DrJ CERTIFICATION

Technical Evaluation Report™

TER 1312-01

Westlake Royal Stone Adhered Masonry Veneer
Applications Over Continuous Insulation

Westlake Royal Stone LLC

Product:

Westlake Royal Stone
Adhered Masonry Veneer

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DIVISION: 04 00 00 - MASONRY

SECTION: 04 70 00 - Manufactured Masonry

SECTION: 04 73 00 - Manufactured Stone Masonry

1 Innovative Product Evaluated[1,2]

1.1 Westlake Royal Stone Adhered Masonry Veneer

2 Applicable Codes and Standards[3,4]

2.1 *Codes*

2.1.1 *IBC—15, 18, 21: International Building Code®*

2.1.2 *IRC—15, 18, 21: International Residential Code®*

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

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

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

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

2.2 *Standards and Referenced Documents*

2.2.1 *AISI S100: North American Specification for the Design of Cold-formed Steel Structural Members*

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

2.2.3 *ANSI/AWC SDPWS: Special Design Provisions for Wind and Seismic*

2.2.4 *ANSI/AWC WFCM: Wood Frame Construction Manual for One- and Two-Family Dwellings*

2.2.5 *ASCE/SEI 7: Minimum Design Loads and Associated Criteria for Buildings and Other Structures*

2.2.6 *ASTM C1063: Standard Specification for Installation of Lathing and Furring to Receive Interior and Exterior Portland Cement-Based Plaster*

2.2.7 *ASTM C1289: Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board*

2.2.8 *ASTM C150: Standard Specification for Portland Cement*

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

2.2.10 *ASTM C90: Standard Specification for Loadbearing Concrete Masonry Units*

2.2.11 *ASTM D5206: Standard Test Method for Windload Resistance of Rigid Plastic Siding*

2.2.12 *ASTM E330: Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights, and Curtain Walls by Uniform Static Air Pressure Difference*

2.2.13 *ASTM F1667: Standard Specification for Driven Fasteners: Nails, Spikes, and Staples*

3 Performance Evaluation

3.1 Tests, testing, test reports, research reports, duly authenticated reports, and related engineering evaluations are defined as intellectual property and/or trade secrets and protected by Defend Trade Secrets Act 2018 (DTSA).[5]

3.2 Testing and/or inspections conducted for this TER were performed by an ISO/IEC 17025 accredited testing laboratory,[6] an ISO/IEC 17020 accredited inspection body,[7] which are internationally recognized accreditations through International Accreditation Forum (IAF), and/or a licensed registered design professional (RDP).

3.3 The Westlake Royal Stone products were evaluated to determine:

3.3.1 The ability of various fasteners to support the gravity and transverse loads induced by the products when installed over wood or steel light-frame construction with the addition of continuous insulation installed between the framing and the Westlake Royal Stone products.

3.3.2 The ability of various fasteners to support the gravity and transverse loads induced by the products when installed over concrete and masonry construction with the addition of continuous insulation installed between the framing and the Westlake Royal Stone products.

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[5] https://www.law.cornell.edu/uscode/text/18/part-I/chapter-90. As our professional duty to inform, please be aware that whoever, with intent to convert a trade secret (TS), that is related to a product or service used in or intended for use in interstate or foreign commerce, to the economic benefit of anyone other than the owner thereof, and intending or knowing that the offense will, injure any owner of that trade secret, knowingly without authorization copies, duplicates, sketches, draws, photographs, downloads, uploads, alters, destroys, photocopies, replicates, transmits, delivers, sends, mails, communicates, or conveys such information; shall be fined under this title or imprisoned not more than 10 years, or both. Any organization that commits any offense described in subsection (a) shall be fined not more than the greater of $5,000,000 or 3 times the value of the stolen trade secret to the organization, including expenses for research and design and other costs of reproducing the trade secret that the organization has thereby avoided. The federal government and each state have a public records act. As the National Society of Professional Engineers states, "Engineers shall not disclose, without consent, confidential information concerning the business affairs or technical processes of any present or former client or employer, or public body on which they serve." Therefore, to protect intellectual property (IP) and TS, and to achieve compliance with public records and trade secret legislation, requires approval through the use of Listings, certified reports, technical evaluation reports, duly authenticated reports and/or research reports prepared by approved agencies and/or approved sources.

