

Listing

Report No: 2302-42



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Performance Characteristics of Owens Corning® (OC™) Lumber

Trade Secret Report Holder:

Owens Corning®

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CSI Designations:

DIVISION: 06 00 00 - WOOD, PLASTICS AND COMPOSITES

Section: 06 05 23 - Wood, Plastic, and Composite Fastenings

Section: 06 10 00 - Rough Carpentry

Section: 06 15 00 - Wood Decking

Section: 06 17 00 - Shop-Fabricated Structural Wood

1 Innovative Product Evaluated¹

1.1 Owens Corning® Lumber

2 Product Description and Materials

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



Figure 1. Owens Corning® (OC™) Lumber



Table 1. Description of Owens Corning® Lumber Structural Composite Lumber

Owens Corning® Lumber	Description
Product Type	Continuous Glass fiber reinforced High Density Polyethylene (HDPE) with (less than 25%) calcium carbonate in base HDPE resin. ≥ 5% of overall total weight is fibrous glass < 2.5% by weight of organic surface binder
Application	Reinforced & semi-reinforced extruded products for use in non-structural and structural applications.
Joists	Reinforced polymeric lumber for nominal 2x6 (i.e., 1.5" by 5.5"), 2x8, and 2x10 joist applications.
Decking	Reinforced polymeric lumber for nominal 5/4x6 (i.e., 1.02" by 5.5"), 5/4x8 and 2x6 flatwise board applications.

2.2 As needed, review material properties for design in Section 6.

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 [RDP]) 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 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 D198: Standard Test Methods of Static Tests of Lumber in Structural Sizes*
- 4.1.2 *ASTM D6109: Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastic Lumber and Related Products*
- 4.1.3 *ASTM D7147: Standard Specification for Testing and Establishing Allowable Loads of Joist Hangers*
- 4.1.4 *ASTM E84: Standard Test Method for Surface Burning Characteristics of Building Materials*
- 4.1.5 *UL 723: Test for Surface Burning Characteristics of Building Materials*
- 4.1.6 *Vista Engineering Full Deck Assembly Report*

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 Owens Corning® Lumber was tested and/or evaluated for:

- 6.1.1 Structural capacities for gravity loads of deck posts, joists, beams, and headers
- 6.1.2 Fastener and hanger connection capacities
- 6.1.3 Flame spread

- 6.2 Other characteristics not specifically delineated herein are not in the scope of this evaluation.

- 6.3 Maximum allowable joist spans are shown in **Table 2**.

- 6.3.1 The maximum joist cantilever is 2' 0" or twenty-five percent (25%) of the length of the joist span, whichever length is less.
- 6.3.2 The length of the cantilever is measured from the exterior side of the post or beam to the end of the rim joist.
- 6.3.3 For more information, see the manufacturer installation guide or contact Owens Corning® Technical Support.

- 6.3.3.1 An example of OC™ Lumber joist installation is shown in **Figure 2**.

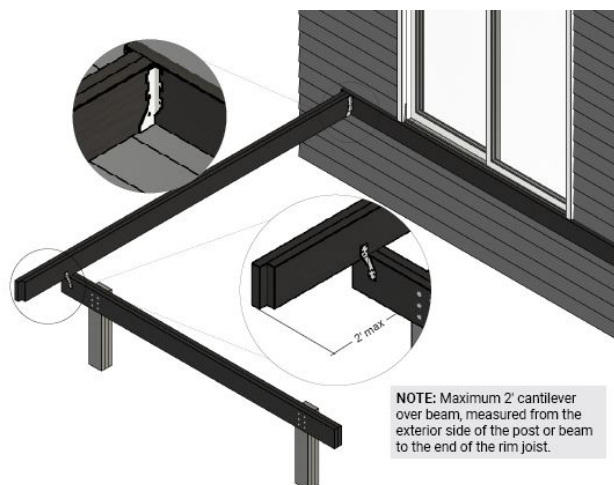


Figure 2. OC™ Lumber Joist Installation

Table 2. Maximum Allowable Joist Spans for OC™ Lumber^{1,2,3,4}

Nominal Joist Size	Allowable Joist Span (ft)		
	Spacing of Deck Joists		
	12	16	24
2x6	8' 7"	7' 9"	6' 10"
2x8	12' 3"	11' 2"	9' 9"
2x10	14' 8"	13' 4"	11' 8"

SI: 1 ft = 0.305 m, 1 in = 25.4 mm

- LL= 40 and DL = 10 psf.
- Decks shall be designed for 40-psf live load per IRC Section R301.5 or a ground snow load up to 40 psf LL.
- OC™ decks use proprietary materials and conditions not prescribed in IRC Section R507.1.
- OC™ decks use design requirements, which are considered proprietary intellectual property and trade secrets, pursuant to IRC Section R301.1.3, IBC Section 1706.2, IBC Section 1707.1, and IRC Section R104.11.

