Listing and Technical Evaluation Report™

Report No: 1410-09

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Subject to Renewal: October 1, 2025

Attachment of Exterior Wall Coverings Through Kingspan® GreenGuard® Extruded Polystyrene (XPS) Sheathing to Wood or Steel Wall Framing

Trade Secret Report Holder:

Kingspan® Insulation LLC

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CSI Designations:

DIVISION: 07 00 00 - THERMAL AND MOISTURE PROTECTION

Section: 07 21 00 - Thermal Insulation Section: 07 40 00 - Roofing and Siding Panels Section: 07 46 00 - Siding

1 Innovative Products Evaluated[1]

1.1 Kingspan GreenGuard Insulation Boards:

1.1.1 Kingspan GreenGuard CM

1.1.2 Kingspan GreenGuard LG CM

1.1.3 Kingspan GreenGuard SL

1.1.4 Kingspan GreenGuard LG SL

1.1.5 Kingspan GreenGuard SLX

1.1.6 Kingspan GreenGuard LG SLX

1.1.7 Kingspan GreenGuard PGU

2 Product Description and Materials

2.1 Kingspan GreenGuard Insulation Boards shall comply with the following material standards:

2.1.1 Extruded Polystyrene (XPS) manufactured in compliance with ASTM C578

2.2 GreenGuard Insulation Boards shall have a minimum compressive strength of 25 psi.

2.3 Where wind pressure resistance is required, GreenGuard Insulation Boards shall comply with ABTG ANSI/FS 100.[2]

2.4 GreenGuard Insulation Boards are proprietary Foam Plastic Insulating Sheathing (FPIS) made from extruded polystyrene in accordance with ASTM C578, Type IV.

2.4.1 GreenGuard Insulation Boards are available with various edge treatments and facers as follows:

2.4.1.1 GreenGuard CM: square edges

2.4.1.2 GreenGuard SL: shiplap edges

2.4.1.3 GreenGuard SLX: film facer on both sides, shiplap edges

2.4.1.4 PGU: $^{7}/_{16}$" XPS with a reinforcing polyolefin fabric on one side and a clear plastic facer on the other side

2.4.2 GreenGuard Insulation Boards are manufactured with or without edge treatments and facers as described in **Section 2.4.1**.

2.4.2.1 Kingspan GreenGuard LG XPS has the same physical properties as the GreenGuard XPS except it is produced with a lower Global Warming Potential (GWP) blowing agent formulation. All references in this report to GreenGuard Insulation Boards include both the GreenGuard XPS and the GreenGuard LG XPS insulation board.

2.5 *Material Availability*

2.5.1 *Thickness:*

2.5.1.1 $^{1}/_{4}$" (32 mm) through 3" (76 mm)

2.5.2 *Standard Product Width:*

2.5.2.1 48" (1219 mm)

2.5.3 *Standard Product Length:*

2.5.3.1 96" (2438 mm)

2.5.3.2 108" (2743 mm)

2.5.4 Consult the manufacturer for the availability of a given product with non-standard width or length.

2.6 The innovative products evaluated in this report are shown in **Figure 1** and **Figure 2** in **Section 6**.

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

3 Definitions

3.1 New Materials[3] 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.[4] The design strengths and permissible stresses shall be established by tests[5] and/or engineering analysis.[6]

3.2 Duly authenticated reports[7] and research reports[8] are test reports and related engineering evaluations, which are written by an approved agency[9] and/or an approved source.[10]

3.2.1 These reports contain intellectual property and/or trade secrets, which are protected by the Defend Trade Secrets Act (DTSA).[11]

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.[12]

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 ANAB[13] ISO/IEC 17025 and ISO/IEC 17020 accredited.