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

[7] Ibid.

3.4 Use in applications requiring a fire-resistance rating are outside the scope of this evaluation.

3.5 Any building code and/or accepted engineering evaluations (i.e., research reports, duly authenticated reports, etc.) that are conducted for this Listing were performed by DrJ Engineering, LLC (DrJ), an ISO/IEC 17065 accredited certification body and a professional engineering company operated by RDPs / approved sources. DrJ is qualified[8] to practice product and code compliance services within its scope of accreditation and engineering expertise, respectively.

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

3.7 Any regulation specific issues not addressed in this section are outside the scope of this TER.

4 Product Description and Materials

4.1 Westlake Royal Stone products are manufactured, precast, concrete veneer products made from Portland cement, aggregate, water, admixtures, and coloring used as adhered, non-bearing exterior veneer or as an interior finish.

4.2 Westlake Royal Stone products have the following characteristics:

4.2.1 Color and texture similar to various stone or brick surfaces. Examples are shown in Figure 1.

Figure 1. Examples of Westlake Royal Stone Product Finishes

4.2.2 Patterns have a maximum per unit area of 720 square inches (0.464 m^2).

4.2.3 Patterns have a maximum per unit dimension of 36" (914 mm).

4.2.4 Patterns have a maximum average thickness of 1.65" (42 mm).

4.2.5 Patterns have a nominal oven dry density less than 105 lb/ft^3 (1362 kg/m^3) and a maximum saturated weight not to exceed 15 lb/ft^2 (73.2 kg/m^2).

4.2.6 The total cladding system weight, including the mortar setting bed, lath and scratch coat, is a maximum of 25 lbs per square foot (122 kg/m^2) when fully saturated.

4.2.7 Product profiles and information is available in the appendices:

4.2.7.1 Appendix B: Eldorado Stone

4.2.7.2 Appendix C: Dutch Quality Stone

4.2.7.3 Appendix D: Cultured Stone

4.2.7.4 Appendix E: Stonecraft

[8] Qualification is performed by a legislatively defined Accreditation Body. ANSI National Accreditation Board (ANAB) is the largest independent accreditation body in North America and provides services in more than 75 countries. DrJ is an ANAB accredited product certification body.

5 Applications

5.1 Westlake Royal Stone products are used as an exterior wall covering in accordance with the applicable sections of IBC Chapter 14 and Chapter 25 and IRC Section R703. They are installed over wood or steel-framed walls and wood structural panels (WSP) capable of supporting the imposed loads in accordance with IBC Section 1609 and IRC Section R301.2.1, including all required transverse wind loads.

5.2 Westlake Royal Stone products are used as an exterior wall covering installed over wood- or steel-framed walls: (1) where the WSP is over sheathed with continuous insulation, or (2) onto masonry or concrete walls that are sheathed with continuous insulation. The maximum foam thicknesses for various framing and fastener types are as shown in Table 1, Table 2, and Table 3.

Table 1. Fastener Requirements to Support Cladding Weight for Westlake Royal Stone Products Installation Over Continuous Insulation – Wood[8,12]

Fastener Penetration Into	Fastener Type[4]	Substrate	Min. Fastener Length[7] (in)	Max. Dist from Face of Framing[11] to Underside of Fastener Head[5,6] (in) (GAP)	Maximum Vertical Spacing (in) of Fasteners Along Each Stud[13]					
					Maximum Cladding Weight (psf)					
					5	10	15	18	22	25
Wood[2,3]	8d nail (0.131 in. dia.)	Lath[1]/Mortar	See footnote 4	≤ 1.125	7	7	7	7	7	7
			2.5	1.625	7	7	7	7	6	5
	12d nail (0.148 in. dia.)		3.25	≤ 1.625	7	7	7	7	7	7
	TRUFAST® SIP TP[10]		See footnote 4	≤ 3.625	7	7	7	7	7	7
			6	4.125	7	7	7	7	7	6
			6.5	4.625	7	7	7	7	7	6
	TRUFAST® SIP LD[10]		See footnote 4	≤ 3.625	7	7	7	7	7	7
	HeadLOK®[9]		See footnote 4	≤ 3.125	7	7	7	7	7	7
	TRUFAST® SIP TP[10]	Permabase or Durarock	2.5	≤ 0.875	8	8	8	8	8	8
			3	1.125	8	8	8	8	8	7
			3.5	1.625	8	8	8	8	7	6
			4	2.125	8	8	8	7	6	5
			4.5	2.625	8	8	7	6	5	4
			5	3.125	8	8	7	5	4	4
			5.5	3.625	8	8	6	5	4	-
			6	4.125	8	8	5	4	-	-
			6.5	4.625	8	7	5	4	-	-
	TRUFAST® SIP LD[10]		See footnote 4	≤ 0.875	8	8	8	8	8	8
			4	1.125	8	8	8	8	8	7
			4.5	1.625	8	8	8	8	7	6
			5	2.125	8	8	8	7	6	5

