



Listing and Technical Evaluation Report™

Report No: 1711-02



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Magnitude10 braces

Trade Secret Report Holder:

Quake Bracing, LLC

Phone: 510-225-1112

Website: www.quakebracing.com

Email: info@quakebracing.com

CSI Designations:

DIVISION: 05 00 00 - METALS

Section: 05 12 23 - Structural Steel for Buildings

DIVISION: 13 00 00 SPECIAL CONSTRUCTION

Section: 13 48 00 - Sound, Vibration and Seismic Control

Section: 13 48 63 - Fabricated Seismic Control Components

1 Innovative Product Evaluated¹

1.1 Magnitude10 brace:

- 1.1.1 Size A – See **Section 2** for description
- 1.1.2 Size AX – See **Section 2** for description
- 1.1.3 Size F – See **Section 2** for description
- 1.1.4 Size FX – See **Section 2** for description

2 Product Description and Materials

- 2.1 Magnitude10 braces are assemblies of materials intended for use as lateral-force-resisting elements to resist lateral forces in buildings.
- 2.2 Magnitude10 braces are made up of wide flange or other steel columns (see Item #12 in **Figure 1**) that includes a sacrificial structural fuse (as shown in **Figure 2**) connection between the top of the column and a connection to the building framing.
 - 2.2.1 The minimum column sizes for the Size A Magnitude10 brace is:
 - 2.2.1.1 W8x35, W10x30 or HP8x36 (see **Section 2.2.5**)
 - 2.2.2 The minimum column sizes for the Size AX Magnitude10 brace is:
 - 2.2.2.1 W8x67 or HP10x57 (see **Section 2.2.5**)
 - 2.2.3 The minimum column sizes for the Size F Magnitude10 brace is:
 - 2.2.3.1 W12x65 or HP12x74 (see **Section 2.2.5**)
 - 2.2.4 The minimum column size for the Size FX Magnitude10 brace is:
 - 2.2.4.1 W12x136, W14x109 or W16x89 (see **Section 2.2.5**)



- 2.2.5 Larger steel sections may be specified by the Engineer of Record (EOR) subject to compatibility with remaining manufactured components (see **Section 6.4.2.4**).
- 2.2.6 Wide flange steel columns shall be of Type HSLA Grade 50 ($F_y = 50$ ksi) steel conforming to ASTM A992.
- 2.2.7 Bearing pile (HP) steel columns shall be of Type HSLA Grade 50 ($F_y = 50$ ksi) steel conforming to ASTM A572.
- 2.2.8 Structural Fuse Plates shall be of Type HSLA Grade 50 ($F_y = 50$ ksi) steel conforming to ASTM A572.

