



Listing and Technical Evaluation Report™

Report No: 2312-07



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StoVentec™ Glass Rainscreen® System

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CSI Designations:

DIVISION: 07 00 00 - THERMAL AND MOISTURE PROTECTION

Section: 07 21 00 - Thermal Insulation

Section: 07 27 00 - Air Barriers

Section: 07 44 63 - Fabricated Faced Panel Assemblies

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

Section: 07 42 00 - Wall Panels

Section: 07 48 00 - Exterior Wall Assemblies

1 Innovative Product Evaluated¹

1.1 StoVentec Glass Rainscreen System

2 Product Description and Materials

2.1 The innovative product evaluated in this report is shown in **Figure 1** and **Figure 2**.

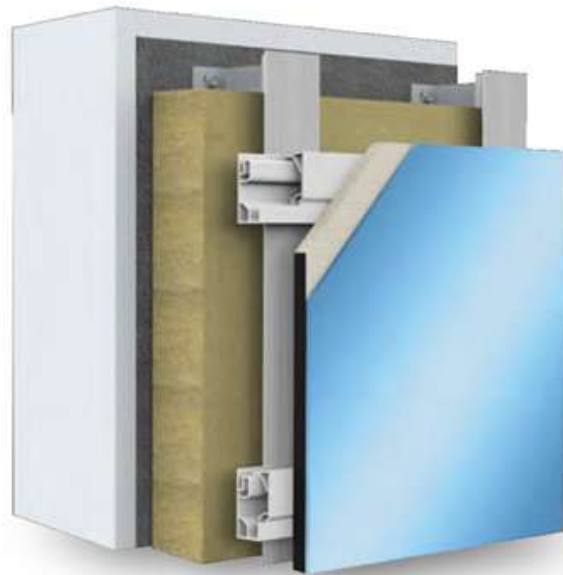


Figure 1. StoVentec Glass Rainscreen System Assembly

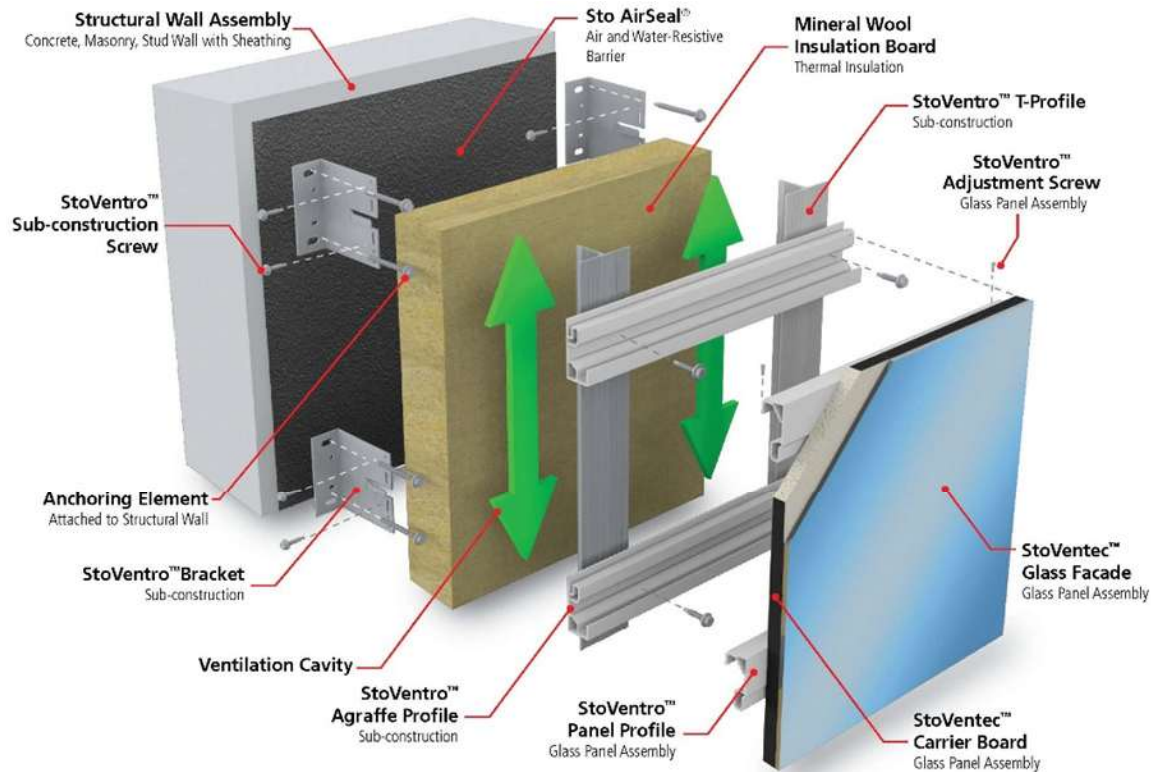


Figure 2. StoVentec Glass Rainscreen System - Components

2.2 StoVentec Glass Rainscreen System is a ventilated rainscreen cladding system.

2.2.1 The outer rainscreen is comprised of tempered safety glass permanently bonded to StoVentec Carrier Board.

2.2.2 A StoVentec™ galvanized or stainless steel and aluminum sub-construction supports the glass composite panel and creates space for mineral wool insulation and a circulating air layer that promotes rapid drying.

2.2.2.1 The galvanized steel brackets have a total (both sides) coating weight of 430 g/m² (1.41 oz/ft²), complying with ASTM A653 type G140.