			5.5	2.625	8	8	8	6	5	4
			6	3.125	8	8	7	5	4	4
			6.5	3.625	8	8	6	5	4	-
	HeadLOK®[9]		See footnote 4	≤ 2.125	8	8	8	8	8	8
			6	2.625	8	8	8	8	8	7
			6.5	3.125	8	8	8	8	7	6

SI: 1 in = 25.4 mm, 1 psf = 0.0479 kN/m²

1. Lath shall be minimum 2.5-lb. metal lath having a minimum 0.020" thickness and shall be attached in accordance with Section 6.9. Tensile strength of the lath steel shall be minimum 43,900 psi.
2. Maximum stud spacing is 16" o.c. Expanded metal lath shall be attached with fasteners, vertically along each stud, at a maximum of 7" o.c.
3. Wood studs shall have a minimum specific gravity of 0.42.
4. Screws shall be corrosion-resistant, self-drilling, self-tapping and have a wafer or pancake head or a washer with a diameter sufficient to prevent the head from pulling through the openings in the lath and shall be in accordance with ASTM C954 or ASTM C1002. Screws shall penetrate the studs a minimum of 1¼" in addition to the tapered point.
5. For thicker continuous insulation applications, design is required in accordance with accepted engineering practice.
6. The total distance from the face of the stud to the underside of the fastener head shall not be more than that listed above. This includes any additional sheathing materials such as OSB, Gypsum, DensGlass®, plywood, lath, rain screen, or airspace incorporated in the design of the wall assembly. Where OSB or plywood is separately attached directly to the stud, the distance from framing to the underside of fastener head may be calculated from the face of the OSB or plywood.
7. Not all fasteners are commonly available in the lengths specified. Proprietary fasteners of equal strength and size are permitted.
8. This table provides some options evaluated by DrJ for the attachment of Westlake Royal Stone products over foam plastic insulating sheathing. Other methods, such as Cascadia clips or Knight Wall Systems, may be considered, but have not been evaluated by DrJ.
9. HeadLOK® screws are proprietary fasteners manufactured by OMG®, Inc. (DBA FastenMaster®). For HeadLOK® fastener code-compliance issues, see the manufacturer product literature and code-compliance reports.
10. TRUFAST® fasteners are proprietary fasteners manufactured by TRUFAST®, LLC. For TRUFAST® fastener code-compliance issues, see the manufacturer product literature and code-compliance reports.
11. Framing is defined as wood studs.
12. Continuous insulation shall be foam plastic sheathing with a minimum compressive strength of 15 psi in accordance with ASTM C578 or ASTM C1289.
13. Values were calculated considering only eccentric gravity loads. Where transverse load resistance is required, withdrawal resistance of the fastener shall also be considered.

Table 2. Fastener Requirements to Support Cladding Weight for Westlake Royal Stone Products Installation Over Continuous Insulation – Steel[7,8,9]

Fastener Penetration Into	Fastener Type[3]	Substrate	Min. Fastener Length[6] (in)	Max Dist from Face of Framing to Underside of Fastener Head[4,5] (in) (GAP)	Maximum Vertical Spacing (in) of Fasteners along Each Stud[10]					
					Maximum Cladding Weight (psf)					
					5	10	15	18	22	25
	#6 screw	Lath[1]/Mortar	1	0.625	7	7	7	7	7	6
			1	0.875	7	7	7	7	6	6
			1.5	1.125	7	7	7	7	6	6
			2	1.625	7	7	7	6	4	4
			2.5	2.125	7	7	6	4	4	-
			3	2.625	7	4	-	-	-	-
			3.5	3.125	4	-	-	-	-	-
	#8 screw		1	0.625	7	7	7	7	7	7
			1	0.875	7	7	7	7	7	6