2.3 The innovative product evaluated in this report is shown in **Figure 1**.

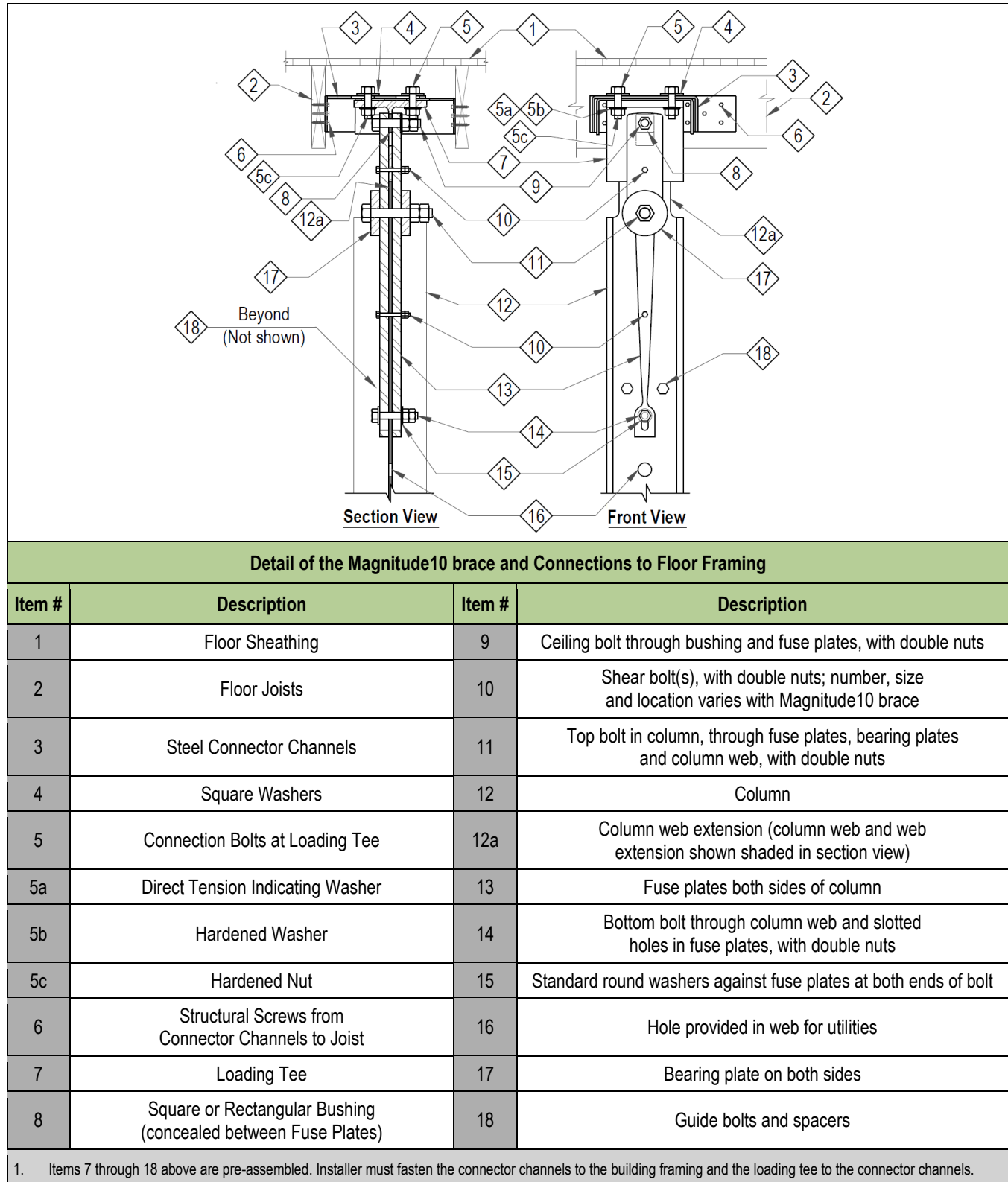


Figure 1. Magnitude10 brace Assembly

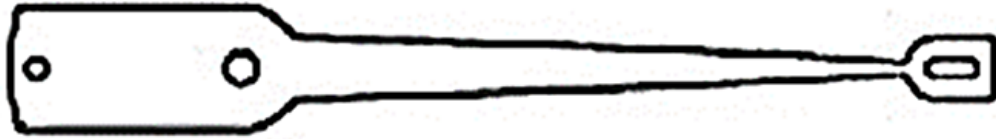


Figure 2. Example of Structural Fuse Used in Magnitude10 brace

- 2.4 The base of the column (Item #12 in **Figure 1**) is embedded in reinforced concrete, or provided with a welded base plate, to create a moment resisting connection in accordance with the detailed installation drawings.
- 2.5 Magnitude10 braces are intended to provide resistance to lateral loads equivalent to conventional lateral resisting systems.
- 2.6 A complete Magnitude10 brace system includes the following:
- 2.6.1 Column: Designed to resist lateral loads and limit deflection to an acceptable level (see Item #12 in **Figure 1**).
 - 2.6.2 Structural Fuses: Designed to resist lateral loads while allowing certain deflections within a specified range (see Item #13 in **Figure 1**).
 - 2.6.3 Shear Bolt(s): Provide increased stiffness to the system prior to a given load level (see Item #10 in **Figure 1**). These bolts are optional subject to **Section 6.3.1.2**. Shear bolts may be fastened with double nuts locked together or with a single nut with the end of the bolt threads peened to prevent the nut from unscrewing.
 - 2.6.4 *Connectors for Attaching Magnitude10 brace to Structural Framing:*
 - 2.6.4.1 Steel Connector Channels: Connects the Magnitude10 brace assembly between joists in the floor system of the building above the Magnitude10 brace (see Item #3 in **Figure 1**).
 - 2.6.4.2 Steel Connector Plate: Connects the Magnitude10 brace to the underside of a wood beam or collector, or other member as designed by the RDP.
 - 2.6.4.3 Loading Tee: Transfers load from the Structural Fuses to the Connector Channels (see Item #7 in **Figure 1**) to floor system.
 - 2.6.5 Hardware and accessories shall be as follows (all items listed below are provided with the Magnitude10 brace as needed for the connection type listed in **Section 2.6.4**):
 - 2.6.5.1 Structural Screws: Structural wood screws for attaching the steel channel to the floor joists or the steel connector plate and loading tee to a wood beam or collector shall be self-drilling structural wood screws used in accordance with a current code evaluation report (see Item #6 in **Figure 1**).
 - 2.6.5.2 Bolts: High-strength ASTM F3125, Grade A325 bolts and SAE J429, Grade 2 and Grade 5 cap screws are used to make connections between the steel members (see Items #5, #9, #10, #11, #14, and #18 in **Figure 1**).
 - 2.6.5.3 Washers: Hardened washers are in accordance with ASTM F436 (see Item #5b in **Figure 1**); standard round washers per ASTM F844 (see Items #15 and #18 in **Figure 1**).
 - 2.6.5.4 Square Washers: $\frac{5}{16}$ " square washers are cut from steel plate (see Item #4 in **Figure 1**).
 - 2.6.5.5 Direct-Tension-Indicating (DTI) Washers: DTI washers shall be in accordance with ASTM F959 (see Item #5a in **Figure 1**).



