Listing and Technical Evaluation Report™

A Duly Authenticated Report from an Approved Agency

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Application of the 250 Pound Sprinkler Installer Load

Trade Secret Report Holder:

Trussway Industries, LLC

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CSI Designations:

DIVISION: 01 00 00 - GENERAL REQUIREMENTS

Section: 01 60 00 - Product Requirements

DIVISION: 15 00 00 - MECHANICAL

Section: 15 30 00 - Fire Protection Piping

1 Code Compliance Process Evaluated[1]

1.1 Application of the 250 Pound Sprinkler Installer Load

2 Product Description and Materials

2.1 The code compliance process evaluated in this report applies to metal plate connected roof and floor trusses as designed and manufactured by Trussway Industries, LLC and shown in **Figure 1**.

Figure 1. Trussway Industries, LLC Roof and Floor Trusses

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

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3 Definitions

3.1 New Materials[2] are defined as building materials, equipment, appliances, systems, or methods of construction not provided for by prescriptive and/or legislatively adopted regulations, known as alternative materials.[3] The design strengths and permissible stresses shall be established by tests[4] and/or engineering analysis.[5]

3.2 Duly authenticated reports[6] and research reports[7] are test reports and related engineering evaluations, which are written by an approved agency[8] and/or an approved source.[9]

3.2.1 These reports contain intellectual property and/or trade secrets, which are protected by the Defend Trade Secrets Act (DTSA).[10]

3.3 An approved agency is *"approved"* when it is ANAB ISO/IEC 17065 accredited. DrJ Engineering, LLC (DrJ) is listed in the ANAB directory.

3.4 An approved source is *"approved"* when a professional engineer (i.e., Registered Design Professional) is properly licensed to transact engineering commerce. The regulatory authority governing approved sources is the state legislature via its professional engineering regulations.[11]

3.5 Testing and/or inspections conducted for this duly authenticated report were performed by an ISO/IEC 17025 accredited testing laboratory, an ISO/IEC 17020 accredited inspection body, and/or a licensed Registered Design Professional (RDP).

3.5.1 The Center for Building Innovation (CBI) is ANAB[12] ISO/IEC 17025 and ISO/IEC 17020 accredited.

3.6 The regulatory authority shall enforce[13] 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[14] stating the nonconformance and the path to its cure.

3.7 The regulatory authority shall accept duly authenticated reports from an approved agency and/or an approved source with respect to the quality and manner of use of new materials or assemblies as provided for in regulations regarding the use of alternative materials, designs, or methods of construction.[15]

3.8 ANAB is an International Accreditation Forum (IAF) Multilateral Recognition Arrangement (MLA) signatory where recognition of certificates, validation and verification statements issued by conformity assessment bodies accredited by all other signatories of the IAF MLA with the appropriate scope, shall be approved.[16] Therefore, all ANAB ISO/IEC 17065 duly authenticated reports are approval equivalent.[17]

3.9 Approval equity is a fundamental commercial and legal principle.[18]

4 Applicable Standards for the Listing; Regulations for the Regulatory Evaluation[19]

4.1 *Standards*

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

4.1.2 *NFPA 13: Standard for the Installation of Sprinkler Systems*

4.1.3 *NFPA 13D: Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes*

4.1.4 *NFPA 13R: Standard for the Installation of Sprinkler Systems in Low-Rise Residential Occupancies*

4.1.5 *TPI 1: National Design Standard for Metal-plate-connected Wood Truss Construction*

4.2 *Regulations*

4.2.1 *IBC – 15, 18, 21: International Building Code®*

4.2.2 *IRC – 15, 18, 21: International Residential Code®*

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5 Listed[20]

5.1 Equipment, materials, products, or services included in a List published by a nationally recognized testing laboratory (i.e., CBI), approved agency (i.e., CBI and DrJ), and/or approved source (i.e., DrJ), or other organization concerned with product evaluation (i.e., DrJ) that maintains periodic inspection (i.e., CBI) of production of listed equipment or materials, and whose listing states either that the equipment or material meets nationally recognized standards or has been tested and found suitable for use in a specified manner.

6 Tabulated Properties Generated from Nationally Recognized Standards

6.1 *Structural Application Support Requirements*

6.1.1 IBC Section 903.3.1 specifies that where required, automatic sprinkler systems shall be designed and installed in accordance with the provisions of NFPA 13, NFPA 13R, or NFPA 13D.

6.1.2 NFPA 13 provides the minimum requirements for the design and installation of automatic fire sprinkler systems and exposure protection sprinkler systems for buildings of all occupancies.

6.1.3 NFPA 13R is intended for a more specific type of building and provides the design and installation criteria of automatic sprinkler systems for protection against fire hazards in Group R occupancies up to and including four stories in height.