Fastener Penetration Into	Fastener Type[3]	Substrate	Min. Fastener Length[6] (in)	Max Dist from Face of Framing to Underside of Fastener Head[4,5] (in) (GAP)	Maximum Vertical Spacing (in) of Fasteners along Each Stud[10]					
					Maximum Cladding Weight (psf)					
					5	10	15	18	22	25
Steel Framing[2] (33 mil, 20 ga, 33 ksi)			1.5	1.125	7	7	7	7	7	6
			2	1.625	7	7	7	7	6	4
			2.5	2.125	7	7	7	6	4	4
			3	2.625	7	7	6	4	4	-
			3.5	3.125	7	6	4	-	-	-
			4	3.625	6	-	-	-	-	-
	#10 screw		See footnote 3	≤ 1.125	7	7	7	7	7	7
			2	1.625	7	7	7	7	6	6
			2.5	2.125	7	7	7	7	6	4
			3	2.625	7	7	7	6	4	4
			3.5	3.125	7	7	6	4	4	-
			4	3.625	7	6	4	-	-	-
			4.5	4.125	7	4	-	-	-	-
	#12 screw		See footnote 3	≤ 1.125	7	7	7	7	7	7
			2	1.625	7	7	7	7	7	6
			2.5	2.125	7	7	7	7	6	6
			3	2.625	7	7	7	7	6	4
			3.5	3.125	7	7	7	6	4	4
			4	3.625	7	7	6	4	4	-
	#12 screw		4.5	4.125	7	6	4	-	-	-
			5	4.625	7	4	-	-	-	-
	#14 screw		See footnote 3	≤ 1.625	7	7	7	7	7	7
			2.5	2.125	7	7	7	7	7	6
			3	2.625	7	7	7	7	6	6
			3.5	3.125	7	7	7	7	6	4
Steel Framing (33 mil, 20 ga, 33 ksi)	#14 screw	Lath[1]/Mortar	4	3.625	7	7	7	6	4	4
			4.5	4.125	7	7	6	4	4	-
			5	4.625	7	6	4	4	-	-
	TRUFAST® SIP LD		3	≤ 0.875	7	7	7	7	7	7

Fastener Penetration Into	Fastener Type[3]	Substrate	Min. Fastener Length[6] (in)	Max Dist from Face of Framing to Underside of Fastener Head[4,5] (in) (GAP)	Maximum Vertical Spacing (in) of Fasteners along Each Stud[10]					
					Maximum Cladding Weight (psf)					
					5	10	15	18	22	25
			3	1.125	7	7	7	7	7	6
			3	1.625	7	7	7	7	6	4
			3	2.125	7	7	6	6	4	4
			3	2.625	7	7	4	4	4	-
			3.5	3.125	7	6	4	-	-	-
			4	3.625	6	-	-	-	-	-
Steel Framing (43 mil, 18 ga, 33 ksi)	#6 screw		See footnote 3	≤ 1.125	7	7	7	7	7	7
			2	1.625	7	7	7	7	7	6
			2.5	2.125	7	7	7	6	6	4
			3	2.625	7	7	4	4	4	-
			3.5	3.125	7	4	-	-	-	-
	#8 screw		See footnote 3	≤ 1.625	7	7	7	7	7	7
			2.5	2.125	7	7	7	7	7	6
			3	2.625	7	7	7	6	6	4
			3.5	3.125	7	7	6	4	4	-
			4	3.625	7	4	-	-	-	-
	#10 screw		See footnote 3	≤ 2.125	7	7	7	7	7	7
			3	2.625	7	7	7	7	7	6
			3.5	3.125	7	7	7	6	6	4
			4	3.625	7	7	6	4	4	-
			4.5	4.125	7	4	-	-	-	-
Steel Framing (43 mil, 18 ga, 33 ksi)	#12 screw		See footnote 3	≤ 2.625	7	7	7	7	7	7
			3.5	3.125	7	7	7	7	7	6
			4	3.625	7	7	7	6	6	4
			4.5	4.125	7	7	6	4	4	4
			5	4.625	7	6	4	-	-	-
	#14 screw		See footnote 3	≤ 3.125	7	7	7	7	7	7
			4	3.625	7	7	7	7	7	6
			4.5	4.125	7	7	7	7	6	4

