Listing and Technical Evaluation Report™

A Duly Authenticated Report from an Approved Agency

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CH Machine Connector Plates

Trade Secret Report Holder:

CH Machine, Inc.

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CSI Designations:

DIVISION: 06 00 00 - WOOD, PLASTICS AND COMPOSITES

Section: 06 05 23 - Wood, Plastic, and Composite Fastenings Section: 06 05 23.17 - Wood Framing Metal Connectors Section: 06 17 53 - Shop-Fabricated Wood Trusses

1 Innovative Products Evaluated[1]

1.1 CH20, CH18, and CH18 HS Truss Plates

2 Product Description and Materials

2.1 An example of the innovative products evaluated in this report is shown in **Figure 1**.

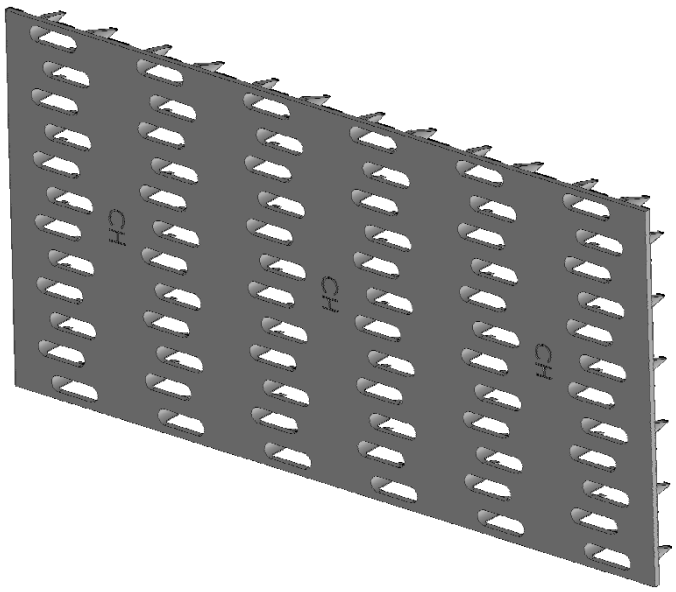

Figure 1. CH Metal Plate Connector

2.2 CH20, CH18, and CH18 HS Truss Plates are flat, light-gauge galvanized steel plates that use integral teeth to transfer lateral loads between wood truss members.

2.2.1 CH20 is manufactured from galvanized steel sheets complying with ASTM A653 SS Grade 50 with a G60 galvanized coating or 30Z30Z Electrolytic Zinc coating, in accordance with ASTM A879.

2.2.1.1 The minimum uncoated thickness of each steel sheet is 0.034".

2.2.1.2 CH20 has eight (8) teeth per square inch that are 0.35" long, 0.125" wide and punched perpendicular to the plane of the plate.

2.2.2 CH18 is manufactured from galvanized steel sheets complying with ASTM A653 SS Grade 50 with a G60 galvanized coating or 30Z30Z Electrolytic Zinc coating, in accordance with ASTM A879.

2.2.2.1 The minimum uncoated thickness of each steel sheet is 0.045".

2.2.2.2 CH18 has eight (8) teeth per square inch that are 0.35" long, 0.125" wide and punched perpendicular to the plane of the plate.

2.2.3 CH18 HS is manufactured from galvanized steel sheets complying with ASTM A653 SS Grade 60 with a G60 galvanized coating or 30Z30Z Electrolytic Zinc coating, in accordance with ASTM A879.

2.2.3.1 The minimum uncoated thickness of each steel sheet is 0.045".

2.2.3.2 CH18 HS has eight (8) teeth per square inch that are 0.35" long, 0.125" wide and punched perpendicular to the plane of the plate.

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

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 *ASTM A653: Specification for Steel Sheet, Zinc-coated Galvanized or Zinc-iron Alloy-coated Galvannealed by the Hot-dip Process*

4.1.2 *ASTM A879: Standard Specification for Steel Sheet, Zinc Coated by the Electrolytic Process for Applications Requiring Designation of the Coating Mass on Each Surface*

4.1.3 *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®*

4.2.3 *FBC-B—20, 23: Florida Building Code – Building[20] (FL 44405)*

4.2.4 *FBC-R—20, 23: Florida Building Code – Residential[20] (FL 44405)*

5 Listed[21]

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 *General*

6.1.1 CH20, CH18, and CH18 HS Truss Plates can be used to connect wood truss members and support the lateral resistance of both vertical and horizontal loads when used in accordance with this report and the applicable code.