6.1.3.1 Examples of buildings typically covered by NFPA 13R include:

6.1.3.1.1 Apartment buildings and condominiums

6.1.3.1.2 Lodging and rooming houses

6.1.3.1.3 Board and care facilities (slow-evacuation type with 16 or fewer occupants and prompt-evacuation type)

6.1.3.1.4 Hotels, motels and dormitories

6.1.4 NFPA 13D provides the design and installation criteria of automatic sprinkler systems for protection against fire hazards in buildings for which the IRC applies, as well as manufactured homes.

6.2 *Sprinkler Systems Installed per NFPA 13 or NFPA 13R*

6.2.1 Structural members supporting sprinkler piping designed and installed in accordance with NFPA 13 or NFPA 13R are required to support the weight of the water-filled pipe plus a 250 lb. concentrated load applied at the location of the pipe attachment. Section 17.4.1.3.1[21] of NFPA 13 states:

> **17.4.1.3.1** Sprinkler piping shall be substantially supported from the building structure, which must support the added load of the water-filled pipe plus 250 lb. (115 kg) applied at the point of hanging, except where permitted by 17.4.1.1.2, 17.4.1.3.3, and 17.4.1.4.1.

6.2.1.1 Section 17.4.1.1.2[22] refers to toggle hangers for the support of 11/2" and smaller pipe under ceilings of hollow tile or metal lath and plaster.

6.2.1.2 Section 17.4.1.3.3[23] refers to flexible piping installation.

6.2.1.3 Section 17.4.1.4.1[24] refers to branch line hangers attached to metal deck limitation of 1" or smaller pipe.

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6.2.2 The 2007 Commentary to Section 17.4.1.3.1[25] provides the following insight as to the intention of these loading requirements:

> Each individual point at which the hanger is attached to the structure must be able to support the weight of the water-filled pipe plus 250 lb. (115 kg). This requirement does not intend to add 250 lb. (115 kg) concurrently for each hanger when the minimum strength of the building structure is determined. Just because a fastener has a listing to be attached to a certain minimum size building element, it does not automatically mean that the building element can support the weight of the water-filled pipe plus 250 lb. (115 kg). As mentioned in the commentary following 17.1.2, the 250 lb. (115 kg) load represents the extra stress imposed by system installation, future construction activities, and physical impact from equipment. It is a temporary point load applied at any hanger.

6.2.3 The Commentary to Section 17.4.1.3.1 of NFPA 13 makes it clear that the 250 lb. concentrated load is intended to represent the weight of a sprinkler installer and is to be applied for a very short time (i.e., just long enough for the pipefitter to regain their balance).

6.2.3.1 This load is considered an installation live load and is not intended to be applied simultaneously at all pipe support locations or concurrently with other live loads such as floor, roof, snow, or wind.

6.2.4 The weight of the water-filled pipe is a dead load that is most often evaluated as an additional uniformly distributed load.

6.2.4.1 The magnitude of this load can vary considerably depending on the size and type of pipe, the spacing between the pipe supports and the number of supports on each truss.

6.2.4.2 Alternatively, concentrated loads for the sprinkler system may be given when attachment locations are known.

6.2.4.3 Main sprinkler lines, risers and lines running parallel to trusses may require special design provisions.

6.2.5 Section 2.3.2.4 (d) of ANSI/TPI 1-2014 indicates that loads from fire sprinkler systems that are to be supported by trusses must be included by the Building Designer in the Construction Documents for the building.

> **2.3.2.4 Required Information in the Construction Documents.**
>
> (d) The location, direction, and magnitude of all dead, live, and lateral loads applicable to each Truss including, but not limited to, loads attributable to: roof, floor, partition, mechanical, fire sprinkler, attic storage, rain and ponding, wind, snow (including snow drift and unbalanced snow), seismic; and any other loads on the Truss

6.3 *Sprinkler Systems Installed per NFPA 13D*

6.3.1 There are no special strength requirements specified for structural members supporting sprinkler piping designed and installed in accordance with NFPA 13D.

6.3.2 Chlorinated Polyvinyl Chloride (CPVC) and Crosslinked Polyethylene (PEX) tubing are the most common types of sprinkler pipe used in residential applications, with pipe sizes ranging from $^1/_2$" to $1^1/_4$" in diameter.

6.3.2.1 Sprinkler systems with these sizes and types of pipes typically add less than 0.75-psf of dead load to the structural framing members and can easily be supported by most plumbing code recognized hangers.

6.3.3 Further, the additional weight of these sprinkler systems is usually accounted for in the miscellaneous dead load for the floor or roof system.

