

Performance Characteristics of DA3D Composite Wall System (DA3D-CWS)

CBI Listing



CL 2205-06

Issue Date: September 23, 2022

Revision Date: August 3, 2023

Subject to Renewal: October 1, 2023

Trade Secret Owner:

Diamond Age 3D, Inc.

Website: www.diamondage3d.com

Telephone: 650-533-6766

Email: brian@diamondage3d.com

DIVISION: 03 00 00 - CONCRETE	DIVISION: 07 00 00 - THERMAL AND MOISTURE PROTECTION
SECTION: 03 23 00 - Stressed Tendon Reinforcing	SECTION: 07 20 00 - Thermal Protection
SECTION: 03 37 00 - Specialty Placed Concrete	SECTION: 07 25 00 - Water-Resistive Barriers/Weather Barriers
SECTION: 03 37 19 - Pneumatically Placed Concrete	SECTION: 07 42 43 - Composite Wall Panels
DIVISION: 06 00 00 - WOOD, PLASTICS AND COMPOSITES	SECTION: 07 80 00 - Fire and Smoke Protection
SECTION: 06 02 00 - Design Information	SECTION: 07 84 26 - Thermal Barriers for Plastics
SECTION: 06 12 00 - Structural Panels	
SECTION: 06 12 19 - Shear Wall Panels	

1 Innovative Product Evaluated^{1,2}

- 1.1 DA3D Composite Wall System (DA3D-CWS)
- 1.2 The innovative product evaluated in this Listing is shown in Figure 1.



Figure 1. DA3D Composite Wall System

¹ For more information, visit cbitest.com or call us at 608-310-6739.

² **Federal Regulation Definition.** 24 CFR 3280.2 "Listed or certified" means included in a list published by a nationally recognized testing laboratory, inspection agency, or other organization concerned with product evaluation that maintains periodic inspection of production of listed equipment or materials, and whose listing states either that the equipment or material meets nationally recognized standards or has been tested and found suitable for use in a specified manner. **International Building Code (IBC) Definition of Listed.** Equipment, materials, products or services included in a list published by an organization acceptable to the building official and concerned with evaluation of products or services that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services and whose Listing states either that the equipment, material, product or service meets identified standards or has been tested and found suitable for a specified purpose. **IBC Definition of Labeled.** Equipment, materials or products to which has been affixed a label, seal, symbol or other identifying mark of a nationally recognized testing laboratory, approved agency or other organization concerned with product evaluation that maintains periodic inspection of the production of the above-labeled items and whose labeling indicates either that the equipment, material or product meets identified standards or has been tested and found suitable for a specified purpose.

1.3 DA3D-CWS is constructed using the components listed in Table 1.

Table 1. DA3D-CWS Components

Wall Assembly Details		
General Details	Description	Diamond Age 3D Wall Assembly Two concrete wythes, pour-in-place foam core, tension ties between inner and outer wythes, Quick Tie hold-downs
	Manufacturer	Diamond Age
Concrete Wythes	Description	DA3D Proprietary Formulation
	Avg. Width (in)	2.75
	Avg. Height (in)	2.5
Lateral Ties	Description	DA3D Proprietary Steel Wall Ties
	Placement	Every 5th print-course, 6" from Quick Tie cable
Foam	Description	Proprietary DA3D Pour in Place Foam
	Manufacturer	Huntsman Building Solutions
	Min. Foam Cure (Hours)	9
Tie-Downs	Description	Quick Tie Orange Post-Tension Tendons
	Avg. Pre-Tension Load (lbs)	4,800

1.3.1 DA3D-CWS:

- 1.3.1.1 Features inner and outer proprietary 3D printed concrete wythes using a proprietary concrete formulation.
- 1.3.1.2 Utilizes periodic proprietary steel ties embedded into the concrete to hold the wythes in place for foam placement and final composite assembly curing.
- 1.3.1.3 Utilizes a proprietary DA3D-Huntsman pour-in-place closed-cell foam to fill the DA3D printed wall cavity.
- 1.3.1.4 Is held to the foundation using QuickTie Orange post-tensioned tendons (QTO-PTT).
- 1.3.1.5 Features the use of a DA3D proprietary lintel system to transfer gravity and uplift loads to the foundation.



