



Listing and Technical Evaluation Report™

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NFPA 285 Tested Wall Assemblies Using Kingspan® Kooltherm® Insulation Boards in Exterior Walls of Buildings of Type I-IV Construction

Trade Secret Report Holder:

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CSI Designations:

DIVISION: 07 00 00 - THERMAL AND MOISTURE PROTECTION

Section: 07 21 00 - Thermal Insulation

Section: 07 24 00 - Exterior Insulation and Finish Systems

Section: 07 27 00 - Air Barriers

1 Innovative Products Evaluatedⁱ

1.1 Kingspan® Kooltherm® Insulation Boards

- 1.1.1 K8 Cavity Board
- 1.1.2 K10 Soffit Board
- 1.1.3 K12 Framing Board
- 1.1.4 K15 Rainscreen Board
- 1.1.5 K20 Concrete Sandwich Board

2 Product Description and Materials

2.1 The innovative products evaluated in this report are shown in **Figure 1** and described in **Table 1**.



Figure 1. Kingspan Kooltherm Insulation Board - Foil Facer (Left) and Glass Facer (Right)



Table 1. Kingspan Kooltherm Product Description

Product	Description	Facers	Standard Dimensions ¹ (in)	Available Thicknesses ² (mm)	Application
K8 Cavity Board	Kingspan Kooltherm products consist of a fiber-free, thermoset phenolic core with facer materials bonded both sides, and are used for non-structural thermal insulation in all types of construction in accordance with the IBC.	Low emissivity composite foil facing on both sides	Width: 47 ¹ / ₄ Length: 16	20 – 120	Partially filled cavity wall
K10 Soffit Board		Glass-tissue based facer on inside face; low emissivity composite foil on exposed face.	Width: 47 ¹ / ₄ Length: 89 ³ / ₈	25 – 120	Structural ceilings or floors (not below grade)
K12 Framing Board		Low emissivity composite foil facing on both sides	Width: 47 ¹ / ₄ Length: 96	20 – 120	Wood frame walls or steel framing systems
K15 Rainscreen Board		Low emissivity composite foil facing on both sides	Width: 47 ¹ / ₄ Length: 96	20 – 120	Behind rainscreen or masonry faced systems
K20 Concrete Sandwich Board		Glass-tissue based facer on both sides	Width: ¹ 47 ¹ / ₄ Length: ¹ 89 ³ / ₈	20 – 120	Precast/concrete insulated sandwich wall systems
SI: 1 in = 25.4 mm					
1. Custom widths and lengths may be available.					
2. Other thicknesses may be available.					

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

3 Definitions

- 3.1 New Materialsⁱⁱ 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.ⁱⁱⁱ The design strengths and permissible stresses shall be established by tests^{iv} and/or engineering analysis.^v
- 3.2 Duly Authenticated Reports^{vi} and Research Reports^{vii} are test reports and related engineering evaluations, which are written by an approved agency^{viii} and/or an approved source.^{ix}
- 3.2.1 These reports contain intellectual property and/or trade secrets, which are protected by the Defend Trade Secrets Act (DTSA).^x
- 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.^{xi}
- 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^{xii} ISO/IEC 17025 and ISO/IEC 17020 accredited.
- 3.6 The regulatory authority shall enforce^{xiii} 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^{xiv} 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.^{xv}
- 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.^{xvi} Therefore, all ANAB ISO/IEC 17065 Duly Authenticated Reports are approval equivalent.^{xvii}
- 3.9 Approval equity is a fundamental commercial and legal principle.^{xviii}

4 Applicable Standards for the Listing; Regulations for the Regulatory Evaluation^{xix}

4.1 Standards

- 4.1.1 *ASTM C209: Standard Test Methods for Cellulosic Fiber Insulating Board*
- 4.1.2 *ASTM D1621: Standard Test Method for Compressive Properties of Rigid Cellular Plastics*
- 4.1.3 *ASTM D1622: Standard Test Method for Apparent Density of Rigid Cellular Plastics*
- 4.1.4 *ASTM D1623: Standard Test Method for Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics*
- 4.1.5 *ASTM D2126: Standard Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging*
- 4.1.6 *ASTM D6226: Standard Test Method for Open Cell Content of Rigid Cellular Plastics*
- 4.1.7 *ASTM E84: Standard Test Method for Surface Burning Characteristics of Building Materials*
- 4.1.8 *ASTM E96: Standard Test Methods for Water Vapor Transmission of Materials*
- 4.1.9 *ASTM E2178: Standard Test Method for Air Permeance of Building Materials*
- 4.1.10 *NFPA 285: Standard Fire Test Method for the Evaluation of Fire Propagation Characteristics of Exterior Nonload-bearing Wall Assemblies Containing Combustible Components*
- 4.1.11 *UL 723: Test for Surface Burning Characteristics of Building Materials*