6.1.2 Unless otherwise noted, adjustment of the allowable design values for duration of load shall be in accordance with the applicable code.

6.2 *Allowable Lateral Resistance Design Values*

6.2.1 CH20, CH18, and CH18 HS Truss Plates are allowed for use as truss plate connectors for wood trusses.

6.2.1.1 Allowable lateral resistance design values are listed in **Table 1**.

Table 1. CH Plate Allowable Lateral Resistance Design Values[1]

CH Plate	Wide Face or Narrow Face[2]	Lumber Species[3,4] (Specific Gravity)	Allowable Design Value (psi/plate)			
			Orientation[5]			
			AA	EA	AE	EE
CH20	Wide	SPF (0.42)	210	180	130	130
		HF (0.43)	210	180	130	135
		DF-L (0.50)	225	185	150	160
		SP (0.55)	235	190	160	175
	Narrow	SPF (0.42)	180	150	110	110
		HF (0.43)	180	150	115	115
		DF-L (0.50)	200	165	145	145
		SP (0.55)	210	175	165	165
CH18	Wide	SPF (0.42)	185	165	125	130
		HF (0.43)	190	165	130	135
		DF-L (0.50)	205	175	155	160
		SP (0.55)	220	185	175	180
	Narrow	SPF (0.42)	140	140	115	110
		HF (0.43)	140	140	115	115
		DF-L (0.50)	155	150	130	140
		SP (0.55)	165	160	140	155
CH18 HS	Wide	SPF (0.42)	185	165	125	130
		HF (0.43)	190	165	130	135
		DF-L (0.50)	205	175	155	160
		SP (0.55)	220	185	175	180
	Narrow	SPF (0.42)	140	140	115	110
		HF (0.43)	140	140	115	115
		DF-L (0.50)	155	150	130	140
		SP (0.55)	165	160	140	155

SI: 1 in = 25.4 mm, 1 lb = 4.45 N, 1 psi = 0.00689 MPa

1. To achieve the values presented in this table, plates of equal size shall be installed on opposite sides of the jointed members. Teeth shall be oriented in the same direction, as well.
2. Wide face denotes that the CH plate is connected to the face grain of each member. Narrow face denotes that the CH plate is connected to the side grain of each member.
3. Wood truss members shall have a minimum specific gravity of that listed in this table.
4. Wood truss members and overall truss design shall be designed by others and shall be of adequate size, species, and grade to resist design loads and requirements in accordance with the applicable building code.
5. Orientation refers to both the plate's slot orientation to the load and the load's orientation to grain.
6. AA denotes that the plate's slots are parallel to load and the load is parallel to grain (see **Figure 2**, which shows the wide face connection).
7. EA denotes that the plate's slots are perpendicular to load and the load is parallel to grain (see **Figure 2**, which shows the wide face connection).
8. AE denotes that the plate's slots are parallel to load and the load is perpendicular to grain (see **Figure 3**, which shows the wide face connection).
9. EE denotes that the plate's slots are perpendicular to load and the load is perpendicular to grain (see **Figure 3**, which shows the wide face connection).