2 Scope of Listing^{3,4}

- 2.1 DA3D-CWS has been tested and/or evaluated in accordance with the following Standards and Referenced Documents for use as specified herein:
- 2.1.1 *ASTM E72: Standard Test Methods of Conducting Strength Tests of Panels for Building Construction*
 - 2.1.2 *ASTM E330: Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights, and Curtain Walls by Uniform Static Air Pressure Difference*
 - 2.1.3 *ASTM E564: Standard Practice for Static Load Test for Shear Resistance of Framed Walls for Buildings*
 - 2.1.4 *ASTM E575: Standard Practice for Reporting Data from Structural Tests of Building Constructions, Elements, Connections, and Assemblies*
 - 2.1.5 *ASTM E2126: Standard Test Methods for Cyclic (Reversed) Load Test for Shear Resistance of Vertical Elements of the Lateral Force Resisting Systems for Buildings*
 - 2.1.6 *ASTM E2322: Standard Test Method for Conducting Transverse and Concentrated Load Tests on Panels Used in Floor and Roof Construction*

3 Performance Evaluation

- 3.1 Tests, testing, test reports, research reports, duly authenticated reports and related engineering evaluations are defined as intellectual property and/or trade secrets and protected by Defend Trade Secrets Act 2016 (DTSA).⁵
- 3.2 Testing and/or inspections conducted for this Listing were performed by CBI, ISO/IEC 17025 accredited testing laboratory,⁶ and ISO/IEC 17020 accredited inspection body,⁷ which are internationally recognized accreditations through International Accreditation Forum (IAF).
- 3.3 Independent testing and/or inspections conducted for this Listing were performed by an ISO/IEC 17025 accredited testing laboratory, ISO/IEC 17020 accredited inspection body, and/or a licensed Registered Design Professional (RDP).

³ This Listing is a code defined research report, which is also known as a duly authenticated report, provided by an approved agency (see IBC Section 1703.1) and/or an approved source (see IBC Section 1703.4.2). An approved agency is "approved" as an approved agency when it is ANAB accredited. DrJ Engineering, LLC (DrJ) is listed in the ANAB directory. A professional engineer is "approved" as an approved source when that professional engineer is properly licensed to transact engineering commerce. Where sealed by a professional engineer, it is also a duly authenticated report certified by an approved source. (i.e., Registered Design Professional). DrJ is an ANAB accredited product certification body.

⁴ 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.

⁵ <https://www.law.cornell.edu/uscode/text/18/part-II/chapter-90>. Given our professional duty to inform, please be aware that whoever, with intent to convert a trade secret (TS), that is related to a product or service used in or intended for use in interstate or foreign commerce, to the economic benefit of anyone other than the owner thereof, and intending or knowing that the offense will, injure any owner of that trade secret, knowingly without authorization copies, duplicates, sketches, draws, photographs, downloads, uploads, alters, destroys, photocopies, replicates, transmits, delivers, sends, mails, communicates, or conveys such information; shall be fined under this title or imprisoned not more than 10 years, or both. 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. As the National Society of Professional Engineers states, "Engineers shall not disclose, without consent, confidential information concerning the business affairs or technical processes of any present or former client or employer, or public body on which they serve." Therefore, to protect intellectual property (IP) and TS, and to achieve 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. For more information, please review this website: Intellectual Property and Trade Secrets.

⁶ Internationally recognized accreditations are performed by members of the International Accreditation Forum (IAF). Accreditation Body and Regional Accreditation Group Members of IAF are admitted to the IAF MLA only after a stringent evaluation of their operations by a peer evaluation team, which is charged to ensure that the applicant complies fully with both international standards and IAF requirements. Once an accreditation body is a signatory of the IAF MLA, it is required to recognise certificates and validation and verification statements issued by conformity assessment bodies accredited by all other signatories of the IAF MLA, with the appropriate scope.

⁷ Ibid.