- 2.6.5.6 Nuts: High-strength nuts shall be in accordance with ASTM A563 DH or ASTM A194-2H (see Item #5c in **Figure 1**); Standard nuts shall be in accordance with ASTM A563A or SAE J995, Grade 2 (see Items #9, #10, #11, #14, and #18 in **Figure 1**). Where double nuts are used, they may be standard hex-nuts, jam-nuts or a combination of both. When standard hex-nuts are used as the outer nut, the bolt threads need only project through one-half the thickness of the nut. Double nuts shall be tightened against each other to resist loosening of the connection.
- 2.6.5.7 Guide Bolt and Spacers: Each Guide Bolt and Spacer includes a bolt, double nut, two washers and two custom tubular spacers (see Item #18 in **Figure 1**).
- 2.6.6 Magnitude10 braces are shipped with Items #7 through #18 (see **Figure 1**) assembled. Items #3 through #6 (see **Figure 1**) are provided with the Magnitude10 brace to be assembled on site according to the manufacturer written installation instructions.
- 2.7 As needed, review material properties for design in **Section 6** and to regulatory evaluation in **Section 8**.

3 Definitions

- 3.1 New Materials² 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 tests⁴ and/or engineering analysis.⁵
- 3.2 Duly authenticated reports⁶ and research reports⁷ are test reports and related engineering evaluations, which are written by an approved agency⁸ 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 ANAB¹² ISO/IEC 17025 and ISO/IEC 17020 accredited.
- 3.6 The regulatory authority shall enforce¹³ 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 writing¹⁴ 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 Evaluation¹⁹

4.1 Standards

- 4.1.1 *ASCE 31: Seismic Evaluation of Existing Buildings*
- 4.1.2 *ASCE 41: Seismic Rehabilitation of Existing Buildings*
- 4.1.3 *ASCE/SEI 7: Minimum Design Loads and Associated Criteria for Buildings and Other Structures*
- 4.1.4 *ASTM A194: Standard Specification for Carbon Steel, Alloy Steel, and Stainless Steel Nuts for Bolts for High Pressure or High Temperature Service, or Both*
- 4.1.5 *ASTM A563: Standard Specification for Carbon and Alloy Steel Nuts*
- 4.1.6 *ASTM A572: Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel*
- 4.1.7 *ASTM A992: Standard Specification for Structural Steel Shapes*
- 4.1.8 *ASTM D7989: Standard Practice for Demonstrating Equivalent In-Plane Lateral Seismic Performance to Wood-Frame Shear Walls Sheathed with Wood Structural Panels*
- 4.1.9 *ASTM E2126: Standard Test Methods for Cyclic (Reversed) Load Test for Shear Resistance of Vertical Elements of the Lateral Force Resisting Systems for Buildings*
- 4.1.10 *ASTM F436: Standard Specification for Hardened Steel Washers Inch and Metric Dimensions*
- 4.1.11 *ASTM F844: Standard Specification for Washers, Steel, Plain (Flat), Unhardened for General Use*
- 4.1.12 *ASTM F959: Standard Specification for Compressible-Washer-Type Direct Tension Indicators for Use with Structural Fasteners, Inch and Metric Series*
- 4.1.13 *ASTM F3125 – Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi (830 MPa) and 150 ksi (1040 MPa) Minimum Tensile Strength, Inch and Metric Dimensions*
- 4.1.14 *FEMA P-807: Seismic Evaluation and Retrofit of Multi-Unit Wood-Frame Buildings With Weak First Stories*
- 4.1.15 *FEMA P-1100-2B: Vulnerability-Based Seismic Assessment and Retrofit of One-and Two-Family Dwellings*
- 4.1.16 *SAE J429: Mechanical and Material Requirements for Externally Threaded Fasteners*
- 4.1.17 *SAE J995: Mechanical and Material Requirements for Steel Nuts*

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 *CBC— 16, 19, 22: California Building Code²⁰*
- 4.2.4 *CRC— 16, 19, 22: California Residential Code²⁰*

5 Listed²¹

- 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 Magnitude10 braces have been tested in accordance with ASTM E2126, Method C. Seismic design parameters and allowable loads are determined using the test data analysis methods in accordance with ASTM D7989.
- 6.2 The testing was conducted to measure the load capacities and drift characteristics of the Magnitude10 brace as a lateral-force-resisting element with performance equivalent to wood structural panel shear walls.
- 6.3 Magnitude10 brace may be used in new or existing construction.
- 6.3.1 In existing construction, Magnitude10 brace was evaluated for use as a replacement or supplementation for the existing lateral load resisting system of construction containing soft story irregularities.
- 6.3.1.1 In accordance with ASCE 7, Section 12.3.2, soft story irregularity is defined to exist where there is a story in which the lateral stiffness is less than seventy percent (70%) of that in the story above or less than eighty percent (80%) of the average stiffness of the three stories above.
- 6.3.1.2 If the Magnitude10 brace installation is not mandated by state or local regulations or where the Authority Having Jurisdiction allows, the RDP may opt to omit some or all of the shear bolts from the Magnitude10 brace (Item #10 in **Figure 1**). The top shear bolt must be left in place until the Magnitude10 brace is completely installed and permanently supported.
- 6.4 *Structural Applications*
- 6.4.1 The allowable lateral load capacity and seismic design coefficients for the Magnitude10 brace are as described in **Table 1**.