6.4 Maximum post spacing recommended for support of deck beams with two supports are depicted in **Figure 3** and **Table 3**.

- 6.4.1 The maximum beam cantilever is 2' 0" or twenty-five percent (25%) of the length of the post spacing, whichever length is less.
- 6.4.2 The length of the cantilever is measured from the exterior side of the post to the end of the beam length.
- 6.4.3 For more information, see the manufacturer installation guide or contact Owens Corning® Technical Support.
- 6.4.4 The procedure for using **Table 3** follows:
 - 6.4.4.1 Determine the length of joist to be used for your deck (i.e., 10').
 - 6.4.4.2 Find the "length of joist column" in **Table 3** (i.e., 10').
 - 6.4.4.3 Using the beam size and # of plies (i.e., 2x8 beam that is 3-ply), find the maximum OC™ post spacing that supports a 10' joist (i.e., this is a 6' 11" post spacing).
 - 6.4.4.4 If applicable, add cantilever(s) to determine final beam length (i.e., if the 6' 11" post spacing has a beam with two cantilevers on each end, the maximum beam length is 10' 11").

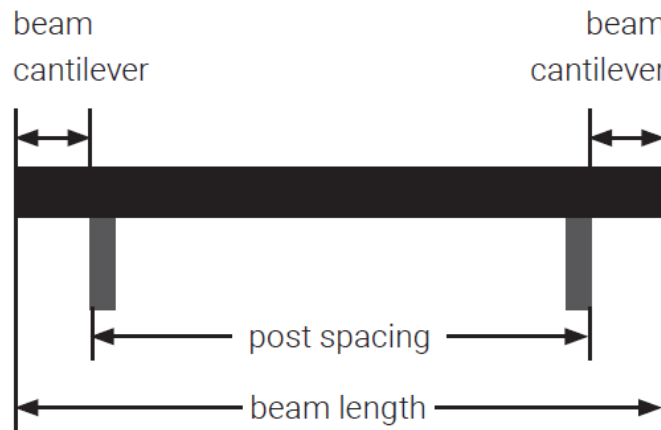


Figure 3. Post Spacing for Support of Beams at Two (2) Locations

Table 3. Maximum Post Spacing for Support of Beams at Two (2) Locations^{1,2,3,4}

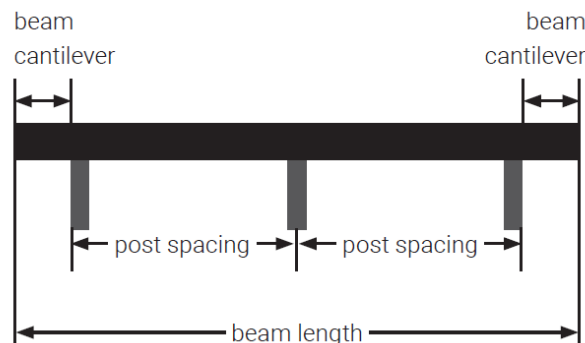
OC™ Nominal Beam Size	# of Plies	Length of OC™ Joist (ft)							
		4'	5'	6'	7'	8'	9'	10'	11'
		Post Spacing (ft)							
2x6	2	5' 1"	4' 10"	4' 8"	4' 7"	4' 5"	4' 4"	4' 2"	4' 1"
	3	5' 10"	5' 7"	5' 5"	5' 3"	5' 1"	4' 11"	4' 10"	4' 8"
2x8	2	7' 3"	7' 0"	6' 9"	6' 6"	6' 4"	6' 2"	6' 0"	5' 10"
	3	8' 4"	8' 0"	7' 8"	7' 6"	7' 3"	7' 1"	6' 11"	6' 9"
2x10	2	8' 8"	8' 4"	8' 1"	7' 10"	7' 7"	7' 4"	7' 2"	7' 0"
	3	9' 11"	9' 7"	9' 3"	8' 11"	8' 8"	8' 5"	8' 3"	8' 1"

SI: 1 ft = 0.305 m, 1 in = 25.4 mm

- LL = 40 and DL = 10 psf.
- Decks shall be designed for 40 psf live load per [IRC Section R301.5](#) or a ground snow load up to 40 psf LL.
- OC™ decks use proprietary materials and conditions not prescribed in [IRC Section R507.1](#).
- OC™ decks use design requirements, which are considered proprietary intellectual property and trade secrets, pursuant to [IRC Section R301.1.3](#), [IBC Section 1706.2](#), [IBC Section 1707.1](#), and [IRC Section R104.11](#). OC™ decks use proprietary materials and conditions not prescribed in [IRC Section R507.1](#).

