation and fiberboard. A film is applied to the foam on the opposing side of the fiberboard.
- 4.3 StarRStruc Plus consists of the following materials:
  - 4.3.1 EPS: 5/8" or 1 1/8" Neopor®
  - 4.3.2 Fiberboard: 0.108" (2.74 mm)
- 4.4 The Neopor® may be installed against the studs (foam in) with the fiberboard on the exterior face of the wall, or the fiberboard may be installed against the studs with the Neopor® on the exterior face of the wall (foam out).
- 4.5 *Material Availability*
  - 4.5.1 StarRStruc Plus R3 Nominal Thickness: 3/4"
  - 4.5.2 StarRStruc Plus R5 Nominal Thickness: 1 1/8"
  - 4.5.3 Standard Width: 4'
  - 4.5.4 Standard Length: 8', 9', 10'
- 4.6 Where the name 'StarRStruc Plus' is used in this TER both the R3 and R5 products apply.

## 5 APPLICATIONS

- 5.1 Except as otherwise described in this TER, StarRStruc Plus shall be installed in accordance with the applicable building codes listed in Section 2 using the provisions set forth therein for the design and installation of wood structural panels (WSP).
- 5.2 StarRStruc Plus is used as a wall sheathing in buildings constructed in accordance with the *IBC* and *IRC* for light-frame wood construction.
- 5.3 StarRStruc Plus is used as a wall sheathing in Type V construction in accordance with the *IBC*.
- 5.4 StarRStruc Plus shall be permitted to be designed in accordance with *SDPWS* for the design of shear walls using the methods set forth therein, excluding the perforated shear wall methodology, and subject to the *SDPWS* boundary conditions except as specifically allowed in this TER.
- 5.5 Anchorage for in-plane shear shall be provided to transfer the induced shear force into and out of each shear wall.
  - 5.5.1 For wind design, anchor bolt spacing shall not exceed 6' o.c. (1,829 mm).
- 5.6 The maximum aspect ratio for StarRStruc Plus shall be 4:1.
- 5.7 The minimum full height panel width shall be 24" (610 mm) in accordance with *IRC* Section R602.10.5.
- 5.8 All panel edges shall be blocked with a minimum 2" (51 mm) nominal lumber.
- 5.9 Fasteners shall be installed flush with the surface of the fiberboard for both foam in and foam out installation orientations.
- 5.10 Installation is permitted for single top plate (advanced framing method) or double top plate applications.
- 5.11 *Structural Applications*
  - 5.11.1 Where the application exceeds the limitations set forth herein, design shall be permitted in accordance with accepted engineering procedures, experience, and technical judgment.
  - 5.11.2 *Simplified IRC Bracing Provisions*
    - 5.11.2.1 StarRStruc Plus is permitted to be used in accordance with the *IRC* simplified bracing method of *IRC* Section R602.12 as modified by Table 1 for foam in orientations and Table 2 for foam out orientations. All other provisions of the *IRC* simplified bracing method shall be met.

TABLE 1. STARRSTRUC PLUS SIMPLIFIED BRACING TABLE – FOAM IN ORIENTATION

Structural Sheathing Product	Ultimate Design Wind Speed, $V_{ult}$ (mph)	Story Level <sup>2</sup>	Eave to Ridge Height (ft)	Minimum Number of Bracing Units Required (Long Side)						Minimum Number of Bracing Units Required (Short Side)					
				Length of Short Side (ft)						Length of Long Side (ft)					
				10	20	30	40	50	60	10	20	30	40	50	60
StarRStruc Plus (Foam In)	115	One Story or Top of Two or Three Stories	10	1	1	2	2	3	3	1	1	2	2	3	3
		First of Two Story or Second of Three Stories		1	2	3	4	4	5	1	2	3	4	4	5
		First of Three Stories		2	3	4	6	7	8	2	3	4	6	7	8
		One Story or Top of Two or Three Stories	15	1	1	3	3	4	4	1	1	3	3	4	4
		First of Two Story or Second of Three Stories		1	2	3	5	5	6	1	2	3	5	5	6
		First of Three Stories		2	3	4	7	8	9	2	3	4	7	8	9
	130	One Story or Top of Two or Three Stories	10	1	2	2	3	3	4	1	2	2	3	3	4
		First of Two Story or Second of Three Stories		2	3	4	5	6	6	2	3	4	5	6	6
		First of Three Stories		2	4	6	7	9	11	2	4	6	7	9	11
		One Story or Top of Two or Three Stories	15	1	3	3	4	4	5	1	3	3	4	4	5
		First of Two Story or Second of Three Stories		2	3	5	6	7	7	2	3	5	6	7	7
		First of Three Stories		2	4	7	8	10	12	2	4	7	8	10	12

SI: 1 in = 25.4 mm

1. This simplified bracing table is based on the provisions of [IRC Section R602.12](#). All provisions therein shall be observed, except that this table shall replace [IRC Table R602.12.4](#), and StarRStruc Plus shall replace the sheathing material.
2. The [2012 IRC Section R602.12](#) limits the number of stories to two when using the simplified wall bracing method. Therefore, when using the 2012 *IRC*, the "First of Three Story" rows shall not be used.
3. StarRStruc Plus installed with butted joints on 2x4 studs spaced 16" o.c. and fastened with a minimum 1-3/4" x 0.120" nails installed 3" o.c. along the edges and 3" o.c. in the field. Fastener edge distance shall be a minimum of 3/8". Nails with a head diameter and length greater than the 1-3/4" x 0.120" nails are also permissible.
4. Minimum 1/2" gypsum wallboard attached to the interior side of the wall in accordance with [IRC Section R702.3.5](#) and [Table R702.3.5](#).
5. Interpolation shall not be permitted.
6. Cripple walls or wood-framed basement walls in a walk-out condition shall be designated as the first story and the stories above shall be re-designated as the second and third stories, respectively, and shall be prohibited in a three-story structure.
7. Actual lengths of the sides of the circumscribed rectangle shall be rounded to the next highest unit of 10 when using this table.
8. For Exposure Category C, multiply bracing units by a factor of 1.20 for a one-story building, 1.30 for a two-story building, and 1.40 for a three-story building.
9. Maximum stud spacing is 16" o.c.



TABLE 2. STARRSTRUC PLUS SIMPLIFIED BRACING TABLE – FOAM OUT ORIENTATION

Structural Sheathing Product	Ultimate Design Wind Speed, $V_{ult}$ (mph)	Story Level <sup>2</sup>	Eave to Ridge Height (ft)	Minimum Number of Bracing Units Required (Long Side)						Minimum Number of Bracing Units Required (Short Side)					
				Length of Short Side (ft)						Length of Long Side (ft)					
				10	20	30	40	50	60	10	20	30	40	50	60
StarRStruc Plus (Foam Out)	115	One Story or Top of Two or Three Stories	10	1	1	2	2	3	3	1	1	2	2	3	3
		First of Two Story or Second of Three Stories		1	2	3	4	4	5	1	2	3	4	4	5
		First of Three Stories		2	3	4	6	7	8	2	3	4	6	7	8
		One Story or Top of Two or Three Stories	15	1	1	3	3	4	4	1	1	3	3	4	4
		First of Two Story or Second of Three Stories		1	2	3	5	5	6	1	2	3	5	5	6
		First of Three Stories		2	3	4	7	8	9	2	3	4	7	8	9
	130	One Story or Top of Two or Three Stories	10	1	2	2	3	3	4	1	2	2	3	3	4
		First of Two Story or Second of Three Stories		2	3	4	5	6	6	2	3	4	5	6	6
		First of Three Stories		2	4	6	7	9	11	2	4	6	7	9	11
		One Story or Top of Two or Three Stories	15	1	3	3	4	4	5	1	3	3	4	4	5
		First of Two Story or Second of Three Stories		2	3	5	6	7	7	2	3	5	6	7	7
		First of Three Stories		2	4	7	8	10	12	2	4	7	8	10	12