2.2.3 See **Table 1** for additional details.

Table 1. StoVentec Glass Rainscreen System – Components and Description

Sub-assembly	Component(s)	Description
Structural Wall Assembly	Concrete, masonry, framed wall (wood or cold-formed steel) with sheathing.	
Air and Moisture Barrier	Sto AirSeal®	A fluid applied air and water-resistive barrier designed for use on most substrates including glass mat gypsum sheathing, wood-based sheathing, concrete and masonry.
StoVentro Sub-Construction	StoVentro Bracket	StoVentro sub-construction forms the structural link between the facade and the supporting wall construction. StoVentro brackets, made of aluminum, galvanized steel, or stainless steel, accommodate wall cavity depths of 40 mm to 360 mm (1 ⁹ / ₁₆ " - 14 ³ / ₁₆ "), with lengths in 20 mm (1 ³ / ₁₆ ") increments. Brackets are secured to structural wall via anchoring elements, which are engineered, code-compliant fasteners (1/4" SD2 Bi-Met 300® Metal Self-Drill Screw, HWH, 304 Stainless Steel may be provided by Sto Corporation).
	StoVentro T-Profile	
	StoVentro Agraffe Profile	
Thermal Insulation	Mineral Wool	Any ASTM C612 compliant, non-combustible (ASTM E136 compliant) mineral wool classified into types and categories: Type IA, IB, IVA. Note: Mineral wool shall have a density of 4.3 lb/ft ³ .
StoVentec Glass Panel Assembly	StoVentro Panel Profile	The StoVentec glass panel assembly is the exterior glass panel on the rainscreen assembly. The StoVentec glass panel assembly is an opaque glass-faced composite panel where the glass is fully bonded to a StoVentec Carrier Board, a lightweight composite board made of recycled glass granulate or closed-cell expanded perlite. StoVentec glass panel assemblies are factory made in accordance with project-specific shop drawings, and are delivered to the project site ready for installation.
	StoVentec Carrier Board	
	StoVentec Glass Facade	

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



3 Definitions

- 3.1 New Materials² 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.³ The design strengths and permissible stresses shall be established by tests⁴ and/or engineering analysis.⁵
- 3.2 Duly authenticated reports⁶ and research reports⁷ are test reports and related engineering evaluations, which are written by an approved agency⁸ and/or an approved source.⁹
- 3.2.1 These reports contain intellectual property and/or trade secrets, which are protected by the Defend Trade Secrets Act (DTSA).¹⁰
- 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) is properly licensed to transact engineering commerce. The regulatory authority governing approved sources is the state legislature via its professional engineering regulations.¹¹
- 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 Registered Design Professional (RDP).
- 3.5.1 The Center for Building Innovation (CBI) is ANAB¹² ISO/IEC 17025 and ISO/IEC 17020 accredited.
- 3.6 The regulatory authority shall enforce¹³ 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 writing¹⁴ 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.¹⁵
- 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.¹⁶ Therefore, all ANAB ISO/IEC 17065 duly authenticated reports are approval equivalent.¹⁷
- 3.9 Approval equity is a fundamental commercial and legal principle.¹⁸

4 Applicable Standards for the Listing; Regulations for the Regulatory Evaluation¹⁹

- 4.1 *Standards*
- 4.1.1 *AAMA 501.1: Standard Test Method for Water Penetration of Windows, Curtain Walls and Doors, using Dynamic Pressure*
- 4.1.2 *AAMA 509: Voluntary Test and Classification Method for Drained and Back Ventilated Rain Scree Wall Cladding Systems*
- 4.1.3 *ASCE 7/SEI 7: Minimum Design Loads and Associated Criteria for Buildings and Other Structures*
- 4.1.4 *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*
- 4.1.5 *ASTM E330: Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference*
- 4.1.6 *ASTM E331: Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference*
- 4.1.7 *BS 6206: Specification for Impact Performance Requirements for Flat Safety Glass and Safety Plastics for use in Buildings*



- 4.1.8 *BS 8200: Code of Practice for Design of Non-loadbearing External Vertical Enclosures of Buildings*
- 4.1.9 *BS EN 356: Glass in Building. Security Glazing. Testing and Classification of Resistance Against Manual Attack*
- 4.1.10 *BS EN 12600: Glass in Building. Pendulum Test. Impact Test Method and Classification for Flat Glass*
- 4.1.11 *CPNI Test Standard Explosion Resistance of Curtain Walling Part 1: Requirements and Classification*
- 4.1.12 *CPNI Test Standard Explosion Resistance of Curtain Walling Part 2: Test Method*
- 4.1.13 *NFPA 285-12: Standard Fire Test Method for the Evaluation of Fire Propagation Characteristics of Exterior Nonload-bearing Wall Assemblies Containing Combustible Components²⁰*
- 4.1.14 *Testing Application Standard (TAS) 201-94: Impact Test Procedures*
- 4.1.15 *Testing Application Standard (TAS) 202-94: Criteria for Testing Impact & Nonimpact Resistant Building Envelope Components Using Uniform Static Air Pressure*
- 4.1.16 *Testing Application Standard (TAS) 203-94: Criteria for Testing Products Subject to Cyclic Wind Pressure Loading*
- 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 *FBC-B – 20, 23: Florida Building Code – Building²¹*
 - 4.2.5 *FBC-R – 20, 23: Florida Building Code – Residential²⁰*
 - 4.2.6 *Miami-Dade County, Florida Department of Regulatory and Economic Resources Product Control Section – Checklist #0285 for the Approval of: Wall Panels, Sheathing, Siding & Soffit (When Made with Other than Metal)*

5 Listed²²

- 5.1 Equipment, materials, products or services included in a List published by a nationally recognized testing laboratory (i.e., CBI), approved agency (i.e., CBI and DrJ), and/or approved source (i.e., DrJ) or other organization concerned with product evaluation (i.e., DrJ) that maintains periodic inspection (i.e., CBI) of production of listed equipment or materials, and whose listing states either that the equipment or material meets nationally recognized standards or has 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 The StoVentec Glass Rainscreen System is used as an exterior wall covering in accordance with IBC Section 1404²³ and IRC Section R703.