6.5 Maximum post spacing recommended for support of deck beams with three supports are depicted in **Figure 4** and **Table 4**.

- 6.5.1 The maximum beam cantilever is 2' 0" or 1/4 of the length of the post spacing, whichever length is less.
- 6.5.2 The length of the cantilever is measured from the exterior side of the exterior post to the end of the beam length.
- 6.5.3 For more information, see the manufacturer installation guide or contact Owens Corning® Technical Support.
- 6.5.4 The procedure for the using **Table 4** follows:
 - 6.5.4.1 Determine the length of joist to be used for your deck (i.e., 10').
 - 6.5.4.2 Find the "length of joist column" in **Table 4** (i.e., 10').
 - 6.5.4.3 Using the beam size and # of plies (i.e., 2x8 beam that is 3-ply), find the maximum OC™ post spacing that supports a 10' joist (i.e., this is a 7' 2" post spacing).
 - 6.5.4.4 If applicable, add cantilever(s) to determine final beam length (i.e., if the 7' 2" post spacing has a beam with two cantilevers on each end, the maximum beam length is 11' 2").



Beam must be continuous over supports.

Figure 4. Post Spacing for Support of Beams at Three (3) or More Locations

Table 4. Maximum Post Spacing for Support of Beams at Three (3) or More Locations^{1,2,3,4}

OC™ Nominal Beam Size	# of Plies	Length of OC™ Joist (ft)							
		4'	5'	6'	7'	8'	9'	10'	11'
		Post Spacing (ft)							
2x6	2	5'-3"	5'-1"	4'-11"	4'-9"	4'-7"	4'-6"	4'-4"	4'-3"
	3	6'-0"	5'-10"	5'-7"	5'-5"	5'-3"	5'-1"	5'-0"	4'-11"
2x8	2	7'-6"	7'-3"	7'-0"	6'-9"	6'-7"	6'-5"	6'-3"	6'-1"
	3	8'-7"	8'-3"	8'-0"	7'-9"	7'-6"	7'-4"	7'-2"	7'-0"
2x10	2	9'-0"	8'-8"	8'-4"	8'-1"	7'-10"	7'-8"	7'-6"	7'-4"
	3	10'-4"	9'-11"	9'-7"	9'-3"	9'-0"	8'-9"	8'-7"	8'-4"

SI: 1 ft = 0.305 m, 1 in = 25.4 mm

1. LL= 40 and DL = 10 psf.
2. Decks shall be designed for 40-psf live load per IRC Section R301.5 or a ground snow load up to 40 psf LL.
3. OC™ decks use proprietary materials and conditions not prescribed in IRC Section R507.1.
4. OC™ decks use design requirements, which are considered proprietary intellectual property and trade secrets, pursuant to IRC Section R301.1.3, IBC Section 1706.2, IBC Section 1707.1, and IRC Section R104.11. OC™ decks use proprietary materials and conditions not prescribed in IRC Section R507.1.

6.6 The maximum bearing capacity of built-up Owens Corning® Lumber posts that are used to support 2-ply and 3-ply Owens Corning® Lumber beams are provided in **Figure 5**, **Figure 6**, and **Table 5**.

- 6.6.1 The maximum post height is 9' 0".
- 6.6.2 All posts shall be diagonally braced to prevent side-sway and/or buckling.
- 6.6.3 For more information regarding post and bracing installations, see the manufacturer installation guide or contact Owens Corning® Technical Support.