4.2 Regulations

- 4.2.1 *IBC – 15, 18, 21: International Building Code®*
- 4.2.2 *IRC – 15, 18, 21: International Residential Code®*

5 Listed^{xx}

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

6 Tabulated Properties Generated from Nationally Recognized Standards

6.1 General

- 6.1.1 ingspan® Kooltherm® Insulation Board are a rigid thermoset closed cell phenolic thermal insulation complying with IBC Section 2603.
- 6.1.2 ingspan® Kooltherm® Insulation Board are permitted to be used in buildings of Type I-IV construction in accordance with IBC Section 2603.5.
- 6.1.3 ingspan® Kooltherm® Insulation Board are permitted to be used in buildings of Type V construction in accordance with IBC Section 2603.4.1.13 and IBC Section 2603.5.



6.2 Water Vapor Permeance

- 6.2.1 inspan® Kooltherm® Insulation Board are classified as Class II vapor retarders in accordance with IBC Section 1404.3.
- 6.2.2 Water vapor permeance values are listed in **Table 2**.

Table 2. Vapor Permeance^{1,2}

Product	Water Vapor Permeance (perm)
Foil Facers (K8, K12 and K15)	0.51
Glass Facers (K10)	0.48
Foil-Glass Facers (K20)	0.79
1. Tested in accordance with ASTM E96 Desiccant Method 2. Results for 1" thickness board	

6.3 Air Barrier Material

- 6.3.1 inspan® Kooltherm® Insulation Board are an air-impermeable insulation and an air barrier material meeting the requirements of IECC Section C402.5.1.3^{xxi} for use as part of an air barrier assembly when installed in accordance with the manufacturer installation instructions and this report.
- 6.3.1.1 All seams, including the top and bottom edges shall be taped.

6.4 Surface Burn Characteristics

- 6.4.1 inspan® Kooltherm® Insulation Board were evaluated for surface burning characteristics in accordance with ASTM E84 per IBC Section 2603.03.
- 6.4.2 Flame spread index and smoke developed index are shown in **Table 3**.

Table 3. Surface Burn Characteristics^{1,2}

Product	Flame Spread Index	Smoke Developed Index	Classification
Kingspan Kooltherm Products	< 25	< 450	Class A
1. Tested in accordance with UL 723 (ASTM E84) 2. Flame spread and smoke-developed indexes are shown for comparison purposes only and are not intended to represent the performance under actual fire conditions.			

6.5 Ignition

- 6.5.1 inspan® Kooltherm® Insulation Board were evaluated to assess performance with regard to ignition in accordance with IBC Section 2603.5.7.
- 6.5.2 inspan® Kooltherm® Insulation Board comply with this section when the exterior side of the sheathing is protected with one of the following materials:
- 6.5.2.1 A thermal barrier complying with IBC Section 2603.4.
- 6.5.2.2 A minimum 1" (25 mm) thickness of concrete or masonry.
- 6.5.2.3 Glass-fiber-reinforced concrete panels of a minimum thickness of 3/8" (9.5 mm).
- 6.5.2.4 Metal-faced panels having a minimum 0.019" thick (0.48 mm) aluminum or 0.016" thick (0.41 mm) corrosion-resistant steel outer facings.



- 6.5.2.5 A minimum 7/8" (22.2 mm) thickness of stucco complying with IBC Section 2510.
- 6.5.2.6 A minimum 1/4" (6.4 mm) thickness fiber-cement lap, panel, or shingle siding complying with IBC Section 1404.16.

6.6 Vertical and Lateral Fire Propagation

- 6.6.1 Kingspan Kooltherm K15 & K5 Insulation Boards were tested to assess their performance with regard to vertical and lateral fire propagation in accordance with NFPA 285 and IBC Section 2603.5.5.
- 6.6.1.1 Engineering analysis also was conducted to assess substitution of other products within the approved wall assemblies.
- 6.6.1.2 The wall assemblies listed in **Table 4** and **Table 5** are approved for use in buildings of Type I-IV construction.

Table 4. Approved NFPA 285 Wall Assemblies Containing Maximum 4^{3/4}-inch Thick Kooltherm® Insulation¹