Structural Sheathing Product	Ultimate Design Wind Speed, $V_{ult}$ (mph)	Story Level <sup>2</sup>	Eave to Ridge Height (ft)	Minimum Number of Bracing Units Required (Long Side)						Minimum Number of Bracing Units Required (Short Side)					
				Length of Short Side (ft)						Length of Long Side (ft)					
				10	20	30	40	50	60	10	20	30	40	50	60
SI: 1 in = 25.4 mm 1. This simplified bracing table is based on the provisions of <u>IRC Section R602.12</u> . All provisions therein shall be observed, except that this table shall replace <u>IRC Table R602.12.4</u> , and StarRStruc Plus shall replace the sheathing material. 2. The <u>2012 IRC Section R602.12</u> limits the number of stories to two when using the simplified wall bracing method. Therefore, when using the 2012 <u>IRC</u> , the "First of Three Story" rows shall not be used. 3. StarRStruc Plus installed with butted joints on 2x4 studs spaced 16" o.c. and fastened as follows with spacing 3" o.c. along the edges and 3" o.c. in the field. Fastener edge distance shall be a minimum of $\frac{3}{8}$ ". a. StarRStruc Plus R3: "N"-style 16ga galvanized staple ( $\frac{1}{2}$ " crown x 1 $\frac{1}{4}$ " leg), or 1" crown x 1 $\frac{1}{4}$ " leg b. StarRStruc Plus R5: 16ga galvanized staple (1" crown x 2" leg) 4. Minimum $\frac{1}{2}$ " gypsum wallboard attached to the interior side of the wall in accordance with <u>IRC Section R702.3.5</u> and <u>Table R702.3.5</u> . 5. Interpolation shall not be permitted. 6. Cripple walls or wood-framed basement walls in a walk-out condition shall be designated as the first story and the stories above shall be re-designated as the second and third stories, respectively, and shall be prohibited in a three-story structure. 7. Actual lengths of the sides of the circumscribed rectangle shall be rounded to the next highest unit of 10 when using this table. 8. For Exposure Category C, multiply bracing units by a factor of 1.20 for a one-story building, 1.30 for a two-story building, and 1.40 for a three-story building. 9. Maximum stud spacing is 16" o.c.															

5.11.3 *Prescriptive IRC Bracing Applications:*

5.11.3.1 StarRStruc Plus may be used in the following applications:

- 5.11.3.1.1 On braced wall lines equivalent to the IRC Method WSP (wood structural panel) when installed in accordance with IRC Section R602.10.4 and this TER.
- 5.11.3.1.2 To brace walls of buildings equivalent to the IRC Method CS-WSP (continuously sheathed wood structural panel) when installed in accordance with IRC Section R602.10.4 and this TER.
- 5.11.3.1.3 To brace walls of buildings equivalent to the IRC Method CS-PF (continuously sheathing portal frame), in lieu of WSP, when installed in accordance with IRC Section R602.10.6.4.
- 5.11.3.1.4 To brace walls of buildings equivalent to the IRC Method PHF (portal frame with hold-downs) when installed in accordance with IRC Section R602.10.6.2.

5.11.3.2 All other IRC prescriptive bracing minimums, spacing requirements, and rules must still be met.

5.11.3.3 Where a building, or portion thereof, does not comply with one or more of the bracing requirements within the prescriptive section of the IRC, those portions shall be designed and constructed in accordance with IRC Section R301.1.

5.11.3.4 Wind Bracing

- 5.11.3.4.1 Required braced wall panel lengths are provided in Table 3 and Table 4 for foam in orientations and Table 5 for foam out orientations. These tables shall be used in place of IRC Table R602.10.3(1). All adjustment factors from IRC Table R602.10.3(2) shall still be applied.



Table 3. *IRC* Bracing Requirements for StarRStruc Plus R3 (Foam In) – Wind

Condition	Braced Wall Line Spacing	Minimum Total Length (ft) of Braced Wall Panels Required Along Each Braced Wall Line									
		Intermediate Sheathing					Continuous Sheathing				
		Ultimate Design Wind Speed, <sup>6</sup> V <sub>ult</sub> (mph)									
		≤ 110	≤ 115	≤ 120	≤ 130	< 140	≤ 110	≤ 115	≤ 120	≤ 130	< 140
One Story or the Top of Two or Three Stories	10	1.7	1.7	2.2	2.2	2.6	1.3	1.7	1.7	2.2	2.2
	20	3.0	3.0	3.4	4.3	4.7	2.6	3.0	3.0	3.4	4.3
	30	4.3	4.7	5.2	6.0	6.9	3.9	3.9	4.3	5.2	6.0
	40	5.6	6.0	6.9	7.8	9.0	4.7	5.2	5.6	6.5	7.8
	50	6.9	7.8	8.2	9.5	11.2	6.0	6.5	6.9	8.2	9.5
	60	8.2	9.0	9.9	11.2	12.9	6.9	7.8	8.2	9.5	11.2
First Story of Two Stories or Second Story of Three Stories	10	3.0	3.4	3.9	4.3	5.2	2.6	3.0	3.0	3.9	4.3
	20	5.6	6.5	6.9	8.2	9.5	4.7	5.6	6.0	6.9	7.8
	30	8.2	9.0	9.9	11.6	13.4	6.9	7.8	8.2	9.9	11.2
	40	10.8	11.6	12.9	15.1	17.2	9.0	9.9	10.8	13.4	14.6
	50	13.4	14.2	15.5	18.5	21.1	11.2	12.1	13.4	15.5	18.1
	60	15.5	17.2	18.5	21.5	25.0	13.4	14.6	15.9	18.5	21.5
First Story of Three Stories	10	4.7	5.2	5.6	6.5	7.3	3.9	4.3	4.7	5.6	6.5
	20	8.6	9.5	9.9	11.6	13.8	7.3	7.8	8.6	9.9	11.6
	30	12.1	13.4	14.6	16.8	19.8	10.3	11.2	12.5	14.6	16.8
	40	15.9	17.2	19.0	22.0	25.4	13.4	14.6	15.9	19.0	21.5
	50	19.4	21.1	23.3	27.1	31.4	16.4	18.1	19.8	22.8	26.7
	60	22.8	25.0	27.6	32.3	37.0	19.8	21.5	23.3	27.1	31.4

SI: 1 in = 25.4 mm, 1 mph = 1.61 km/h

- Demonstrates equivalency to *IRC* Table R602.10.3(1). All adjustment factors from *IRC* Table R602.10.3(2) shall be applied.
- StarRStruc Plus installed with butted joints on 2x4 studs spaced 16" o.c. and fastened with a minimum 1-3/4" x 0.120" nails installed 3" o.c. along the edges and 3" o.c. in the field. Fastener edge distance shall be a minimum of 3/8". Nails with a head diameter and length greater than the 1-3/4" x 0.120" nails are also permissible.
- Minimum 1/2" gypsum wallboard shall be installed as part of the wall assembly. Where gypsum wallboard is not applied to the interior side of the wall assembly, bracing lengths shall be multiplied by a factor of 1.4.
- Linear interpolation is permitted.
- Bracing lengths are the result of comparative equivalency testing and analysis using both tested and published design values as points of comparison. DrJ relies upon the design values published in the codes and standards listed in Section 2 that are adopted into law and that the manufacturers of those products stand behind. DrJ performs all equivalency analysis based on legally defined design values, the responsibility for which is the manufacturer of those products or the members of the associations that publish those design values.
- Wind speeds are V<sub>ult</sub> in accordance with *ASCE* 7-16. Use the following equation to convert to equivalent V<sub>asd</sub> wind speed for use with the *2012 IBC* in accordance with *IBC* Section 1609.3.1:  $V_{asd} = V_{ult}\sqrt{0.6}$ .