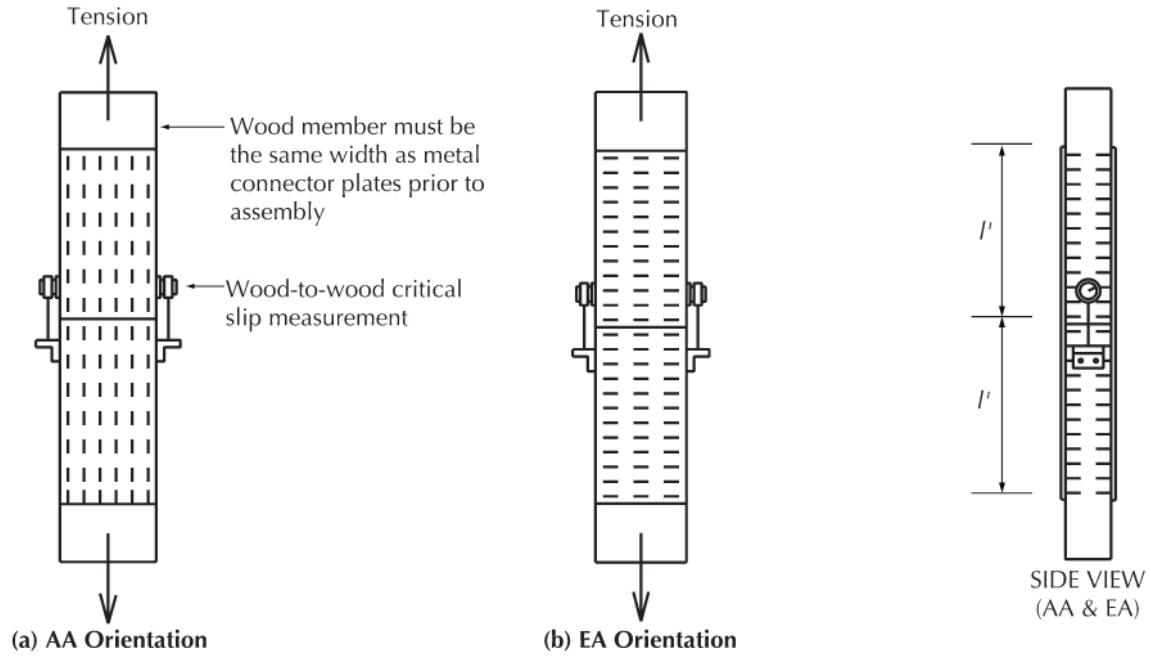

Figure 2. AA and EA Orientations (TPI 1 Figure 5.2-3)

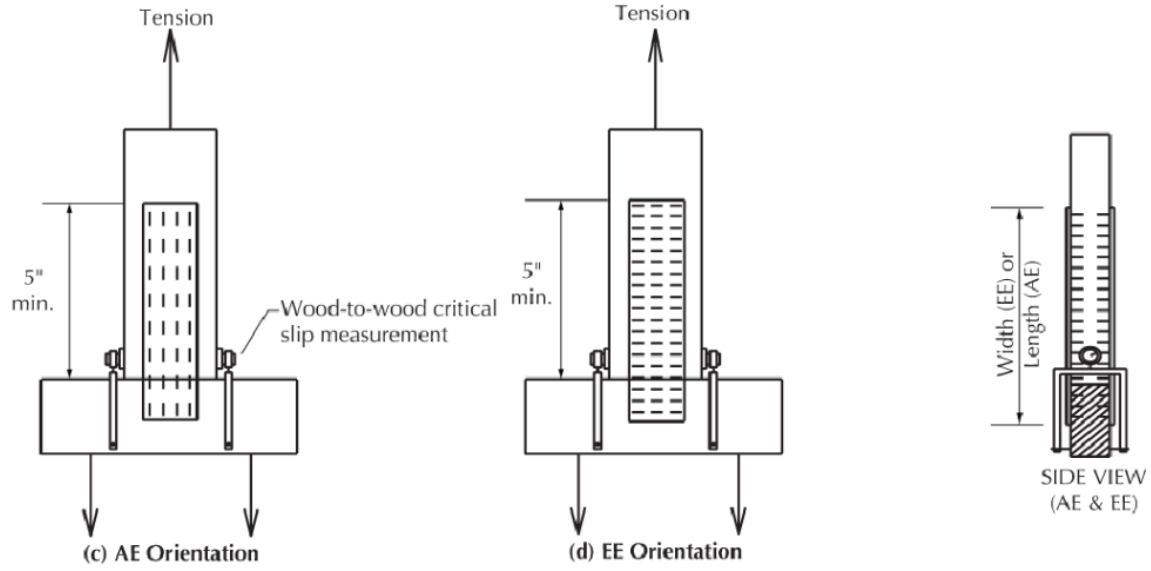

Figure 3. AE and EE Orientations (TPI 1 Figure 5.2-3)

6.3 *Allowable Tension Design Values and Effectiveness Ratios*

6.3.1 CH20, CH18, and CH18 HS Truss Plates have allowable tension design values and effectiveness ratios as listed in **Table 2**.