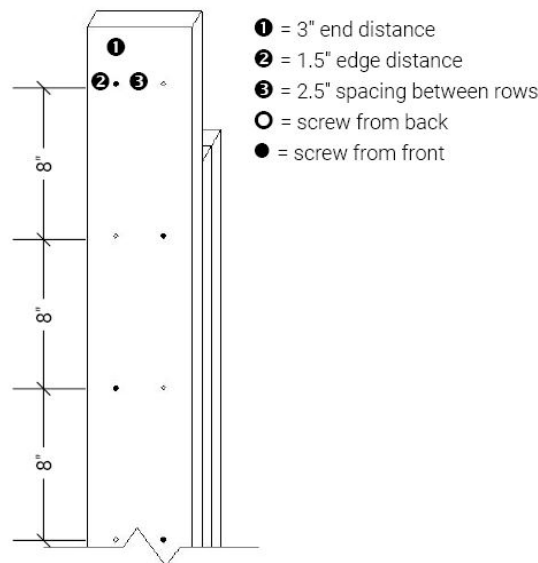


Figure 5. Post Supporting a 2-ply Beam

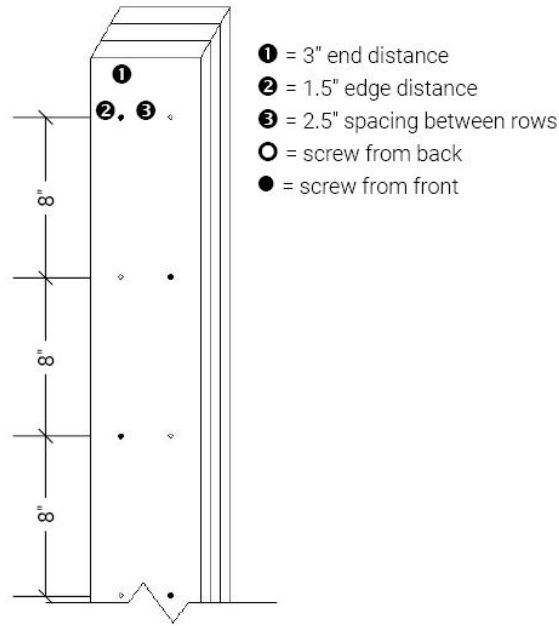


Figure 6. Post Supporting a 3-ply Beam

Table 5. Maximum Bearing Capacity of Posts to Support 2-Ply and 3-Ply Beams¹

Maximum Bearing Capacity Support a 2-Ply Beam (See Figure 5)	Maximum Bearing Capacity to Support a 3-Ply Beam (See Figure 6)
5,500 lbs	8,250 lbs
1. Maximum post height is 9 ft. Important Note: Post shall be diagonally braced to prevent side-sway and buckling.	

6.7 General application information regarding fasteners to be used with Owens Corning® Lumber follows:

- 6.7.1 #10 x 3" stainless steel composite deck screws
- 6.7.2 #9 x 2.5" stainless steel composite deck screws
- 6.7.3 #9 x 1.5" exterior grade connector screws
- 6.7.4 Beam-to-post connectors with a minimum uplift capacity of 2,000 lbs.
- 6.7.5 Hurricane ties and angle brackets with minimum uplift capacity of 500 lbs.
- 6.7.6 For more information, see the manufacturer installation guide or contact Owens Corning® Technical Support.

6.8 Minimum design values required for joist hangers that are used to make connections between Owens Corning® Lumber and ledgers, headers or beams are provided in **Table 6**.

- 6.8.1 For more information, see the manufacturer installation guide or contact Owens Corning® Technical Support.



Table 6. Minimum Design Values for Hangers Attached to Owens Corning Lumber¹

Hanger Type	Minimum Gravity Allowable Load (lb)	Minimum Uplift Allowable Load (lb)
Single 2x6 Joist Hanger	345	500
Single 2x8 Joist Hanger	490	500
Single 2x10 Joist Hanger	545	500
Double 2x6 Joist Hanger	685	500
Double 2x8 Joist Hanger	980	500
Double 2x10 Joist Hanger	1,170	500

1. In accordance with ASTM D7147.

6.9 General application information regarding WEARDECK™ follows:

6.9.1 Minimum Screw Lengths:

6.9.1.1 2 1/2" screws for 5/4" x 8" WEARDECK™

6.9.1.2 1 1/2" screws for 1/2" x 6" and 1/2" x 10" WEARDECK™

6.9.2 Minimum Spacing:

6.9.2.1 End to end: 1/16" (3/16" recommended)

6.9.2.2 Side to side: 1/16" (3/16" recommended)

6.9.3 For more WEARDECK™ information, see the manufacturer installation guide or contact Owens Corning® Technical Support.

6.10 Engineering properties for various Owens Corning® Lumber member sizes are found in **Table 7**.

Table 7. Owens Corning Structural Lumber Edgewise Orientation Design Values (ASD)

Nominal Member Size	Fb (psi)	EI (lb-in ²)	MOE (psi)	I _x (in ⁴)	S _x (in ³)
2x6	1,305	7,200,000	300,000	20.8	7.6
2x8	1,460	20,900,000	400,000	52.7	14.1
2x10	1,515	35,800,000	400,000	98.9	21.4

Fb, EI and MOE are allowable design values.

6.10.1 Applications of the Owens Corning® Lumber that require professional engineering are those conditions where the joist, beam, and column application is outside of the prescriptive values provided in **Table 2** through **Table 5**.