Table 1. Allowable Lateral Load Capacity & Seismic Design Coefficients for the Magnitude10 brace^{1,2}

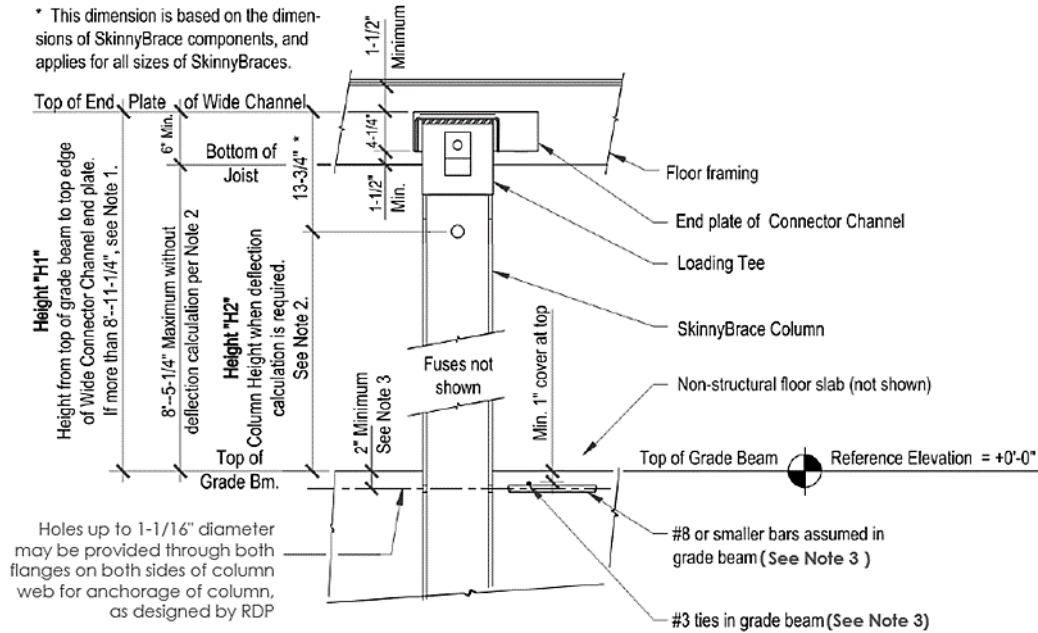
Magnitude10 brace Size	Maximum Ceiling Height ³	Allowable Lateral Load Capacity (lbf) ⁴	Response Modification Coefficient R ⁵	Overstrength Factor C _d ^{6,7}	Deflection Amplification Factor C _d ⁸	Structural System Limitations and Building Height Limit ⁹ (ft)				
						Seismic Design Category				
						B	C	D	E	F
A	8' – 5 1/4"	2,400	6.5	3.0	4	NL	NL	65	65	65
AX	8' – 5 1/4"	3,400								
F	8' – 5 1/4"	8,275								
FX	8' – 5 1/4"	11,750								

SI: 1 in. = 25.4 mm, 1 lb. = 4.45 N

- The Magnitude10 brace shall be installed in accordance with **Section 9** of this report.
- All seismic design parameters follow the equivalency as defined in **Section 8** of this report.
- "Ceiling height" is measured from the top of the foundation grade beam, pedestal or column base plate to the bottom of the framing members of the floor being braced with the Magnitude10 brace. See **Figure 3** and **Figure 4** for a detail showing how the ceiling height is measured.
- Allowable lateral load capacity was selected to provide a minimum factor of safety of 2.5 and to meet the drift limit of two and one-half percent (2.5%) of the story height. A story height of 9 feet was used to determine the drift limit.
- Response modification coefficient, R, for use throughout ASCE 7. Note: R reduces forces to a strength level, not an allowable stress level.
- The tabulated value of the overstrength factor, Ω_0 , is permitted to be reduced by subtracting one-half (0.5) for structures with flexible diaphragms.
- Collectors and their connections, and bearing and anchorage of the steel column, shall be designed in accordance with the special load combinations of ASCE 7 Section 12.4.3.
- Deflection amplification factor, C_d , for use with ASCE 7 Sections 12.8.6, 12.8.7, and 12.9.2.
- NL = Not Limited. Heights are measured from the base of the structure as defined in ASCE 7 Section 11.2.