- 6.1.1.1 StoVentec Glass Rainscreen System can be installed over wood-framed, steel-framed, masonry or concrete walls capable of supporting the imposed loads in accordance with IBC Section 1609.

6.2 Structural Design

- 6.2.1 Walls incorporating StoVentec Glass Rainscreen System shall be designed to resist wind loads per IBC Section 1609, IRC Section R301.2.1 and ASCE/SEI 7 Chapter 30.
- 6.2.2 StoVentec Glass Rainscreen System assembly details are shown in **Table 2** and allowable wind loads shown are shown in **Table 3**.

**Table 2. StoVentec Glass Rainscreen System Assembly Details**

Assembly ID	Wall Details			StoVentec Sub-Construction Details			Glass Details	
	Framing Member Type and Size	Framing Member Spacing	Exterior Sheathing Material	Bracket Spacing (Vertical)	T-Rail Spacing (Horizontal)	Agraffe Rail Spacing	Thickness	Glass Panel (Wall) Size
#1	18-gauge, CFS Stud: 1 ⁵ / ₈ " x 6" Track: 1 ¹ / ₄ " x 6"	16" o.c.	5/8" plywood	24" o.c.	16" o.c.	18" o.c.	1/4"	48" x 102 ³ / ₈ "
#2						40" o.c.		
#3						24" & 17 ¹¹ / ₁₆ " o.c.		48" x 125"
#4					32" o.c.	18" o.c.	5/16"	84 ⁵ / ₈ " x 102 ³ / ₈ "
#5						40" o.c.		

SI: 1 in = 25.4 mm

Table 3. Allowable Wind Load Resistance¹

Assembly ID ²	Direction	Allowable Design Load (psf)	V _{ult} , Exposure Category ³ (mph)			V _{asd} , Exposure Category ⁴ (mph)		
			B	C	D	B	C	D
#1	Negative	145	200	200	200	155	155	155
	Positive	155	200	200	200	155	155	155
#2	Negative	85	200	200	190	155	155	145
	Positive	155	200	200	200	155	155	155
#3	Negative	115	200	200	200	155	155	155
	Positive	170	200	200	200	155	155	155
#4	Negative	105	200	200	200	155	155	155
	Positive	140	200	200	200	155	155	155
#5	Negative	55	195	165	150	150	130	115
	Positive	135	200	200	200	155	155	155

SI: 1 in = 25.4 mm, 1 psf = 0.0479 kN/m², 1 mph = 1.61 km/h

1. Tested in accordance with ASTM E330.
2. See **Table 2** for assembly details.
3. Wind speeds are based on the methodology detailed in ASCE 7-22 and the following assumptions:
 - a. A building height of 30-ft, GC_p = -1.4 for Zone 5 and an Effective Wind Area of 10 ft², Topographic Factor: K_{zt} = 1.0, Ground Elevation Factor: K_e = 1.0, Internal Pressure Coefficient, GC_{pi} = +/-0.18 for an enclosed building, K_d = 0.85 for 'Component and Cladding'
 - b. V_{ult} is limited to 200 mph.
4. $V_{asd} = V_{ult} \sqrt{0.6}$. V_{asd} is limited to 155 mph (200√0.6).



6.3 High Velocity Hurricane Zone (HVHZ) – Wind and Impact Testing

- 6.3.1 Pursuant to Note 3 in Miami-Dade County, Florida Department of Regulatory and Economic Resources Product Control Section – Checklist #0285, StoVentec siding and cladding products are exempt from impact and positive pressure tests if one of the following conditions is met:
- 6.3.1.1 The product is installed on exterior walls that are at minimum, comprised of either nominal 2x wood studs or 2x6 18-gauge CFS framing members. The members are spaced a maximum of 16" o.c., and are sheathed with 5/8" plywood.
 - 6.3.1.2 The product is installed in front of a concrete block structure with construction complying with ASTM C90.
 - 6.3.1.3 StoVentec Glass Rainscreen System installed on walls other than the ones described in **Section 6.3.1.1** and **Section 6.3.1.2** for HVHZ, are outside the scope of this report.
- 6.3.2 StoVentec Glass Rainscreen System was evaluated in accordance with TAS 202 and meet the uniform static air pressure criteria for HVHZ in accordance with FBC-B Section 1620.
- 6.3.2.1 The allowable static design pressure for each assembly is shown in **Table 5**.
- 6.3.3 StoVentec Glass Rainscreen System was evaluated in accordance with TAS 203 and met the fatigue load test criteria for HVHZ in accordance with FBC-B Section 1625.
- 6.3.3.1 The assemblies resisted cyclic loading per FBC-B Table 1625.4 for the design loads shown in **Table 5** for each assembly.
- 6.3.4 StoVentec Glass Rainscreen System assembly details for HVHZ evaluation are shown in **Table 4**. The assessment of the HVHZ testing is summarized in **Table 5**.