Table 2. CH Plate Allowable Tension Design Values and Effectiveness Ratios

CH Plate	Orientation[1]	Allowable Design Value (pli)	Tensile Effectiveness Ratio[3]
CH20	0° (AA)	495	0.453
	90° (EA)	470	0.431
	0° (AA, Non-Standard joint)[2]	625	0.570
CH18	0° (AA)	705	0.500
	90° (EA)	715	0.507
	0° (AA, Non-Standard joint)[2]	830	0.588
CH18 HS	0° (AA)	820	0.500
	90° (EA)	835	0.507
	0° (AA, Non-Standard joint)[2]	965	0.588

SI: 1 in = 25.4 mm, 1 lb = 4.45 N, 1 pli = 0.175 N/mm

1. Orientation refers to the plate's slot orientation to the load (0° is parallel to the plate's slots, 90° is perpendicular to the plate's slots), given tension loading is parallel to grain.
   a. AA denotes that the plate's slots are parallel to load and the load is parallel to grain (see **Figure 2** and **Figure 4**).
   b. EA denotes that the plate's slots are perpendicular to load and the load is parallel to grain (see **Figure 2**).
2. Non-Standard joints denote full metal plate cross-sectional area across the wood member's joint plane (see **Figure 4**).
3. Tensile Effectiveness Ratio (R_t) is defined in TPI 1 as:
   $R_t = \frac{F_{tp}}{F_{tc}}$,
   where,
   F_{tp} is the plate's ultimate tensile strength for the given orientation and
   F_{tc} is the theoretical ultimate tensile strength of the matched solid metal control specimen.

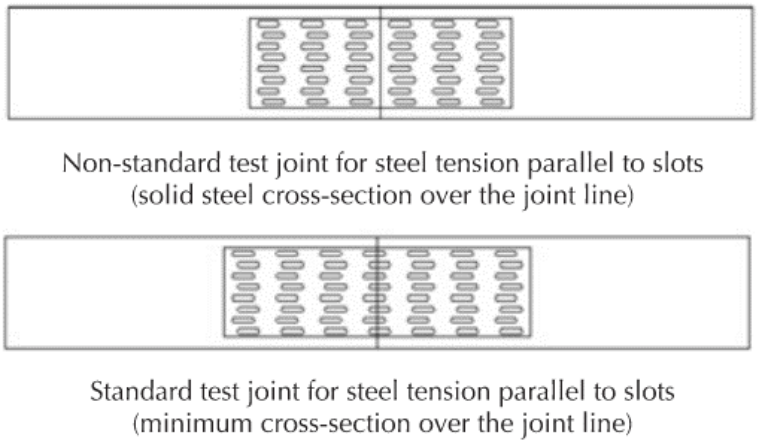

Figure 4. Non-Standard and Standard Joints (TPI 1 Figure 5.4-4)

6.4 *Allowable Shear Design Values and Effectiveness Ratios*

6.4.1 CH20, CH18, and CH18 HS Truss Plates have allowable shear design values as listed in **Table 3**.

Table 3. CH Plate Allowable Shear Design Values and Effectiveness Ratios

CH Plate	Plate Angle[1]	Allowable Design Value (pli)	Shear Effectiveness Ratio[2]
CH20	0°	344	0.51
	30°	394	0.58
	60°	484	0.72
	90°	316	0.47
	120°	288	0.43
	150°	297	0.44
CH18	0°	442	0.62
	30°	472	0.66
	60°	619	0.87
	90°	451	0.63
	120°	345	0.48
	150°	372	0.52
CH18 HS	0°	580	0.62
	30°	620	0.66
	60°	810	0.87
	90°	590	0.63
	120°	450	0.48
	150°	490	0.52

SI: 1 in = 25.4 mm, 1 lb = 4.45 N, 1 pli = 0.175 N/mm

1. Plate angle is measured from the vertical.
2. Shear Strength Effectiveness Ratio (R_s) is defined in TPI 1 as:
   $R_s = \left(\frac{F_{sp}}{F_{sc}}\right) = \frac{F_{sp}}{0.577 \times F_{tc}}$,
   where,
   F_{sp} is the plate's ultimate shear stress for the given orientation,
   F_{sc} is the theoretical ultimate shear stress of the matched solid metal control specimen, and
   F_{tc} is the average ultimate tensile stress.