Wall Component	Materials
Base Wall System Use 1, 2 or 3	<ol style="list-style-type: none"> 1. Cast-concrete Wall 2. Concrete Masonry Wall 3. One layer 5/8" thick Type X gypsum wallboard on interior installed over steel studs: minimum 3^{5/8}" depth, minimum 20-gauge, spaced at a maximum of 24" o.c. with lateral bracing every 4' vertically.
Floorline Firestopping	<ol style="list-style-type: none"> 1. 4 lb./cu ft. mineral wool in each stud cavity at each floor line, attached with Z-clips or equivalent.
Cavity Insulation Use either 1, 2 or 3	<ol style="list-style-type: none"> 1. None 2. Fiberglass batt or mineral wool insulation (faced or unfaced) 3. Any noncombustible insulation (faced or unfaced)
Exterior Gypsum Sheathing Use either 1 or 2	<ol style="list-style-type: none"> 1. None; when base wall systems #1 or #2 are used, sheathing is optional 2. Minimum 5/8" thick, Type X, exterior type gypsum sheathing
Water-Resistive Barrier Use either 1 or 2 Applied over exterior gypsum sheathing and underneath exterior insulation	<ol style="list-style-type: none"> 1. None 2. Any Water-Resistive Barrier (WRB) material as indicated in Table 6.
Exterior Insulation	<ol style="list-style-type: none"> 1. Kingspan Kooltherm K15, K8, K10, K12 or K20 insulation – minimum 1" (25 mm) thick to a maximum of 4^{3/4}" (120 mm) thick. Standard silver aluminum, black coated aluminum, white coted aluminum or glass tissue facers are all acceptable facing materials.
Sealing of Exterior Insulation	<ol style="list-style-type: none"> 1. Optional; all exterior insulation joints and veneer tie penetrations sealed with acrylic, asphalt or butyl-based sealing tape – max. 4" width
Exterior Veneer Use any of these options	<ol style="list-style-type: none"> 1. Brick <ol style="list-style-type: none"> a. Standard nominal 4" thick, clay brick b. Brick veneer anchors – standard types – installed maximum 24" o.c. vertically on each stud c. Maximum 2" air gap between exterior insulation and brick 2. Concrete <ol style="list-style-type: none"> a. Minimum 2" thick b. Maximum 2" air gap between exterior insulation and concrete. c. Any standard non-open joint technique may be used.



Table 4. Approved NFPA 285 Wall Assemblies Containing Maximum 4^{3/4}-inch Thick Kooltherm® Insulation¹

Wall Component	Materials
	<ol style="list-style-type: none"> Concrete Masonry Units (CMU) <ol style="list-style-type: none"> Minimum 4" thick Maximum 2" air gap between exterior insulation and CMU Stone Veneer <ol style="list-style-type: none"> Minimum 2" thick limestone or natural stone veneer Minimum 1½" thick cast artificial stone veneer Any standard non-open joint technique may be used (such as shi lap, etc.) Stucco <ol style="list-style-type: none"> Minimum ¾" thick 2 or 3-coat stucco installed over lath
Flashing of Window, Door and Other Exterior Wall Penetrations¹	<ol style="list-style-type: none"> As an option, flash window, door and other exterior penetrations with limited amounts of acrylic, asphalt or butyl-based sealing tape, max. 12" width. As an option, Kooltherm® Cavity Closure can be used to close wall cavities at openings.
1. For more information regarding window detailing for NFPA 285 assemblies, please contact the manufacturer.	

Table 5. Approved NFPA 285 Wall Assemblies Containing Maximum 3" Thick Kooltherm Insulation¹

Wall Component	Materials
Base Wall System Use 1, 2 or 3	<ol style="list-style-type: none"> Cast-concrete Wall Concrete Masonry Wall One layer 5/8" thick Type X gypsum wallboard on interior installed over steel studs: minimum 35/8" depth, minimum 20-gauge, spaced at a maximum of 24" o.c. with lateral bracing every 4' vertically.
Floorline Firestopping	<ol style="list-style-type: none"> 4 lb./cu ft. mineral wool in each stud cavity at each floor line, attached with Z-clips or equivalent.
Cavity Insulation Use either 1, 2 or 3	<ol style="list-style-type: none"> None Fiberglass batt or mineral wool insulation (faced or unfaced) Any noncombustible insulation (faced or unfaced)
Exterior Gypsum Sheathing Use either 1 or 2	<ol style="list-style-type: none"> None (only allowed when base wall systems #1 or #2 are used) ½" or 5/8" thick, Type X, exterior type gypsum sheathing
Water-Resistive Barrier Use either 1 or 2 Applied over exterior gypsum sheathing and underneath exterior insulation	<ol style="list-style-type: none"> None Any WRB material as indicated in Table 6.
Exterior Insulation	<ol style="list-style-type: none"> Kingspan® Kooltherm® K15, K8, K10, K12 or K20 insulation – minimum 1" (25 mm) thick to a maximum of 3" (75 mm) thick. Standard silver aluminum, black coated aluminum, white coated aluminum or glass tissue facers are all acceptable facing materials.