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6.4 *Serviceability Requirements*

6.4.1 *Sprinkler Systems Installed per NFPA 13 or NFPA 13R*:

6.4.1.1 NFPA 13 and NFPA 13R establish no minimum serviceability (i.e., deflection limitation) requirements for the structural members supporting the sprinkler piping or the 250 lb. concentrated load.

6.4.1.2 IBC Section 1604.3 includes the minimum serviceability requirements for structural systems and members. IBC Table 1604.3 provides maximum deflection limits for various construction and load conditions (**Figure 2**).

CONSTRUCTION	L or L_r	S[j] or W[f]	$D + L$[d, g]
Roof members:[e]			
Supporting plaster or stucco ceiling	//360	//360	//240
Supporting nonplaster ceiling	//240	//240	//180
Not supporting ceiling	//180	//180	//120
Floor members	//360	—	//240
Exterior walls:			
With plaster or stucco finishes	—	//360	—
With other brittle finishes	—	//240	—
With flexible finishes	—	//120	—
Interior partitions:[b]			
With plaster or stucco finishes	//360	—	—
With other brittle finishes	//240	—	—
With flexible finishes	//120	—	—
Farm buildings	—	—	//180
Greenhouses	—	—	//120

For SI: 1 foot = 304.8 mm.

a. For structural roofing and siding made of formed metal sheets, the total load deflection shall not exceed //60. For secondary roof structural members supporting formed metal roofing, the live load deflection shall not exceed //150. For secondary wall members supporting formed metal siding, the design wind load deflection shall not exceed //90. For roofs, this exception only applies when the metal sheets have no roof covering.

b. Flexible, folding and portable partitions are not governed by the provisions of this section. The deflection criterion for interior partitions is based on the horizontal load defined in Section 1607.16.

c. See Section 2403 for glass supports.

d. The deflection limit for the $D + (L \text{ or } L_r)$ load combination only applies to the deflection due to the creep component of long-term dead load deflection plus the short-term live load deflection. For lumber, structural glued laminated timber, prefabricated wood I-joists and structural composite lumber members that are dry at time of installation and used under dry conditions in accordance with the ANSI/AWC NDS, the creep component of the long-term deflection shall be permitted to be estimated as the immediate dead load deflection resulting from $0.5D$. For lumber and glued laminated timber members installed or used at all other moisture conditions or cross laminated timber and wood structural panels that are dry at time of installation and used under dry conditions in accordance with the ANSI/AWC NDS, the creep component of the long-term deflection is permitted to be estimated as the immediate dead load deflection resulting from D. The value of $0.5D$ shall not be used in combination with ANSI/AWC NDS provisions for long-term loading.

e. The preceding deflections do not ensure against ponding. Roofs that do not have sufficient slope or camber to ensure adequate drainage shall be investigated for ponding. See Chapter 8 of ASCE 7.

f. The wind load shall be permitted to be taken as 0.42 times the "component and cladding" loads or directly calculated using the 10-year mean return interval basic wind speed, V, for the purpose of determining deflection limits in Table 1604.3. Where framing members support glass, the deflection limit therein shall not exceed that specified in Section 1604.3.7

g. For steel structural members, the deflection due to creep component of long-term dead load shall be permitted to be taken as zero.

h. For aluminum structural members or aluminum panels used in skylights and sloped glazing framing, roofs or walls of sunroom *additions* or patio covers not supporting edge of glass or aluminum sandwich panels, the total load deflection shall not exceed //60. For continuous aluminum structural members supporting edge of glass, the total load deflection shall not exceed //175 for each glass lite or //60 for the entire length of the member, whichever is more stringent. For aluminum sandwich panels used in roofs or walls of sunroom *additions* or patio covers, the total load deflection shall not exceed //120.

i. l = Length of the member between supports. For cantilever members, l shall be taken as twice the length of the cantilever.

j. The snow load shall be permitted to be taken as 0.7 times the design snow load determined in accordance with Section 1608.1 for the purpose of determining deflection limits in Table 1604.3.

Figure 2. 2021 IBC Table 1604.3 Deflection Limits

6.4.1.3 As clarified in the Commentary to the 2021 IBC, the serviceability requirements provided in IBC Section 1604.3 are intended only for finished construction and do not apply to structural systems or members during construction.

Q3. In Table 1604.3, Note g states "dead load shall be taken as zero for structural steel members." Would this apply to the precomposition check of composite beam deflection limits under wet weight of concrete?

A3. No. The serviceability requirements of Section 1604.3 apply to the finished construction. The loading condition described would be a construction consideration, which is not directly regulated by the serviceability criteria.

