# Listing and Technical Evaluation Report™

**Report No: 2002-03**

Issue Date: January 11, 2021

Revision Date: December 5, 2023

Subject to Renewal: January 1, 2027

## RockCast Lightweight Stone Masonry Units

### Trade Secret Report Holder:


Reading Rock®, Inc.

Phone: 513-874-2345 Website: www.readingrock.com Email: swortwoodm@readingrock.com


### CSI Designations:

**DIVISION**: 04 00 00 - MASONRY

Section: 04 42 00 - Exterior Stone Cladding

Section: 04 43 13 - Stone Masonry Veneer

Section: 04 73 00 - Manufactured Stone Masonry

## 1 Innovative Products Evaluated[i]

1.1 RockCast Lightweight Series

## 2 Product Description and Materials

2.1 The innovative products evaluated in this report are shown in **Figure 1** and **Figure 2**.

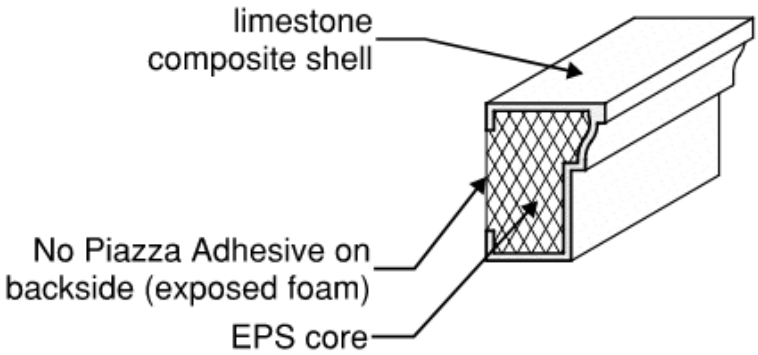
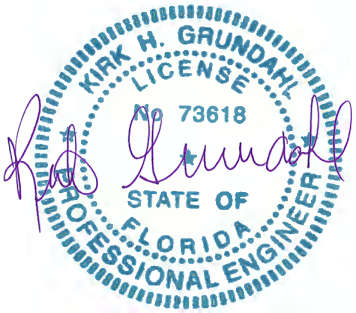



**Figure 1**. RockCast Lightweight Series for General Applications

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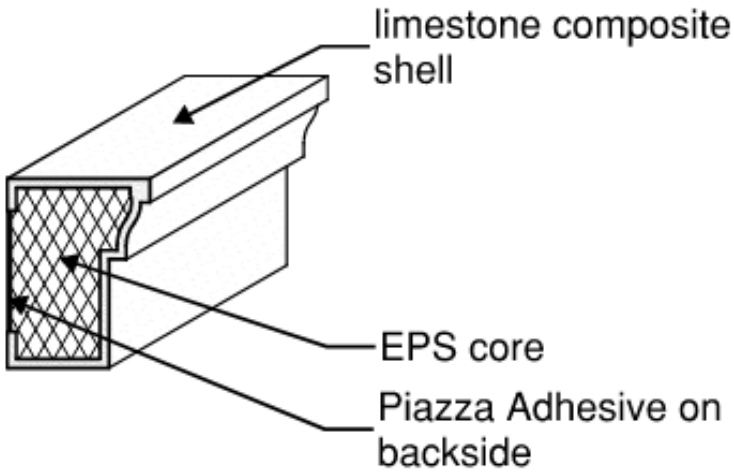


**Figure 2**. RockCast Lightweight Series for NFPA 285 Compliant Applications

2.2 RockCast Lightweight Series is a non-structural architectural stone decorative façade product consisting of an Expanded Polystyrene (EPS) foam core encased in a limestone composite shell.