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[22]

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.[23]

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.[24]

8 Regulatory Evaluation and Accepted Engineering Practice

8.1 CH20, CH18, and CH18 HS Truss Plates comply with the following legislatively adopted regulations and/or accepted engineering practice for the following reasons:

8.1.1 Structural performance under load conditions for use as a metal plate connector for wood trusses in accordance with IBC Section 2306.1 and TPI 1.

8.1.2 Tensile strength and effectiveness ratio in accordance with TPI 1.

8.1.3 Shear strength and effectiveness ratio in accordance with TPI 1.

8.2 Overall truss design is outside the scope of this report.

8.3 Any building code, regulation and/or accepted engineering evaluations (i.e., research reports, duly authenticated reports, etc.) that are conducted for this Listing were performed by DrJ Engineering, LLC (DrJ), an ISO/IEC 17065 accredited certification body and a professional engineering company operated by RDP/approved sources. DrJ is qualified[25] to practice product and regulatory compliance services within its scope of accreditation and engineering expertise, respectively.

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

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

9 Installation

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

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

9.3 *Installation Procedure*

9.3.1 Wood trusses connected with CH20, CH18, and CH18 HS Truss Plates shall be assembled in accordance with Chapter 3 of TPI 1 and IBC Section 2303.4 and IRC Section R502.11 or IRC Section R802.10.

9.3.2 Single plate installation is not allowable. Install CH20, CH18, and CH18 HS Truss Plates in corresponding pairs on opposite faces of truss member joints.

9.3.3 CH20, CH18, and CH18 HS Truss Plates must be pressed into wood for the full depth of the teeth by a hydraulic platen press, multiple roller presses (partial embedment followed by full embedment presses), or combinations of hydraulic-platen presses and/or roller presses that feed into a stationary finish roller press.

10 Substantiating Data

10.1 Testing has been performed under the supervision of a professional engineer and/or under the requirements of ISO/IEC 17025 as follows:

10.1.1 Truss plate connector testing for lateral resistance in accordance with TPI 1

10.1.2 Truss plate connector testing for tensile strength in accordance with TPI 1

10.1.3 Truss plate connector testing for shear strength in accordance with TPI 1

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

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

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

10.5 Testing and engineering analysis: The strength, rigidity, and/or general performance of component parts and/or the integrated structure are determined by suitable tests that simulate the actual conditions of application that occur and/or by accepted engineering practice and experience.[26]

10.6 Where additional condition of use and/or regulatory compliance information is required, please search for CH20, CH18, and CH18 HS Truss Plates on the DrJ Certification website.

11 Findings

11.1 As outlined in **Section 6**, CH20, CH18, and CH18 HS Truss Plates have performance characteristics that were tested and/or meet applicable regulations and are suitable for use pursuant to its specified purpose.

11.2 When used and installed in accordance with this duly authenticated report and the manufacturer installation instructions, CH20, CH18, and CH18 HS Truss Plates shall be approved for the following applications:

11.2.1 Use as a metal plate connector for wood truss construction in accordance with IBC Section 2306.1.

11.3 Unless exempt by state statute, when CH20, CH18, and CH18 HS Truss Plates are to be used as a structural and/or building envelope component in the design of a specific building, the design shall be performed by an RDP.

11.4 Any application specific issues not addressed herein can be engineered by an RDP. Assistance with engineering is available from CH Machine, Inc.

11.5 IBC Section 104.11 (IRC Section R104.11 and IFC Section 104.10[27] are similar) in pertinent part states:

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

11.6 **Approved**:[28] Building regulations require that the building official shall accept duly authenticated reports.[29]

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

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

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

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

11.8 Through the IAF Multilateral Agreements (MLA), this duly authenticated report can be used to obtain product approval in any jurisdiction or country because all ANAB ISO/IEC 17065 duly authenticated reports are equivalent.[30]

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 This report establishes allowable metal connector plate design values only. The design values (lateral resistance values, effective tension strength ratios, and effective shear resistance ratios) used in the design of wood trusses using CH20, CH18, and CH18 HS Truss Plates must not exceed those listed in **Table 1**, **Table 2**, or **Table 3** of this report.