Table 5. Approved NFPA 285 Wall Assemblies Containing Maximum 3" Thick Kooltherm Insulation¹

Wall Component	Materials
Sealing of Exterior Insulation	1. Optional; all exterior insulation joints and veneer tie penetrations sealed with acrylic, asphalt or butyl-based sealing tape – max. 4" width
Exterior Veneer Use any of these options	<ol style="list-style-type: none"> MCM Panel System <ol style="list-style-type: none"> Any metal composite material system that has been successfully tested by the panel manufacturer via the NFPA 285 test method. Acceptable NFPA 285 testing shall consist of successful NFPA 285 test results on wall assembly incorporating a comparable thickness of combustible foam insulation behind the MCM. MCM panels shall be maximum 4-mm thick. Steel, Aluminum or Copper Metal Exterior Wall Cladding <ol style="list-style-type: none"> Aluminum cladding shall be minimum 0.080" thick. Steel cladding shall be minimum 0.0149" thick. Copper cladding shall be minimum 0.0216" thick. Any standard installation technique may be used. Also acceptable to install cladding using Knight Wall Rainscreen Attachment System. Fiber-Cement Siding (Noncombustible) <ol style="list-style-type: none"> Minimum 1/4" thick. Any standard installation technique with noncombustible furring can be used. A maximum 1 1/2" air gap allowed behind the fiber-cement siding. Swisspearl Carat Panels <ol style="list-style-type: none"> Minimum 0.315-inch (8 mm) thick with closed or open joints (maximum 1/2" joints when open). Any standard installation technique using noncombustible furring can be used. A maximum 1 1/2" air gap allowed behind panels. Brick <ol style="list-style-type: none"> Standard nominal 4" thick, clay brick Brick veneer anchors – standard types – installed maximum 24" o.c. vertically on each stud Maximum 2" air gap between exterior insulation and brick Concrete <ol style="list-style-type: none"> Minimum 2" thick Maximum 2" air gap between exterior insulation and concrete. Any standard non-open joint technique may be used. Concrete Masonry Units (CMU) <ol style="list-style-type: none"> Minimum 4" thick Maximum 2" air gap between exterior insulation and CMU Stone Veneer <ol style="list-style-type: none"> Minimum 2" thick limestone or natural stone veneer Minimum 1 1/2" thick cast artificial stone veneer Any standard non-open joint technique may be used (such as shiplap, etc.). Stucco <ol style="list-style-type: none"> Minimum 3/4" thick 2 or 3-coat stucco installed over lath Terracotta Cladding <ol style="list-style-type: none"> Use any terracotta cladding system in which terracotta is minimum 1 1/4" thick. Any standard joint installation technique such as shiplap, etc. may be used. EIFS <ol style="list-style-type: none"> Henkel Polybit Industries Limited Ceresit EIFS – EIFS system consisting of Ceresit-CT 85 adhesive mortar and basecoat, Ceresit-CT 16 primer, and Ceresit-CT 60 finish coat.



Table 5. Approved NFPA 285 Wall Assemblies Containing Maximum 3" Thick Kooltherm Insulation¹

Wall Component	Materials
	<p>12. Thin Brick</p> <ul style="list-style-type: none"> a. Minimum 3/4" thick clay brick fully adhered with cementitious mortar (standard or polymer modified) to minimum 1/2" thick cement backer board or gypsum sheathing. b. A secondary water-resistive barrier can be installed between the board/sheathing and the brick. c. The secondary water-resistive barrier shall not be full-coverage asphalt or butyl-based self-adhered membranes.
Flashing of Window, Door and Other Exterior Wall Penetrations¹	<ul style="list-style-type: none"> 1. As an option, flash window, door and other exterior penetrations with limited amounts of acrylic, asphalt or butyl-based sealing tape, max. 12" width. 2. As an option, Kooltherm® Cavity Closure can be used to close wall cavities at openings.
1. For more information regarding window detailing for NFPA 285 assemblies, please contact the manufacturer.	

6.6.1.3 The materials listed in **Table 6** are approved for use as WRB in buildings of Type I-IV construction.

Table 6. Approved WRB Materials for NFPA 285 Wall Assemblies

Manufacturer	Material ¹	For Use with Table 4	For Use with Table 5
3M™	3M™ Self-Adhered Air and Vapor Barrier 3015	X	X
BASF	MasterSeal AWB 660	X	X
	MasterSeal AWB 660I	X	X
Carlisle	CCW-705FR w/ Primers	X	X
	Barritech™ VP	X	X
	Barritech™ NP	X	X
Cosella-Dörken	DeltaR-Foxx	X	X
	DeltaR-Foxx Plus	X	X
	DeltaR-Fassade S	X	X
	DeltaR-Vent S/Plus	X	X
	DeltaR-Maxx Plus	X	X
Dow Chemical	WeatherMate™	X	X
	WeatherMate™ Plus	X	X
Dow Corning®	DefendAir 200	X	X
Dryvit	BackstopR NT	X	X
DuPont	DuPont™ TyvekR CommercialWrap®	X	X
	DuPont™ TyvekR CommercialWrap® D	X	X