Table 4. StoVentec Glass Rainscreen System HVHZ Assembly Details

Assembly ID	Wall Details			StoVentec Sub-Construction Details			Glass Details	
	Framing Member Type and Size	Framing Member Spacing	Exterior Sheathing Material	Bracket Spacing (Vertical)	T-Rail Spacing (Horizontal)	Agraffe Rail Spacing	Thickness	Glass Panel (Wall) Size
#1	18-gauge, CFS Stud: 1 5/8" x 6"	16" o.c.	5/8" plywood	24" o.c.	16" o.c.	18" o.c.	6 mm or 8 mm	48" x 102 3/8"
#2	Track and Flange: 1 1/4" x 6"					40" o.c.		48" x 102 3/8"

SI: 1 in = 25.4 mm

Table 5. High Velocity Hurricane Zone Application Assessment

Assembly ID	Design Load ¹ (psf)	TAS 201		TAS 202		TAS 203
		Large Missile Impact	Small Missile Impact	Water Penetration	Uniform Static Load	Cyclic Wind
#1	100	Exempt ²	Exempt ²	Pass	Pass	Pass
#2	70			Pass	Pass	Pass

SI: 1 psf = 0.048 kPa

1. Design load values are for both positive and negative loading directions.

2. Exemption based on Miami-Dade County, Florida Department of Regulatory and Economic Resources Product Control Section – Checklist #0285.



6.4 Flame Spread Index and Smoke Developed Index

- 6.4.1 The flame spread and smoke developed index performance of StoVentec Glass Rainscreen System components are shown in **Table 6**.

Table 6. Surface Burning Characteristics of the StoVentec Glass Rainscreen System Components

StoVentec Glass Rainscreen System Component	Flame Spread	Smoke Developed Index	Classification
Sto AirSeal	≤ 25	≤ 450	Class A
StoGuard VaporSeal	≤ 25	≤ 450	Class A
Sto Gold Coat	≤ 25	≤ 450	Class A
Sto Carrier Board	≤ 25	≤ 450	Class A
1. Laminate and XPS tested in accordance with ASTM E84/ UL723.			

6.5 Moisture Vapor Permeance

- 6.5.1 The moisture vapor permeance of StoVentec Glass Rainscreen System components are shown in **Table 7**.

Table 7. Moisture Vapor Permeance of Components¹

StoVentec Glass Rainscreen System Component	Vapor Permeance	Classification
Sto AirSeal	<10 perms ²	Class III
Sto VaporSeal	<0.1 perm ²	Class I
Sto Gold Coat	<10 perms ²	Class III
1. Tested in accordance with ASTM E96.		
2. Procedure A, Desiccant Method.		

6.6 Air Barrier

- 6.6.1 Air leakage of the StoVentec Glass Rainscreen System was evaluated in accordance with ASTM E283.

6.6.1.1 StoVentec Glass Rainscreen System complies with IECC Section C402.5.1.4.

- 6.6.2 StoVentec Glass Rainscreen System components listed in **Table 8**, meet the requirements of IECC Section C402.5.1.3 for use as an air barrier when installed in accordance with the manufacturer installation instructions and this report. The air barrier properties are shown in **Table 8**.

Table 8. Air Barrier Properties of StoVentec Glass Rainscreen System Components^{1,2}

StoVentec Glass Rainscreen System Component	Air Leakage L/(s·m ²)
Sto AirSeal	< 0.02
StoGuard VaporSeal	< 0.02
Sto Gold Coat	< 0.02
1. Tested in accordance with ASTM 2178.	
2. Values are taken at 75 Pa.	



6.7 Weather Protection

6.7.1 StoVentec Glass Rainscreen System assemblies were evaluated in accordance with AAMA 509.

6.7.1.1 StoVentec Glass Rainscreen System achieved a V2/W1 Classification.

6.8 Vertical and Lateral Fire Propagation

6.8.1 Vertical and lateral fire propagation of StoVentec Glass Rainscreen System was evaluated in accordance with NFPA 285.

6.8.2 The assemblies described in **Table 9** meet the conditions of acceptance of NFPA 285.

Table 9. StoVentec Glass Rainscreen System NFPA 285 Assembly Details

Component	Description
Exterior Wall Assembly/Framing	<ol style="list-style-type: none"> 1. Cast concrete walls 2. CMU concrete walls 3. 18-gauge, 6" deep by 1⁵/₈" flange steel studs and 20-gauge tracks installed with 1/2" pan head framing screws spaced 16" o.c. <p>Optional: Fill or partially fill steel stud wall cavity with non-combustible insulation, mineral fiber or fiberglass insulation meeting FSI 25 and SDI 450 when tested in accordance with ASTM E84.</p>
Interior Gypsum	<ol style="list-style-type: none"> 1. For steel stud wall framing: ASTM C1369 compliant, 5/8" thick Type X gypsum board installed with long dimension perpendicular to steel studs using #14 x 1 1/4" self-tapping bugle head screws spaced 8" o.c. at the edge and 12" in the field. All joints and screw heads shall receive a Level 2 finish.
Exterior Sheathing/Construction	<ol style="list-style-type: none"> 1. For steel stud wall framing: Glass mat: ASTM C1177 or ASTM C1658 compliant, 1/2" thick Georgia Pacific DensGlass Gold Exterior Sheathing installed with long dimension perpendicular to steel studs using #14 x 1 1/4" self-tapping bugle head screws spaced 8" o.c. at the edge and 12" in the field. All joints covered with one layer of StoGuard 80207 Fabric embedded in Sto AirSeal 81210. Rough opening covered with StoGuard 80209 Redicorner and StoGuard 80208 Fabric embedded in Sto AirSeal 81210. <p>Note: Exterior wall construction may also be concrete or masonry of sufficient structural capacity to support the weight of the StoVentec Glass Rainscreen System.</p>
Air and Moisture Barrier (Apply one according to manufacturer instructions, to exterior side of the structural wall assembly)	<ol style="list-style-type: none"> 1. Sto AirSeal: a fluid-applied polymeric air and water-resistive barrier rolled or sprayed over gypsum board joints and wall edges at a nominal thickness of 20 wet mils and embed StoGuard Fabric in wet material. Spray-apply Sto AirSeal vapor permeable air barrier over the entire wall area, including joints and edges, at a nominal thickness of 50 to 70 wet mils. 2. StoGuard VaporSeal R: a fluid-applied polymeric air, vapor and water-resistive barrier rolled or sprayed in a two-coat process at a wet film thickness of 15 mils per coat and embed StoGuard Fabric in wet material. 3. Sto Gold Coat (81636 or 80265): a fluid-applied polymeric air and water-resistive barrier applied at a wet film thickness of 10-20 mils and embed StoGuard Fabric in wet material. <p>Note: Where the air and moisture barrier is applied over sheathing, (as an alternative to StoGuard Fabric) joints are to be first treated with Sto Gold Fill® and mesh reinforcement, StoGuard RapidFill™ or Sto RapidGuard™ in accordance with manufacturer instructions.</p>