6.10.1.1 In other words, a deck design that requires higher applied loads, longer spans, multiple joist spans, a cantilever, a concentrated load, multiple applied loads, etc.

- 6.10.2 The engineered design drawing development process follows:
- 6.10.2.1 To size Owens Corning® Lumber structural members, use the allowable stress design values found in **Table 7**.
 - 6.10.2.2 Analyze the resistance needed, for the pertinent member size designated in **Table 7** using the allowable stress design properties and standard engineering equations.^{xxi}
 - 6.10.2.2.1 These properties are based upon test data and use actual design dimensions, i.e., 1½" by 5½", 1½" by 7¼" and 1½" by 9¼" section properties.
 - 6.10.2.3 Create an engineered design drawing for the application, which includes but is not limited to span, depth, applied loads, support conditions, anchorage, reaction limits, component connections, deflection limits, moisture conditions, serviceability conditions, durability conditions, end connection details, boundary condition application details, and so forth.
 - 6.10.2.4 Each Owens Corning® Lumber engineered design and associated engineered design drawing shall provide sufficient detailing for the specific floor, wall, or roof installation.
 - 6.10.2.5 Each Owens Corning® Lumber structural member design is defined as an engineered design pursuant to the building code and professional engineering law, which requires the design to be performed by a Registered Design Professional where all loading and boundary conditions are provided by the owner or the Registered Design Professional in Responsible Charge of the project.
 - 6.10.2.5.1 Where assistance is needed regarding innovative product structural member specialty engineered designs, please contact Owens Corning® Technical Support.
- 6.10.3 To establish a complete load path, all connections shall be designed separately to transfer load from Owens Corning® Lumber to other structural members and then onto the foundation. Please refer to the manufacturer details and installation instructions or contact Owens Corning® Technical Support.
- 6.11 OC™ Standard Deck Tested and Analyzed – Load Resistance for a Specific OC™ Deck Design
- 6.11.1 Owens Corning® Lumber decks were constructed as detailed in **Figure 7**.
 - 6.11.2 12' x 10' decks were constructed with joists spaced at 24" on center, 16" on center, and at 12" on center.
 - 6.11.3 These decks were constructed with a 24" cantilever on one side of the deck and the joists were installed using 2x8 Owens Corning® Lumber.

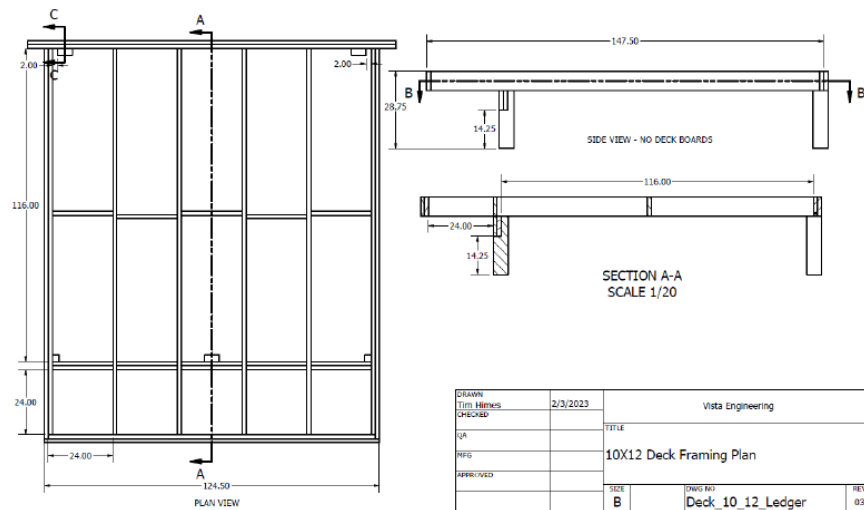


Figure 7. Tested Deck Framing Plan



6.11.4 Based on this OC™ deck standard design for the specific **Figure 7** installation details, the allowable design values for Owens Corning® Lumber Composite Assemblies are found in **Table 8**.

Table 8. Allowable Composite Floor Joist Assembly Applications

Product	12-foot Long Owens Corning® Lumber Joist with 2-foot Cantilever Spaced 24" O.C. Total Load in PSF	12-foot Long Owens Corning® Lumber Joist with 2-foot Cantilever Spaced 16" O.C. Total Load in PSF	12-foot Long Owens Corning® Lumber Joist with 2-foot Cantilever Spaced 12" O.C. Total Load in PSF
Owens Corning® Lumber 2x8 Joist Assemblies	50	65	80

6.12 Owens Corning® Lumber meets the requirements for composite deck boards having a flame spread in accordance with **Table 9**.