**Table 6.** Approved WRB Materials for NFPA 285 Wall Assemblies

Manufacturer	Material ¹	For Use with Table 4	For Use with Table 5
	DuPont™ TyvekR ThermaWrap™	X	X
	DuPont™ TyvekR Fluid Applied WB+ (nominal 25 wet mil thickness)	X	X
Henry Company	Air-Bloc® 32MR	X	X
	Air-Bloc® 31MR	X	X
	Air-Bloc® 33MR	X	X
	Blueskin VP™ 160	X	X
	Air-Bloc® 21 FR	X	X
	Metal Clad™	X	X
	Foilskin®	X	X
Hohmann & Barnard	Enviro-Barrier™	X	X
	Enviro-Barrier™ VP	X	X
Grace Construction Products	Perm-A-BarrierR Aluminum Wall Membrane	X	X
	Perm-A-BarrierR VPL	X	X
	Perm-A-BarrierR VPL LT	X	X
	Perm-A-BarrierR VPS	X	X
	Perm-A-BarrierR NPL 10	X	X
JX Nippon ANCI, Inc.	JX ALTATM Commercial Wrap	X	X
	JX ALTATM HP Wrap	X	X
	JX ALTATM LP Wrap	X	X
Kingspan®	Kingspan® GreenGuard® Max™ Building Wrap	X	X
	Kingspan® GreenGuard® Classic Building Wrap	X	X
	Kingspan® GreenGuard® C2000 Building Wrap	X	X
	Kingspan® GreenGuard® Raindrop® 3D Building Wrap	X	X
	Kingspan® GreenGuard® HPW™ Building Wrap	X	X
	Everbilt™ Premium Non-woven Housewrap	X	X
Momentive Performance Materials	GE SEC2500 SilShield* AWB	X	X
	GE SEC2600 SilShield* AWB	X	X

Table 6. Approved WRB Materials for NFPA 285 Wall Assemblies

Manufacturer	Material ¹	For Use with Table 4	For Use with Table 5
	GE SEC2600-r SilShield* AWB	X	X
Polyguard Products	Airluk Flex® applied at a maximum 40 mils WFT	X	
	Airluk Flex® WG applied at a maximum 20 mils WFT	X	
	Airluk Flex® VP applied at a maximum 32 mils WFT	X	
Prosoco	CAT 5	X	
	CAT 5 Rainscreen	X	
Soprema	Sopresa Stick 1100 TI	X	
	Soprased Stick VP	X	
Sto Corp	Sto Gold Coat® with StoGuard Fabric	X	X
	Sto Emerald Coat® with StoGuard Fabric	X	X
	Sto ExtraSeal™ with StoGuard Mesh	X	X
	StoGuard® VaproShield™	X	
STS, Inc.	Wall Guardian™ FW-100A	X	X
Tremco, Inc.	ExoAir 430	X	
VaproShield	WallShield	X	X
	WrapShield	X	X
	WrapShield SA™	X	
	RevealShield™	X	X
	RevealShield SA™	X	X
W.R. Meadows	Air-Shield™ LMP (Gray)	X	X
	Air-Shield™ LMP (Black)	X	X
	Air-Shield™ TMP	X	X
	Air-Shield™ LSR	X	X
1. Installation shall comply with the instructions in Table 4 or Table 5 respectively. All WRB to be installed at the indicated or recommended application rates and per the manufacturer installation instructions.			

- 6.7 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^{xxii}

- 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.^{xxiii}
- 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.^{xxiv}

8 Regulatory Evaluation and Accepted Engineering Practice

- 8.1 Kingspan® Kooltherm® Insulation Board comply with the following legislatively adopted regulations and/or accepted engineering practice for the following reasons:
 - 8.1.1 Kingspan® Kooltherm® Insulation Board products were evaluated to determine the following:
 - 8.1.1.1 Material properties in accordance with ASTM C209.
 - 8.1.1.2 Use as an air barrier material in accordance with [IECC Section C402.5.1.2](#).
 - 8.1.1.3 Performance for use in buildings of Type I-IV construction in accordance with [IBC Section 2603.5](#).
 - 8.1.1.3.1 Performance in accordance with ASTM E84/UL 723 for flame spread and smoke development ratings in accordance with [IBC Section 2603.3](#) and [IBC Section 2603.5.4](#).
 - 8.1.1.3.2 Performance with regard to the potential heat generated by the Foam Plastic Insulating Sheathing (FPIS) in accordance with [IBC Section 2603.5.3](#).
 - 8.1.1.3.3 Performance with regard to vertical and lateral fire propagation in accordance with [IBC Section 2603.5.5](#).
 - 8.1.1.3.4 Performance for use in buildings of Type V construction.
 - 8.1.1.3.5 Performance with regard to ignition in accordance with [IBC Section 2603.5.7](#).
 - 8.1.2 Use as part of an NFPA 285 wall assembly in accordance with [IBC Section 2603.5.5](#).
- 8.2 Wind pressure resistance is outside the scope of this report.
- 8.3 Any building code, regulation, and/or accepted engineering evaluations (i.e., research reports, duly authenticated reports, etc.) that are conducted for this Listing were performed by DrJ Engineering, LLC (DrJ), an [ISO/IEC 17065 accredited certification body](#) and a professional engineering company operated by [RDP/approved sources](#). DrJ is qualified^{xxv} to practice product and regulatory compliance services within its scope of accreditation and engineering expertise, respectively.
- 8.4 Engineering evaluations are conducted with DrJ's ANAB [accredited ICS code scope](#) of expertise, which are also its areas of professional engineering competence.
- 8.5 Any regulation specific issues not addressed in this section are outside the scope of this report.