- 6.4.2 If an alternative, steel column section is specified in accordance with **Section 2.2.5**. The selected section shall be designed to resist the specified lateral loads and limit deflection to an allowable level.
- 6.4.2.1 The lateral loads shall be applied to the column at the location of the top pin connecting the fuse member to the column or an equivalent force system shall be determined to account for the moment generated by the span between the top of the column and the point of connection to the floor framing.
- 6.4.2.2 Required column strength shall be determined considering a lateral load equal to the value given in **Table 1** as the Allowable Lateral Load Capacity for the Magnitude10 brace size used, multiplied by the Overstrength Factor given in **Table 1**. The Overstrength Factor may be reduced by 0.5 for structures with flexible diaphragms, in accordance with note “b” in ASCE 7 Table 12.2-1. The lateral load shall be considered to act on the column as described in **Section 6.4.2.1**.
- 6.4.2.3 The design story drift shall be calculated using the strength level seismic forces specified in ASCE 7 Section 12.8, without reduction for allowable stress design. The allowable lateral load in **Table 1** can be converted to a design strength level by dividing by 0.7.
- 6.4.2.4 Alternate column sections shall have a minimum design web thickness (t_w), and minimum clear distance between fillets at flanges (T) as listed below:
- 6.4.2.4.1 For Size A: $t_w = 0.300$ in, $T = 5\frac{3}{4}$ "
- 6.4.2.4.2 For Size AX: $t_w = 0.565$ in, $T = 5\frac{3}{4}$ "
- 6.4.2.4.3 For Size F: $t_w = 0.390$ in, $T = 9\frac{1}{8}$ "
- 6.4.2.4.4 For Size FX: $t_w = 0.525$ in, $T = 9\frac{1}{8}$ "
- 6.4.2.5 For Magnitude10 brace Size A, the deflection contribution of the Magnitude10 brace components, other than the steel column, shall be taken as 0.277" at the design lateral capacity of 3,430 lbs. (2,400 lbs. / 0.7). This deflection may be reduced by the ratio of the lateral seismic force to the design lateral capacity. The deflection of the Magnitude10 brace components shall be added to the calculated elastic deflection of the steel column at the strength level seismic forces to determine the total elastic deflection of the Magnitude10 brace. The design story drift shall be determined in accordance with ASCE 7 Section 12.8.6 using the deflection amplification factor listed in **Table 1**.
- 6.4.2.6 For Magnitude10 brace Size AX, the deflection contribution of the Magnitude10 brace components, other than the steel column, shall be taken as 0.422" at the design lateral capacity of 4,857 lbs. (3,400 lbs. / 0.7). This deflection may be reduced by the ratio of the lateral seismic force to the design lateral capacity. The deflection of the Magnitude10 brace components shall be added to the calculated elastic deflection of the steel column at the strength level seismic forces to determine the total elastic deflection of the Magnitude10 brace. The design story drift shall be determined in accordance with ASCE 7 Section 12.8.6 using the deflection amplification factor listed in **Table 1**.
- 6.4.2.7 For Magnitude10 brace Size F, the deflection contribution of the Magnitude10 brace components, other than the steel column, shall be taken as 0.292" at the design lateral capacity of 11,821 lbs. (8,275 lbs. / 0.7). This deflection may be reduced by the ratio of the lateral seismic force to the design lateral capacity. The deflection of the Magnitude10 brace components shall be added to the calculated elastic deflection of the steel column at the strength level seismic forces to determine the total elastic deflection of the Magnitude10 brace. The design story drift shall be determined in accordance with ASCE 7 Section 12.8.6 using the deflection amplification factor listed in **Table 1**.
- 6.4.2.8 For Magnitude10 brace Size FX, the deflection contribution of the Magnitude10 brace components, other than the steel column, shall be taken as 0.430" at the design lateral capacity of 16,786 lbs. (11,750 lbs. / 0.7). This deflection may be reduced by the ratio of the lateral seismic force to the design lateral capacity. The deflection of the Magnitude10 brace components shall be added to the calculated elastic deflection of the steel column at the strength level seismic forces to determine the total elastic deflection of the Magnitude10 brace. The design story drift shall be determined in accordance with ASCE 7 Section 12.8.6 using the deflection amplification factor listed in **Table 1**.