6.4.1.4 The weight of the water-filled pipe is a permanent (i.e., dead) load and is subject to the deflection limitations of IBC Table 1604.3, when evaluated in conjunction with total design load.

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6.4.2 *Sprinkler Systems Installed per NFPA 13D*:

6.4.2.1 There are no special serviceability requirements specified for structural members supporting sprinkler piping designed and installed in accordance with NFPA 13D.

6.4.2.2 The minimal additional dead load provided by these systems is subject to the deflection limitations of the IRC, when evaluated in conjunction with total design load.

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

7 Certified Performance[26]

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.[27]

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.[28]

8 Regulatory Evaluation and Accepted Engineering Practice

8.1 Application of the 250 Pound Sprinkler Installer Load complies with the following legislatively adopted regulations and/or accepted engineering practice for the following reasons:

8.1.1 The design practice of Trussway Industries, LLC's metal plate connected wood trusses has been evaluated for compliance with IBC Section 903.3.1, which requires fire sprinkler systems to be designed and installed in accordance with NPFA 13, 13R, or 13D.

8.1.1.1 For NFPA 13 and 13R systems, this includes loading of trusses to account for the weight of the water filled pipe as well as a short duration load of 250 lbs. to account for an impact should an installer lose balance and grab a pipe to steady themselves.

8.1.1.2 For NFPA 13D systems, small diameter PVC or PEX piping is common. The dead load of the sprinkler system is generally covered in the normal dead loads applied to the trusses.

8.2 Any building code, regulation and/or accepted engineering evaluations (i.e., research reports, duly authenticated reports, etc.) that are conducted for this Listing were performed by DrJ Engineering, LLC (DrJ), an ISO/IEC 17065 accredited certification body and a professional engineering company operated by RDP/approved sources. DrJ is qualified[29] to practice product and regulatory compliance services within its scope of accreditation and engineering expertise, respectively.

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

8.4 Any regulation specific issues not addressed in this section are outside the scope of this report.

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9 Installation

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

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

9.3 The product(s) and process evaluated by this report fall within the scope of one or more of the model, state or local building codes for building construction. The testing and/or substantiating data used in this report is limited to buildings, structures, building elements, construction materials and civil engineering related specifically to buildings.

9.4 The provisions of model, state or local building codes for building construction do not intend to prevent the installation of any material or to prohibit any design or method of construction. Alternatives shall use consensus standards, performance-based design methods or other engineering mechanics based means of compliance. This report assesses compliance with defined standards, accepted engineering analysis, performance-based design methods, etc. in the context of the pertinent building code requirements.

10 Substantiating Data

10.1 Information contained herein may include the result of testing and/or data analysis by sources that are approved agencies, approved sources, and/or RDPs. Accuracy of external test data and resulting analysis is relied upon.

10.2 Where applicable, testing and/or engineering analysis are based upon provisions that have been codified into law through state or local adoption of regulations and standards. The developers of these regulations and standards are responsible for the reliability of published content. DrJ's engineering practice may use a regulation-adopted provision as the control. A regulation-endorsed control versus a simulation of the conditions of application to occur establishes a new material as being equivalent to the regulatory provision in terms of quality, strength, effectiveness, fire resistance, durability, and safety.

10.3 The accuracy of the provisions provided herein may be reliant upon the published properties of raw materials, which are defined by the grade mark, grade stamp, mill certificate, or duly authenticated reports from approved agencies and/or approved sources provided by the supplier. These are presumed to be minimum properties and relied upon to be accurate. The reliability of DrJ's engineering practice, as contained in this duly authenticated report, may be dependent upon published design properties by others.

10.4 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.[30]

10.5 Where additional condition of use and/or regulatory compliance information is required, please search for Application of the 250 Pound Sprinkler Installer Load on the DrJ Certification website.

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11 Findings

11.1 As outlined in **Section 6**, Application of the 250 Pound Sprinkler Installer Load has performance characteristics that were tested and/or meet applicable regulations and are suitable for use pursuant to its specified purpose.

11.2 When used and installed in accordance with this duly authenticated report and the manufacturer installation instructions, the Application of the 250 Pound Sprinkler Installer Load shall be approved for use due to the following.

11.2.1 The 250 lb. sprinkler installer load required by NFPA 13 for structural members supporting sprinkler systems designed and installed in accordance with NFPA 13 or NFPA 13R requirements is an installation live load.

11.2.1.1 This is a very short-term load condition that will use a 2.0 load duration factor, CD, per NDS Appendix B.

11.2.1.2 This load is to be applied concurrently with only the design dead loads.

11.2.1.3 Trussway Industries, LLC trusses account for this load as follows:

11.2.1.3.1 The 250 lb. sprinkler installer load is attached as a single point load hung from the top chord of the trusses, or

11.2.1.3.2 The 250 lb. sprinkler installer load is attached to the bottom chord of the trusses and is distributed to two adjacent trusses. See **Figure 3** for details.