9 Installation

- 9.1 Installation shall comply with the approved construction documents, the manufacturer installation instructions, this report, and the applicable building code.
- 9.2 In the event of a conflict between the manufacturer installation instructions and this report, the more restrictive shall govern.
- 9.3 See **Table 4** and **Table 5** for NFPA 285-compliant wall assemblies using Kingspan® Kooltherm® Insulation Board. See **Table 6** for NFPA 285-compliant WRBs for use with the assemblies in **Table 4** and **Table 5**.
- 9.4 For applications outside the scope of this report, an engineered design is required.



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 Material properties in accordance with ASTM C209
 - 10.1.2 Compressive strength properties in accordance with ASTM D1621
 - 10.1.3 Apparent core density properties in accordance with ASTM D1622
 - 10.1.4 Tensile strength in accordance with ASTM D1622
 - 10.1.5 Flame spread and smoke developed ratings in accordance with ASTM E84/UL 723
 - 10.1.6 Water vapor transmission and permeance properties in accordance with ASTM E96
 - 10.1.7 Air barrier material performance in accordance with ASTM E2178
 - 10.1.8 Vertical and lateral flame spread in accordance with NFPA 285
- 10.2 Engineering analysis supporting the following material properties:
 - 10.2.1 Extension of NFPA 285.
- 10.3 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.
- 10.4 Where pertinent, testing and/or engineering analysis are based upon provisions that have been codified into law through state or local adoption of regulations and standards. The developers of these regulations and standards are responsible for the reliability of published content. DrJ's engineering practice may use a regulation-adopted provision as the control. A regulation-endorsed control versus a simulation of the conditions of application to occur establishes a new material as being equivalent to the regulatory provision in terms of quality, strength, effectiveness, fire resistance, durability, and safety.
- 10.5 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.
- 10.6 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.^{xxvi}
- 10.7 Where additional condition of use and/or regulatory compliance information is required, please search for Kingspan® Kooltherm® Insulation Board on the DrJ Certification website.



11 Findings

- 11.1 As outlined in Section 6, ingspan® Kooltherm® Insulation Board 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, ingspan® Kooltherm® Insulation Board shall be approved for the following applications:
- 11.2.1 ingspan® Kooltherm® Insulation Board are approved for use in exterior walls without a thermal barrier in accordance with [IBC Section 2603.4](#) and [IBC Section 2603.5.2](#).
 - 11.2.2 ingspan® Kooltherm® Insulation Board are approved for use in exterior walls of buildings of Type I-IV construction in accordance with [IBC Section 2603.5](#).
 - 11.2.3 ingspan® Kooltherm® Insulation Board are approved for use in wall assemblies meeting the requirements of NFPA 285 testing when constructed in accordance with **Table 4** or **Table 5**.
- 11.3 Any application specific issues not addressed herein can be engineered by an RDP. Assistance with engineering is available from Kingspan® Insulation LLC.
- 11.4 [IBC Section 104.11](#) ([IRC Section R104.11](#) and [IFC Section 104.10](#)^{xxvii} 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.
- 11.5 **Approved:**^{xxviii} Building regulations require that the building official shall accept Duly Authenticated Reports.^{xxix}
- 11.5.1 An approved agency is “approved” when it is [ANAB ISO/IEC 17065 accredited](#).
 - 11.5.2 An approved source is “approved” when an [RDP](#) is properly licensed to transact engineering commerce.
 - 11.5.3 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.
- 11.6 DrJ is a licensed engineering company, employs licensed RDPs and is an [ANAB-Accredited Product Certification Body – Accreditation #1131](#).
- 11.7 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.^{xxx}



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, ingspan® Kooltherm® Insulation Board shall not be used:
 - 12.3.1 As a nailing base for cladding.
 - 12.3.2 The insulation boards shall not be used to resist lateral loads.
 - 12.3.2.1 Walls shall be braced by other materials in accordance with the applicable code, and the exterior wall covering shall be capable of resisting the full design wind pressure.
- 12.4 In areas where the probability of termite infestation is very heavy and the building is wood-framed construction, ingspan® Kooltherm® Insulation Board must not be placed on exterior walls located within 6" (152 mm) of the ground and shall meet the requirements of IBC Section 2603.8.
- 12.5 ingspan® Kooltherm® Insulation Board shall be separated from the interior of the building by an approved thermal barrier except as provided for in Section 6.5.
- 12.6 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:
 - 12.6.1 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.
 - 12.6.2 This report and the installation instructions shall be submitted at the time of permit application.
 - 12.6.3 These innovative products have an internal quality control program and a third-party quality assurance program.
 - 12.6.4 At a minimum, these innovative products shall be installed per Section 9 of this report.
 - 12.6.5 The review of this report by the AHJ shall comply with IBC Section 104 and IBC Section 105.4.
 - 12.6.6 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.
 - 12.6.7 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.
- 12.7 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.
- 12.8 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).
- 12.9 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.kingspaninsulation.us.