3.6 The regulatory authority shall enforce[14] the specific provisions of each legislatively adopted regulation. If there is a non-conformance, the specific regulatory section and language of the non-conformance shall be provided in writing[15] 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.[16]

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.[17] Therefore, all ANAB ISO/IEC 17065 duly authenticated reports are approval equivalent.[18]

3.9 Approval equity is a fundamental commercial and legal principle.[19]

4 Applicable Standards for the Listing; Regulations for the Regulatory Evaluation[20]

4.1 *Standards*

4.1.1 *AISI S100: North American Specification for the Design of Cold-formed Steel Structural Members*

4.1.2 *ANSI/AWC NDS: National Design Specification (NDS) for Wood Construction*

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

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

4.1.5 *ASTM C847: Standard Specification for Metal Lath*

4.1.6 *ASTM C1063: Standard Specification for Installation of Lathing and Furring to Receive Interior and Exterior Portland Cement-Based Plaster*

4.1.7 *ASTM C1513: Standard Specification for Steel Tapping Screws for Cold-Formed Steel Framing Connections*

4.1.8 *ASTM F1667: Standard Specification for Driven Fasteners: Nails, Spikes, and Staples*

4.1.9 *ABTG ANSI/FS 100: Standard Requirements for Wind Pressure Resistance of Foam Plastic Insulating Sheathing Used in Exterior Wall Covering Assemblies*[21]

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®*

5 Listed[22]

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 *Structural Applications*

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

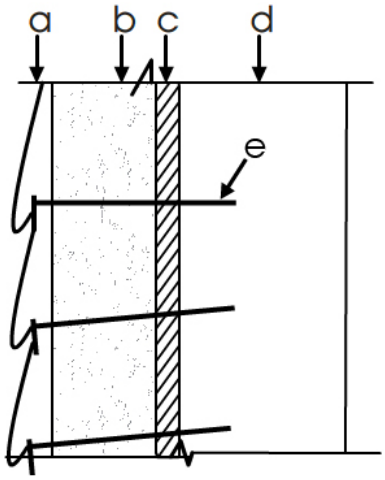
6.2 *Design Procedure*

6.2.1 Determine an appropriate cladding attachment requirement in accordance with **Section 6.2** through **Section 6.4**.

6.2.2 Select one of the following methods of cladding attachment:

6.2.2.1 Direct attachment of cladding through GreenGuard Insulation Boards to wall framing as shown in **Figure 1**.

6.2.2.2 Furring attachment through GreenGuard Insulation Boards to wall framing, as shown in **Figure 2**, whereby cladding is attached to furring in accordance with the applicable building code and the cladding manufacturer installation instructions.



Exterior Wall Covering Assembly (direct attachment):

a – Cladding material and fasteners

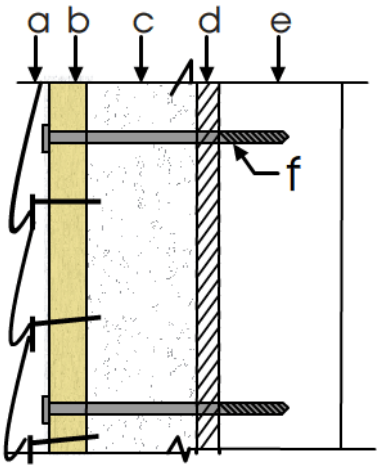
b – Thickness of GreenGuard Insulation Boards, as required

c – Optional wall sheathing or as required by the applicable building code (i.e., gypsum sheathing, WSP or other)[23]

d – Wall framing per code (i.e., wood or cold-formed steel studs)

e – Fastener per **Table 1** or by design

Figure 1. Exterior Wall Covering Assembly Components (Direct Attachment)
***Note:** Wall Sheathing layer "c" is optional unless required by the applicable building code



Exterior Wall Covering Assembly (through furring):

a – Cladding material and fasteners

b – Min 3/4" thick (nominal 1x3 or larger) wood furring or min. 3/4" plywood (Exterior 1)[24]

c – Thickness of GreenGuard Insulation Boards, as required

d – Optional wall sheathing or as required by the applicable building code (i.e., gypsum sheathing, WSP or other)[25]

e – Wall framing per code (i.e., wood or cold-formed steel studs)

f – Fastener per **Table 2** or by design

Figure 2. Exterior Wall Covering Assembly Components (Through Furring)
***Note:** Wall sheathing layer "d" is optional unless required by the applicable building code

6.3 From **Table 1** for "*direct attachment*" method or **Table 2** for "*furring attachment*" method, determine the maximum allowable GreenGuard Insulation Boards thickness based on a selected minimum fastener size, maximum fastener spacing and the cladding system weight.