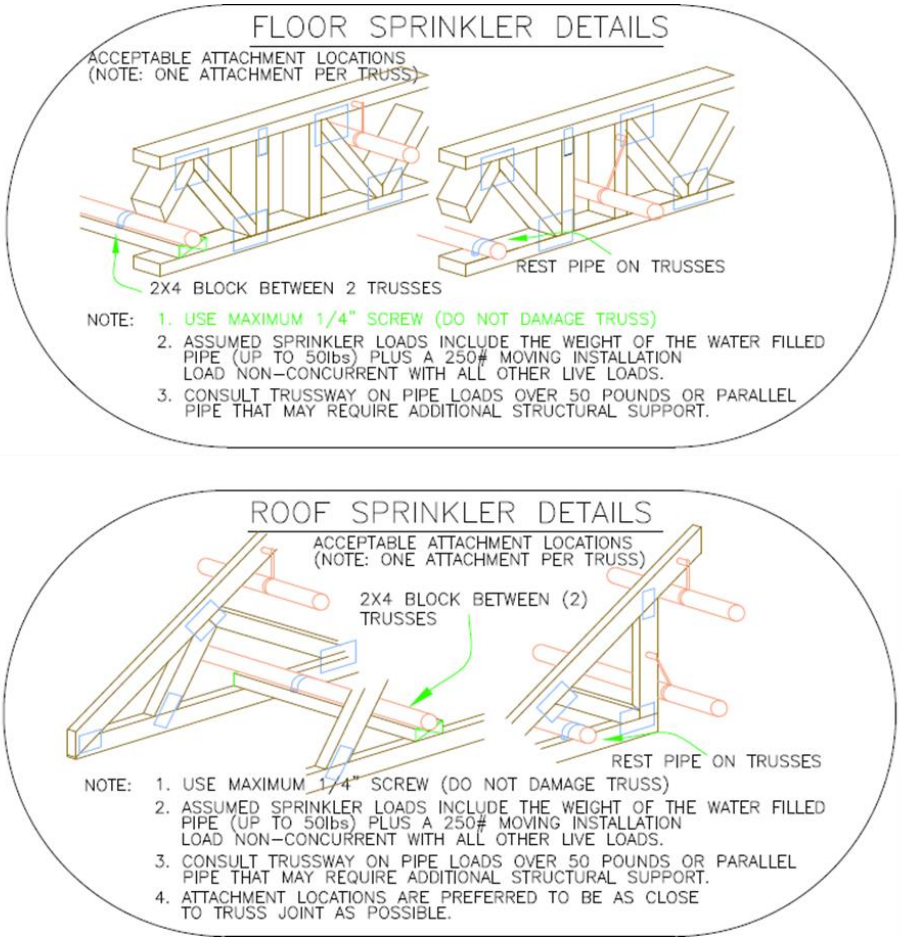

Figure 3. Assumed Sprinkler Attachments to Trussway Industries, LLC Trusses

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11.2.1.4 Trusses designed to support this load shall include the following note.

11.2.1.4.1 **NOTE**: The truss design accounts for IBC Section 903.3.1 and NFPA 13, NFPA 13R, or NFPA 13D compliance requirements relating to a 250 lb. short-term (C_D=2.0) installer load to be supported at a hanger point on top chord or by two trusses on bottom chord, non-concurrent with other live loads.

11.2.1.5 The deflection limitations of the building code are not applicable to the 250 lb. concentrated load check because this loading condition typically occurs during the construction phase of the building.

11.2.1.5.1 From a safety perspective, this is a strength issue not a deflection issue.

11.2.1.6 The location, direction and magnitude of the dead load used to approximate the weight of the water filled fire sprinkler system to be supported by the trusses must be provided by the Building Designer or Trussway Industries, LLC will apply 50 lbs.

11.2.1.6.1 This is a permanent load condition, the magnitude of which will be dependent on the size and spacing of the pipe.

11.2.1.6.2 When defined by the Building Designer, this load is added to the bottom chord dead load and is subject to the deflection limitations of IBC Table 1604.3 when evaluated in conjunction with other dead and live loads that are being applied to the truss system.

11.2.2 *Sprinkler Systems Installed per NFPA 13D:*

11.2.2.1 The 250 lb. sprinkler installer load does not apply to sprinkler systems installed per the requirements of NFPA 13D.