TABLE 4. IRC BRACING REQUIREMENTS FOR STARRSTRUC PLUS R5 (FOAM IN) – WIND

Condition	Braced Wall Line Spacing	Minimum Total Length (ft) of Braced Wall Panels Required Along Each Braced Wall Line									
		Intermediate Sheathing					Continuous Sheathing				
		Ultimate Design Wind Speed, <sup>6</sup> V <sub>ult</sub> (mph)									
		≤ 110	≤ 115	≤ 120	≤ 130	< 140	≤ 110	≤ 115	≤ 120	≤ 130	< 140
One Story or the Top of Two or Three Stories	10	1.9	1.9	2.3	2.3	2.8	1.4	1.9	1.9	2.3	2.3
	20	3.3	3.3	3.7	4.7	5.1	2.8	3.3	3.3	3.7	4.7
	30	4.7	5.1	5.6	6.5	7.5	4.2	4.2	4.7	5.6	6.5
	40	6.1	6.5	7.5	8.4	9.8	5.1	5.6	6.1	7.0	8.4
	50	7.5	8.4	8.9	10.3	12.2	6.5	7.0	7.5	8.9	10.3
	60	8.9	9.8	10.8	12.2	14.0	7.5	8.4	8.9	10.3	12.2
First Story of Two Stories or Second Story of Three Stories	10	3.3	3.7	4.2	4.7	5.6	2.8	3.3	3.3	4.2	4.7
	20	6.1	7.0	7.5	8.9	10.3	5.1	6.1	6.5	7.5	8.4
	30	8.9	9.8	10.8	12.6	14.5	7.5	8.4	8.9	10.8	12.2
	40	11.7	12.6	14.0	16.4	18.7	9.8	10.8	11.7	14.5	15.9
	50	14.5	15.4	16.8	20.1	22.9	12.2	13.1	14.5	16.8	19.6
	60	16.8	18.7	20.1	23.4	27.1	14.5	15.9	17.3	20.1	23.4
First Story of Three Stories	10	5.1	5.6	6.1	7.0	8.0	4.2	4.7	5.1	6.1	7.0
	20	9.4	10.3	10.8	12.6	15.0	8.0	8.4	9.4	10.8	12.6
	30	13.1	14.5	15.9	18.2	21.5	11.2	12.2	13.6	15.9	18.2
	40	17.3	18.7	20.6	23.9	27.6	14.5	15.9	17.3	20.6	23.4
	50	21.1	22.9	25.3	29.5	34.1	17.8	19.6	21.5	24.8	29.0
	60	24.8	27.1	29.9	35.1	40.2	21.5	23.4	25.3	29.5	34.1

SI: 1 in = 25.4 mm, 1 mph = 1.61 km/h

- Demonstrates equivalency to [IRC Table R602.10.3\(1\)](#). All adjustment factors from [IRC Table R602.10.3\(2\)](#) shall be applied.
- StarRStruc Plus installed with butted joints on 2x4 studs spaced 16" o.c. and fastened with a minimum 1-3/4" x 0.120" nails installed 3" o.c. along the edges and 3" o.c. in the field. Fastener edge distance shall be a minimum of 3/8". Nails with a head diameter and length greater than the 1-3/4" x 0.120" nails are also permissible.
- Minimum 1/2" gypsum wallboard shall be installed as part of the wall assembly. Where gypsum wallboard is not applied to the interior side of the wall assembly, bracing lengths shall be multiplied by a factor of 1.4.
- Linear interpolation is permitted.
- Bracing lengths are the result of comparative equivalency testing and analysis using both tested and published design values as points of comparison. DrJ relies upon the design values published in the codes and standards listed in Section 2 that are adopted into law and that the manufacturers of those products stand behind. DrJ performs all equivalency analysis based on legally defined design values, the responsibility for which is the manufacturer of those products or the members of the associations that publish those design values.
- Wind speeds are V<sub>ult</sub> in accordance with [ASCE 7-16](#). Use the following equation to convert to equivalent V<sub>asd</sub> wind speed for use with the [2012 IBC](#) in accordance with [IBC Section 1609.3.1](#):  $V_{asd} = V_{ult} \sqrt{0.6}$ .

TABLE 5. IRC BRACING REQUIREMENTS FOR STARRSTRUC PLUS R3 & R5 (FOAM OUT) – WIND

Condition	Braced Wall Line Spacing	Minimum Total Length (ft) of Braced Wall Panels Required Along Each Braced Wall Line									
		Intermediate Sheathing					Continuous Sheathing				
		Ultimate Design Wind Speed, <sup>6</sup> V <sub>ult</sub> (mph)									
		≤ 110	≤ 115	≤ 120	≤ 130	< 140	≤ 110	≤ 115	≤ 120	≤ 130	< 140
One Story or the Top of Two or Three Stories	10	1.6	1.6	2.0	2.0	2.3	1.2	1.6	1.6	2.0	2.0
	20	2.7	2.7	3.1	3.9	4.3	2.3	2.7	2.7	3.1	3.9
	30	3.9	4.3	4.7	5.5	6.3	3.5	3.5	3.9	4.7	5.5
	40	5.1	5.5	6.3	7.0	8.2	4.3	4.7	5.1	5.9	7.0
	50	6.3	7.0	7.4	8.6	10.2	5.5	5.9	6.3	7.4	8.6
	60	7.4	8.2	9.0	10.2	11.7	6.3	7.0	7.4	8.6	10.2
First Story of Two Stories or Second Story of Three Stories	10	2.7	3.1	3.5	3.9	4.7	2.3	2.7	2.7	3.5	3.9
	20	5.1	5.9	6.3	7.4	8.6	4.3	5.1	5.5	6.3	7.0
	30	7.4	8.2	9.0	10.6	12.1	6.3	7.0	7.4	9.0	10.2
	40	9.8	10.6	11.7	13.7	15.6	8.2	9.0	9.8	12.1	13.3
	50	12.1	12.9	14.1	16.8	19.2	10.2	10.9	12.1	14.1	16.4
	60	14.1	15.6	16.8	19.5	22.7	12.1	13.3	14.5	16.8	19.5
First Story of Three Stories	10	4.3	4.7	5.1	5.9	6.6	3.5	3.9	4.3	5.1	5.9
	20	7.8	8.6	9.0	10.6	12.5	6.6	7.0	7.8	9.0	10.6
	30	10.9	12.1	13.3	15.2	18.0	9.4	10.2	11.3	13.3	15.2
	40	14.5	15.6	17.2	19.9	23.1	12.1	13.3	14.5	17.2	19.5
	50	17.6	19.2	21.1	24.6	28.5	14.9	16.4	18.0	20.7	24.2
	60	20.7	22.7	25.0	29.3	33.6	18.0	19.5	21.1	24.6	28.5