6.3.1 To determine cladding system weight, add the weight of all materials on the exterior side of the foam sheathing (see 'a' in **Figure 1** and 'a' and 'b' in **Figure 2**).

6.3.2 Use actual weights for the materials installed. Actual cladding weights of materials can be obtained from the cladding manufacturer material specifications. Other typical weights of building materials can be found in the Commentary to ASCE 7-16.

Table 1. Siding Minimum Fastening Requirements for Direct Cladding Attachment[1,9,11,13]

Framing Type	Siding Fastener: Type and Minimum Size[4,5]	Siding Fastener Vertical Spacing (in)[10]	Maximum Thickness of GreenGuard Insulation Boards (in)[8]							
			16" o.c. Fastener Horizontal Spacing				24" o.c. Fastener Horizontal Spacing			
			Max. Cladding Weight[2,3,6,12] (psf)							
			3	11	18	25	3	11	18	25
Wood Framing (minimum 1¼" penetration)	0.113" diameter nail[7]	6	2	1.45	0.75	DR	2	0.85	DR	DR
		8	2	1	DR	DR	2	0.55	DR	DR
		12	2	0.55	DR	DR	1.85	DR	DR	DR
	0.120" diameter nail[7]	6	3	1.70	0.90	0.55	3	1.05	0.50	DR
		8	3	1.20	0.60	DR	3	0.70	DR	DR
		12	3	0.70	DR	DR	2.15	DR	DR	DR
	0.131" diameter nail	6	4	2.15	1.20	0.75	4	1.35	0.70	DR
		8	4	1.55	0.80	DR	4	0.90	DR	DR
		12	4	0.90	DR	DR	2.70	0.50	DR	DR
	0.162" diameter nail	6	4	3.55	2.05	1.40	4	2.25	1.25	0.80
		8	4	2.55	1.45	0.95	4	1.60	0.85	0.50
		12	4	1.60	0.85	0.50	4	0.95	DR	DR
Steel Framing (minimum penetration of steel thickness + 3 threads)	#8 screw into 33 mil steel or thicker	6	3	2.95	2.20	1.45	3	2.35	1.25	DR
		8	3	2.55	1.60	0.60	3	1.80	DR	DR
		12	3	1.80	DR	DR	3	0.65	DR	DR
	#10 screw into 33 mil steel	6	4	3.50	2.70	1.95	4	2.90	1.70	0.55
		8	4	3.10	2.05	1	4	2.25	0.70	DR
		12	4	2.25	0.70	DR	3.70	1.05	DR	DR
	#10 screw into 43 mil steel or thicker	6	4	4	4	3.60	4	4	3.45	2.70
		8	4	4	3.70	3	4	3.85	2.80	1.80
		12	4	3.85	2.80	1.80	4	3.05	1.50	DR