**Table 9. StoVentec Glass Rainscreen System NFPA 285 Assembly Details**

Component	Description
Exterior Insulation	<ol style="list-style-type: none"> ASTM C612 and ASTM E136 compliant, minimum 2" thick non-combustible mineral wool insulation having a density between 3½ and 4½ pcf installed onto wall using 16-gauge pins at a minimum of 5 locations per insulation section (one at each corner and one at the approximate center). Pins shall be ½" to 1" longer than the thickness of insulation. <p>Note:</p> <p>Thickness of insulation shall be based on depth of wall brackets (minimum ventilation cavity space between the insulation and the wall bracket (bottom surface of the StoVentec T-Profile) shall be minimum 20 mm (approximately 13/16") and maximum 50 mm (approximately 2").</p> <p>Cavity, when measured from the face of the insulation to the inward facing side of the StoVentec Panel is 90 mm max (approximately 39/16").</p> <p>Pins can be secured onto wall via adhesive or one #10x13/8" self-tapping bugle-head screw per pin base at steel stud locations (screws shall be a minimum 3/8" longer than the combined sheathing and stud thickness).</p>
Window Header and Floorline Insulation and Intumescent Gasket	<ol style="list-style-type: none"> ASTM C612 and ASTM E136 compliant, non-combustible mineral wool insulation having a density of 6 pcf, installed as continuous strip on top of the window header and at the floorline extending 4" either wide of the window using 16-gauge pins. Thickness based on depth of cavity which extends from the substrate to be within 1", but no closer than 9/16" from the inward facing side of the panel. ROKU® Strip 4" wide x 5/64" thick installed at the front face of each of the two mineral wool sections located at the window header and floorline using #12 x 6" self-tapping sheet metal screws spaced approximately 32" and 48" o.c. Two screws were used at each location. Minimum 28-gauge metal fire breaks spanning the cavity. Metal break may be supported by underlying structure or StoVentec T-Profiles in combination with ancillary wall brackets and shall either penetrate the wall insulation by 50 mm or be used in conjunction with the wall insulation and the metal fire break.
Rainscreen Cladding	<ol style="list-style-type: none"> StoVentec Glass cladding panels bonded to StoVentec Carrier Board A+ or Sto Carrier Hydro.
Joint System	<ol style="list-style-type: none"> All joints, vertical and horizontal, between panels to be 5 mm to 12 mm. <p>Note:</p> <p>Joints can be open (dry) or sealed.</p>
Opening Head and Sill Flashing	<ol style="list-style-type: none"> Minimum 26-gauge steel head flashing adhered with silicone or mechanically fixed to top of opening treated with weather barrier. Minimum 26-gauge steel sill flashing adhered with silicone to bottom of opening with supplemental fasteners. <p>Note:</p> <p>ASTM C1177 compliant gypsum sheathing may be used to line opening prior to application of weather barrier.</p>
Opening Jamb	<ol style="list-style-type: none"> Minimum 26-gauge steel jamb profile bridging the gap between the opening and the edge of the panel. StoVentec Glass Panel, no less than 100 mm wide, may be used to create the return bridging the gap between the opening and the outward facing panel.
Floorline Firestopping	<ol style="list-style-type: none"> Provide floorline fire stopping as required per building code.
SI: 1 in = 25.4 mm	



6.9 Fire-Rated Assemblies

- 6.9.1 StoVentec Glass Rainscreen System may be installed over existing 1-hour fire-resistance rated wall assemblies, either load bearing or non-load bearing, and will be able to maintain the fire resistance rating of the wall assemblies.

6.10 Impact Resistance

- 6.10.1 StoVentec Glass Rainscreen System was evaluated for impact resistance in accordance with BS 6206, BS 8200, BS EN 356, and BS EN 12600.
 - 6.10.1.1 StoVentec Glass Panels were able to resist the 100 mm ($3^{15}/_{16}$ ") diameter, solid steel impactor with a mass of 4.11 kg (9.1 lb) from penetrating through at a vertical drop-height of 9 m ($29^{1}/_{2}$ ft).
 - 6.10.1.2 StoVentec Glass Panels comply with BS 6206 Class A at a drop height of 1,219 mm (48") with a soft body having a total mass of 45 kg (100 lb).
 - 6.10.1.3 StoVentec Glass Panels comply with BS EN 12600 Class 1 at a drop height of 1,200 mm ($47^{1}/_{4}$ ") with a soft body having a total mass of 50 kg (110 lb).
 - 6.10.1.4 StoVentec Glass Panels comply with BS 8200 Category B.
 - 6.10.1.4.1 Impact energy of 10 N•m (7.4 lb•ft) with a hard body.
 - 6.10.1.4.2 Impact energy of 500 N•m (369 lb•ft) with a soft body.