2.2.1 The EPS foam is Type I in accordance with ASTM C578.

2.2.2 The limestone composite shell is cast from a single-component, polymer-modified cementitious mix that includes the following materials:

2.2.2.1 Portland cement, in accordance with ASTM C150, Type I or III

2.2.2.2 Coarse aggregates, in accordance with ASTM C33, including granite, quartz, or limestone

2.2.2.3 Fine aggregates, in accordance with ASTM C33, including manufactured or natural sand

2.2.2.4 Inorganic iron oxide pigments, in accordance with ASTM C979, except carbon black pigments

2.3 *Material Availability*

2.3.1 RockCast Lightweight Series is available in a variety of sizes and profiles.

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

## 3 Definitions

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

3.2 Duly Authenticated Reports[vi] and Research Reports[vii] are test reports and related engineering evaluations, which are written by an approved agency[viii] and/or an approved source.[ix]

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

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

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


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3.5 Testing and/or inspections conducted for this Duly Authenticated Report were performed by an ISO/IEC 17025 accredited testing laboratory, an ISO/IEC 17020 accredited inspection body and/or a licensed RDP.

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

3.6 The regulatory authority shall enforce[xiii] the specific provisions of each legislatively adopted regulation. If there is a non-conformance, the specific regulatory section and language of the non-conformance shall be provided in writing[xiv] stating the nonconformance and the path to its cure.

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

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

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

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

4.1 *Standards*

4.1.1 *ASTM C33: Standard Specification for Concrete Aggregates*

4.1.2 *ASTM C150: Standard Specification for Portland Cement*

4.1.3 *ASTM C231: Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method*

4.1.4 *ASTM C426: Standard Test Method for Linear Drying Shrinkage of Concrete Masonry Units*

4.1.5 *ASTM C578: Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation*

4.1.6 *ASTM C666: Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing*

4.1.7 *ASTM C979: Standard Specification for Pigments for Integrally Colored Concrete*

4.1.8 *ASTM C1194: Standard Test Method for Compressive Strength of Architectural Cast Stone*

4.1.9 *ASTM C1195: Standard Test Method for Absorption of Architectural Cast Stone*

4.1.10 *ASTM C1364: Standard Specification for Architectural Cast Stone*

4.1.11 *ASTM E84: Standard Test Method for Surface Burning Characteristics of Building Materials*

4.1.12 *ASTM E488: Standard Test Methods for Strength of Anchors in Concrete Elements*

4.1.13 *ASTM E831: Standard Test Method for Linear Thermal Expansion of Solid Materials by Thermomechanical Analysis*

4.1.14 *NFPA 285: Standard Fire Test Method for the Evaluation of Fire Propagation Characteristics of Exterior Wall Assemblies Containing Combustible Components*

4.1.15 *TMS 402: Building Code for Masonry Structures*

4.1.16 *TMS 602: Specification for Masonry Structures*

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[xx] (FL 37459)*

4.2.4 *FBC-R—20, 23: Florida Building Code – Residential[xx] (FL 37459)*


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## 5 Listed[xxi]

5.1 A nationally recognized testing laboratory such as CBI, states that the materials, designs, methods of construction and/or equipment have met nationally recognized standards and/or have been tested and found suitable for use in a specified manner.

## 6 Tabulated Properties Generated from Nationally Recognized Standards

6.1 *General*

6.1.1 RockCast Lightweight Series is an architectural stone complying with IBC Section 1404[xxii] and IRC Section R703.

6.1.2 RockCast Lightweight Series is used in buildings of Type I-V construction in accordance with IBC Chapter 6.

6.1.3 RockCast Lightweight Series products must be installed using the RockCast Lightweight Series Installation System over concrete, masonry, or cold-formed steel studs.

6.2 *Compressive Strength*

6.2.1 The RockCast Lightweight Series limestone composite shell was tested to assess its compressive strength in accordance with ASTM C1194 per ASTM C1364 (see **Table 1**).

**Table 1**. Compressive Strength

| Product | Average Compressive Strength (psi) |
|---|---|
| RockCast Lightweight Series | 6,850 |
| SI: 1 psi = 0.00689 MPa<br>1. The limestone composite shell tested in accordance with ASTM C1194. | |

6.3 *Water Absorption*

6.3.1 The RockCast Lightweight Series limestone composite shell was tested to assess its performance with regard to water absorption in accordance with ASTM C1195 per ASTM C1364 (see **Table 2**).

**Table 2**. Water Absorption

| Product | Average Absorption Mass (%) |
|---|---|
| RockCast Lightweight Series | 2.7 |
| 1. The limestone composite shell tested in accordance with ASTM C1195. | |

6.4 *Air Content*

6.4.1 The RockCast Lightweight Series limestone composite shell was tested for sufficient air content in accordance with ASTM C231 per ASTM C1364 (see **Table 3**).