Table 9. Flame Spread and Smoke Developed Index¹

Product Description	Flame Spread
Owens Corning® Lumber Joists	65
Owens Corning® Lumber Deck Boards	65

1. Tested in accordance with ASTM E84/ UL723.

6.13 Railings, rail posts, and stair stringers are outside of the scope of this Listing. For more information, please contact Owens Corning Technical Support

6.14 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 Installation

8.1 Installation shall comply with the approved construction documents, the manufacturer installation instructions, this report and the applicable building code.

8.2 In the event of a conflict between the manufacturer installation instructions and this report, the more restrictive shall govern.



9 Substantiating Data

- 9.1 Testing has been performed under the supervision of a professional engineer and/or under the requirements of ISO/IEC 17025 as follows:
- 9.1.1 Flexural testing in accordance with ASTM D198
 - 9.1.2 Flexural test data in accordance with ASTM D6109 from approved sources
 - 9.1.3 Vista Engineering Full Deck Assembly Report
 - 9.1.4 Compression testing (short and long specimens) in accordance with ASTM D198
 - 9.1.5 Joist hanger assembly testing in accordance with ASTM D7147
 - 9.1.6 Span and post spacing calculations from approved sources
 - 9.1.7 Surface burning characteristics in accordance with ASTM E84
- 9.2 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.
- 9.3 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.
- 9.4 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.
- 9.5 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.^{xxv}
- 9.6 Where additional condition of use and/or regulatory compliance information is required, please search for Owens Corning® Lumber on the DrJ Certification website.

10 Findings

- 10.1 As outlined in Section 6, Owens Corning® Lumber has performance characteristics that were tested and/or meet applicable regulations and is suitable for use pursuant to its specified purpose.
- 10.2 When used and installed in accordance with this duly authenticated report and the manufacturer installation instructions, Owens Corning® Lumber shall be approved for the following applications:
- 10.2.1 Joists as permitted in **Table 2**.
 - 10.2.2 Posts as permitted in **Table 3** and **Table 4**.
 - 10.2.3 Built-up Posts as permitted in **Table 5**.
 - 10.2.4 Ledgers as permitted in **Table 6**.
 - 10.2.5 Headers and beams as permitted in **Table 7**
 - 10.2.6 Fire-rated as Class B per flame spread index shown in **Table 9**.
- 10.3 Unless exempt by state statute, when Owens Corning® Lumber is to be used as a structural and/or building envelope component in the design of a specific building, the design shall be performed by an RDP.
- 10.4 Any application specific issues not addressed herein can be engineered by an RDP. Assistance with engineering is available from Owens Corning®.



10.5 IBC Section 104.11 (IRC Section R104.11 and IFC Section 104.10^{xxvi} 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.

10.6 **Approved:**^{xxvii} Building regulations require that the building official shall accept duly authenticated reports.^{xxviii}

10.6.1 An approved agency is “approved” when it is ANAB ISO/IEC 17065 accredited.

10.6.2 An approved source is “approved” when an RDP is properly licensed to transact engineering commerce.

10.6.3 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.

10.7 DrJ is a licensed engineering company, employs licensed RDPs and is an ANAB-Accredited Product Certification Body – Accreditation #1131.

10.8 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.^{xxix}

11 Conditions of Use

11.1 Material properties shall not fall outside the boundaries defined in Section 6.

11.2 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.

11.3 As listed herein, Owens Corning® Lumber shall be used:

11.3.1 Primarily for outdoor decks.

11.3.2 For all other applications, assistance is available from Owens Corning® Technical Support.

11.4 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:

11.4.1 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.

11.4.2 This report and the installation instructions shall be submitted at the time of permit application.

11.4.3 This innovative product has an internal quality control program and a third-party quality assurance program.

11.4.4 At a minimum, this innovative product shall be installed per Section 8 of this report.

11.4.5 The review of this report by the AHJ shall comply with IBC Section 104 and IBC Section 105.4.

11.4.6 This innovative product has an internal quality control program and a third party quality assurance program in accordance with IBC Section 104.4, IBC Section 110.4, IBC Section 1703, IRC Section R104.4 and IRC Section R109.2.

11.4.7 The application of this innovative product in the context of this report is dependent upon the accuracy of the construction documents, implementation of installation instructions, inspection as required by IBC Section 110.3, IRC Section R109.2 and any other regulatory requirements that may apply.



- 11.5 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.
- 11.6 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).
- 11.7 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.

12 Identification

- 12.1 The innovative product listed in Section 1.1 is identified by a label on the board or packaging material bearing the manufacturer name, product name, this report number and other information to confirm code compliance.
- 12.2 Additional technical information can be found at www.owenscorning.com .