11.2.2.2 Sprinkler systems installed per NFPA 13D typically weigh less than 0.75-psf.

11.2.2.3 These systems can easily be supported by most plumbing code recognized hangers.

11.2.2.4 The additional weight of these sprinkler systems is usually accounted for in the miscellaneous bottom chord dead load for the floor or roof system, unless otherwise specified by the Building Designer.

11.3 Any application specific issues not addressed herein can be engineered by an RDP. Assistance with engineering is available from Trussway Industries, LLC.

11.4 IBC Section 104.11 (IRC Section R104.11 and IFC Section 104.10[31] are similar) in pertinent part states:

> **104.11 Alternative materials, design and methods of construction and equipment.** The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code. Where the alternative material, design or method of construction is not approved, the building official shall respond in writing, stating the reasons the alternative was not approved.

11.5 **Approved**:[32] Building regulations require that the building official shall accept duly authenticated reports.[33]

11.5.1 An approved agency is *"approved"* when it is ANAB ISO/IEC 17065 accredited.

11.5.2 An approved source is *"approved"* when an RDP is properly licensed to transact engineering commerce.

11.5.3 Federal law, Title 18 US Code Section 242, requires that where the alternative product, material, service, design, assembly, and/or method of construction is not approved, the building official shall respond in writing, stating the reasons why the alternative was not approved. Denial without written reason deprives a protected right to free and fair competition in the marketplace.

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

11.7 Through the IAF Multilateral Agreements (MLA), this duly authenticated report can be used to obtain product approval in any jurisdiction or country because all ANAB ISO/IEC 17065 duly authenticated reports are equivalent.[34]

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12 Conditions of Use

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

12.2 As defined in **Section 6**, where material and/or engineering mechanics properties are created for load resisting design purposes, the resistance to the applied load shall not exceed the ability of the defined properties to resist those loads using the principles of accepted engineering practice.

12.3 When required by adopted legislation and enforced by the building official, also known as the authority having jurisdiction (AHJ) in which the project is to be constructed:

12.3.1 Any calculations incorporated into the construction documents shall conform to accepted engineering practice and, when prepared by an approved source, shall be approved when signed and sealed.

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

12.3.3 This code compliance process has an internal quality control program and a third-party quality assurance program.

12.3.4 At a minimum, this code compliance process shall be installed per **Section 9** of this report.

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

12.3.6 This code compliance process has an internal quality control program and a third party quality assurance program in accordance with IBC Section 104.4, IBC Section 110.4, IBC Section 1703, IRC Section R104.4, and IRC Section R109.2.

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

12.4 The approval of this report by the AHJ shall comply with IBC Section 1707.1, where legislation states in part, "*the building official shall accept duly authenticated reports from approved agencies in respect to the quality and manner of use of new material or assemblies as provided for in Section 104.11*," all of IBC Section 104, and IBC Section 105.4.

12.5 Design loads shall be determined in accordance with the regulations adopted by the jurisdiction in which the project is to be constructed and/or by the building designer (i.e., owner or RDP).

12.6 The actual design, suitability, and use of this report for any particular building, is the responsibility of the owner or the authorized agent of the owner.

13 Identification

13.1 The code compliance process listed in **Section 1.1** is identified by a label on the board or packaging material bearing the manufacturer name, product name, this report number, and other information to confirm code compliance.

13.2 Additional technical information can be found at www.trussway.com .

14 Review Schedule

14.1 This report is subject to periodic review and revision. For the latest version, visit drjcertification.org.

14.2 For information on the status of this report, please contact DrJ Certification.

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

15.1 Application of the 250 Pound Sprinkler Installer Load 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.

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Appendix A

1 Legislation that Authorizes AHJ Approval

1.1 **Fair Competition**: State legislatures have adopted Federal regulations for the examination and approval of building code referenced and alternative products, materials, designs, services, assemblies, and/or methods of construction that:

1.1.1 Advance innovation.

1.1.2 Promote competition so all businesses have the opportunity to compete on price and quality in an open market on a level playing field unhampered by anticompetitive constraints.

1.1.3 Benefit consumers through lower prices, better quality, and greater choice.

1.2 **Adopted Legislation**: The following local, state and federal regulations affirmatively authorize this code compliance process 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),[35] where providing test reports, engineering analysis, and/or other related IP/TS is subject to prison of not more than ten years[36] and/or a $5,000,000 fine or 3 times the value of[37] 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[38] 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.[39]

1.2.6 The commerce of approved sources (i.e., registered PEs) is regulated by professional engineering legislation. Professional engineering commerce shall always be approved by AHJs, except where there is evidence provided in writing, that specific legislation have been violated by an individual registered PE.