**Table 3**. Air Content

| Product | Average Air Content (%) |
|---|---|
| RockCast Lightweight Series | 9.5 |
| 1. The limestone composite shell tested in accordance with ASTM C231. | |


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6.5 *Freeze-Thaw Durability*

6.5.1 The RockCast Lightweight Series limestone composite shell was tested to assess Cumulative Percent Mass Loss (CPWL) after experiencing rapidly repeated cycles of freezing and thawing, in accordance with ASTM C666 Procedure A per ASTM C1364 (see **Table 4**).

**Table 4**. Freeze-Thaw Durability

| Product | CPWL (%) |
|---|---|
| RockCast Lightweight Series | 0.5 |
| 1. The limestone composite shell tested in accordance with ASTM C666. | |

6.6 *Linear Drying Shrinkage*

6.6.1 RockCast Lightweight Series limestone composite shell was tested in accordance with ASTM C426 to determine linear shrinkage per ASTM C1364 (see **Table 5**).

**Table 5**. Linear Shrinkage

| Product | Average Linear Shrinkage (%) |
|---|---|
| RockCast Lightweight Series | 0.150 |
| 1. The limestone composite shell tested in accordance with ASTM C426. | |

6.7 *Linear Thermal Expansion*

6.7.1 The RockCast Lightweight Series limestone composite shell was tested in accordance with ASTM E831 to determine the coefficient of thermal expansion (see **Table 6**).

**Table 6**. Thermal Expansion

| Product | Average Coefficient of Thermal Expansion (in/in°F) |
|---|---|
| RockCast Lightweight Series | $3.165 \times 10^{-6}$ |
| 1. The composite shell tested in accordance with ASTM E831. | |

6.8 *Surface Burn Characteristics*

6.8.1 Flame spread and smoke developed indexes for RockCast Lightweight Series are shown in **Table 7**.

**Table 7**. Surface Burn Characteristics

| Product | Flame Spread | Smoke Developed |
|---|---|---|
| RockCast Lightweight Series | < 25 | < 450 |
| 1. Product tested in accordance with ASTM E84. | | |

6.9 *Thermal Barrier Requirements*

6.9.1 For exterior applications, RockCast Lightweight Series shall be separated from the interior of a building by an approved thermal barrier in accordance with IBC Section 2603.4.

6.9.2 For interior applications, RockCast Lightweight Series is approved for use without a thermal barrier when the limestone composite shell layer over the foam is a minimum of 1" thick per IBC Section 2603.4.1.1.


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6.10 *Vertical and Lateral Fire Propagation*

6.10.1 RockCast Lightweight Series was tested to assess performance with regard to vertical and lateral fire propagation in accordance with NFPA 285 and IBC Section 2603.5.5.

6.10.1.1 The wall assemblies listed in **Table 8** are approved for use in buildings of Type I-V construction.

6.10.1.2 See **Figure 3** for an approved NFPA 285-compliant window header/perimeter detail.

**Table 8**. Approved NFPA 285 Wall Assemblies[1]

| Wall Component | Materials |
|---|---|
| Base Wall System<br>Use any item 1-3 | 1. Cast concrete walls<br>2. CMU concrete walls<br>3. Steel studs – 18-gauge (min.), 3 5/8" (min.), 16" o.c. (max.) |
| Floor Line Firestopping | 1. 4 inch, 4 pcf mineral fiber (mineral wool) friction fit or installed with z-clips |
| Cavity Insulation<br>Use any item 1-4 | 1. None<br>2. Any noncombustible insulation per ASTM E136<br>3. Any mineral fiber or mineral wool (faced or unfaced)<br>4. Any fiberglass (faced or unfaced) |
| Exterior Sheathing | 1. One (1) layer 1/2" or thicker exterior type gypsum sheathing |
| WRB over Sheathing | 1. Piazza Approved Air & Weather Barrier |
| Steel Channel<br>For Exterior Insulation | 1. 2" (max.) vertical steel channel (Piazza-Z) 16" o.c. (max.) |
| Exterior Insulation[2]<br>Use item 1 or 2 | 1. 2" (max.) Dow Styrofoam Type IV or Type X<br>2. 2" (max.) Owens Corning Foamular 250 Type IV or Type X |
| Horizontal Track | 1. 3/4 inch (max.) horizontal steel track (Piazza track) to attach RockCast Lightweight Series |
| Exterior Cladding[3] | 1. RockCast Lightweight Series<br>a. Foam Core: 12" (max.) ACH 1 pcf EPS for wall area<br>b. Masonry Shell: 5/8" (min.) RockCast Lightweight Series<br>c. Piazza Adhesive (1/4" thickness) |
| Joint Caulk | 1. Pecora 890FTS – TXTR (with mineral wool backer material) |
| Special Condition | 1. Header/jamb/sill shall conform to the design shown in **Figure 3**. |