13 Review Schedule

- 13.1 This report is subject to periodic review and revision. For the latest version, visit drjcertification.org.
- 13.2 For information on the status of this report, please contact [DrJ Certification](#).

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

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



Appendix A

1 Legislation that Authorizes AHJ Approval

- 1.1 **Fair Competition:** State legislatures have adopted Federal regulations for the examination and approval of building code referenced and alternative products, materials, designs, services, assemblies and/or methods of construction that:
- 1.1.1 Advance Innovation,
 - 1.1.2 Promote competition so all businesses have the opportunity to compete on price and quality in an open market on a level playing field unhampered by anticompetitive constraints, and
 - 1.1.3 Benefit consumers through lower prices, better quality and greater choice.
- 1.2 **Adopted Legislation:** The following local, state and federal regulations affirmatively authorize this innovative product to be approved by AHJs, delegates of building departments and/or delegates of an agency of the federal government:
- 1.2.1 Interstate commerce is governed by the Federal Department of Justice to encourage the use of innovative products, materials, designs, services, assemblies and/or methods of construction. The goal is to “protect economic freedom and opportunity by promoting free and fair competition in the marketplace.”
 - 1.2.2 Title 18 US Code Section 242 affirms and regulates the right of individuals and businesses to freely and fairly have new products, materials, designs, services, assemblies and/or methods of construction approved for use in commerce. Disapproval of alternatives shall be based upon non-conformance with respect to specific provisions of adopted legislation and shall be provided in writing stating the reasons why the alternative was not approved, with reference to the specific legislation violated.
 - 1.2.3 The federal government and each state have a public records act. In addition, each state also has legislation that mimics the federal Defend Trade Secrets Act 2016 (DTSA),^{xxx} where providing test reports, engineering analysis and/or other related IP/TS is subject to prison of not more than ten years^{xxxi} and/or a \$5,000,000 fine or 3 times the value of^{xxxii} 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^{xxxiii} 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.^{xxxiv}
 - 1.2.6 The commerce of approved sources (i.e., registered PEs) is regulated by professional engineering legislation. Professional engineering commerce shall always be approved by AHJs, except where there is evidence provided in writing, that specific legislation has been violated by an individual registered PE.
 - 1.2.7 The AHJ shall accept duly authenticated reports from approved agencies in respect to the quality and manner of use of new materials or assemblies as provided for in IBC Section 104.11.^{xxxv}



- 1.3 **Approved^{xxxvi} 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.^{xxxvii} 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.^{xxxviii}
- 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^{xxxix} 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^{xl} (i.e., ANAB, International Accreditation Forum (IAF), etc.).
- 1.6 **Approved by Florida:** Statewide approval of products, methods, or systems of construction shall be approved, without further evaluation by:
- 1.6.1 A certification mark or listing of an approved certification agency,
 - 1.6.2 A test report from an approved testing laboratory,
 - 1.6.3 A product evaluation report based upon testing or comparative or rational analysis, or a combination thereof, from an approved product evaluation entity, or
 - 1.6.4 A product evaluation report based upon testing, comparative or rational analysis, or a combination thereof, developed, signed and sealed by a professional engineer or architect, licensed in Florida.
- 1.7 For local product approval, products or systems of construction shall demonstrate compliance with the structural wind load requirements of the Florida Building Code (FBC) through one of the following methods;
- 1.7.1 A certification mark, listing or label from a commission-approved certification agency indicating that the product complies with the code,
 - 1.7.2 A test report from a commission-approved testing laboratory indicating that the product tested complies with the code,
 - 1.7.3 A product-evaluation report based upon testing, comparative or rational analysis, or a combination thereof, from a commission-approved product evaluation entity which indicates that the product evaluated complies with the code,
 - 1.7.4 A product-evaluation report or certification based upon testing or comparative or rational analysis, or a combination thereof, developed and signed and sealed by a Florida professional engineer or Florida registered architect, which indicates that the product complies with the code, or
 - 1.7.5 A statewide product approval issued by the Florida Building Commission.