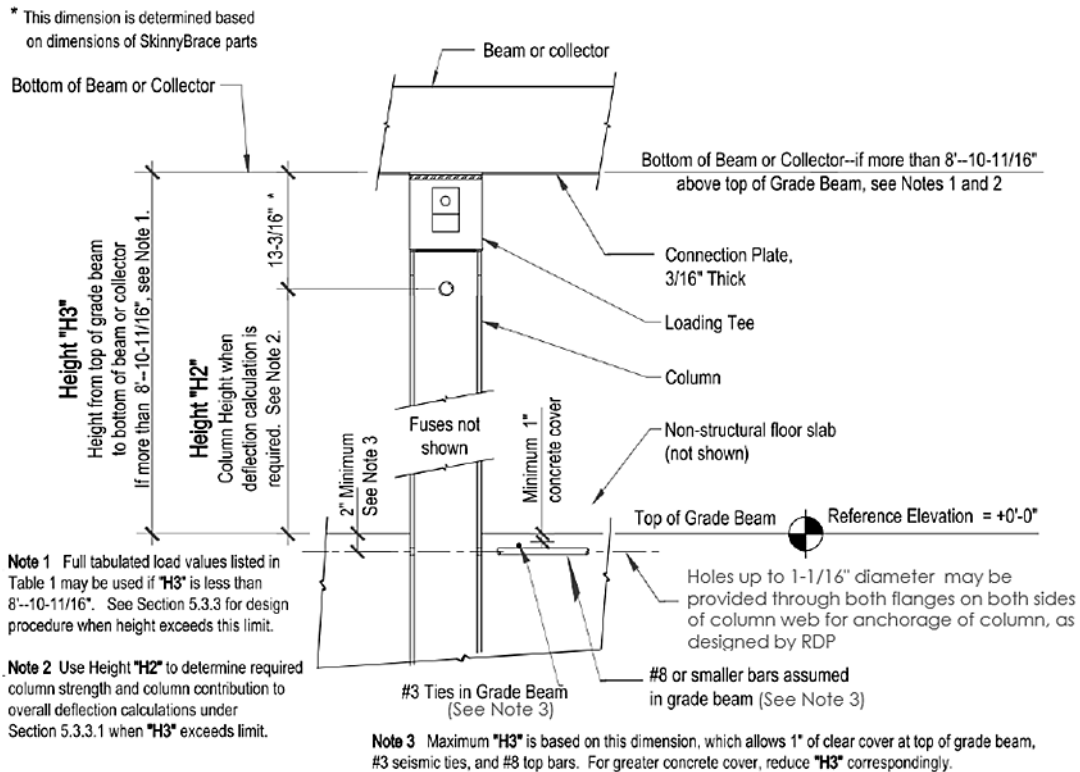


Note 1. Full tabulated values listed in Table 1 may be used if "H1" is less than 8'-11-1/4". See Section 5.3.3 for design procedure when height exceeds this limit.

Note 2. Use Height "H2" to calculate required column strength and column contribution to overall deflection per Section 5.3.3.1 when "H1" exceeds limit.

Note 3. Maximum "H1" is based on this dimension, which allows 1" concrete cover at top of grade beam, #3 seismic ties, and #8 top bars. For greater concrete cover or bar sizes, reduce "H1" correspondingly.

Figure 3. Height Determination for Connection Joists



Note 1 Full tabulated load values listed in Table 1 may be used if "H3" is less than 8'-10-11/16". See Section 5.3.3 for design procedure when height exceeds this limit.

Note 2 Use Height "H2" to determine required column strength and column contribution to overall deflection calculations under Section 5.3.3.1 when "H3" exceeds limit.

Note 3 Maximum "H3" is based on this dimension, which allows 1" of clear cover at top of grade beam, #3 seismic ties, and #8 top bars. For greater concrete cover, reduce "H3" correspondingly.

Figure 4. Height Measurements at Connection to Beam Collector



- 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 Performance²²

- 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 Magnitude10 brace complies with the following legislatively adopted regulations and/or accepted engineering practice for the following reasons:
- 8.1.1 Magnitude10 braces were evaluated to determine the following:
- 8.1.1.1 Structural performance for shear wall assemblies used as lateral force resisting systems in Seismic Design Categories A through F, have been tested and evaluated in accordance with the following standards:
- 8.1.1.1.1 ASCE/SEI 7: Minimum Design Loads and Associated Criteria for Buildings and Other Structures
- 8.1.1.1.2 ASTM D7989: Standard Practice for Demonstrating Equivalent In-Plane Lateral Seismic Performance to Wood-Frame Shear Walls Sheathed with Wood Structural Panels
- 8.1.1.1.3 ASTM E72: Standard Test Methods of Conducting Strength Tests of Panels for Building Construction
- 8.1.1.1.4 ASTM E564: Standard Practice for Static Load Test for Shear Resistance of Framed Walls for Buildings
- 8.1.1.1.5 ASTM E2126: Standard Test Methods for Cyclic (Reversed) Load Test for Shear Resistance of Vertical Elements of the Lateral Force Resisting Systems for Buildings
- 8.1.1.2 Lateral force resisting systems for use in both wind and seismic applications follow the performance-based provisions of IBC Section 2306.1, IBC Section 2306.3 and/or Section 4.3 SDPWS for light-frame wood wall assemblies.
- 8.1.1.2.1 **Table 1** provides Seismic Design Coefficients (SDC) that conform to the requirements in ASCE 7 Section 12.2.1, 12.2.1.1 and Table 12.2-1 for design of wall assemblies in buildings that require seismic design.
- 8.1.1.3 Proprietary "*shear wall*" assemblies tested in accordance with ASTM D7989, as permitted by FEMA P-1100-2b, Sheet S1, Section M for use in prescriptive seismic retrofits of one and two-family dwellings.