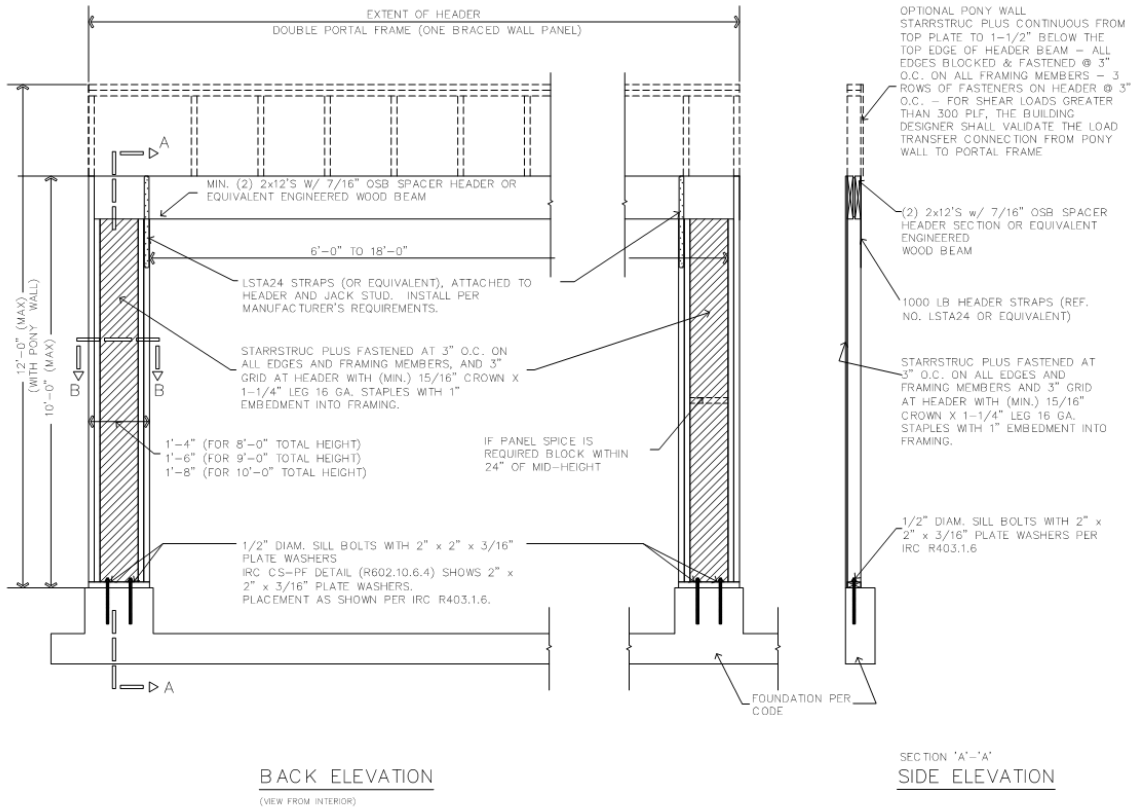
SI: 1 in = 25.4 mm, 1 mph = 1.61 km/h

- Linear interpolation is permitted.
- StarRStruc Plus installed with butted joints on 2x4 studs spaced 16" o.c. and fastened as follows with spacing 3" o.c. along the edges and 3" o.c. in the field. Fastener edge distance shall be a minimum of 3/8".
  - StarRStruc Plus R3: "N"-style 16ga galvanized staple (1/2" crown x 1 1/4" leg), or 1" crown x 1 1/4" leg
  - StarRStruc Plus R5: 16ga galvanized staple (1" crown x 2" leg)
- Demonstrates equivalency to IRC Table R602.10.3(1). All adjustment factors from IRC Table R602.10.3(2) shall be applied.
- Minimum 1/2" gypsum wallboard shall be installed as part of the wall assembly. Where gypsum wallboard is not applied to the interior side of the wall assembly, bracing lengths shall be multiplied by a factor of 1.4.
- Bracing lengths are the result of comparative equivalency testing and analysis using both tested and published design values as points of comparison. DrJ relies upon the design values published in the codes and standards listed in Section 2 that are adopted into law and that the manufacturers of those products stand behind. DrJ performs all equivalency analysis based on legally defined design values, the responsibility for which is the manufacturer of those products or the members of the associations that publish those design values.
- Wind speeds are V<sub>ult</sub> in accordance with ASCE 7-16. Use the following equation to convert to equivalent V<sub>asd</sub> wind speed for use with the 2012 IBC in accordance with IBC Section 1609.3.1:  $V_{asd} = V_{ult}\sqrt{0.6}$ .

5.11.4 *StarRStruc Plus Method CS-PF – Continuously Sheathed Portal Frame:*

5.11.4.1 A “StarRStruc Plus Structural Sheathing CS-PF” was evaluated for use in *IRC Method CS-PF* in accordance with IRC Section R602.10.6.4 and Table R602.10.6.4 and is approved for use as a contributing length of wall bracing in accordance with IRC Section R602.10.5.

5.11.4.2 The StarRStruc Plus Structural Sheathing CS-PF is described as follows in Figure 2.



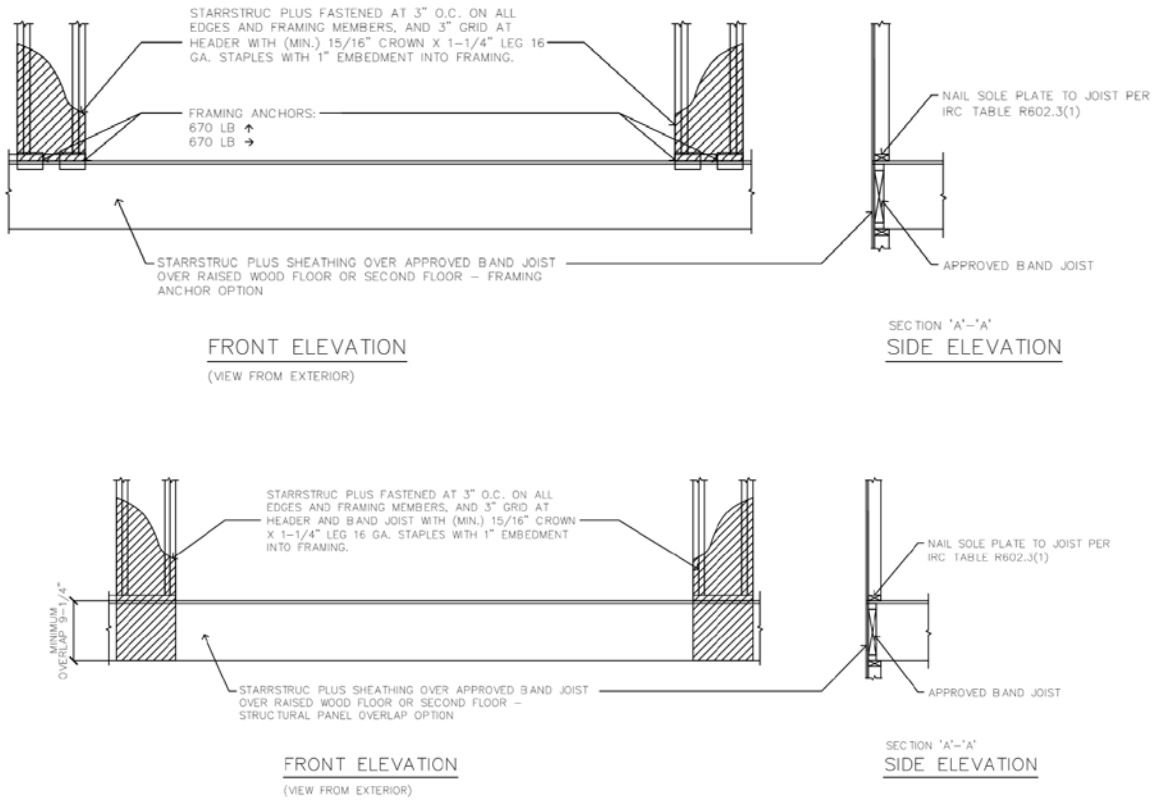
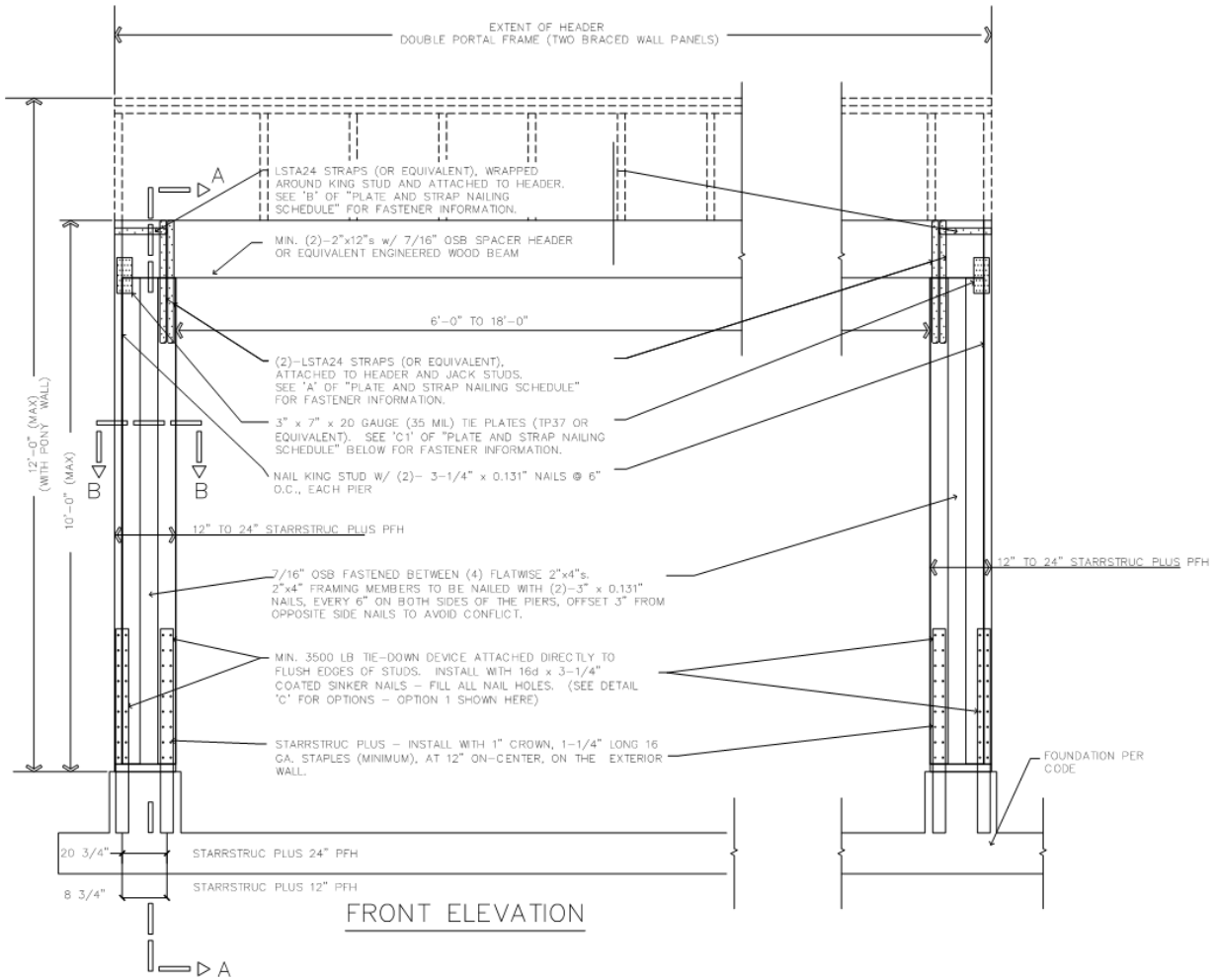