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® Kooltherm® Insulation Board 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, and
 - 1.1.3 Benefit consumers through lower prices, better quality, and greater choice.
- 1.2 **Adopted Legislation:** The following local, state, and federal regulations affirmatively authorize 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),^{xxx} where providing test reports, engineering analysis and/or other related IP/TS is subject to prison of not more than ten years^{xxxii} and/or a \$5,000,000 fine or 3 times the value of^{xxxiii} 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^{xxxiv} 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.^{xxxv}
 - 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.^{xxxvi}



- 1.3 **Approved^{xxxvii} 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.^{xxxviii} 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.^{xxxix}
- 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^{xi} 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^{xii} (i.e., ANAB, International Accreditation Forum [IAF], etc.).
- 1.6 **Approved by Florida:** Statewide approval of products, methods, or systems of construction shall be approved, without further evaluation by:
- 1.6.1 A certification mark or listing of an approved certification agency,
 - 1.6.2 A test report from an approved testing laboratory,
 - 1.6.3 A product evaluation report based upon testing or comparative or rational analysis, or a combination thereof, from an approved product evaluation entity, or
 - 1.6.4 A product evaluation report based upon testing, comparative or rational analysis, or a combination thereof, developed, signed and sealed by a professional engineer or architect, licensed in Florida.
 - 1.6.5 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](#),^{xlii} 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)"*.^{xliii} 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](#)^{xliv} and [Part 3280](#),^{xlv} 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.^{xlvi}
 - 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.^{xlvii}
 - 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.^{xlviii}
 - 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.^{xlix}
- 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.ⁱ
 - 1.11.4 Therefore, all ANAB ISO/IEC 17065 Duly Authenticated Reports are approval equivalent.ⁱⁱ
- 1.12** Approval equity is a fundamental commercial and legal principle.ⁱⁱⁱ