Fastener Penetration Into	Fastener Type[3]	Substrate	Min. Fastener Length[6] (in)	Max Dist from Face of Framing to Underside of Fastener Head[4,5] (in) (GAP)	Maximum Vertical Spacing (in) of Fasteners along Each Stud[10]					
					Maximum Cladding Weight (psf)					
					5	10	15	18	22	25
			5	4.625	7	7	6	6	4	4
	TRUFAST® SIP LD		3	≤ 1.625	7	7	7	7	7	7
			3	2.125	7	7	7	7	7	6
			3	2.625	7	7	7	6	6	4
			3.5	3.125	7	7	6	4	4	-
			4	3.625	7	4	-	-	-	-
Steel Framing (54 mil, 16 ga., 50 ksi)	#6 screw	Lath[1]/Mortar	See footnote 3	≤ 1.625	7	7	7	7	7	7
			2.5	2.125	7	7	7	7	7	6
			3	2.625	7	7	7	6	4	4
			3.5	3.125	7	4	-	-	-	-
	#8 screw		See footnote 3	≤ 2.125	7	7	7	7	7	7
			3	2.625	7	7	7	7	7	6
			3.5	3.125	7	7	7	6	6	4
			4	3.625	7	6	4	4	-	-
	#10 screw		See footnote 3	≤ 2.625	7	7	7	7	7	7
			3.5	3.125	7	7	7	7	7	6
			4	3.625	7	7	7	6	6	4
			4.5	4.125	7	7	4	4	-	-
	#12 screw		See footnote 3	≤ 3.625	7	7	7	7	7	7
			4.5	4.125	7	7	7	7	6	4
			5	4.625	7	7	6	4	4	-
	#14 screw		See footnote 3	≤ 4.125	7	7	7	7	7	7
			5	4.625	7	7	7	7	6	6
Steel Framing (54 mil, 16 ga., 50 ksi)	TRUFAST® SIP LD		3	≤ 2.125	7	7	7	7	7	7
			3	2.625	7	7	7	7	7	6
			3.5	3.125	7	7	7	6	4	4
			4	3.625	7	6	4	-	-	-

SI: 1 in = 25.4 mm, 1 psf = 0.0479 kN/m^2

1. Lath shall be minimum 2.5-lb. metal lath having a minimum 0.020" thickness and shall be attached in accordance with Section 6.9. Tensile strength of the lath steel shall be minimum 43,900 psi.

Fastener Penetration Into	Fastener Type[3]	Substrate	Min. Fastener Length[6] (in)	Max Dist from Face of Framing to Underside of Fastener Head[4,5] (in) (GAP)	Maximum Vertical Spacing (in) of Fasteners along Each Stud[10]					
					Maximum Cladding Weight (psf)					
					5	10	15	18	22	25

2. Maximum stud spacing is 16" o.c. Expanded metal lath shall be attached with fasteners, vertically along each stud, a maximum of 7" o.c.
3. Screws shall be corrosion-resistant, self-drilling, self-tapping and penetrate a minimum of ⅜" and have a wafer or pancake head or a washer with a diameter sufficient to prevent the head from pulling through the openings in the lath and shall be in accordance with ASTM C954 or ASTM C1002.
4. For thicker continuous insulation applications, design is required in accordance with accepted engineering practice.
5. The total distance from the face of the stud to the underside of the fastener head shall not be more than that listed above. This includes any additional sheathing materials such as OSB, plywood, Gypsum, DensGlass®, lath, rain screen, or airspace incorporated in the design of the wall assembly.
6. Not all fasteners are commonly available in the lengths specified. Proprietary fasteners of equal strength and size are permitted.
7. This table provides some options evaluated by DrJ for the attachment of Westlake Royal Stone products over foam plastic insulating sheathing. Other methods, such as Cascadia clips or Knight Wall Systems, may be considered, but have not been evaluated by DrJ.
8. Framing is defined as steel studs.
9. Continuous insulation shall be foam plastic sheathing with a minimum compressive strength of 15 psi in accordance with ASTM C578 or ASTM C1289.
10. Values were calculated considering only eccentric gravity loads. Where transverse load resistance is required, withdrawal resistance of the fastener shall also be considered.