FIGURE 2. STARRSTRUC PLUS STRUCTURAL SHEATHING CS-PF

5.11.5 *StarRStruc Plus Method PFH – Portal Frame with Hold Downs:*

5.11.5.1 In accordance with the IRC Section R602.10.6.2, the PFH referenced in the *IRC* is permitted to be an equivalent replacement for a 4' length of Method WSP bracing.

5.11.5.2 The StarRStruc Plus Structural Sheathing 12" PFH and 24" PFH is constructed in accordance with Figure 3, Figure 4, Figure 5.



**PLATE AND STRAP NAILING SCHEDULE**

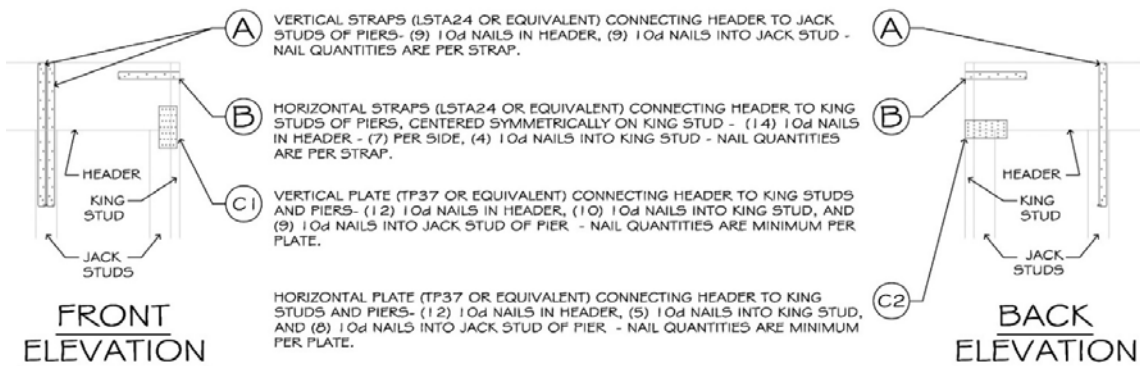


FIGURE 3. CONSTRUCTION DETAILS OF STARRSTRUC PLUS 12" TO 24" PFH

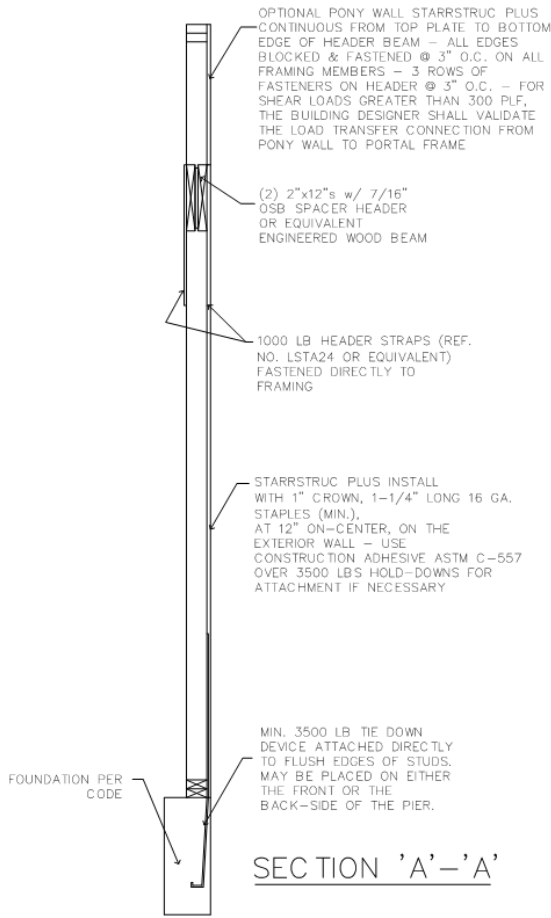
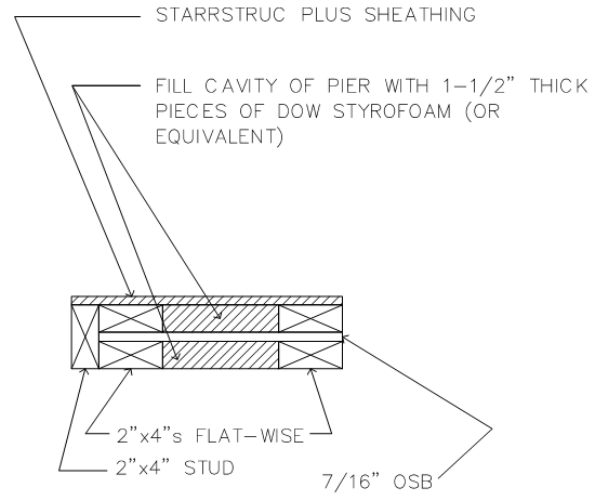


FIGURE 4. PFH SECTION A-A



SECTION 'B'-'B'  
OPTIONAL INSULATION  
OF JOIST CAVITIES

FIGURE 5. PFH SECTION B-B

5.11.5.3 A comparison of WSP braced wall lines and StarRStruc Plus 12" PFH and 24" PFH is shown in Table 5.

TABLE 6. ASD ALLOWABLE DESIGN VALUES FOR PFH<sup>1,2,3,4,5</sup>

Test Name	Sheathing Material	Fastener Size & Spacing	Total Bracing Width (in)	Maximum Wall Height (ft)	ASD Allowable Design Value per Panel/Pier (lb)
IBC/IRC Benchmark	3/8" OSB isolated 4'x8' panels	2 3/8" x 0.113" nails at 6:12 spacing	96	≤ 10	1,400
12" PFH	StarRStruc Plus	see Figure 3, Figure 4, and Figure 5	12	8	1,410
				10	1,060
24" PFH	StarRStruc Plus	see Figure 3, Figure 4, and Figure 5	24	8	2,560
				10	1,920

SI: 1 in = 25.4 mm, 1 lb = 4.45 N

- Capacity derived from multiple full-scale tests at SBCRI constructed with SPF framing, as well as testing from other labs, showing the capacity of OSB sheathing in buildings constructed in accordance with the minimum requirements of the *IRC*.
- The PFH bracing type in the *IBC/IRC* is defined as equivalent to a 4' BWP using 3/8" WSP. Equivalent capacity is based on comparison of SBCRI testing of the PFH and 3/8" OSB as compared to the published capacities as defined in the *IBC* and *SDPWS*.
- For seismic design, reduce capacities by a factor of 1.4.
- Interpolation between the wall heights and pier widths for the 12" PFH and 24" PFH is permitted.
- 10'-high wall design values are provided here that use a 75% factor to reduce the 8'-high wall design values generated by the SBCRI test data.