SI: 1 in = 25.4 mm; 1 psf = 0.0479 kPa

1. Tabulated requirements are based on wood framing of Spruce-Pine-Fir or any wood species with a specific gravity of 0.42 or greater in accordance with AFPA/NDS and minimum 33 ksi steel for 33 mil and 43 mil steel and 50 ksi steel for 54 mil steel or thicker.
2. Cladding weight shall include all materials supported by the fasteners on the exterior side of GreenGuard Insulation Boards (i.e., wood structural panel sheathing may be installed between the cladding material and GreenGuard Insulation Boards). In such cases, both the cladding and the WSP sheathing weight must be included in the calculation for the cladding weight.
3. Examples of cladding included in each weight category: 3 psf – vinyl siding, 11 psf – fiber cement siding, 25 psf – masonry or cultured stone. Examples are not inclusive.
4. Nail fasteners shall comply with ASTM F1667, except nail length shall be permitted to exceed ASTM F1667 standard lengths. Screws shall comply with ASTM C1513.
5. Self-drilling tapping screw fasteners for connection of siding to steel framing shall comply with the requirements of AISI S200. Other approved fasteners of equivalent or greater diameter and bending strength shall be permitted.
6. For cladding system weights exceeding 25 psf with any thickness of GreenGuard Insulation Boards, a design professional should be consulted.
7. Maximum foam thickness of 2" for 0.113" and 3" for 0.120" diameter nails for 3 psf cladding weight due to limiting factor of nail length.
8. GreenGuard Insulation Boards shall have a minimum compressive strength of 15 psi in accordance with ASTM C578.
9. Metal lath shall be minimum 2.5 lbs./yd^2 diamond mesh in accordance with ASTM C847. Metal lath lock washers on fasteners are highly recommended.
10. Vertical spacing of fasteners in metal lath shall not exceed 7" o.c., in accordance with ASTM C1063 and the Masonry Veneer Manufacturers Association (MVMA) Installation Guide
11. Where adhered masonry is used, it shall be installed in accordance with the MVMA Installation Guide.
12. Linear interpolation between cladding weight categories is not permitted.
13. DR = Design Required

Table 2. Furring Minimum Fastening Requirements for Application Over Foam Plastic Insulating Sheathing[1,13]

Furring Material	Framing Member	Fastener Type and Min. Size[2,3,5,6,7]	Min. Pene-tration into Wall Framing (in)	Fastener Spacing in Furring (in)	Max. Thickness of GreenGuard Insulation Boards (in)[11]								Allowable Wind Pressure Resistance of Furring Attachment (psf)	
					16" o.c. Furring[4,8]				24" o.c. Furring[4,8]					
					Siding Weight[9,10,12] (psf)									
					3	11	18	25	3	11	18	25	16" o.c.	24" o.c.
Min. 1x3 Wood Furring	Min. 2x Wood Stud	Nail (0.131" shank; 0.281" head)	1 1/4	8	4	2.45	1.45	0.95	4	1.60	0.85	DR	46.5	31.0
				12	4	1.60	0.85	DR	4	0.95	DR	DR	31.0	20.7
				16	4	1.10	DR	DR	3.05	0.60	DR	DR	23.3	15.5
		0.162" diameter nail	1 1/4	8	4	4	2.45	1.60	4	2.75	1.45	0.85	57.5	38.3
				12	4	2.75	1.45	0.85	4	1.65	0.75	DR	38.3	25.6
				16	4	1.90	0.95	DR	4	1.05	DR	DR	28.8	19.2
		#10 wood screw	1	12	4	2.30	1.20	0.70	4	1.40	0.60	DR	107.3	71.6
				16	4	1.65	0.75	DR	4	0.90	DR	DR	79.0	52.7
				24	4	0.90	DR	DR	2.85	DR	DR	DR	35.1	23.4
		1/4" lag screw	1 1/2	12	4	2.65	1.50	0.90	4	1.65	0.80	DR	140.4	93.6
				16	4	1.95	0.95	0.50	4	1.10	DR	DR	79.0	52.7
				24	4	1.10	DR	DR	3.25	0.50	DR	DR	35.1	23.4
Min. 33mil Steel Hat Channel or Min. 1x3 Wood Furring	33 mil Steel Stud	#8 screw (0.285" head)	Steel thickness +3 threads	12	3	1.80	DR	DR	3	0.65	DR	DR	52.9	35.3
				16	3	1	DR	DR	2.85	DR	DR	DR	39.7	26.5
				24	2.85	DR	DR	DR	2.20	DR	DR	DR	26.5	17.6
		#10 screw (0.333" head)	Steel thickness +3 threads	12	4	2.25	0.70	DR	3.70	1.05	DR	DR	62.9	41.9
				16	3.85	1.45	DR	DR	3.40	DR	DR	DR	47.1	31.4
				24	3.40	DR	DR	DR	2.70	DR	DR	DR	31.4	21.0
	43 mil or thicker Steel Stud	#8 screw (0.285" head)	Steel thickness +3 threads	12	3	1.80	DR	DR	3	0.65	DR	DR	69.0	46.0
				16	3	1	DR	DR	2.85	DR	DR	DR	51.8	34.5
				24	2.85	DR	DR	DR	2.20	DR	DR	DR	34.5	23.0
		#10 screw (0.333" head)	Steel thickness +3 threads	12	4	3.85	2.80	1.80	4	3.05	1.50	DR	81.9	54.6
				16	4	3.30	1.95	0.60	4	2.25	DR	DR	61.5	41.0
				24	4	2.25	DR	DR	4	0.65	DR	DR	35.1	23.4