SI: 1 in = 25.4 mm

1. The assemblies and combinations created herein and the various substitutions of products are based on testing and professional thermal engineering analysis by Priest & Associates Consulting, LLC.
2. Exterior insulation is attached using Piazza-Z clips. RockCast Lightweight Series is attached using clips and track to Piazza-Z.
3. Any decorative piece of any reasonable shape may be allowed as long as either condition below is met:
   a. The per foot volume does not exceed 3,456 cubic inches per foot of length.
   b. The per foot cross sectional area does not exceed 288 square inches.


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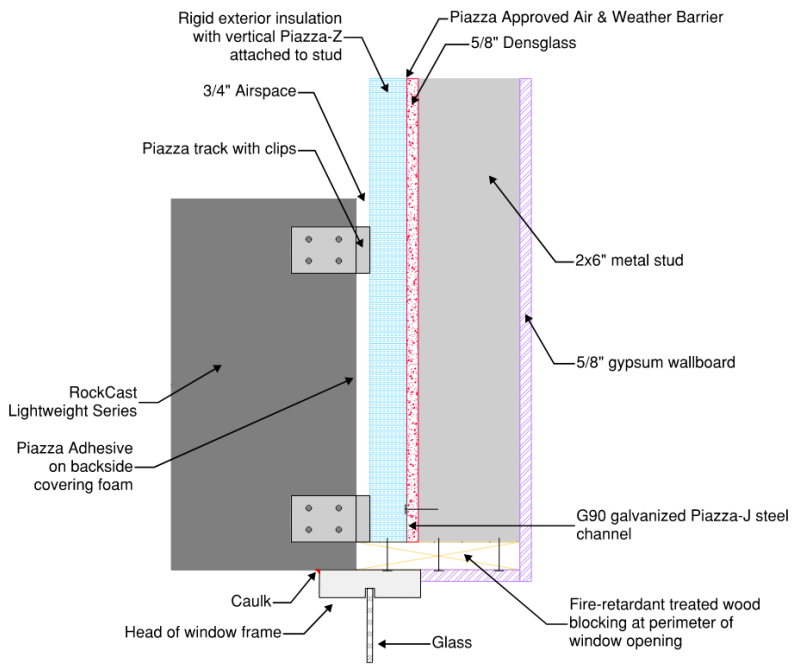


**Figure 3**. Window Header/Perimeter Detail for NFPA 285 Compliance

6.11 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[xxiii]

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.[xxiv]

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.[xxv]

## 8 Regulatory Evaluation and Accepted Engineering Practice

8.1 RockCast Lightweight Series was evaluated to determine the following:

8.1.1 Physical properties of limestone composite shell in accordance with IBC Section 2103.1, including compressive strength, absorption, linear drying shrinkage, air content, and freeze-thaw.

8.1.2 Use as an exterior wall covering in accordance with IBC Section 1404[xxvi] and IRC Section R703.

8.1.3 Use an interior wall and ceiling finish material in accordance with IBC Section 803 and IBC Section 2603.4.1.1.

8.1.4 Use as a masonry construction material in accordance with IBC Section 2103.1 and IRC Section R606.2.

8.1.5 Performance for use in buildings of Type I-V in accordance with IBC Chapter 6.

8.1.6 Performance in accordance with ASTM E84 for flame spread and smoke development ratings in accordance with IBC Section 2603.3, IBC Section 2603.5.4 and IRC Section R302.9.