Notes

- i For more information, visit drjcertification.org or call us at 608-310-6748.
- ii <https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1702>
- iii Alternative Materials, Design and Methods of Construction and Equipment: The provisions of any regulation code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by a regulation. Please review <https://www.justice.gov/atr/mission> and <https://up.codes/viewer/colorado/ibc-2021/chapter/1/scope-and-administration#104.11>
- iv <https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1706>:-:text=the%20design%20strengths%20and%20permissible%20stresses%20shall%20be%20established%20by%20tests%20as
- v The design strengths and permissible stresses of any structural material shall conform to the specifications and methods of design of accepted engineering practice. <https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1706>:-:text=shall%20conform%20to%20the%20specifications%20and%20methods%20of%20design%20of%20accepted%20engineering%20practice
- vi <https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1707.1>:-:text=the%20building%20official%20shall%20accept%20duly%20authenticated%20reports%20from%20approved%20agencies
- vii <https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1703.4.2>
- viii https://up.codes/viewer/wyoming/ibc-2021/chapter/2/definitions#approved_agency
- ix https://up.codes/viewer/wyoming/ibc-2021/chapter/2/definitions#approved_source
- x <https://www.law.cornell.edu/uscode/text/18/1832> (b) Any organization that commits any offense described in subsection (a) shall be fined not more than the greater of \$5,000,000 or 3 times the value of the stolen trade secret to the organization, including expenses for research and design and other costs of reproducing the trade secret that the organization has thereby avoided. The federal government and each state have a public records act. To follow DTSA and comply state public records and trade secret legislation requires approval through ANAB ISO/IEC 17065 accredited certification bodies or approved sources. For more information, please review this website: [Intellectual Property and Trade Secrets](https://www.intellectualpropertyandtradesecrets.com/).
- xi <https://www.nspe.org/resources/issues-and-advocacy/professional-policies-and-position-statements/regulation-professional> AND <https://apassociation.org/list-of-engineering-boards-in-each-state-archive/>
- xii <https://www.cbiteest.com/accreditation/>
- xiii <https://up.codes/viewer/colorado/ibc-2021/chapter/1/scope-and-administration#104.11>:-:text=to%20enforce%20the%20provisions%20of%20this%20code
- xiv <https://up.codes/viewer/colorado/ibc-2021/chapter/1/scope-and-administration#104.11>:-:text=Where%20the%20alternative%20material%20design%20or%20method%20of%20construction%20is%20not%20approved%20the%20building%20official%20shall%20respond%20in%20writing%20stating%20the%20reasons%20why%20the%20alternative%20was%20not%20approved AND <https://up.codes/viewer/colorado/ibc-2021/chapter/1/scope-and-administration#105.3.1>:-:text=If%20the%20application%20or%20the%20construction%20documents%20do%20not%20conform%20to%20the%20requirements%20of%20pertinent%20laws%20the%20building%20official%20shall%20reject%20such%20application%20in%20writing%20stating%20the%20reasons%20therefore
- xv <https://up.codes/viewer/colorado/ibc-2021/chapter/17/special-inspections-and-tests#1707.1>:-:text=the%20building%20official%20shall%20accept%20duly%20authenticated%20reports%20from%20approved%20agencies%20in%20respect%20to%20the%20quality%20and%20manner%20of%20use%20of%20new%20materials%20or%20assemblies%20as%20provided%20for%20in%20Section%20104.11
- xvi <https://iaf.eu/en/about-iaf-mia/#>:-:text=it%20is%20required%20to%20recognise%20certificates%20and%20validation%20and%20verification%20statements%20issued%20by%20conformity%20assessment%20bodies%20accredited%20by%20all%20other%20signatories%20of%20the%20IAF%20MLA%20with%20the%20appropriate%20scope
- xvii True for all ANAB accredited product evaluation agencies and all International Trade Agreements.
- xviii <https://www.justice.gov/crt/deprivation-rights-under-color-law> AND <https://www.justice.gov/atr/mission>
- xix Unless otherwise noted, all references in this Listing are from the 2021 version of the codes and the standards referenced therein. This material, product, design, service and/or method of construction also complies with the 2000-2021 versions of the referenced codes and the standards referenced therein.
- xx <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>
- xxi 2018 IECC Section C402.5.1.2.1
- xxii <https://up.codes/viewer/colorado/ibc-2021/chapter/17/special-inspections-and-tests#1703.4>
- xxiii <https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280#>:-:text=All%20construction%20methods%20shall%20be%20in%20conformance%20with%20accepted%20engineering%20practices%20to%20insure%20durable%20livable%20and%20safe%20housing%20and%20shall%20demonstrate%20acceptable%20workmanship%20reflecting%20journeyman%20quality%20of%20work%20of%20the%20various%20trades
- xxiv <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
- xxv 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.
- xxvi See Code of Federal Regulations (CFR) Title 24 Subtitle B Chapter XX Part 3280 for definition.
- xxvii 2018 IFC Section 104.9
- xxviii 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.



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- xxix <https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1707.1>
 - xxx Multilateral approval is true for all ANAB accredited product evaluation agencies and all International Trade Agreements.
 - xxxi <http://www.drjengineering.org/AppendixC> AND <https://www.drjcertification.org/cornell-2016-protection-trade-secrets>
 - xxxii <https://www.law.cornell.edu/uscode/text/18/1832#:~:text=imprisoned%20not%20more%20than%2010%20years>
 - xxxiii <https://www.law.cornell.edu/uscode/text/18/1832#:~:text=Any%20organization%20that,has%20thereby%20avoided>
 - xxxiv <https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1706.2>
 - xxxv IBC 2021, Section 1706.1 Conformance to Standards
 - xxxvi IBC 2021, Section 1707 Alternative Test Procedure, 1707.1 General
 - xxxvii See Section 11 for the distilled building code definition of **Approved**
 - xxxviii Los Angeles Municipal Code, SEC. 98.0503. TESTING AGENCIES
 - xxxix <https://up.codes/viewer/california/ca-building-code-2022/chapter/17/special-inspections-and-tests#1707.1>
 - xl New York City, The Rules of the City of New York, § 101-07 Approved Agencies
 - xli New York City, The Rules of the City of New York, § 101-07 Approved Agencies
 - xlii <https://up.codes/viewer/new-jersey/ibc-2018/chapter/17/special-inspections-and-tests#1707.1>
 - xliii <https://www.nj.gov/dca/divisions/codes/codreg/ucc.html>
 - xliv <https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3282/subpart-A/section-3282.14>
 - xlv <https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280>
 - xlvi IBC 2021, Section 1706 Design Strengths of Materials, 1706.2 New Materials. Adopted law pursuant to IBC model code language 1706.2.
 - xlvii IBC 2021, Section 1707 Alternative Test Procedure, 1707.1 General. Adopted law pursuant to IBC model code language 1707.1.
 - xlviii <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/>
 - xlix IBC 2021, Section 1706 Design Strengths of Materials, Section 1706.1 Conformance to Standards Adopted law pursuant to IBC model code language 1706.1.
 - i <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>
 - ii True for all ANAB accredited product evaluation agencies and all International Trade Agreements.
 - iii <https://www.justice.gov/crt/deprivation-rights-under-color-law> AND <https://www.justice.gov/atr/mission>