12.3.1 Design of truss, fabrication, quality assurance, and special inspection is outside the scope of this report and shall be in accordance with TPI 1, engineering drawings from an RDP, and the applicable code.

12.4 All lumber used in the fabrication of wood trusses connected with CH20, CH18, and CH18 HS Truss Plates shall be graded in accordance with the applicable building code and shall have a moisture content not in excess of nineteen percent (19%).

12.4.1 CH20, CH18, and CH18 HS Truss Plates installed in lumber having a moisture content greater than nineteen percent (19%) at the time of truss fabrication, shall have the lateral resistance values listed in **Table 1** multiplied by the wet service factor, C_M, specified in TPI 1 Table 6.4-4.

12.5 CH20, CH18, and CH18 HS Truss Plates must be installed in corresponding pairs on opposite faces of truss member joints.

12.6 Trusses assembled using CH20, CH18, and CH18 HS Truss Plates, shall be in accordance with the tolerances provided for in with ANSI/TPI 1, Chapter 3.

12.7 Allowable loads shown in **Table 1**, **Table 2**, or **Table 3** have not been adjusted for use in preservative-treated or fire-retardant treated lumber. Allowable value shall be adjusted in accordance with the treatment manufacturer product evaluation report. If this information is not in the report, contact the treatment manufacturer for this information.

12.8 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:

12.8.1 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.

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

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

12.8.4 At a minimum, these innovative products shall be installed per **Section 9** of this report.

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

12.8.6 These innovative products have an internal quality control program and a third party quality assurance program in accordance with IBC Section 104.4, IBC Section 110.4, IBC Section 1703, IRC Section R104.4, and IRC Section R109.2.

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

12.9 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.

12.10 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).

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

13 Identification

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

13.2 Additional technical information can be found at www.chmachineinc.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 CH20, CH18, and CH18 HS Truss Plates are included in this report published by an approved agency that is concerned with evaluation of products or services, maintains periodic inspection of the production of listed materials or periodic evaluation of services. This report states either that the material, product, or service meets recognized standards or has been tested and found suitable for a specified purpose. This report meets the legislative intent and definition of being acceptable to the AHJ.

Appendix A

1 Legislation that Authorizes AHJ Approval

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

1.1.1 Advance innovation.

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

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

1.2 **Adopted Legislation**: The following local, state and federal regulations affirmatively authorize these innovative products to be approved by AHJs, delegates of building departments, and/or delegates of an agency of the federal government:

1.2.1 Interstate commerce is governed by the Federal Department of Justice to encourage the use of innovative products, materials, designs, services, assemblies, and/or methods of construction. The goal is to "*protect economic freedom and opportunity by promoting free and fair competition in the marketplace*."

1.2.2 Title 18 US Code Section 242 affirms and regulates the right of individuals and businesses to freely and fairly have new products, materials, designs, services, assemblies, and/or methods of construction approved for use in commerce. Disapproval of alternatives shall be based upon non-conformance with respect to specific provisions of adopted legislation and shall be provided in writing stating the reasons why the alternative was not approved, with reference to the specific legislation violated.

1.2.3 The federal government and each state have a public records act. In addition, each state also has legislation that mimics the federal Defend Trade Secrets Act 2016 (DTSA),[31] where providing test reports, engineering analysis, and/or other related IP/TS is subject to prison of not more than ten years[32] and/or a $5,000,000 fine or 3 times the value of[33] 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[34] 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.[35]

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.[36]

1.3 **Approved**[37] **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.[38] 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.[39]

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[40] 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[41] (i.e., ANAB, International Accreditation Forum also known as IAF, etc.).

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

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

1.6.2 A test report from an approved testing laboratory,

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

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

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

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

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

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

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

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

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

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

1.8 **Approved by New Jersey**: Pursuant to the 2018 Building Code of New Jersey in IBC Section 1707.1 General,[42] 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)*".[43] 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[44] and Part 3280,[45] the Department encourages innovation and the use of new technology in manufactured homes. The design and construction of a manufactured home shall conform to the provisions of Part 3282 and Part 3280 where key approval provisions in mandatory language follow:

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

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

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

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

1.10.1 For new materials that are not specifically provided for in this code, the design strengths and permissible stresses shall be established by tests.[46]

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.[47]

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.[48]

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.[49]

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.[50]

1.11.4 Therefore, all ANAB ISO/IEC 17065 duly authenticated reports are approval equivalent.[51]

1.12 Approval equity is a fundamental commercial and legal principle.[52]

Issue Date: February 2, 2022
Subject to Renewal: April 1, 2026

FBC Supplement to Report Number 2104-03

REPORT HOLDER: CH Machine, Inc.