8.1.7 Performance with regard to thermal barrier requirements in accordance with IBC Section 2603.4.

8.1.8 Performance with regard to vertical and lateral fire propagation in accordance with IBC Section 2603.5.5.


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8.1.9 Use as a part of an NFPA 285 wall assembly in accordance with IBC Section 1402.5[xxvii] and IBC Section 2603.5.5.

8.2 RockCast Lightweight Series was evaluated for installation over concrete, masonry or cold-formed steel studs using the RockCast Lightweight Series Installation System.

8.2.1 For mechanical attachment, fasteners must be in accordance with Section **9** and the manufacturer installation instructions.

8.2.2 Connection of RockCast Lightweight Series elements to substrate requires an engineered design in accordance with Section **6**.

8.3 The ability of the fastening system to support the gravity and transverse loads is outside the scope of this report.

8.4 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[xxviii] to practice product and regulatory compliance services within its scope of accreditation and engineering expertise, respectively.

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

8.6 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 *General*

9.3.1 RockCast Lightweight Series shall be installed with the RockCast Lightweight Series Installation System in accordance with the engineered design, manufacturer product data and approved shop drawings. In the event of a conflict between the manufacturer installation instructions and this report, the more restrictive shall govern.

9.3.2 All other installation and flashing details germane to the project shall be in accordance with the applicable building code and manufacturer installation instructions.

9.3.3 RockCast Lightweight Series shall be installed over substrates of concrete, masonry or cold formed-steel studs.

9.3.4 Substrates shall be flat within 1/4" in 4' 0" and deviations shall be corrected before beginning installation.

9.3.5 Installation shall be performed by an applicator certified by the manufacturer.

9.3.6 Installation is subject to conditions of use set forth in Section **9** of this report.

9.4 *NFPA 285-Compliant Installation Method*

9.4.1 The wall assembly shall comply with the vertical and lateral fire propagation requirements of Section **6.10**.

9.4.2 The exposed EPS on the backside of the units shall be completely covered and sealed using Piazza Adhesive, as shown in **Figure 2**. The Piazza Adhesive shall be a continuous 1/4" thick coat and shall be applied using a trowel.

9.4.3 The adhesive should be allowed to set for six to eight hours after applying to the RockCast Lightweight Series units.

9.4.4 Piazza Track System is attached to the substrate, and then RockCast Lightweight Series units shall be positioned and mechanically attached to the clips according to the approved shop drawings.


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9.4.5 *Fasteners:*

9.4.5.1 Fasteners for attaching the clips to the RockCast Lightweight Series units shall be cadmium coated Hilti Kwik Con II $^{3}/_{16}$" or $^{1}/_{4}$" diameter x $1^{1}/_{4}$" length anchors, or equal. Longer fasteners are allowed.

9.4.5.2 All fasteners must meet ASTM B117 – 1000 Hour Salt Spray.

9.4.5.3 All fasteners must be in accordance with manufacturer product data and approved shop drawings.

9.4.6 Maintain a $^{3}/_{8}$" to 1" joint spacing between units.

9.4.7 Caulk joints using Pecora 890FTS-TXTR or equivalent.

9.5 *Adhesion Installation Method*

9.5.1 Substrate surfaces shall be clean, dry, structurally sound, and free of paint, efflorescence, grease, oil, form release agents, and curing compounds.

9.5.2 Piazza Adhesive shall be mixed according to the manufacturer instructions.

9.5.3 Piazza Adhesive shall be applied directly to the RockCast Lightweight Series units, not the substrate.

9.5.4 Use ribbon and dab method. Apply mixed Piazza Adhesive in a ribbon of approximately 2" wide by $^{3}/_{8}$" thick to entire perimeter of RockCast Lightweight Series unit using a trowel. Apply dabs of $^{3}/_{8}$" to $^{5}/_{8}$" thickness by 4" in diameter approximately 8" o.c., both vertically and horizontally, over entire RockCast Lightweight Series unit.