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



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



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](http://www.intellectualpropertyandtradesecrets.com).
- xi https://www.nspe.org/resources/issues-and-advocacy/professional-policies-and-position-statements/regulation-professional_boards-in-each-state-archive/ AND <https://apassociation.org/list-of-engineering-boards-in-each-state-archive/>
- xii <https://www.cbiteest.com/accreditation/>
- xiii <https://up.codes/viewer/colorado/ibc-2021/chapter/1/scope-and-administration#104>:-:text=to%20enforce%20the%20provisions%20of%20this%20code
- xiv <https://up.codes/viewer/colorado/ibc-2021/chapter/1/scope-and-administration#104.11>:-:text=Where%20the%20alternative%20material%20design%20or%20method%20of%20construction%20is%20not%20approved%20the%20building%20official%20shall%20respond%20in%20writing%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%20the%20reasons%20therefore
- xv <https://up.codes/viewer/colorado/ibc-2021/chapter/17/special-inspections-and-tests#1707.1>:-:text=the%20building%20official%20shall%20accept%20duly%20authenticated%20reports%20from%20approved%20agencies%20in%20respect%20to%20the%20quality%20and%20manner%20of%20use%20of%20new%20materials%20or%20assemblies%20as%20provided%20for%20in%20Section%20104.11
- xvi <https://iaf.nu/en/about-iaf-mia/#>:-:text=it%20is%20required%20to%20recognise%20certificates%20and%20validation%20and%20verification%20statements%20issued%20by%20conformity%20assessment%20bodies%20accredited%20by%20all%20other%20signatories%20of%20the%20IAF%20MLA%20with%20the%20appropriate%20scope
- xvii True for all ANAB accredited product evaluation agencies and all International Trade Agreements.
- xviii <https://www.justice.gov/crt/deprivation-rights-under-color-law> AND <https://www.justice.gov/atr/mission>
- xix Unless otherwise noted, all references in this Listing are from the 2021 version of the codes and the standards referenced therein. This material, product, design, service and/or method of construction also complies with the 2000-2021 versions of the referenced codes and the standards referenced therein.
- xx <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 <https://ctscivil.com/wp-content/uploads/2019/08/V-M-D-Diagrams.pdf>; <https://engineering.purdue.edu/~ce474/Docs/DA6-BeamFormulas.pdf>. For assistance with beam or post specialty engineered design, please contact Owens Corning® via email at oclumber@owenscorning.com.
- 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 See Code of Federal Regulations (CFR) [Title 24 Subtitle B Chapter XX Part 3280](#) for definition.
- xxvi [2018 IFC Section 104.9](#)
- xxvii 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.
- xxviii <https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1707.1>
- xxix Multilateral approval is true for all ANAB accredited product evaluation agencies and all International Trade Agreements.
- xxx <http://www.drjengineering.org/AppendixC> AND <https://www.drjcertification.org/cornell-2016-protection-trade-secrets>
- xxxi <https://www.law.cornell.edu/uscode/text/18/1832#:~:text=imprisoned%20not%20more%20than%2010%20years>
- xxxi <https://www.law.cornell.edu/uscode/text/18/1832#:~:text=Any%20organization%20that.has%20thereby%20avoided>
- xxxi <https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1706.2>
- xxxi [IBC 2021, Section 1706.1 Conformance to Standards](#)
- xxxi [IBC 2021, Section 1707 Alternative Test Procedure, 1707.1 General](#)
- xxxi See Section 11 for the distilled building code definition of **Approved**
- xxxi [Los Angeles Municipal Code, SEC. 98.0503. TESTING AGENCIES](#)
- xxxi <https://up.codes/viewer/california/ca-building-code-2022/chapter/17/special-inspections-and-tests#1707.1>
- xxxi [New York City, The Rules of the City of New York, § 101-07 Approved Agencies](#)
- xi [New York City, The Rules of the City of New York, § 101-07 Approved Agencies](#)
- xii https://up.codes/viewer/new_jersey/ibc-2018/chapter/17/special-inspections-and-tests#1707.1
- xiii <https://www.nj.gov/dca/divisions/codes/codreg/ucc.html>
- xiii <https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3282/subpart-A/section-3282.14>
- xiv <https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280>
- xiv [IBC 2021, Section 1706 Design Strengths of Materials, 1706.2 New Materials.](#) Adopted law pursuant to IBC model code language 1706.2.
- xvi [IBC 2021, Section 1707 Alternative Test Procedure, 1707.1 General.](#) Adopted law pursuant to IBC model code language 1707.1.
- xvii https://www.nspe.org/resources/issues-and-advocacy/professional-policies-and-position-statements/regulation-professional_boards-in-each-state-archive/ AND <https://apassociation.org/list-of-engineering-boards-in-each-state-archive/>
- xlviii [IBC 2021, Section 1706 Design Strengths of Materials, Section 1706.1 Conformance to Standards](#) Adopted law pursuant to IBC model code language 1706.1.
- xlix <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>
- i True for all ANAB accredited product evaluation agencies and all International Trade Agreements.
- ii <https://www.justice.gov/crt/deprivation-rights-under-color-law> AND <https://www.justice.gov/atr/mission>