5.11.5.4 The test data and subsequent engineering analysis provides confirmation that the performance of the StarRStruc Plus 12" PFH and 24" PFH provide comparable equivalence to the Method WSP braced wall panels.

5.11.5.5 The maximum allowable compressive strength of the StarRStruc Plus 12" to 24" PFH is 11,156 lbs. per pier based on five SPF studs per pier (detailed in Figure 3, Figure 4, and Figure 5). Additional compressive capacity may be engineered into each pier. Structurally attaching full-height framing members within the pier cavity is one possible engineered option.

5.11.6 *Alternative Prescriptive IRC Wall Bracing Applications:*

5.11.6.1 As an alternative to Section 5.11.2, the following provisions are permitted:

5.11.6.1.1 StarRStruc Plus may be used to brace walls of buildings as an alternative to the WSP and CS-WSP provisions of *IRC Section R602.10.4*, when installed in accordance with this TER.

5.11.6.1.2 These braced wall line length equivalency factors (Table 7) are based on equivalency testing and are used to comply with Method WSP and CS-WSP of the *IRC*.



5.11.6.1.3 Required braced wall panel lengths for StarRStruc Plus shall be as determined by multiplying the equivalency factor shown in Table 6 by the lengths in IRC Table R602.10.3(1) as modified by all applicable factors in Table R602.10.3(2). All *IRC* footnotes shall apply.

TABLE 7. BRACED WALL LINE LENGTH EQUIVALENCY FACTOR<sup>1,2,3,4,5,6</sup>

Wall Assembly	Orientation (in)	Fastener(s)	Fastener Spacing (in)	Max. Stud Spacing (in)	Equivalency Factor to <i>IRC</i> WSP and CS-WSP
StarRStruc Plus R3	Foam In	1-3/4" x 0.120" nail <sup>(7)</sup>	3:3	16 o.c.	0.86
	Foam Out	"N"-style 16ga staple 1/2" crown x 1-1/4" leg, or 1" crown x 1-1/4" leg			0.78
StarRStruc Plus R5	Foam In	1-3/4" x 0.120" nail <sup>(7)</sup>			0.94
	Foam Out	16ga staple, 1" crown x 2" leg			0.78

SI: 1 in = 25.4 mm

- Gypsum sheathing installed with Type W screws at 8":8" spacing.
- Multiply the bracing lengths in IRC Table R602.10.3(1) and IRC Table R602.10.3(2) Method WSP or CS-WSP as applicable, including all footnotes, by the factors shown here to establish the required bracing length.
- Where gypsum wallboard is not applied to the interior side of the StarRStruc Plus assembly, bracing lengths shall be multiplied by a factor of 1.4.
- Valid for single and double top plate StarRStruc Plus installations
- Factors based on SPF framing materials.
- These braced wall line length equivalency factors are based on equivalency testing and are used to comply with Method WSP and CS-WSP of the *IRC*.
- Nails with a head diameter and length greater than the 1-3/4" x 0.120" nails are also permissible.

5.11.7 *Prescriptive IBC Conventional Light-Frame Wood Construction:*

5.11.7.1 StarRStruc Plus may be used to brace exterior walls of buildings as an equivalent alternative to WSP or CS-WSP bracing methods of the *IBC* when installed with blocked or unblocked 1/2" gypsum fastened with a minimum #6 Type W screw spaced a maximum of 8" o.c. at panel edges and 8" o.c. in the field. Bracing shall be in accordance with the conventional light-frame construction method of IBC Section 2308.6<sup>7</sup> and this TER.

5.11.8 *Performance-Based IBC Wood-Framed Construction:*

5.11.8.1 StarRStruc Plus panels used in wall assemblies designed as shear walls are approved for the following applications:

- 5.11.8.1.1 Design in accordance with the methodology used in *SDPWS* for WSP using the capacities shown in Table 8.
- 5.11.8.1.2 Resist lateral wind load forces using the allowable shear loads (in pounds per linear foot) set forth in Table 8.
- 5.11.8.1.3 Resist transverse wind load forces using the allowable transverse loads (in pounds per square foot) set forth in Table 9. The transverse wind load forces correspond to the allowable basic wind speeds in Table 10.

<sup>7</sup> 2012 *IBC* Section 2308.9.3

TABLE 8. ALLOWABLE STRESS DESIGN (ASD) CAPACITY FOR WIND<sup>1</sup>

Product	Foam Board Orientation	Fastener(s) Schedule <sup>2</sup>	Fastener Spacing (edge:field) (in)	Maximum Stud Spacing (in)	Gypsum Wallboard <sup>3</sup> (GWB)	Gypsum Wallboard <sup>3</sup> Fastener Spacing (edge:field) (in)	Allowable Unit Shear Capacity (plf)
StarRStruc Plus R3	Foam In	1-3/4" x 0.120" smooth shank nail <sup>(4)</sup>	3:3	16 o.c.	None	-	260
					1/2" GWB	8:8	360
	Foam Out	"N"-style 16ga staple 1/2" crown x 1-1/4" leg, or 1" crown x 1-1/4" leg			None	-	295
					1/2" GWB	8:8	395
StarRStruc Plus R5	Foam In	1-3/4" x 0.120" ring shank nail	3:3	16 o.c.	None	-	230
					1/2" GWB	8:8	330
	Foam Out	16ga staple, 1" crown x 2" leg			None	-	300
					1/2" GWB	8:8	400

SI: 1 in = 25.4 mm, 1 lb/ft = 0.0146 kN/m

1. Tested in accordance with ASTM E564
2. StarRStruc Plus installed with butted joints on 2x4 studs spaced 16" o.c. and fastened as follows with spacing 3" o.c. along the edges and 3" o.c. in the field. Fastener edge distance shall be a minimum of 3/8".
3. Gypsum attached with minimum #6 type W or S screws 1 1/4" long
4. Nails with a head diameter and length greater than the 1-3/4" x 0.120" nails are also permissible.

TABLE 9. TRANSVERSE (OUT-OF-PLANE) WIND LOAD RESISTANCE<sup>1,2,3</sup>

Product	Maximum Stud Spacing (in)	Fastener Schedule	Allowable Design Value (psf)
StarRStruc Plus	16 o.c.	1" crown, 1 1/4" leg, 16 gauge galvanized staples, 3":3" o.c. spacing (edge:field)	120

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

1. Tested in accordance with ASTM E330
2. The capacities shown are for the purpose of providing information on the hold-down capacity of the sheathing to the bottom plate connection independent of lateral loading. Where combined shear and uplift loading is needed, consult a professional engineer.
3. Applicable to both the positive and negative direction.

TABLE 10. BASIC WIND SPEED FOR USE IN EXTERIOR WALL COVERING ASSEMBLIES<sup>1,2</sup>

Product	Allowable Components & Cladding Basic Wind Speed (mph)	
	ASCE 7-05 ( $V_{asd}$ )	ASCE 7-10 and 7-16 ( $V_{ult}$ )
StarRStruc Plus	< 170	< 215
SI: 1 mph = 1.61 km/h 1. Allowable wind speeds are based on the following: Mean roof height 30', Exposure B, Zone 4, 10 sq. ft. effective wind area. See the applicable building code for any adjustment need for specific building location and configuration. 2. 16" o.c. framing		

5.12 Thermal Insulation

5.12.1 StarRStruc Plus meets the continuous insulation requirements of IECC Section C402 and IECC Section R402 and has the thermal resistance provided in Table 11.

TABLE 11. THERMAL RESISTANCE PROPERTIES<sup>1</sup>

Product	R-Value (F*ft <sup>2</sup> *hr/Btu)
StarRStruc Plus R3	3.0
StarRStruc Plus R5	5.0
1. Components tested in accordance with <i>ASTM C518</i>	

5.13 Water-Resistive Barrier (WRB)

- 5.13.1 StarRStruc Plus may be used as a WRB as prescribed in IBC Section 1403.2<sup>8</sup> and IRC Section R703.2 when installed with foam facing in on exterior walls as described in this section.
- 5.13.2 StarRStruc Plus installed with the foam facing out shall be covered with a code-compliant WRB in accordance with IBC Section 1403.2<sup>9</sup> and IRC Section R703.2.
- 5.13.3 StarRStruc Plus shall be installed with board joints placed directly over exterior framing spaced a maximum of 16" (610 mm) o.c. The fasteners used to attach the board shall be installed in accordance with Table 1 through Table 8 and Section 6 as applicable.
- 5.13.4 A separate WRB may also be provided. If a separate WRB method is used, sealing of the sheathing joints is not required.
- 5.13.5 Flashing must be installed at all sheathing penetrations and shall comply with all the applicable code sections. Use StarRtape, Fortiflash® Butyl, or approved equal.
- 5.13.6 StarRStruc Plus may be installed as a WRB in a non-structural capacity with the fasteners used to attach the board installed in accordance with Section 5.17. All joints between sheathing panels shall be covered by minimum 1.5" (38 mm) wide tape (StarRtape or equivalent).