6.11 Blast Resistance

- 6.11.1 StoVentec Glass Rainscreen System was evaluated for blast resistance in accordance with CPNI Test Standard Explosion Resistance of Curtain Walling.
 - 6.11.1.1 Loading Category, VXRU (user defined):
 - 6.11.1.1.1 Peak Reflected Pressure, P_r : 594 kPa
 - 6.11.1.1.2 Peak Reflected Specific Impulse, I_r : 791 kPa•ms
 - 6.11.1.1.3 Values exceed Loading Category VXR4. The following ratings are applicable to Loading Category VXR4 and below:
 - 6.11.1.1.3.1 Per Table A.1 in Annex A of NPSA TEST STANDARD Explosion Resistance of Windows and Curtain Walling Part 1: Requirements and Classification, a charge mass (TNT equivalent) of 100 kg (220 lb) and a stand-off distance of 20 m (65 ft) are likely to create the blast load for the VXR4 Loading Category.
 - 6.11.1.2 StoVentec Glass Rainscreen System achieved an:
 - 6.11.1.2.1 Internal Hazard Rating of B – no hazard
 - 6.11.1.2.2 External Hazard Rating of Y – limited hazard

- 6.12 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 Performance²⁴

- 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.²⁵
- 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.²⁶



8 Regulatory Evaluation and Accepted Engineering Practice

- 8.1 StoVentec Glass Rainscreen System complies with the following legislatively adopted regulations and/or accepted engineering practice for the following reasons:
- 8.1.1 Exterior wall covering in accordance with IBC Section 1402, IBC Section 1403, IBC Section 1404 and IRC Section R703 for use in Types I-IV construction defined in IBC Section 602.
 - 8.1.2 Structural design in accordance with IBC Section 1609 per IBC Section 1402.3 and IRC Section R301.2.1 per IRC Section R703.1.2 for wind loads.
 - 8.1.3 Weather resistance in accordance with IBC Section 1402.2 and IRC Section R703.1.1.
 - 8.1.4 NFPA 285 full scale tests in accordance with IBC Section 1402.5.
- 8.2 StoVentec Glass Rainscreen System was tested in accordance with TAS 202 and TAS 203 to determine its suitability for use in the High Velocity Hurricane Zone (HVHZ) in accordance with the FBC-B Section 1620, FBC-B Section 1625 and FBC-B Section 1626.
- 8.2.1 Evaluation of TAS 201 impact testing in accordance with FBC-B Section 1626 was exempted pursuant to Note 3 in Miami-Dade County, Florida Department of Regulatory and Economic Resources Product Control Section – Checklist #0285 and the assembly described in **Table 4**.
 - 8.2.1.1 Subject to conditions specified in **Section 12** of this report.
- 8.3 Use of StoVentec Glass Rainscreen System as part of a 1-hour fire-rated wall assembly shall only be permitted when installed over existing fire-resistance rated wall assemblies. This includes both steel and wood framed wall assemblies that have gypsum wallboard installed on both faces of the stud framing, CMU block exterior wall assemblies or cast concrete wall assemblies.
- 8.4 Use of StoVentec Glass Rainscreen System for interior applications is outside the scope of this report.
- 8.5 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 qualified²⁷ to practice product and regulatory compliance services within its scope of accreditation and engineering expertise, respectively.
- 8.6 Engineering evaluations are conducted with DrJ's ANAB accredited ICS code scope of expertise, which are also its areas of professional engineering competence.
- 8.7 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 *General*
- 9.3.1 StoVentec Glass Rainscreen System shall be installed over exterior wall assemblies complying with IBC Section 1402.3 using the StoVentec sub-construction described in **Table 1**.
 - 9.3.1.1 Exterior wall assemblies shall include flashing, a water-resistive barrier (Sto AirSeal), water drainage (ventilation cavity) and protection against condensation in accordance with IBC Section 1402.2 and IRC Section R703.1.1.



9.3.2 Components of the StoVentro sub-construction shall be installed in accordance with the following:

9.3.2.1 *StoVentro Bracket to Structural Wall Assembly:*

- 9.3.2.1.1 #14 x 2" stainless steel screw.
- 9.3.2.1.2 A minimum of three threads shall protrude from the CFS framing member when screw is installed flush with the StoVentro Bracket.
- 9.3.2.1.3 Fastener penetration into wood framing members shall be a minimum of 1".
- 9.3.2.1.4 Engineered calculation for minimum fastener size and penetration may be required in order to resist the desired wind speed.

9.3.2.2 *StoVentro T-Profile to StoVentro Bracket:*

- 9.3.2.2.1 #12 x 7/8" stainless steel screw.
- 9.3.2.2.2 A minimum of three threads shall protrude from the main member when screw is installed flush with either of the StoVentro sub-construction component.

9.3.2.3 *StoVentro Agraffe Rail to StoVentro T-Profile:*

- 9.3.2.3.1 #12 x 7/8" stainless steel screw.
- 9.3.2.3.2 A minimum of three threads shall protrude from the main member when screw is installed flush with either of the StoVentro sub-construction component.