3.4 Allowable stress design properties for resistance to transverse loads are shown in Table 2.

Table 2. Positive/Negative Allowable Stress Design Pressure (PSF) for DA3D-CWS

DA3D-CWS (Maximum 9-foot Tall Wall)	Positive/Negative Design Pressure (PSF) ASD	EI (lb-in ²)	Pressure (in PSF) at Various Deflection Limits			
			H/480	H/360	H/240	H/180
Design Properties	65	300,000,000	80	90	100	110

3.5 Allowable stress design properties for resistance to lateral loads when used as lateral force resisting systems are shown in Table 3.

Table 3. Allowable Lateral Force Resistance for Wind and Seismic (PLF) for DA3D-CWS

DA3D-CWS	Lateral Load Resistance (PLF)
Quick Tie Tension Tendon 8 foot high wall	615
Quick Tie Tension Tendon 9 foot high wall	545
Quick Tie Tension Tendon 10 foot high wall	490
1. Maximum 4' spacing on the Quick Tie Tension Tendons 2. For seismic resistance use a Response modification factor of 1.5 and a Deflection Amplification Coefficient of 2.5.	

3.6 Allowable stress design properties for resistance to compressive loads are shown in Table 4.

Table 4. Allowable Gravity Force Resistance (PLF) for DA3D-CWS

DA3D-CWS	Gravity Resistance (PLF)
Design Property	7,500

3.7 Allowable stress design properties for resistance to uplift loads are shown in Table 5.

Table 5. Allowable Uplift Force Resistance (PLF) for DA3D-CWS

DA3D-CWS	Uplift Resistance (PLF)
Design Property	1,200

3.8 Allowable stress design properties for resistance to compression and uplift loads for DA3D-CWS Proprietary Lintels are shown in Table 6 and Table 7.

Table 6. Allowable Gravity Force Resistance (PLF) for DA3D-CWS Proprietary Lintels

DA3D-CWS (Maximum Lintel Span is 7 feet)	Gravity Resistance (PLF)
Design Property	11,400



Table 7. Allowable Uplift Force Resistance (PLF) for DA3D-CWS Proprietary Lintels

DA3D-CWS (Maximum Lintel Span is 7 feet)	Uplift Resistance (PLF)
Design Property	1,200

3.9 Any building code 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 RDPs/approved sources. DrJ is qualified⁸ to practice product and code compliance services within its scope of accreditation and engineering expertise, respectively.

4 Installation

- 4.1 Installation shall comply with the manufacturer installation instructions, this Listing, the approved construction documents, and the applicable building code.
- 4.2 In the event of a conflict between the manufacturer installation instructions, this Listing, the approved construction documents and the applicable building code, the most restrictive shall govern.

5 Findings

- 5.1 As described in Section 3, DA3D-CWS has performance characteristics that were tested and/or meet pertinent standards and is suitable for use pursuant to its specified purpose.
- 5.2 When used and installed in accordance with this Listing and the manufacturer installation instructions, DA3D-CWS shall be approved for:
 - 5.2.1 Resistance to transverse loads due to wind and gravity pressures on building surfaces.
 - 5.2.2 Resistance to lateral loads for assemblies used as lateral force resisting systems for wind pressures on building surfaces.
 - 5.2.3 Resistance to compressive loads.
 - 5.2.4 Resistance to uplift loads.
 - 5.2.5 Resistance to compressive and uplift loads for DA3D-CWS Proprietary Lintels.
 - 5.2.6 A Water Resistive Barrier (WRB) is not required in accordance with the pertinent regulations.
- 5.3 Unless exempt by state statute, when the DA3D-CWS 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.
- 5.4 Any application specific issues not addressed herein can be engineered by an RDP. Assistance with engineering is available from Diamond Age 3D, Inc.
- 5.5 IBC Section 104.11 (IRC Section R104.11 and IFC Section 104.10⁹ 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.

⁸ 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.