Table 3. Fastener Requirements to Support Cladding Weight for Westlake Royal Stone Products Installation Over Continuous Insulation – Masonry & Concrete[8,11]

Lath[1] Fastener Substrate:[2]	Lath Fastener Type	Max. Veneer Weight (includes lath, scratch coat, and mortar setting bed) (psf)	Maximum Distance from Face of Framing to Underside of Fastener Head[5,6] (in)	Lath Fastener – Minimum Size[7] (dia. x length)
Concrete[4] (minimum 2,500 psi)	TRUFAST®[10] TRUGRIP, TRUFAST® SIP LD, or Tapcon®[9] Hex Screw	15	1.375	TRUFAST® SIP LD or TRUFAST® TRUGRIP 3" or Tapcon® Hex Screw 3/16" x 3.25"
			1.875	TRUFAST® SIP LD or TRUFAST® TRUGRIP 3.5" or Tapcon® Hex Screw ¼" x 3.75"
			2.375	TRUFAST® SIP LD or TRUFAST® TRUGRIP 4" or Tapcon® Hex Screw ¼" x 4"
			3.375	TRUFAST® TRUGRIP 4.5" or Tapcon® Hex Screw ¼" x 5"
		18	1.375	TRUFAST® SIP LD or TRUFAST® TRUGRIP 3" or Tapcon® Hex Screw 3/16" x 3.25"
			1.875	TRUFAST® SIP LD or TRUFAST® TRUGRIP 3.5" or Tapcon® Hex Screw ¼" x 3.75"
			2.375	TRUFAST® SIP LD or TRUFAST® TRUGRIP 4" or Tapcon® Hex Screw ¼" x 4"
			3.375	Tapcon® Hex Screw ¼" x 5"
		22	1.375	TRUFAST® SIP LD or TRUFAST® TRUGRIP 3" or Tapcon® Hex Screw ¼" x 3.25"
			1.875	TRUFAST® TRUGRIP 3.5" or Tapcon® Hex Screw ¼" x 3.75"

Lath[1] Fastener Substrate:[2]	Lath Fastener Type	Max. Veneer Weight (includes lath, scratch coat, and mortar setting bed) (psf)	Maximum Distance from Face of Framing to Underside of Fastener Head[5,6] (in)	Lath Fastener – Minimum Size[7] (dia. x length)
			2.375	TRUFAST® TRUGRIP 4" or Tapcon® Hex Screw ¼" x 4"
			3.375	Tapcon® Hex Screw ¼" x 5"
		25	1.375	TRUFAST® TRUGRIP 3" or Tapcon® Hex Screw ¼" x 3.25"
			1.875	TRUFAST® TRUGRIP 3.5" or Tapcon® Hex Screw ¼x 3.75"
			2.375	Tapcon® Hex Screw ¼" x 4"
			3.375	Tapcon® Hex Screw 5/16" x 5"
Masonry[3] (medium/normal Hollow CMU per ASTM C90)	TRUFAST® SIP LD, or Tapcon® Hex Screw	15	1.375	TRUFAST® SIP LD 3" or Tapcon® Hex Screw 3/16" x 2.75"
			1.875	TRUFAST® SIP LD 3.5" or Tapcon® Hex Screw 3/16" x 3.25"
			2.375	Tapcon® Hex Screw ¼" x 3.75"
			3.375	Tapcon® Hex Screw ¼" x 5"
		18	1.375	TRUFAST® SIP LD 2.5" or Tapcon® Hex Screw 3/16" x 2.75"
			1.875	Tapcon® Hex Screw 3/16" x 3.25"
			2.375	Tapcon® Hex Screw ¼" x 3.75"
			3.375	Tapcon® Hex Screw ¼" x 5"
Masonry[3] (medium/normal Hollow CMU per ASTM C90)	TRUFAST® SIP LD, or Tapcon® Hex Screw	22	1.375	Tapcon® Hex Screw ¼" x 2.75"
			1.875	Tapcon® Hex Screw ¼" x 3.25"
			2.375	Tapcon® Hex Screw ¼" x 3.75"
			3.375	Tapcon® Hex Screw 5/16" x 5"
		25	1.375	Tapcon® Hex Screw ¼" x 2.75"
			1.875	Tapcon® Hex Screw ¼" x 3.25"
			2.375	Tapcon® Hex Screw ¼" x 3.75"