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 Wind load resistance testing in accordance with ASTM E330
 - 10.1.2 Wind testing for use in a HVHZ in accordance with TAS 202 and TAS 203
 - 10.1.3 Full scale fire resistance testing and analysis in according to NFPA 285
 - 10.1.4 Surface burning testing in accordance with ASTM E84
 - 10.1.5 Air barrier testing in accordance with ASTM E2178
 - 10.1.6 Water vapor transmission testing in accordance with ASTM E96
 - 10.1.7 Engineering evaluation performed by Jensen Hughes
 - 10.1.8 Impact resistance testing in accordance with BS 6206, BS 8200, BS EN 356 and BS EN 12600
 - 10.1.9 Blast resistance testing in accordance with CPNI Test Standard Explosion Resistance of Curtain Walling, Part 2
- 10.2 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.
- 10.3 Where applicable, 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.



- 10.4 The accuracy of the provisions provided herein may be reliant upon the published properties of raw materials, which are defined by the grade mark, grade stamp, mill certificate 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.
- 10.5 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.²⁸
- 10.6 Where additional condition of use and/or regulatory compliance information is required, please search for StoVentec Glass Rainscreen System on the DrJ Certification website.

11 Findings

- 11.1 As outlined in **Section 6**, StoVentec Glass Rainscreen System 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, StoVentec Glass Rainscreen System shall be approved for the following applications:
- 11.2.1 Use as an exterior wall covering in accordance with IBC Section 1402, IBC Section 1403 and IBC Section 1404 for Types I-V construction.
- 11.2.2 Use in High Velocity Hurricane Zone (HVHZ) in accordance with the FBC-B Section 1620, FBC-B Section 1625, FBC-B Section 1626 and Miami-Dade County, Florida Department of Regulatory and Economic Resources Product Control Section – Checklist #0285.
- 11.2.3 Use on buildings of Type I-V construction that are greater than 40 ft in height above grade plane in accordance with IBC Section 1402.5.
- 11.2.4 Fireblocking is not required pursuant to IBC Section 718.2.6, Exception 3.
- 11.3 Unless exempt by state statute, when StoVentec Glass Rainscreen System is to be used as a structural and/or building envelope component in the design of a specific building, the design shall be performed by an RDP.
- 11.4 Any application specific issues not addressed herein can be engineered by an RDP. Assistance with engineering is available from Sto Corporation.
- 11.5 IBC Section 104.11 (IRC Section R104.11 and IFC Section 104.10²⁹ 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:**³⁰ Building regulations require that the building official shall accept duly authenticated reports.³¹
- 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.³²

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 As listed herein, StoVentec Glass Rainscreen System shall be subject to the following conditions:
- 12.3.1 Installation shall be in accordance with manufacturer instructions and this report.
- 12.3.2 Installation of StoVentec Glass Rainscreen System complies with the requirements of FBC Section 1626 for use in the High Velocity Hurricane Zone when installed over one of the following assemblies:
- 12.3.2.1 Exterior walls framed with nominal 2x wood studs or minimum 2x6, 18-gauge CFS studs spaced 16" o.c. and sheathed with $\frac{5}{8}$ " plywood,
- 12.3.2.2 Exterior concrete walls having a minimum nominal thickness of 8" and constructed in accordance with FBC Chapter 21 (High-Velocity Hurricane Zones).
- 12.3.2.3 Exterior reinforced concrete elements constructed of solid normal weight concrete (no voids), designed in accordance with FBC Chapter 19 (High-Velocity Hurricane Zones) and having a minimum of 2" thickness.
- 12.3.3 The structural wall or underlying support structure/substrate shall be adequate to resist the wind loads shown in **Table 3** and **Table 5**.
- 12.3.4 The allowable capacity of the connection system used for installation shall be meet or exceed the wind loads shown in **Table 3** and **Table 5**, and shall be capable of supporting the weight of the StoVentec Glass Rainscreen System.
- 12.4 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:
- 12.4.1 Any calculations incorporated into the construction documents shall conform to accepted engineering practice and, when prepared by an approved source, shall be approved when signed and sealed.
- 12.4.2 This report and the installation instructions shall be submitted at the time of permit application.
- 12.4.3 This innovative product has an internal quality control program and a third-party quality assurance program.
- 12.4.4 At a minimum, this innovative product shall be installed per **Section 9** of this report.
- 12.4.5 The review of this report by the AHJ shall comply with IBC Section 104 and IBC Section 105.4.
- 12.4.6 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.
- 12.4.7 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.



- 12.5 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.
- 12.6 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).
- 12.7 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.stocorp.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 StoVentec Glass Rainscreen 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
 - 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),³³ where providing test reports, engineering analysis and/or other related IP/TS is subject to prison of not more than ten years³⁴ and/or a \$5,000,000 fine or 3 times the value of³⁵ 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 materials³⁶ 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.³⁷
 - 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 have 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 104.11.³⁸



- 1.3 **Approved³⁹ 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.⁴⁰ 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 1707.1.⁴¹
- 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 deemed⁴² 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 agreement⁴³ (i.e., ANAB, International Accreditation Forum also known as 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.
 - 1.6.5 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:
 - 1.6.5.1 A certification mark, listing or label from a commission-approved certification agency indicating that the product complies with the code,
 - 1.6.5.2 A test report from a commission-approved testing laboratory indicating that the product tested complies with the code,
 - 1.6.5.3 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,