9.5.5 Units shall be immediately placed on the substrate.

9.5.6 The RockCast Lightweight Series units shall be allowed to set for six to eight hours after applying adhesive.

9.5.7 Maintain a $^{3}/_{8}$" to 1" joint spacing between units.

9.5.8 Caulk joints using Pecora 890FTS-TXTR or equivalent.

9.6 *Mechanical Installation Method where NFPA 285 Compliance is not Required*

9.6.1 The exposed EPS on the backside of the units does not need to be covered and sealed using Piazza Adhesive, as shown in **Figure 1**.

9.6.2 **Method 1**: Piazza Track System is attached to the substrate, and then RockCast Lightweight Series units shall be positioned and mechanically attached to the clips according to the approved shop drawings.

9.6.3 **Method 2**: PZ Connectors are attached to the substrate, and then RockCast Lightweight Series units shall be positioned and mechanically attached according to the approved shop drawings.

9.6.4 *Fasteners:*

9.6.4.1 Fasteners for attaching the clips to the RockCast Lightweight Series units shall be cadmium coated Hilti Kwik Con II $^{3}/_{16}$" or $^{1}/_{4}$" diameter x $1^{1}/_{4}$" length anchors, or equal. Longer fasteners are allowed.

9.6.4.2 All fasteners must meet ASTM B117 – 1000 Hour Salt Spray.

9.6.4.3 All fasteners must be in accordance with the manufacturer product data and approved shop drawings.

9.6.5 Maintain a $^{3}/_{8}$" to 1" joint spacing between units.

9.6.6 Caulk joints using Pecora 890FTS-TXTR or equivalent.

9.6.7 A standard mechanical installation example without rigid insulation is shown in **Figure 4**.

9.6.8 To meet energy code requirements, Piazza-Z can be used vertically with rigid insulation.


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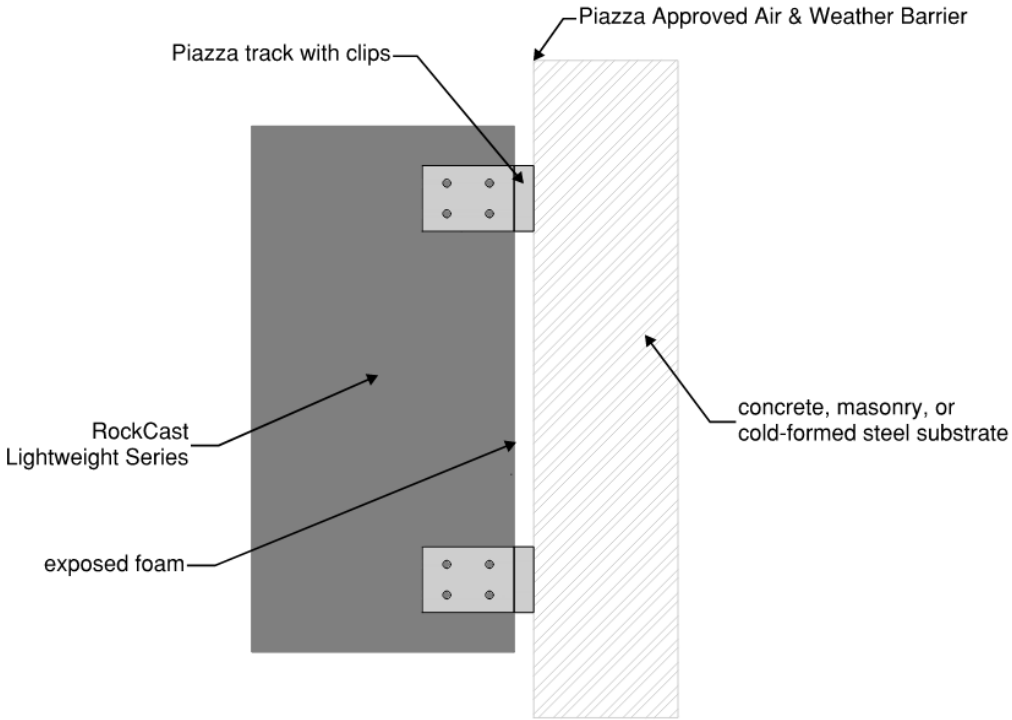


**Figure 4**. Example of Mechanical Attachment of RockCast Lightweight Series to Substrate

## 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 Compressive strength in accordance with ASTM C1194 per ASTM C1364