SI: 1 in = 25.4 mm; 1 psf = 0.0479 kPa

Table 2. Furring Minimum Fastening Requirements for Application Over Foam Plastic Insulating Sheathing[1,13]

Furring Material	Framing Member	Fastener Type and Min. Size[2,3,5,6,7]	Min. Pene-tration into Wall Framing (in)	Fastener Spacing in Furring (in)	Max. Thickness of GreenGuard Insulation Boards (in)[11]								Allowable Wind Pressure Resistance of Furring Attachment (psf)	
					16" o.c. Furring[4,8]				24" o.c. Furring[4,8]					
					Siding Weight[9,10,12] (psf)									
					3	11	18	25	3	11	18	25	16" o.c.	24" o.c.

1. Table values are based on:
   a. Minimum 3/4" (19.1 mm) thick wood furring and wood studs of Spruce-Pine-Fir or any softwood species with a specific gravity of 0.42 or greater per AFPA/NDS.
   b. Minimum 33 mil steel hat channel furring of 33 ksi steel. Steel hat channel shall have a minimum 7/8" (22.2 mm) depth.
   c. Steel framing of indicated nominal steel thickness and minimum 33 ksi steel for 33 mil and 43 mil steel and 50 ksi steel for 54 mil steel or thicker.
2. Self-drilling, self-tapping screw fasteners for connection of siding to steel framing shall comply with the requirements of AISI S200. Other approved fasteners of equivalent or greater diameter and bending strength shall be permitted.
3. Nail fasteners shall comply with ASTM F1667, except nail length shall be permitted to exceed ASTM F1667 standard lengths. Screws shall comply with ASTM C1513.
4. Furring shall be spaced a maximum of 24" o.c. in a vertical or horizontal orientation.
   a. In a vertical orientation, furring shall be located over wall studs and attached with the required fastener spacing.
   b. Where placed horizontally, wood furring shall be preservative treated wood in accordance with IRC Section R317.1 or naturally durable wood and fasteners shall be corrosion resistant in accordance to IRC Section R317.3. Steel furring shall have a minimum G60 galvanized coating.
   c. Furring strips installed in a horizontal direction shall be fastened at each stud with a number of fasteners equivalent to that required by the fastener spacing. If the required nail spacing is 12" o.c. and the studs are 24" o.c., then two (2) nails would be required at each stud (24/12=2). In no case shall fasteners be spaced more than 24" (0.6 m) apart.
5. Lag screws shall be installed with a standard cut washer.
6. Lag screws and wood screws shall be pre-drilled in accordance with AFPA/NDS.
7. Approved self-drilling screws of equal or greater shear and withdrawal strength shall be permitted without pre-drilling.
8. A minimum 2x wood furring shall be used where the required siding fastener penetration into wood material exceeds 3/4" (19.1 mm) and is not more than 1 1/2" (38.1 mm), unless approved deformed shank siding nails or siding screws are used to provide equivalent withdrawal strength, allowing the siding connection to be made to a 1x wood furring.
9. Examples of cladding included in each weight category: 3 psf – vinyl siding, 11psf – fiber cement siding, 25 psf – masonry or cultured stone. Examples are not inclusive.
10. For cladding system weights exceeding 25 psf with any thickness of GreenGuard Insulation Boards, a design professional should be consulted.
11. Foam sheathing shall have a minimum compressive strength of 15 psi, in accordance with ASTM C578.
12. Linear interpolation between cladding weight categories is not permissible.
13. DR = Design Required