⁹ 2018 IFC Section 104.9



- 5.6 **Approved:**¹⁰ Building codes require that the building official shall accept duly authenticated reports¹¹ or research reports¹² from approved agencies and/or approved sources (i.e., licensed RDP) with respect to the quality and manner of use of new products, materials, designs, services, assemblies, or methods of construction.
- 5.6.1 Acceptability of an approved agency, by a building official, is performed by verifying that the agency is accredited by a recognized accreditation body of the International Accreditation Forum (IAF).
- 5.6.2 Acceptability of a licensed RDP, by a building official, is performed by verifying that the RDP and/or their business entity is listed by the licensing board of the relevant jurisdiction.
- 5.7 CBI is an approved agency through its ISO/IEC 17025 testing and an ISO/IEC 17020 inspection accreditation. CBI employs RDPs and is accredited by ANAB.¹³ DrJ employs RDPs and is ANAB-Accredited.
- 5.8 Through ANAB accreditation and the IAF Multilateral Agreements, this Listing can be used to obtain product approval in any jurisdiction or country that has IAF MLA Members & Signatories to meet the Purpose of the MLA – “*certified once, accepted everywhere.*” IAF specifically says, “*Once an accreditation body is a signatory of the IAF MLA, it is required to recognise certificates and validation and verification statements issued by conformity assessment bodies accredited by all other signatories of the IAF MLA, with the appropriate scope.*”¹⁴

6 Conditions of Use

- 6.1 Performance characteristics are specified in Section 3.
- 6.2 As defined in Section 3, 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.
- 6.3 As listed herein, DA3D-CWS shall not be used:
- 6.3.1 Allowable stress design properties for resistance to transverse loads shall not exceed those described in Section 3.
- 6.3.2 Allowable stress design properties for resistance to lateral loads when used as lateral force resisting systems shall not exceed values in Section 3.
- 6.3.3 Allowable stress design properties for resistance to compressive loads shall not exceed those described in Section 3.
- 6.3.4 Allowable stress design properties for resistance to uplift loads shall not exceed those described in Section 3.
- 6.3.5 Allowable stress design properties for resistance to compressive and uplift loads for DA3D-CWS Proprietary Lintels shall not exceed those described in Section 3.
- 6.3.6 As a nailing base for claddings, trim, windows, and doors.
- 6.4 When required by adopted legislation and enforced by the building official, also known as the authority having jurisdiction (AHJ)¹⁵ in which the project is to be constructed:
- 6.4.1 Any calculations incorporated into the construction documents shall conform to accepted engineering practice, and, when prepared by an approved source, shall be approved when requirements of adopted legislation are met.
- 6.4.2 This Listing and the installation instructions shall be submitted at the time of permit application.

¹⁰ 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.

¹¹ <https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1707.1>

¹² <https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1703.4.2>

¹³ Please see the ANAB directories and search for Center for Building Innovation - <https://anab.ansi.org/laboratory-accreditation> and <https://anab.ansi.org/inspection-body-accreditation>

¹⁴ <https://iaf.nu/en/about-iaf-mla/#:~:text=required%20to%20recognise>

¹⁵ Also known as the Authority Having Jurisdiction (AHJ)



- 6.4.3 This innovative product has an internal quality control program and a third-party quality assurance program.
- 6.4.4 At a minimum, this innovative product shall be installed per Section 4 of this Listing.
- 6.5 The approval of this Listing by the AHJ shall comply with IBC Section 1707.1, where legislation states in pertinent part, “*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 Section 104.11,” all of IBC Section 104, and IBC Section 105.4.*
- 6.6 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.
- 6.7 The application of this innovative product in the context of this Listing 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.
- 6.8 The actual design, suitability, and use of this Listing for any particular building is the responsibility of the owner or the owner’s authorized agent.
- 6.9 Any required design loads shall be provided by the building designer (i.e., owner or RDP) and/or determined in accordance with the building code adopted by the jurisdiction in which the project is to be constructed.
- 6.10 Information contained herein may include the result of testing and/or data analysis by sources that are approved agencies (i.e., ANAB accredited agencies), approved sources (i.e., RDPs), and/or professional engineering regulations. Accuracy of external test data and resulting analysis is relied upon.
- 6.11 Where pertinent, testing and/or engineering analysis is based upon state or local code and/or standard provisions that have been codified into law through legislation. The developers of the codes and standards are legally responsible for the accuracy of any legislatively adopted material properties and/or analytical methods. Any testing and/or engineering mechanics-based analysis may use legislatively and/or code adopted provisions as the control condition. The use of a control condition to compare to a test condition establishes equivalency to that prescribed in the adopted legislation with respect to quality, strength, effectiveness, fire resistance, durability, and safety.
- 6.12 The reliability of the attributes provided herein may be dependent upon published design properties by others. These properties are defined by the grade mark, grade stamp, mill certificate, Listings, certified reports, duly authenticated reports, and/or research reports prepared by approved agencies and/or approved sources furnished by suppliers of products, materials, designs, assemblies, and/or methods of construction. These are presumed to be minimum properties and relied upon to be accurate.
- 6.13 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.¹⁶
- 6.14 Where additional condition of use and/or code compliance information is required, please search for DA3D-CWS on the DrJ Engineering website.