10.1.2 Water absorption in accordance with ASTM C1195 per ASTM C1364

10.1.3 Air content in accordance with ASTM C231 per ASTM C1364

10.1.4 Freezing and thawing resistance in accordance with ASTM C666 per ASTM C1364

10.1.5 Linear shrinkage in accordance with ASTM C426 per ASTM C1364

10.1.6 Thermal expansion in accordance with ASTM E831

10.1.7 Surface burning characteristics in accordance with ASTM E84

10.1.8 Exterior wall fire testing in accordance with NFPA 285

10.1.9 Engineering analysis assessing the substitution of products within the approved NFPA 285

10.1.10 Tensile and shear strength of post-installed anchors in accordance with ASTM E488

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


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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.[xxix]

10.6 Where additional condition of use and/or regulatory compliance information is required, please search for RockCast Lightweight Series on the DrJ Certification website.

## 11 Findings

11.1 As outlined in Section **6**, RockCast Lightweight Series 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, RockCast Lightweight Series shall be approved for the following applications:

11.2.1 Use as an exterior wall covering in accordance with IBC Section 1404[xxx] and IRC Section R703 when attached to the wall using the RockCast Lightweight Series Installation System.

11.2.2 Use an interior wall and ceiling finish material in accordance with IBC Section 803 and IBC Section 2603.4.1.1 when attached to the wall using the RockCast Lightweight Series Installation System.

11.2.3 Use as a masonry construction material in accordance with IBC Section 2103.1 and IRC Section R606.2.

11.2.4 Use in buildings of Type I-V in accordance with IBC Chapter 6.

11.2.5 Use as a part of an NFPA 285 wall assembly in accordance with IBC Section 1402.5[xxxi] and IBC Section 2603.5.5.

11.3 Unless exempt by state statute, when RockCast Lightweight Series 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 Reading Rock®, Inc.

11.5 IBC Section 104.11 (IRC Section R104.11 and IFC Section 104.10[xxxii] 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**:[xxxiii] Building regulations require that the building official shall accept duly authenticated reports.[xxxiv]

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.


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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.[xxxv]

## 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, RockCast Lightweight Series shall be used:

12.3.1 On exterior or interior walls with a substrate of concrete, masonry, or cold-formed steel studs capable of supporting the imposed loads, as determined by architect or engineer of record.

12.4 Connection of RockCast Lightweight Series elements to substrate requires an engineered design. Refer to manufacturer approved shop drawings.

12.5 For interior applications, the foam must be covered with a minimum of 1" RockCast Lightweight Series limestone composite shell on all exposed sides in accordance with IBC Section 2603.4.1.1.

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

12.6.4 At a minimum, these innovative products 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 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.

12.6.7 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.

12.7 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.


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## 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.readingrock.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 RockCast Lightweight Series 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.


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## Appendix A

# 1 Legislation that Authorizes AHJ Approval

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

1.1.1 Advance Innovation,

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

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

1.2 **Adopted Legislation**: The following local, state and federal regulations affirmatively authorize 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),[xxxvi] where providing test reports, engineering analysis and/or other related IP/TS is subject to prison of not more than ten years[xxxvii] and/or a $5,000,000 fine or 3 times the value of[xxxviii] 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[xxxix] 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.[xl]

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.[xli]


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1.3 **Approved**[xlii] **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.[xliii] 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.[xliv]

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[xlv] 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[xlvi] (i.e., ANAB, International Accreditation Forum (IAF), etc.).

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

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

1.6.2 A test report from an approved testing laboratory,

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

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

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

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

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

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

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


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

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

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

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

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

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

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

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

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

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

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

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


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

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

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

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

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

1.12.3 The design strengths and permissible stresses of any structural material…shall conform to the specifications and methods of design of accepted engineering practice performed by an approved source.[liv]

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

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

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

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

1.13.4 Therefore, all ANAB ISO/IEC 17065 Duly Authenticated Reports are approval equivalent.[lvi]

1.14 Approval equity is a fundamental commercial and legal principle.[lvii]


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Issue Date: December 5, 2023

Subject to Renewal: January 1, 2027

# FBC Supplement to Report Number 2002-03

REPORT HOLDER: Reading Rock®, Inc.