1 Evaluation Subject

1.1 CH20, CH18, and CH18 HS Truss Plates

2 Purpose and Scope

2.1 Purpose

2.1.1 The purpose of this Report Supplement is to show CH20, CH18, and CH18 HS Truss Plates, recognized in Report Number 2104-03, have also been evaluated for compliance with the codes listed below as adopted by the Florida Building Commission.

2.2 *Applicable Code Editions*

2.2.1 *FBC-B—20, 23: Florida Building Code – Building (FL 44405)*

2.2.2 *FBC-R—20, 23: Florida Building Code – Residential (FL 44405)*

3 Conclusions

3.1 CH20, CH18, and CH18 HS Truss Plates, described in Report Number 2104-03, comply with the FBC-B and FBC-R and are subject to the conditions of use described in this supplement.

3.2 Where there are variations between the IBC and IRC and the FBC-B and FBC-R applicable to this report, they are listed here:

3.2.1 FBC-B Section 104.4 and Section 110.4 are reserved.

3.2.2 FBC-R Section R104 and Section R109 are reserved.

3.2.3 FBC-B Section 2306.1 replaces IBC Section 2306.1.

3.2.4 FBC-R Section R802.10 replaces IRC Section R802.10.

4 Conditions of Use

4.1 CH20, CH18, and CH18 HS Truss Plates, described in Report Number 2104-03, must comply with all of the following conditions:

4.1.1 All applicable sections in Report Number 2104-03.

4.1.2 The design, installation, and inspections are in accordance with additional requirements of FBC-B Chapter 16 and Chapter 17, as applicable.

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 All references to the FBC-B and FBC-R are the same as the 2021 IBC and 2021 IRC unless otherwise noted in the Florida Supplement at the end of this report.

21 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

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

23 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

24 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

25 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.

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

27 2018 IFC Section 104.9

28 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.

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

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

31 http://www.drjengineering.org/AppendixC AND https://www.drjcertification.org/cornell-2016-protection-trade-secrets
32 https://www.law.cornell.edu/uscode/text/18/1832#:~:text=imprisoned%20not%20more%20than%2010%20years
33 https://www.law.cornell.edu/uscode/text/18/1832#:~:text=Any%20organization%20that,has%20thereby%20avoided
34 https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1706.2
35 IBC 2021, Section 1706.1 Conformance to Standards
36 IBC 2021, Section 1707 Alternative Test Procedure, 1707.1 General
37 See **Section 11** for the distilled building code definition of **Approved**.
38 Los Angeles Municipal Code, SEC. 98.0503. TESTING AGENCIES
39 https://up.codes/viewer/california/ca-building-code-2022/chapter/17/special-inspections-and-tests#1707.1
40 New York City, The Rules of the City of New York, § 101-07 Approved Agencies
41 New York City, The Rules of the City of New York, § 101-07 Approved Agencies
42 https://up.codes/viewer/new_jersey/ibc-2018/chapter/17/special-inspections-and-tests#1707.1
43 https://www.nj.gov/dca/divisions/codes/codreg/ucc.html
44 https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3282/subpart-A/section-3282.14
45 https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280
46 IBC 2021, Section 1706 Design Strengths of Materials, 1706.2 New Materials. Adopted law pursuant to IBC model code language 1706.2.
47 IBC 2021, Section 1707 Alternative Test Procedure, 1707.1 General. Adopted law pursuant to IBC model code language 1707.1.
48 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/
49 IBC 2021, Section 1706 Design Strengths of Materials, Section 1706.1 Conformance to Standards Adopted law pursuant to IBC model code language 1706.1.
50 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
51 True for all ANAB accredited product evaluation agencies and all International Trade Agreements.
52 https://www.justice.gov/crt/deprivation-rights-under-color-law AND https://www.justice.gov/atr/mission