¹⁶ See Code of Federal Regulations (CFR) Title 24 Subtitle B Chapter XX Part 3280 for definition.



7 Identification

- 7.1 Labeling^{17,18} shall include, but not be limited to, the manufacturer name, manufacturing location/identifier, and the CBI Listing number.
- 7.2 Labeling may include, but not be limited to, the CBI mark and any other numerical designations related to layout locations for a given project.

8 Review Schedule

- 8.1 This Listing is subject to periodic review and revision. For the most recent version, visit cbitest.com.
- 8.2 For information on the status of this Listing, contact [CBI](#).

9 Approved for Use Pursuant to US and International Legislation Defined in Appendix A

- 9.1 DA3D-CWS is included in this [list](#) 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, and whose Listing states either that the material, product, or service meets identified standards or has been tested and found suitable for a specified purpose. This Listing meets the legislative intent and definition of being acceptable to the AHJ.

¹⁷ **LABEL:** An identification applied on a product by the manufacturer that contains the name of the manufacturer, the function and performance characteristics of the product or material and the name and identification of an [approved agency](#), and that indicates that the representative sample of the product or material has been tested and evaluated by an [approved agency](#) (see [IBC Section 1703.5](#), "Manufacturer designation" and "Mark").

¹⁸ **LABELED:** Equipment, materials or products to which has been affixed a [label](#), seal, symbol or other identifying mark of a nationally recognized testing laboratory, [approved agency](#) or other organization concerned with product evaluation that maintains periodic inspection of the production of the above-[labeled](#) items and whose labeling indicates either that the equipment, material or product meets identified standards or has been tested and found suitable for a specified purpose.



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 DA3D-CWS 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)¹⁹ where providing test reports, engineering analysis and/or other related IP/TS is subject to prison of not more than 10 years²⁰ and/or a \$5,000,000 fine or 3 times the value of²¹ 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 materials²² that are not specifically provided for in any building code, 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.²³
 - 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 104.11.²⁴

¹⁹ <http://www.drjengineering.org/AppendixC> and <https://www.law.cornell.edu/uscode/text/18/1832>

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

²¹ <https://www.law.cornell.edu/uscode/text/18/1832#:~:text=Any%20organization%20that,has%20thereby%20avoided>

²² <https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1706.2>

²³ [IBC 2021, Section 1706.1 Conformance to Standards](#)

²⁴ [IBC 2021, Section 1707 Alternative Test Procedure, 1707.1 General](#)

- 1.3 **Approved²⁵ 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, which 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.²⁶ The Superintendent of Building roster of approved testing agencies 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 CBI 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 1707.1.²⁷
- 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 NYC Building Code 2022 (NYCBC) states in pertinent part that an approved agency shall be deemed²⁸ 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 agreement²⁹ (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) A certification mark or listing of an approved certification agency, 2) A test report from an approved testing laboratory, 3) A product evaluation report based upon testing or comparative or rational analysis, or a combination thereof, from an approved product evaluation entity; 4) A product evaluation report based upon testing or comparative or rational analysis, or a combination thereof, developed and signed and sealed by a professional engineer or architect, licensed in Florida. 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) A certification mark, listing, or label from a commission-approved certification agency indicating that the product complies with the code; 2) A test report from a commission-approved testing laboratory indicating that the product tested complies with the code; 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; 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; 5) A statewide product approval issued by the Florida Building Commission. 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).