<sup>8</sup> 2015 IBC Section 1404.2

<sup>9</sup> 2015 IBC Section 1404.2

5.14 Vapor Retarder

5.14.1 StarRStruc Plus is a Class II *vapor retarder* in accordance with IBC Section 1404.3 and as shown in Table 12.

TABLE 12. WATER VAPOR BARRIER PROPERTIES<sup>1</sup>

Product	Water Vapor Transmission (perm)
StarRStruc Plus	0.3
1. Tested in accordance with ASTM E96, Desiccant Method	

5.15 Air Barrier

5.15.1 StarRStruc Plus meets the requirements of IRC Section N1102.4.1.1 and IECC Section C402.5.1.2.1<sup>10</sup> for use as a component of the air barrier when installed in accordance with the manufacturer's installation instructions and this TER (Table 13).

5.15.2 When used as part of a continuous air barrier assembly, StarRStruc Plus shall be installed in accordance with Section 6. When installed as part of a continuous air barrier in a non-structural capacity, the fasteners used to attach the board may be installed in accordance with Section 5.17.

5.15.3 All sheathing panel edges at the top and bottom of wall assemblies, and all joints between sheathing panels, shall be sealed in accordance with IRC Section N1102.4.1.1 and IECC Section R402.4.1.1 and C402.5.1. All joints between sheathing panels shall be covered by minimum 1.5" (38 mm) wide tape (StarRtape or equivalent).

TABLE 13. AIR BARRIER PROPERTIES<sup>1</sup>

Product	Air Permeability (cfm/ft <sup>2</sup> )
StarRStruc Plus	< 0.004
1. Tested in accordance with ASTM E2178	

5.16 Surface Burning Characteristics

5.16.1 StarRStruc Plus has the flame spread and smoke developed characteristics shown in Table 14 when tested in accordance with ASTM E84 per IBC Section 2603.3.

TABLE 14. SURFACE BURN CHARACTERISTICS<sup>1</sup>

Product	Flame Spread	Smoke Developed
StarRStruc Plus	≤ 25	≤ 450
1. Tested in accordance with ASTM E84		

5.17 Minimum Fastening Requirements for Non-Structural Applications

5.17.1 Where other means of wall bracing are provided, or are not required, and an approved exterior wall covering capable of separately resisting loads perpendicular to the face of the walls is installed over the sheathing, StarRStruc Plus may be used.

5.17.2 The sheathing panels are applied to wall framing with minimum 0.120" x 1¼" (3 mm x 32 mm) galvanized roofing nails or 16 gage galvanized staples having a 7/16" (11 mm) crown and 1¼" (32 mm) leg lengths.

<sup>10</sup> 2012 IECC Section C402.4.1.2.1

- 5.17.3 Fastener spacing shall be a maximum of 6" (152 mm) at the edges and 12" (305 mm) on intermediate members.
- 5.17.3.1 Stud spacing shall be a maximum of 24" (610 mm) o.c.
- 5.17.3.2 Minimum fastener penetration into the framing members is 3/4" (19 mm).

6 INSTALLATION

- 6.1 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.
- 6.2 Fasteners shall conform to those listed in Table 1 through Table 8 and Section 5.17, as applicable.
- 6.3 Always fasten staples parallel to the framing member.
- 6.4 Fasteners shall be installed with a minimum edge distance of 3/8".
- 6.5 For joints butted at framing members, a single row of fasteners must be applied to each panel edge into the stud.
- 6.6 *Installation Procedure*
  - 6.6.1 Fasten StarRStruc Plus in the order shown in Figure 6. Do not fasten the four corners first.
  - 6.6.2 Do not tack StarRStruc Plus to framing, but fasten each panel completely once fastening begins.

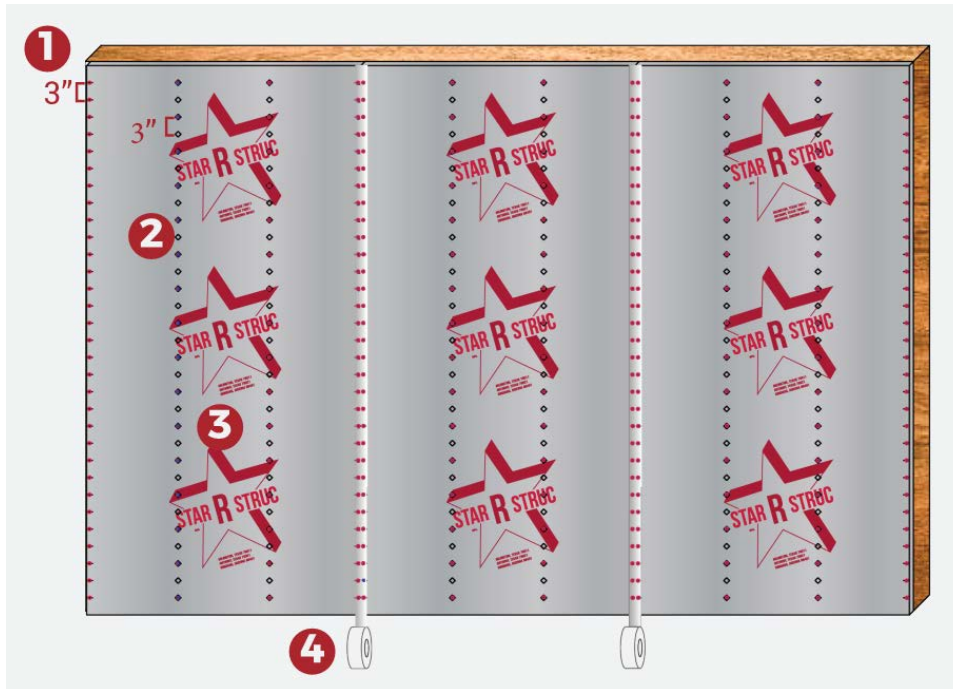


FIGURE 6. INSTALLATION FASTENING PATTERN

- 6.6.3 Step 1: Fasten all sheets around the perimeter every 3" using approved staples or nails. All perimeter edges must be installed over framing members and fastened for structural use. All fasteners shall penetrate at least 1" (Figure 7).
- 6.6.4 Step 2: Fasten all sheets in the field every 3" using approved staples or nails. All fasteners shall penetrate at least 1" (Figure 7).