1.2.7 The AHJ shall accept duly authenticated reports from approved agencies in respect to the quality and manner of use of new materials or assemblies as provided for in IBC Section 104.11.[40]

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1.3 **Approved**[41] **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.[42] 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.[43]

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[44] 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[45] (i.e., ANAB, International Accreditation Forum also known as IAF, etc.).

1.6 **Approved by Florida**: Statewide approval of products, methods or systems of construction shall be approved, without further evaluation by:

1.6.1 A certification mark or listing of an approved certification agency,

1.6.2 A test report from an approved testing laboratory,

1.6.3 A product evaluation report based upon testing or comparative or rational analysis, or a combination thereof, from an approved product evaluation entity, or

1.6.4 A product evaluation report based upon testing, comparative or rational analysis, or a combination thereof, developed, signed, and sealed by a professional engineer or architect, licensed in Florida.

1.6.5 For local product approval, products or systems of construction shall demonstrate compliance with the structural wind load requirements of the Florida Building Code (FBC) through one of the following methods:

1.6.5.1 A certification mark, listing, or label from a commission-approved certification agency indicating that the product complies with the code,

1.6.5.2 A test report from a commission-approved testing laboratory indicating that the product tested complies with the code,

1.6.5.3 A product-evaluation report based upon testing, comparative or rational analysis, or a combination thereof, from a commission-approved product evaluation entity which indicates that the product evaluated complies with the code,

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1.6.5.4 A product-evaluation report or certification based upon testing or comparative or rational analysis, or a combination thereof, developed and signed and sealed by a Florida professional engineer or Florida registered architect, which indicates that the product complies with the code, or

1.6.5.5 A statewide product approval issued by the Florida Building Commission.

1.6.6 The Florida Department of Business and Professional Regulation (DBPR) website provides a listing of companies certified as a Product Evaluation Agency (i.e., EVLMiami 13692), a Product Certification Agency (i.e., CER10642), and as a Florida Registered Engineer (i.e., ANE13741).

1.7 **Approved by Miami-Dade County (i.e., Notice of Acceptance NOA])**: A Florida statewide approval is an NOA. An NOA is a Florida local product approval. By Florida law, Miami-Dade County shall accept the statewide and local Florida Product Approval as provided for in Florida legislation 553.842 and 553.8425.

1.8 **Approved by New Jersey**: Pursuant to the 2018 Building Code of New Jersey in IBC Section 1707.1 General,[46] 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)*".[47] Furthermore N.J.A.C 5:23-3.7 states: "*Municipal approvals of alternative materials, equipment, or methods of construction*."

1.8.1 **Approvals**: Alternative materials, equipment, or methods of construction shall be approved by the appropriate subcode official provided the proposed design is satisfactory and that the materials, equipment, or methods of construction are suitable for the intended use and are at least the equivalent in quality, strength, effectiveness, fire resistance, durability, and safety of those conforming with the requirements of the regulations.

1.8.1.1 A field evaluation label and report or letter issued by a nationally recognized testing laboratory verifying that the specific material, equipment, or method of construction meets the identified standards or has been tested and found to be suitable for the intended use, shall be accepted by the appropriate subcode official as meeting the requirements of the above.

1.8.1.2 Reports of engineering findings issued by nationally recognized evaluation service programs such as but not limited to, the Building Officials and Code Administrators (BOCA), the International Conference of Building Officials (ICBO), the Southern Building Code Congress International (SBCCI), the International Code Council (ICC), and the National Evaluation Service, Inc., shall be accepted by the appropriate subcode official as meeting the requirements of the above.

1.8.2 The New Jersey Department of Community Affairs has confirmed that technical evaluation reports, from any accredited entity listed by ANAB, meets the requirements of item the previous paragraph, given that the listed entities are no longer in existence and/or do not provide "*reports of engineering findings*."

1.9 **Approved by the Code of Federal Regulations Manufactured Home Construction and Safety Standards**: Pursuant to Title 24, Subtitle B, Chapter XX, Part 3282.14[48] and Part 3280,[49] the Department encourages innovation and the use of new technology in manufactured homes. The design and construction of a manufactured home shall conform to the provisions of Part 3282 and Part 3280 where key approval provisions in mandatory language follow:

1.9.1 *"All construction methods shall be in conformance with accepted engineering practices."*

1.9.2 *"The strength and rigidity of the component parts and/or the integrated structure shall be determined by engineering analysis or by suitable load tests to simulate the actual loads and conditions of application that occur."*

1.9.3 *"The design stresses of all materials shall conform to accepted engineering practice."*

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1.10 **Approval by US, Local and State Jurisdictions in General**: In all other local and state jurisdictions, the adopted building code legislation states in pertinent part that:

1.10.1 For new materials that are not specifically provided for in this code, the design strengths and permissible stresses shall be established by tests.[50]

1.10.2 For innovative alternatives and/or methods of construction, the building official shall accept duly authenticated reports from approved agencies with respect to the quality and manner of use of new materials or assemblies.[51]

1.10.2.1 An approved agency is *"approved"* when it is ANAB ISO/IEC 17065 accredited. DrJ Engineering, LLC (DrJ) is in the ANAB directory.