²⁵ See Section 5.6 for the distilled building code definition of Approved.

²⁶ Los Angeles Municipal Code, SEC. 98.0503. TESTING AGENCIES

²⁷ https://up.codes/viewer/california/ca-building-code-2022/chapter/17/special-inspections-and-tests#1707.1

²⁸ New York City, The Rules of the City of New York, § 101-07 Approved Agencies

²⁹ New York City, The Rules of the City of New York, § 101-07 Approved Agencies



- 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 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 Building Code 2018 of New Jersey in IBC Section 1707.1 General,³⁰ 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)”.³¹ Furthermore N.J.A.C 5:23-3.7 states: Municipal approvals of alternative materials, equipment, or methods of construction. **(a) 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. 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 (a) above. 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 (a) above. 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 2 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 3282.14³² and Part 3280,³³ “*the Department encourages innovation and the use of new technology in manufactured homes*” and the design and construction of a manufactured home shall conform with the provisions of Part 3282 and Part 3280 where key approval provisions in mandatory language follow: 1) “*All construction methods shall be in conformance with accepted engineering practices*”, 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.*”, and 3) “*The design stresses of all materials shall conform to accepted engineering practice.*”
- 1.10 **Approved 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.³⁴
- 1.10.2 For innovative alternative products, materials, designs, services and/or methods of construction, in the absence of approved rules or other approved standards...the building official shall accept duly authenticated reports (i.e., listing and/or research report) from approved agencies with respect to the quality and manner of use of new materials or assemblies.³⁵ A building official approved agency is deemed to be approved via certification from an accreditation body that is listed by the International Accreditation Forum³⁶ or equivalent.

³⁰ https://up.codes/viewer/new_jersey/ibc-2018/chapter/17/special-inspections-and-tests#1707.1

³¹ <https://www.nj.gov/dca/divisions/codes/codereg/ucc.html>

³² <https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3282/subpart-A/section-3282.14>

³³ <https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280>

³⁴ IBC 2021, Section 1706 Design Strengths of Materials, 1706.2 New Materials. Adopted law pursuant to IBC model code language 1706.2.

³⁵ IBC 2021, Section 1707 Alternative Test Procedure, 1707.1 General. Adopted law pursuant to IBC model code language 1707.1.

³⁶ Please see the ANAB directory for building official approved agencies.



- 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.³⁷ An approved source is defined as a PE subject to professional engineering laws, where a research and/or a technical evaluation report certified by a PE, shall be approved.
- 1.11 **Approved by International Jurisdictions:** The USMCA and GATT agreements provide for approval of innovative materials, products, designs, services, assemblies and/or methods of construction through the Technical Barriers to Trade agreements and the International Accreditation Forum (IAF) Multilateral Recognition Arrangement (MLA), where these agreements state in relevant part:
- 1.11.1 Permit participation of conformity assessment bodies located in the territories of other Members (defined as GATT Countries) under conditions no less favourable than those accorded to bodies located within their territory or the territory of any other country.
 - 1.11.2 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.
 - 1.11.3 Conformity assessment procedures are not prepared, adopted, or applied with a view to or with the effect of creating unnecessary obstacles to international trade. This means that conformity assessment procedures shall not be more strict or be applied more strictly than is necessary to give the importing Member adequate confidence that products conform to the applicable technical regulations or standards.
 - 1.11.4 **Approved:** The purpose of the IAF 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, products, designs, services, assemblies and/or methods of construction. Accreditations granted by IAF MLA signatories are recognised worldwide based on their equivalent accreditation programs, therefore reducing costs and adding value to businesses and consumers.

³⁷ IBC 2021, Section 1706 Design Strengths of Materials, Section 1706.1 Conformance to Standards Adopted law pursuant to IBC model code language 1706.1.