6.4 The minimum fastening requirement shall be the more stringent of that required by:

6.4.1 Fastening schedule determined in accordance with **Section 6.3** of this report.

6.4.2 Fastener type, head size, diameter, spacing and penetration into framing required by the applicable building code for the specific cladding material and the cladding manufacturer installation instructions.[26,27]

6.4.2.1 Where the seismic provisions of IRC Section R301.2.2 apply, the wall assembly shall not exceed the weight limits of IRC Section R301.2.2.1, unless an engineered design is provided in accordance with IRC Section R301.1.3.

6.4.2.2 Where the seismic load provisions of IBC Section 1613 apply, the cladding attachment shall be verified to provide resistance to meet or exceed minimum required earthquake loads.

6.4.3 Fastenings that are not at least equivalent to minimum required fastener characteristics described in **Section 6.4.2** shall be designed to provide adequate support of cladding weight, resistance to wind loading and seismic loads as required by the applicable building code.

6.4.4 For furring connections in accordance with **Table 2**, allowable wind load resistance shall be verified to meet or exceed the minimum required wind load of the applicable code.

6.4.4.1 Refer to IRC Table R301.2.1(1)[28] for components and cladding wind loads for the applicable wall wind zone and for an effective wind area of 10 square feet.

6.4.4.2 For IBC required wind loads, see IBC Section 1609.

6.5 Where the application falls outside of the performance evaluation, conditions of use and/or installation requirements set forth herein, alternative techniques shall be permitted in accordance with accepted engineering practice and experience. This includes but is not limited to the following areas of engineering: mechanics or materials, structural, building science and fire science.

7 Certified Performance[29]

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.[30]

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.[31]

8 Regulatory Evaluation and Accepted Engineering Practice

8.1 GreenGuard Insulation Boards comply with the following legislatively adopted regulations and/or accepted engineering practice for the following reasons:

8.1.1 Lateral force resisting systems for use in both wind and seismic applications follow the performance-based provisions of IBC Section 2306.1, IBC Section 2306.3, and/or SDPWS Section 4.3 for light-frame wood wall assemblies.

8.2 This report examines the attachment of exterior wall coverings through Kingspan GreenGuard Extruded Polystyrene (XPS) Insulation Boards with thickness up to 3", to wood or cold-formed steel wall studs.

8.3 This report also provides a systematic approach for the design process of attaching exterior wall coverings through XPS to wood or steel wall framing.

8.4 This report and design methodology considers only the weight of the exterior covering on fasteners cantilevered though the XPS and into the stud.

8.5 Wind pressure resistance of the exterior covering is outside the scope of this report. Consult the exterior covering manufacturer installation instructions for information regarding the allowable design wind pressure for a given product, in accordance with ABTG ANSI/FS 100.

8.5.1 The intent of this report is not to reduce minimum fastener sizes, penetrations and spacings required to resist wind loads. Where fastener requirements for wind resistance or cladding weight are more stringent, they shall control the design.

8.6 Attachment of window flanges over XPS is outside the scope of this report.

8.7 Any building code, regulation and/or accepted engineering evaluations (i.e., research reports, duly authenticated reports, etc.) that are conducted for this Listing were performed by DrJ Engineering, LLC (DrJ), an ISO/IEC 17065 accredited certification body and a professional engineering company operated by RDP/approved sources. DrJ is qualified[32] to practice product and regulatory compliance services within its scope of accreditation and engineering expertise, respectively.