## 1 Evaluation Subject

1.1 RockCast Lightweight Series

## 2 Purpose and Scope

2.1 Purpose

2.1.1 The purpose of this Report Supplement is to show the RockCast Lightweight Series, recognized in Report Number 2002-03, 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 37459)*

2.2.2 *FBC-R—20, 23: Florida Building Code – Residential (FL 37459)*

## 3 Conclusions

3.1 RockCast Lightweight Series, described in Report Number 2002-03, complies 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 Chapter 6 replaces IBC Chapter 6

3.2.4 FBC-B Section 1403.2 replaces IBC Section 1402.5.

3.2.5 FBC-B Section 1405 replaces IBC Section 1404.

3.2.6 FBC-B Section 2103.1 replaces IBC Section 2103.1.

3.2.7 FBC-B Section 2603.5.4 replaces IBC Section 2603.5.4.

3.2.8 FBC-R Section R703 replaces IRC Section R703.

## 4 Conditions of Use

4.1 RockCast Lightweight Series, described in Report Number 2002-03, must comply with all of the following conditions:

4.1.1 All applicable sections in Report Number 2002-03.

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


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# Notes

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

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

iii Alternative Materials, Design and Methods of Construction and Equipment: The provisions of any regulation code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by a regulation. Please review https://www.justice.gov/atr/mission and https://up.codes/viewer/colorado/ibc-2021/chapter/1/scope-and-administration#104.11

iv https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1706:~:text=the%20design%20strengths%20and%20permissible%20stresses%20shall%20be%20established%20by%20tests%20as

v The design strengths and permissible stresses of any structural material shall conform to the specifications and methods of design of accepted engineering practice. https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1706:~:text=shall%20conform%20to%20the%20specifications%20and%20methods%20of%20design%20of%20accepted%20engineering%20practice

vi https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1707.1:~:text=the%20building%20official%20shall%20accept%20duly%20authenticated%20reports%20from%20approved%20agencies

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

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

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

x https://www.law.cornell.edu/uscode/text/18/1832 (b) Any organization that commits any offense described in subsection (a) shall be fined not more than the greater of $5,000,000 or 3 times the value of the stolen trade secret to the organization, including expenses for research and design and other costs of reproducing the trade secret that the organization has thereby avoided. The federal government and each state have a public records act. To follow DTSA and comply state public records and trade secret legislation requires approval through ANAB ISO/IEC 17065 accredited certification bodies or approved sources. For more information, please review this website: Intellectual Property and Trade Secrets.

xi 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/

xii https://www.cbitest.com/accreditation/

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

xiv https://up.codes/viewer/colorado/ibc-2021/chapter/1/scope-and-administration#104.11:~:text=Where%20the%20alternative%20material%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

xv https://up.codes/viewer/colorado/ibc-2021/chapter/17/special-inspections-and-tests#1707.1:~:text=the%20building%20official%20shall%20accept%20duly%20authenticated%20reports%20from%20approved%20agencies%20in%20respect%20to%20the%20quality%20and%20manner%20of%20use%20of%20new%20materials%20or%20assemblies%20as%20provided%20for%20in%20Section%20104.11

xvi https://iaf.nu/en/about-iaf-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

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

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

xix Unless otherwise noted, all references in this Listing are from the 2021 version of the codes and the standards referenced therein. This material, product, design, service and/or method of construction also complies with the 2000-2021 versions of the referenced codes and the standards referenced therein.

xx 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.

xxi 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

xxii 2015 IBC Section 1405

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

xxiv 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

xxv 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

xxvi 2015 IBC Section 1405

xxvii 2015 IBC Section 1403.5

xxviii 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.


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

xxx 2015 IBC Section 1405

xxxi 2015 IBC Section 1403.5

xxxii 2018 IFC Section 104.9

xxxiii 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.

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

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

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

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

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

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

xl IBC 2021, Section 1706.1 Conformance to Standards

xli IBC 2021, Section 1707 Alternative Test Procedure, 1707.1 General

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

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

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

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

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

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

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

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

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

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

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

liii 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/

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

lv 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

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

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


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