- 8.1.2 ASTM D7989 is accepted engineering practice used to establish SDC. Test data generated by ISO/IEC 17025 approved agencies and/or professional engineers, and all associated professional engineering evaluations, which use ASTM D7989 as their basis, are defined as intellectual property and/or trade secrets and are also defined as an independent design review (i.e., Listings, certified reports, duly authenticated reports from approved agencies, and/or research reports prepared by approved agencies and/or approved sources).
- 8.1.2.1 Structural performance under lateral load conditions for both wind and seismic loading for use with the IBC performance-based provisions in IBC Section 2306.1 and IBC Section 2306.3 for light-frame wood wall assemblies.
- 8.1.2.1.1 **Table 1** provides SDC that conform to the requirements in ASCE 7 Section 12.2.1 and Table 12.2-1 for design of wall assemblies in buildings that require seismic design in accordance with ASCE 7 (i.e., all seismic design categories).
- 8.1.2.1.2 The basis for equivalency testing is outlined in Section 12.2.1.1 of ASCE 7:
- 12.2.1.1 Alternative Structural Systems.** Use of seismic force-resisting systems not contained in Table 12.2-1 shall be permitted contingent on submittal to and approval by the Authority Having Jurisdiction and independent structural design review of an accompanying set of design criteria and substantiating analytical and test data. The design criteria shall specify any limitations on system use, including Seismic Design Category and height; required procedures for designing the system's components and connections; required detailing; and the values of the response modification coefficient, R ; overstrength factor, Ω_o ; and deflection amplification factor, C_d .
- 8.1.2.1.3 The seismic evaluation performed as part of this report is based on testing executed in accordance with ASTM D7989 and ASTM E2126 to establish SDCs that conform to the requirements of ASCE 7 Section 12.2.1.1.
- 8.2 Magnitude10 braces have been evaluated for lateral load only. Use for resisting gravity loads is outside the scope of this report and is not approved.
- 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 qualified²⁵ 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 All Magnitude10 brace installations in new or existing construction shall be accompanied by a complete set of detailed design drawings sealed by the RDP setting forth the components to be used for the installation and the requirements for installation.
 - 9.3.1.1 When used in existing construction, consideration shall be given to the condition of the existing building and the ability to retrofit the building with the Magnitude10 brace system to provide the alternate lateral load resisting system.
 - 9.3.2 Sizing of the Magnitude10 brace system components shall be such that the resistance provided exceeds the loading requirements of the building code in force in the jurisdiction where the Magnitude10 brace is being installed.
 - 9.3.3 The Magnitude10 brace system shall also be designed to limit deflections and story drift to no more than those allowed in accordance with the adopted building code.
 - 9.3.4 Collectors and their connections, and bearing and anchorage of the steel column shall be designed in accordance with the special load combinations of ASCE 7 Section 12.4.3.
 - 9.3.5 Where connection to framing cannot be accomplished using the Connector Channels or Connection Plates provided by the manufacturer, the building designer shall design an alternative connection from the Loading Tee to the existing structure. The alternative connection shall provide for special load combinations of ASCE 7 Section 12.4.3.

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 Seismic test data analysis in accordance with ASTM D7989
 - 10.1.2 Cyclical shear resistance testing in accordance with ASTM E2126
- 10.2 Yield Link Connection Providing Ductility and Hysteretic Energy Dissipation with Easily Replaceable Elements to Reduce Earthquake Damage and Recovery Time, SEAOC Convention Proceedings, 2016.
- 10.3 Information contained herein may include the result of testing and/or data analysis by sources that are approved agencies, approved sources and/or RDPs. Accuracy of external test data and resulting analysis is relied upon.
- 10.4 Where 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.
- 10.5 The accuracy of the provisions provided herein may be reliant upon the published properties of raw materials, which are defined by the grade mark, grade stamp, mill certificate or duly authenticated reports from approved agencies and/or approved sources provided by the supplier. These are presumed to be minimum properties and relied upon to be accurate. The reliability of DrJ's engineering practice, as contained in this duly authenticated report, may be dependent upon published design properties by others.



- 10.6 Testing and engineering analysis: The strength, rigidity, and/or general performance of component parts and/or the integrated structure are determined by suitable tests that simulate the actual conditions of application that occur and/or by accepted engineering practice and experience.²⁶
- 10.7 Where additional condition of use and/or regulatory compliance information is required, please search for Magnitude10 brace on the DrJ Certification website.

11 Findings

- 11.1 As outlined in **Section 6**, Magnitude10 brace has performance characteristics that were tested and/or meet applicable regulations and is 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, Magnitude10 brace shall be approved for the following applications:
- 11.2.1 The Quake Bracing, LLC Magnitude10 brace system is approved to replace or supplement lateral resisting systems (i.e., wood structural panel shear walls).
- 11.2.1.1 Approval of Magnitude10 brace is based on the testing listed in **Section 10**, which has been submitted in accordance with IBC Section 1703.4.
- 11.3 Unless exempt by state statute, when Magnitude10 brace is to be used as a structural and/or building envelope component in the design of a specific building, the design shall be performed by an RDP.
- 11.4 Any application specific issues not addressed herein can be engineered by an RDP. Assistance with engineering is available from Quake Bracing, LLC.
- 11.5 IBC Section 104.11 (IRC Section R104.11 and IFC Section 104.10²⁷ 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 As listed herein, Magnitude10 brace shall not be used:
 - 12.3.1 To carry vertical loads.
- 12.4 Special inspection of each installed Magnitude10 brace shall be conducted by a qualified third-party inspector as required by the manufacturer installation requirements and the jurisdiction where the Magnitude10 brace is installed.
- 12.5 Any generally accepted engineering calculations needed to show compliance with this report shall be submitted to the code official for review and approval.
- 12.6 When required by adopted legislation and enforced by the building official, also known as the authority having jurisdiction (AHJ) in which the project is to be constructed:
 - 12.6.1 Any calculations incorporated into the construction documents shall conform to accepted engineering practice and, when prepared by an approved source, shall be approved when signed and sealed.
 - 12.6.2 This report and the installation instructions shall be submitted at the time of permit application.
 - 12.6.3 This innovative product has an internal quality control program and a third-party quality assurance program.
 - 12.6.4 At a minimum, this innovative product shall be installed per **Section 9** of this report.
 - 12.6.5 The review of this report by the AHJ shall comply with IBC Section 104 and IBC Section 105.4.
 - 12.6.6 This innovative product has an internal quality control program and a third party quality assurance program in accordance with IBC Section 104.4, IBC Section 110.4, IBC Section 1703, IRC Section R104.4 and IRC Section R109.2.
 - 12.6.7 The application of this innovative product in the context of this report is dependent upon the accuracy of the construction documents, implementation of installation instructions, inspection as required by IBC Section 110.3, IRC Section R109.2 and any other regulatory requirements that may apply.
- 12.7 The approval of this report by the AHJ shall comply with IBC Section 1707.1, where legislation states in part, *"the building official shall accept duly authenticated reports from approved agencies in respect to the quality and manner of use of new material or assemblies as provided for in Section 104.11,"* all of IBC Section 104, and IBC Section 105.4.
- 12.8 Design loads shall be determined in accordance with the regulations adopted by the jurisdiction in which the project is to be constructed and/or by the building designer (i.e., owner or RDP).
- 12.9 The actual design, suitability, and use of this report for any particular building, is the responsibility of the owner or the authorized agent of the owner.