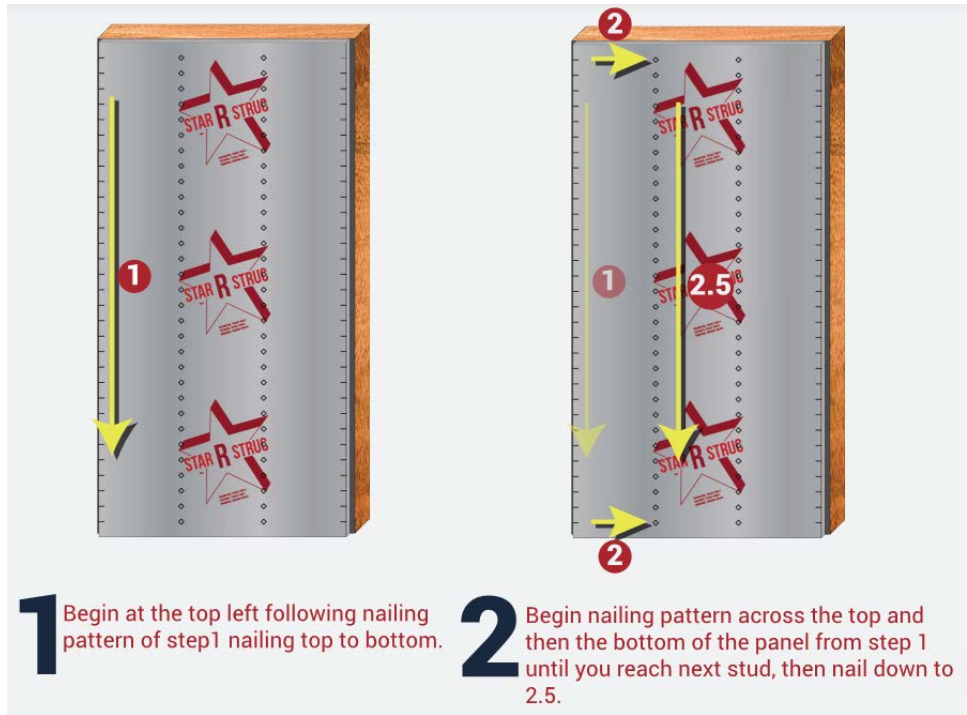


FIGURE 7. INSTALLATION, STEPS 1 AND 2

- 6.6.5 Step 3: Fasten all sheets in the field every 3" using approved staples or nails (Figure 8).
- 6.6.6 Step 4: To achieve a WRB, all seams must be taped in shingle fashion. Use StarRtape, Fortiflash® Butyl, or approved equivalent. Seams must be dry and clear of debris (Figure 8).

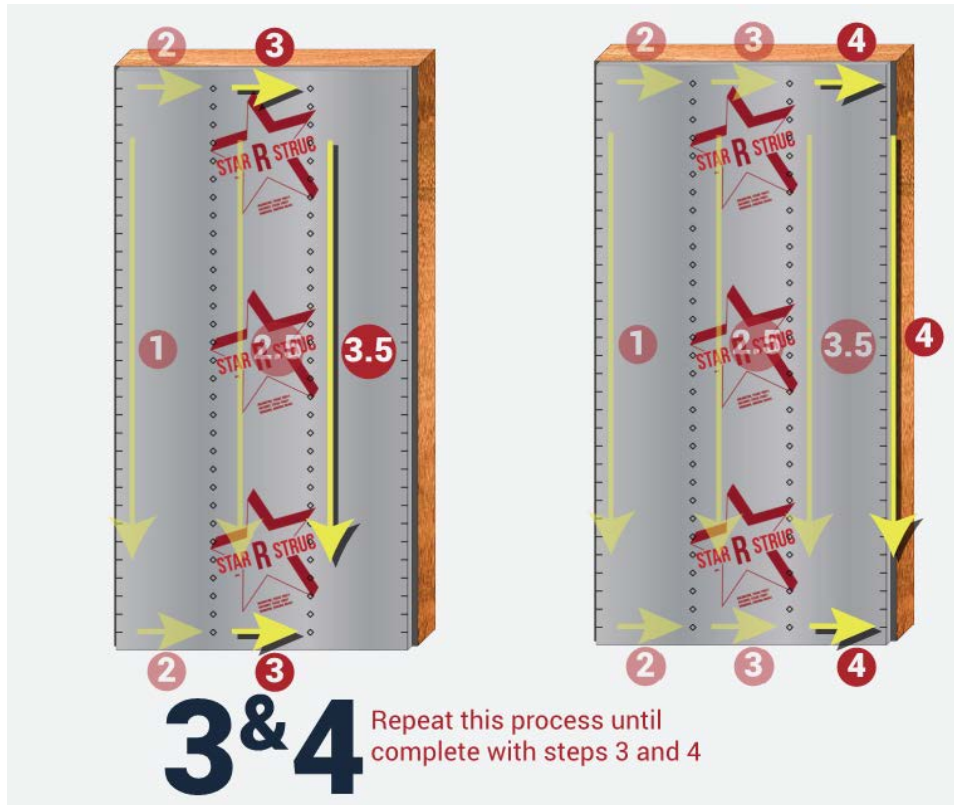


FIGURE 8. INSTALLATION, STEPS 3 AND 4

## 7 TEST ENGINEERING SUBSTANTIATING DATA

- 7.1 Lateral wall testing performed by Structural Building Components Research Institute (SBCRI) in accordance with *ASTM E564*.
- 7.2 Transverse wind pressure resistance testing performed by SBCRI in accordance with *ASTM E330*.
- 7.3 Material property testing for Neopor® in accordance with *ASTM C578*.
- 7.4 Water-resistive barrier testing conducted in accordance with *ASTM E331*.
- 7.5 Water vapor transmission testing performed by Intertek in accordance with *ASTM E96*.
- 7.6 Air barrier testing performed by Architectural Testing in accordance with *ASTM E2178*.
- 7.7 Surface burning characteristics testing performed by UL in accordance with *ASTM E84*.
- 7.8 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.



- 7.9 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 suppliers 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 Use as an alternative to the WSP and CS-WSP wall bracing in accordance with *IRC Section R602.10*.
  - 8.1.2 Use to resist wind loading in accordance with the *IBC* performance-based provisions, *IBC Section 2306.1* and *Section 2306.3*, for light-frame wood wall assemblies.
  - 8.1.3 Use to resist transverse loads on wall assemblies used in light-frame wood construction in accordance with *IBC Section 1609.1.1* and *IRC Section R301.2.1*.
  - 8.1.4 Use as insulated sheathing in accordance with the *IRC Section N1102.4.1.1* and *IECC Section C402.1*.
  - 8.1.5 Use as a water resistive barrier (WRB) in accordance with the *IBC Section 1403.2*<sup>11</sup> and *IRC Section R703.2*.
  - 8.1.6 Use as a Class II vapor retarder in accordance with *IBC Section 1404.3*.
  - 8.1.7 Use as an air barrier in accordance with the *IRC Section N1102.4.1.1* and *IECC Section C402.5.1.2.1*.<sup>12</sup>
- 8.2 *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 StarRStruc Plus shall not be used as a nailing base for claddings, trim, windows, or doors. Fastening through the StarRStruc Plus into the framing is acceptable.
- 9.2 Walls sheathed with StarRStruc Plus shall not be used to resist horizontal loads from concrete and masonry walls.
- 9.3 When used as part of a continuous air barrier assembly, all sheathing panel edges at the top and bottom of the wall assemblies, and all joints between sheathing panels, shall be sealed with an approved construction tape.

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<sup>11</sup> 2015 *IBC Section 1404.2*

<sup>12</sup> 2012 *IECC Section C402.4.1.2.1*





- 9.4 When StarRStruc Plus is installed as a wall sheathing but is not installed per structural requirements, light-framed walls shall be braced by other means. When used as a WRB, installation shall be in accordance with Section 5.13 of this TER.
- 9.5 When StarRStruc Plus is not installed as a WRB, other means of providing a WRB are required, as per the code.
- 9.6 When used in accordance with the *IBC* in high wind areas, special inspections shall comply with *IBC Section 1705.11*.<sup>13</sup>
- 9.7 Design loads shall be determined in accordance with the building code adopted by the jurisdiction in which the project is to be constructed.
  - 9.7.1 Allowable shear loads shall not exceed the values in Table 8 for wind loads.
  - 9.7.2 Transverse design loads shall not exceed those described in Table 9, unless an approved exterior wall covering capable of separately resisting loads perpendicular to the face of the walls is installed over the sheathing.
  - 9.7.3 Allowable wind speeds do not exceed values in Table 10.
- 9.8 The manufacturer's installation instructions shall be available on the jobsite for inspection.
- 9.9 All panel edges shall be supported by wall framing or solid blocking a minimum of 2" (51 mm) nominal in thickness.
- 9.10 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.
- 9.11 Any generally accepted engineering calculations needed to show compliance with this TER shall be submitted to the AHJ for review and approval.
- 9.12 *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*).
- 9.13 At a minimum, this product shall be installed per Section 6 of this TER.
- 9.14 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*.
- 9.15 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.
- 9.16 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.

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<sup>13</sup> *2012 IBC Section 1705.10*



## 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 [www.starrfoam.com](http://www.starrfoam.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](http://drjcertification.org).
- 11.2 For information on the current status of this TER, contact [DrJ Certification](#).