- 1.6.5.4 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
- 1.6.5.5 A statewide product approval issued by the Florida Building Commission.
- 1.6.6 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).
- 1.7 **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](#).
- 1.8 **Approved by New Jersey:** Pursuant to the 2018 Building Code of New Jersey in [IBC Section 1707.1 General](#),⁴⁴ 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)"*.⁴⁵ Furthermore N.J.A.C 5:23-3.7 states: *"Municipal approvals of alternative materials, equipment, or methods of construction."*
 - 1.8.1 **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.
 - 1.8.1.1 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.
 - 1.8.1.2 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.
 - 1.8.2 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."*
- 1.9 **Approved by the Code of Federal Regulations Manufactured Home Construction and Safety Standards:** Pursuant to Title 24, Subtitle B, Chapter XX, [Part 3282.14](#)⁴⁶ and [Part 3280](#),⁴⁷ 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:
 - 1.9.1 *"All construction methods shall be in conformance with accepted engineering practices."*
 - 1.9.2 *"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."*
 - 1.9.3 *"The design stresses of all materials shall conform to accepted engineering practice."*



- 1.10 **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:
- 1.10.1 For new materials that are not specifically provided for in this code, the design strengths and permissible stresses shall be established by tests.⁴⁸
 - 1.10.2 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.⁴⁹
 - 1.10.2.1 An approved agency is “approved” when it is ANAB ISO/IEC 17065 accredited. DrJ Engineering, LLC (DrJ) is in the ANAB directory.
 - 1.10.2.2 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.⁵⁰
 - 1.10.3 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.⁵¹
- 1.11 **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:
- 1.11.1 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.
 - 1.11.2 **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.
 - 1.11.3 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.⁵²
 - 1.11.4 Therefore, all ANAB ISO/IEC 17065 duly authenticated reports are approval equivalent.⁵³
- 1.12 Approval equity is a fundamental commercial and legal principle.⁵⁴



For more information, visit [drjcertification.org](#) or call us at 608-310-6748.

<https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1702>

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://up.codes/viewer/colorado/ibc-2021/chapter/1/scope-and-administration#104.11>

<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

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

<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

<https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1703.4.2>

https://up.codes/viewer/wyoming/ibc-2021/chapter/2/definitions#approved_agency

https://up.codes/viewer/wyoming/ibc-2021/chapter/2/definitions#approved_source

<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](#).

<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/>

<https://www.cbiteest.com/accreditation/>

<https://up.codes/viewer/colorado/ibc-2021/chapter/1/scope-and-administration#104>:~:text=to%20enforce%20the%20provisions%20of%20this%20code

<https://up.codes/viewer/colorado/ibc-2021/chapter/1/scope-and-administration#104.11>:~:text=Where%20the%20alternative%20material%2C%20design%20or%20method%20of%20construction%20is%20not%20approved%2C%20the%20building%20official%20shall%20respond%20in%20writing%2C%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%2C%20the%20building%20official%20shall%20reject%20such%20application%20in%20writing%2C%20stating%20the%20reasons%20therefore

<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

<https://iaf.nu/en/about-iaf-mla/#>:~: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

True for all ANAB accredited product evaluation agencies and all International Trade Agreements.

<https://www.justice.gov/crt/deprivation-rights-under-color-law> AND <https://www.justice.gov/atr/mission>

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.

References to NFPA 285-12 in this report are code compliant through the 2018 version of the IBC.

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 report.

<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>

2015 IBC Section 1405

<https://up.codes/viewer/colorado/ibc-2021/chapter/17/special-inspections-and-tests#1703.4>

<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%2C%20livable%2C%20and%20safe%20housing%20and%20shall%20demonstrate%20acceptable%20workmanship%20reflecting%20journeyman%20quality%20of%20work%20of%20the%20various%20trades

<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

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](#).

See Code of Federal Regulations (CFR) [Title 24 Subtitle B Chapter XX Part 3280](#) for definition.

2018 IFC Section 104.9



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.

<https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1707.1>

Multilateral approval is true for all ANAB accredited product evaluation agencies and all International Trade Agreements.

<http://www.drjengineering.org/AppendixC> AND <https://www.drjcertification.org/cornell-2016-protection-trade-secrets>

<https://www.law.cornell.edu/uscode/text/18/1832#:~:text=imprisoned%20not%20more%20than%2010%20years>

<https://www.law.cornell.edu/uscode/text/18/1832#:~:text=Any%20organization%20that,has%20thereby%20avoided>

<https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1706.2>

IBC 2021, Section 1706.1 Conformance to Standards

IBC 2021, Section 1707 Alternative Test Procedure, 1707.1 General

See Section 11 for the distilled building code definition of **Approved**

Los Angeles Municipal Code, SEC. 98.0503. TESTING AGENCIES

<https://up.codes/viewer/california/ca-building-code-2022/chapter/17/special-inspections-and-tests#1707.1>

New York City, The Rules of the City of New York, § 101-07 Approved Agencies

New York City, The Rules of the City of New York, § 101-07 Approved Agencies

<https://up.codes/viewer/new-jersey/ibc-2018/chapter/17/special-inspections-and-tests#1707.1>

<https://www.nj.gov/dca/divisions/codes/codreg/ucc.html>

<https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3282/subpart-A/section-3282.14>

<https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280>

IBC 2021, Section 1706 Design Strengths of Materials, 1706.2 New Materials. Adopted law pursuant to IBC model code language 1706.2.

IBC 2021, Section 1707 Alternative Test Procedure, 1707.1 General. Adopted law pursuant to IBC model code language 1707.1.

<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/>

IBC 2021, Section 1706 Design Strengths of Materials, Section 1706.1 Conformance to Standards Adopted law pursuant to IBC model code language 1706.1.

<https://iaf.nu/en/about-iaf-mla/#:~: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>

True for all ANAB accredited product evaluation agencies and all International Trade Agreements.

<https://www.justice.gov/crt/deprivation-rights-under-color-law> AND <https://www.justice.gov/atr/mission>