8.8 Engineering evaluations are conducted with DrJ's ANAB accredited ICS code scope of expertise, which are also its areas of professional engineering competence.

8.9 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 *Installation Procedure*

9.3.1 Verify that materials comply with the following provisions of this report:

9.3.1.1 GreenGuard Insulation Boards shall comply with the requirements of **Section 6**.

9.3.1.2 Wall framing materials shall comply with **Section 6**, specifically the minimum wood and cold-formed steel framing member requirements in the footnotes to **Table 1** and **Table 2**, as applicable.

9.3.1.3 Cladding or furring fastener type and size, including fastener length to obtain required penetration into or through framing members, complies with the solution determined in accordance with **Section 6.4.1**.

9.3.1.3.1 Where fasteners are permitted to penetrate into or fully through sheathing or nailable substrate without penetrating into framing as specified by the manufacturer instructions and supported by a test report, the end of the fastener shall extend a minimum of 1/4" beyond the opposite face of the sheathing or nailable substrate in accordance with IRC Section R703.11.1.

9.3.2 Fasteners shall be installed into framing members and driven flush and snug so that gaps between layers are removed, except where a gap under the cladding fastener head is required for attachment of vinyl siding.

9.3.3 Fasteners shall be installed in a workmanlike manner and not over-driven, resulting in material damage or excessive distortion of cladding, furring or GreenGuard Insulation Boards.

9.3.4 Ensure framing members or blocking are provided to allow for attachment of siding and trim materials at transitions such as corners and wall penetrations.

9.3.5 Ensure that a code compliant water-resistive barrier system and flashing are provided prior to, or during the installation of cladding materials. Refer to DRR 1205-05 for construction detailing concepts.

9.3.6 Where required by contract documents, the project owner, owner's agent or good practice, construct a mock-up assembly to demonstrate constructability and a proper integration of components.

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 National Design Specification for Wood Construction – 2012 Edition, American Wood Council.

10.1.2 General Dowel Equations for Calculating Lateral Connection Values (1999), TR-12, American Forest & Paper Association.

10.1.3 North American Cold-Formed Steel Specification – 2012 Edition, American Iron & Steel Institute (AISI S100 standard).

10.1.4 New York State Energy Research and Development Authority, Fastening Systems for Continuous Insulation, 2010.

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.[33]

10.6 Where additional condition of use and/or regulatory compliance information is required, please search for GreenGuard Insulation Boards on the DrJ Certification website.

11 Findings

11.1 As outlined in **Section 6**, Kingspan GreenGuard Insulation Boards have performance characteristics that were tested and/or meet applicable regulations and are 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, GreenGuard Insulation Boards shall be approved for the following applications:

11.2.1 The design procedure and installation requirements outlined in this report may be used to attach exterior wall coverings through GreenGuard Insulation Boards to wood or steel wall framing.

11.2.2 IRC Section R703.3, IRC Section R703.15 and IRC Section R703.16 include provisions for the attachment of cladding and/or furring over GreenGuard Insulation Boards to appropriately resist the required design wind loads.

11.3 Unless exempt by state statute, when GreenGuard Insulation Boards are 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 Kingspan Insulation LLC.

11.5 IBC Section 104.11 (IRC Section R104.11 and IFC Section 104.10[34] 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**:[35] Building regulations require that the building official shall accept duly authenticated reports.[36]

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.[37]

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 Installation of GreenGuard Insulation Boards shall be on exterior walls with code compliant wood framing or cold-formed steel framing meeting the minimum requirements as indicated in **Table 1** and **Table 2**.

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 These innovative products have an internal quality control program and a third-party quality assurance program.