Lath[1] Fastener Substrate:[2]	Lath Fastener Type	Max. Veneer Weight (includes lath, scratch coat, and mortar setting bed) (psf)	Maximum Distance from Face of Framing to Underside of Fastener Head[5,6] (in)	Lath Fastener – Minimum Size[7] (dia. x length)

SI: 1 in = 25.4 mm, 1 psf = 0.0479 kN/m²

1. Lath shall be minimum 2.5-lb. metal lath having a minimum 0.020" thickness and shall be attached in accordance with Section 6.9. Tensile strength of the lath steel shall be minimum 43,900 psi.
2. Maximum fastener spacing in masonry and concrete is 16" o.c. horizontally and 7" o.c. vertically.
3. Masonry Construction – Tapcon® fasteners shall penetrate a minimum of 1". TRUFAST® SIP LD and TRUGRIP fasteners shall penetrate a minimum of 1½".
4. Concrete Construction – Tapcon® fasteners shall have a minimum penetration depth of 1½". TRUFAST® SIP LD and TRUGRIP fasteners shall penetrate a minimum of 1½".
5. For thicker continuous insulation applications, design is required in accordance with accepted engineering practice.
6. The total distance from concrete or masonry to the underside of the fastener head shall not be more than that listed above. This includes any additional sheathing materials such as OSB, plywood, Gypsum, DensGlass®, rain screen, or airspace incorporated in the design of the wall assembly.
7. Not all fasteners are commonly available in the lengths specified. Proprietary fasteners of equal strength and size are permitted.
8. This table provides some options evaluated by DrJ for the attachment of Westlake Royal Stone products over foam plastic insulating sheathing. Other methods, such as Cascadia clips or Knight Wall Systems, may be considered, but have not been evaluated by DrJ.
9. Tapcon® fasteners are proprietary fasteners manufactured by ITW Buildex. For Tapcon® fastener code-compliance issues, see the manufacturer product literature and code-compliance reports.
10. TRUFAST® fasteners are proprietary fasteners manufactured by TRUFAST®, LLC. For TRUFAST® fastener code-compliance issues, see the manufacturer product literature and code-compliance reports. Continuous insulation shall be foam plastic sheathing with a minimum compressive strength of 15 psi in accordance with ASTM C578 or ASTM C1289.

5.3 Westlake Royal Stone products are used as an exterior wall covering installed over furring. The furring is placed over the continuous insulation and fastened to the wood or steel studs or concrete or masonry substrate. The maximum foam thickness for various fastener sizes and types is listed in Table 4.

Table 4. Maximum Foam Thickness for Fastener Type and Size[1,13,15]

Furring Material	Framing Member[2,3,4,20]	Min Fastener Penetration into Wall Framing[5]	Cladding Weight[16] (psf)	Max Distance from the Face of Framing to the Underside of the Furring Material[14] (in)	Fastener Type & Minimum Size[10,11,12,17,18,19] (dia. x length)
Minimum 1x3 Wood Furring	Minimum 2x Wood Stud[6]	See footnote 6	15	1	0.148" x 3.25" Nail or HeadLOK® 4.5" or TRUFAST® SIP (LD or TP) 4"
				1.5	HeadLOK® 4.5" or TRUFAST® SIP (LD or TP) 4.5"
				2	HeadLOK® 5" or TRUFAST® SIP (LD or TP) 5"
				3	HeadLOK® 6" or TRUFAST® SIP (LD or TP) 7"
			18	1	0.148" x 3.25" Nail or HeadLOK® 4.5" or TRUFAST® SIP (LD or TP) 4"
				1.5	HeadLOK® 4.5" or TRUFAST® SIP (LD or TP) 4.5"
				2	HeadLOK® 5" or TRUFAST® SIP (LD or TP) 5"
				3	HeadLOK® 6" or TRUFAST® SIP (LD or TP) 7"
			22	1	0.148" x 3.25" Nail or HeadLOK® 4.5" or TRUFAST® SIP (LD or TP) 4"
				1.5	HeadLOK® 4.5" or TRUFAST® SIP (LD or TP) 4.5"
				2	HeadLOK® 5" or TRUFAST® SIP (LD or TP) 6"
				3	HeadLOK® 6" or TRUFAST® SIP (LD or TP) 7"