1.10.2.2 An approved source is *"approved"* when an RDP is properly licensed to transact engineering commerce. The regulatory authority governing approved sources is the state legislature via its professional engineering regulations.[52]

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.[53]

1.11 **Approval by International Jurisdictions**: The USMCA and GATT agreements provide for approval of innovative materials, designs, services, and/or methods of construction through the Agreement on Technical Barriers to Trade and the IAF Multilateral Recognition Arrangement (MLA), where these agreements:

1.11.1 State that conformity assessment procedures (i.e., ISO/IEC 17020, 17025, 17065, etc.) are prepared, adopted, and applied so as to grant access for suppliers of like products originating in the territories of other Members under conditions no less favourable than those accorded to suppliers of like products of national origin or originating in any other country, in a comparable situation.

1.11.2 **Approved**: The purpose of the MLA is to ensure mutual recognition of accredited certification and validation/verification statements between signatories to the MLA and subsequently, acceptance of accredited certification and validation/verification statements in many markets based on one accreditation for the timely approval of innovative materials, designs, services, and/or methods of construction.

1.11.3 ANAB is an IAF-MLA signatory where recognition of certificates, validation, and verification statements issued by conformity assessment bodies accredited by all other signatories of the IAF MLA, with the appropriate scope, shall be approved.[54]

1.11.4 Therefore, all ANAB ISO/IEC 17065 duly authenticated reports are approval equivalent.[55]

1.12 Approval equity is a fundamental commercial and legal principle.[56]

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Notes

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

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

[3] 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

[4] 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

[5] 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

[6] 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

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

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

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

[10] 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.

[11] https://www.nspe.org/resources/issues-and-advocacy/professional-policies-and-position-statements/regulation-professional AND https://apassociation.org/list-of-engineering-boards-in-each-state-archive/

[12] https://www.cbitest.com/accreditation/

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

[14] https://up.codes/viewer/colorado/ibc-2021/chapter/1/scope-and-administration#104.11:~:text=Where%20the%20alternative%20material%2C%20design%20or%20method%20of%20construction%20is%20not%20approved%2C%20the%20building%20official%20shall%20respond%20in%20writing%2C%20stating%20the%20reasons%20why%20the%20alternative%20was%20not%20approved AND https://up.codes/viewer/colorado/ibc-2021/chapter/1/scope-and-administration#105.3.1:~:text=If%20the%20application%20or%20the%20construction%20documents%20do%20not%20conform%20to%20the%20requirements%20of%20pertinent%20laws%2C%20the%20building%20official%20shall%20reject%20such%20application%20in%20writing%2C%20stating%20the%20reasons%20therefore

[15] 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

[16] 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

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

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

[19] 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.

[20] 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

[21] NFPA 13-2016 Section 9.2.1.3.1

[22] NFPA 13-2016 Section 9.2.1.1.2

[23] NFPA 13-2016 Section 9.2.1.3.3

[24] NFPA 13-2016 Section 9.2.1.4.1

[25] Section 9.2.1.3.1 in 2007 version

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

[27] https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280#:~:text=All%20construction%20methods%20shall%20be%20in%20conformance%20with%20accepted%20engineering%20practices%20to%20insure%20durable%2C%20livable%2C%20and%20safe%20housing%20and%20shall%20demonstrate%20acceptable%20workmanship%20reflecting%20journeyman%20quality%20of%20work%20of%20the%20various%20trades

[28] 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

[29] 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.

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

[31] 2018 IFC Section 104.9

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[32] 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.

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

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

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

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

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

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

[39] IBC 2021, Section 1706.1 Conformance to Standards

[40] IBC 2021, Section 1707 Alternative Test Procedure, 1707.1 General

[41] See **Section 11** for the distilled building code definition of **Approved**.

[42] Los Angeles Municipal Code, SEC. 98.0503. TESTING AGENCIES

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

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

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

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

[47] https://www.nj.gov/dca/divisions/codes/codreg/ucc.html

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

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

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

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

[52] https://www.nspe.org/resources/issues-and-advocacy/professional-policies-and-position-statements/regulation-professional AND https://apassociation.org/list-of-engineering-boards-in-each-state-archive/

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

[54] 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

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

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

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