13 Identification

- 13.1 The innovative product listed in **Section 1.1** is identified by a label on the board or packaging material bearing the manufacturer name, product name, this report number and other information to confirm code compliance.
- 13.2 Additional technical information can be found at www.quakebracing.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 Magnitude10 braces 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 this innovative product to be approved by AHJs, delegates of building departments and/or delegates of an agency of the federal government:
 - 1.2.1 Interstate commerce is governed by the Federal Department of Justice to encourage the use of innovative products, materials, designs, services, assemblies, and/or methods of construction. The goal is to “*protect economic freedom and opportunity by promoting free and fair competition in the marketplace.*”
 - 1.2.2 Title 18 US Code Section 242 affirms and regulates the right of individuals and businesses to freely and fairly have new products, materials, designs, services, assemblies and/or methods of construction approved for use in commerce. Disapproval of alternatives shall be based upon non-conformance with respect to specific provisions of adopted legislation and shall be provided in writing stating the reasons why the alternative was not approved, with reference to the specific legislation violated.
 - 1.2.3 The federal government and each state have a public records act. In addition, each state also has legislation that mimics the federal Defend Trade Secrets Act 2016 (DTSA),³¹ where providing test reports, engineering analysis and/or other related IP/TS is subject to prison of not more than ten years³² and/or a \$5,000,000 fine or 3 times the value of³³ 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 materials³⁴ 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 **Approved³⁷ 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 deemed⁴⁰ 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 agreement⁴¹ (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: September 14, 2021
Subject to Renewal: October 1, 2025

CBC and CRC Supplement to Report Number 1711-02

REPORT HOLDER: Quake Bracing, LLC

1 Evaluation Subject

1.1 Magnitude10 brace

2 Purpose and Scope

2.1 Purpose

2.1.1 The purpose of this Report Supplement is to show Magnitude10 brace, recognized in Report Number 1711-02 has also been evaluated for compliance with the codes listed below.

2.2 *Applicable Code Editions*

2.2.1 *CBC—19, 22: California Building Code (Title 24, Part 2)*

2.2.2 *CRC—19, 22: California Residential Code (Title 24, Part 2.5)*

2.2.3 *CEC —19, 22: California Energy Code (Title 24, Part 6)*

3 Conclusions

3.1 Magnitude10 brace, described in Report Number 1711-02, complies with the CBC and CRC and is subject to the conditions of use described in this supplement.

3.2 Where there are variations between the IBC and IRC and the CBC and CRC applicable to this report, they are listed here:

3.2.1 CBC Section 1703.4 replaces IBC Section 1703.4.

4 Conditions of Use

4.1 Magnitude10 brace, described in Report Number 1711-02, must comply with all of the following conditions:

4.1.1 All applicable sections in Report Number 1711-02.

4.1.2 The design, installation, and inspections are in accordance with additional requirements of CBC and CRC, as applicable.



Notes

- 1 For more information, visit djrcertification.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](https://www.ipandts.com/).
- 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.cbiteest.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.eu/en/about-iaf-mia/#>:-:text=it%20is%20required%20to%20recognise%20certificates%20and%20validation%20and%20verification%20statements%20issued%20by%20conformity%20assessment%20bodies%20accredited%20by%20all%20other%20signatories%20of%20the%20IAF%20MLA%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 CBC and CRC are the same as the 2021 IBC and 2021 IRC unless otherwise noted in the 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#labeled> 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](https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1707.1)
- 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>



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

<http://www.drjengineering.org/AppendixC> AND <https://www.drjcertification.org/comell-2016-protection-trade-secrets>

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

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

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

IBC 2021, Section 1706.1 Conformance to Standards

IBC 2021, Section 1707 Alternative Test Procedure, 1707.1 General

See **Section 11** for the distilled building code definition of **Approved**

Los Angeles Municipal Code, SEC. 98.0503. TESTING AGENCIES

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

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

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

<https://up.codes/viewer/new-jersey/ibc-2018/chapter/17/special-inspections-and-tests#1707.1>

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

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

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

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

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

<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/>

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

[https://iaf.nu/en/about-iaf-](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)

[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](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)

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

<https://www.justice.gov/crt/deprivation-rights-under-color-law> AND <https://www.justice.gov/atr/mission>