12.4.4 At a minimum, these innovative products 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 These innovative products have 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 these innovative products 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 products listed in **Section 1.1** are 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.kingspan.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 Kingspan GreenGuard Insulation Boards are 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 these innovative products 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),[38] where providing test reports, engineering analysis and/or other related IP/TS is subject to prison of not more than ten years[39] and/or a $5,000,000 fine or 3 times the value of[40] the Intellectual Property (IP) and Trade Secrets (TS).

1.2.3.1 Compliance with public records and trade secret legislation requires approval through the use of Listings, certified reports, Technical Evaluation Reports, duly authenticated reports and/or research reports prepared by approved agencies and/or approved sources.

1.2.4 For new materials[41] 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.[42]

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.[43]

1.3 **Approved**[44] **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.[45] 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.[46]

1.4 **Approved by Chicago**: The Municipal Code of Chicago (MCC) states in pertinent part that an Approved Agency is a Nationally Recognized Testing Laboratory (NRTL) acting within its recognized scope and/or a certification body accredited by the American National Standards Institute (ANSI) acting within its accredited scope. Construction materials and test procedures shall conform to the applicable standards listed in the MCC. Sufficient technical data shall be submitted to the building official to substantiate the proposed use of any product, material, service, design, assembly and/or method of construction not specifically provided for in the MCC. This technical data shall consist of research reports from approved sources (i.e., MCC defined Approved Agencies).

1.5 **Approved by New York City**: The 2022 NYC Building Code (NYCBC) states in part that an approved agency shall be deemed[47] an approved testing agency via ISO/IEC 17025 accreditation, an approved inspection agency via ISO/IEC 17020 accreditation, and an approved product evaluation agency via ISO/IEC 17065 accreditation. Accrediting agencies, other than federal agencies, must be members of an internationally recognized cooperation of laboratory and inspection accreditation bodies subject to a mutual recognition agreement[48] (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,[49] 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)*".[50] 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[51] and Part 3280,[52] 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.[53]

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.[54]

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.[55]

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.[56]

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.[57]

1.11.4 Therefore, all ANAB ISO/IEC 17065 duly authenticated reports are approval equivalent.[58]

1.12 Approval equity is a fundamental commercial and legal principle.[59]

Notes

1 For more information, visit drjcertification.org or call us at 608-310-6748.

2 Formerly SBCA ANSI/FS 100

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

4 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

5 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

6 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

7 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

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

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

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

11 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.

12 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/

13 https://www.cbitest.com/accreditation/

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

15 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

16 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

17 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

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

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

20 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.

21 Formerly SBCA ANSI/FS 100

22 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

23 For compliance with the 2015, 2018, and 2021 IBC and IRC, where a separate structural sheathing layer is not provided to separately resist wind load, the FPIS must comply with ABTG ANSI/FS 100.

24 Siding fastening into a suitable nail-base sheathing shall be permitted for claddings not weighing more than 3 psf and foam sheathing thicknesses not greater than 2"; refer to 2018 IRC Section R703 for requirements.

25 Minimum required furring thickness may increase where cladding fastening requirements dictate more penetration depth in framing; alternatively, a compatible siding fastener with adequate withdrawal resistance shall be specified.

26 An example of this would be lath attachments for stucco where a maximum of 7" o.c. spacing is required.

27 2018 IRC Section R703.3 provides a prescriptive table for the attachment of furring to resist up to 30 psf design wind loading.

28 2018 IRC Table R301.2(2)

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

30 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%20liv

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

31 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

32 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.

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

34 2018 IFC Section 104.9

35 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.

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

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

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

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

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

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

42 IBC 2021, Section 1706.1 Conformance to Standards

43 IBC 2021, Section 1707 Alternative Test Procedure, 1707.1 General

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

45 Los Angeles Municipal Code, SEC. 98.0503. TESTING AGENCIES

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

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

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

49 https://up.codes/viewer/new_jersey/ibc-2018/chapter/17/special-inspections-and-tests#1707.1

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

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

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

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

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

55 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/

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

57 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

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

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