Furring Material	Framing Member[2,3,4,20]	Min Fastener Penetration into Wall Framing[5]	Cladding Weight[16] (psf)	Max Distance from the Face of Framing to the Underside of the Furring Material[14] (in)	Fastener Type & Minimum Size[10,11,12,17,18,19] (dia. x length)
			25	1	0.148" x 3.25" Nail or HeadLOK® 4.5" or TRUFAST® SIP (LD or TP) 4"
				1.5	HeadLOK® 4.5" or TRUFAST® SIP (LD or TP) 5.5"
				2	HeadLOK® 5" or TRUFAST® SIP (LD or TP) 6"
				3	NONE
Steel Hat Channel (minimum 33 mil, 33 ksi)	Steel Stud[7] (33 mil or thicker, 33 ksi)	Steel Thickness + 3 Threads	15	1	#4 (0.112" x 1.5") or TRUFAST® SIP LD 1.5"
				1.5	#6 (0.138" x 2") or TRUFAST® SIP LD 2"
				2	#6 (0.138" x 2.5") or TRUFAST® SIP LD 2.5"
				3	#10 (0.186" x 3.5") or TRUFAST® SIP LD 3.5"
			18	1	#4 (0.112" x 1.5") or TRUFAST® SIP LD 1.5"
				1.5	#6 (0.138" x 2") or TRUFAST® SIP LD 2"
				2	#8 (0.164" x 2.5") or TRUFAST® SIP LD 2.5"
				3	#12 (0.216" x 3.5") or TRUFAST® SIP LD 3.5"
			22	1	#6 (0.138" x 1.5") or TRUFAST® SIP LD 1.5"
				1.5	#8 (0.164" x 2") or TRUFAST® SIP LD 2"
				2	#10 (0.186" x 2.5") or TRUFAST® SIP LD 2.5"
				3	#14 (0.242" x 3.5") or TRUFAST® SIP LD 3.5"
			25	1	#8 (0.164" x 1.5") or TRUFAST® SIP LD 1.5"
				1.5	#10 (0.186" x 2") or TRUFAST® SIP LD 2"
				2	#12 (0.216" x 3.5") or TRUFAST® SIP LD 2.5"
				3	#16 (0.268" x 3.5") or TRUFAST® SIP LD 3.5"
Steel Hat Channel (minimum 33 mil, 33 ksi)	Steel Stud (43 mil or thicker, 33 ksi) Steel Stud	Steel Thickness + 3 Threads	15	1	#4 (0.112" x 1.5") or TRUFAST® SIP LD 1.5"
				1.5	#6 (0.138" x 2") or TRUFAST® SIP LD 2"
				2	#6 (0.138" x 2.5") or TRUFAST® SIP LD 2.5"
				3	#8 (0.164" x 3.5") or TRUFAST® SIP LD 3.5"
			18	1	#4 (0.112" x 1.5") or TRUFAST® SIP LD 1.5"
Steel Hat Channel (minimum 33 mil, 33 ksi)	Steel Stud (43 mil or thicker, 33 ksi)	Steel Thickness + 3 Threads	18	1.5	#6 (0.138" x 2") or TRUFAST® SIP LD 2"
				2	#6 (0.138" x 2.5") or TRUFAST® SIP LD 2.5"
				3	#10 (0.186" x 3.5") or TRUFAST® SIP LD 3.5"
			22	1	#6 (0.138" x 1.5") or TRUFAST® SIP LD 1.5"
				1.5	#6 (0.138" x 2") or TRUFAST® SIP LD 2"
				2	#8 (0.164" x 2.5") or TRUFAST® SIP LD 2.5"

Furring Material	Framing Member[2,3,4,20]	Min Fastener Penetration into Wall Framing[5]	Cladding Weight[16] (psf)	Max Distance from the Face of Framing to the Underside of the Furring Material[14] (in)	Fastener Type & Minimum Size[10,11,12,17,18,19] (dia. x length)
				3	#10 (0.186" x 3.5") or TRUFAST® SIP LD 3.5"
			25	1	#6 (0.138" x 1.5") or TRUFAST® SIP LD 1.5"
				1.5	#8 (0.164" x 2") or TRUFAST® SIP LD 2"
				2	#8 (0.164" x 2.5") or TRUFAST® SIP LD 2.5"
				3	#12 (0.216" x 3.5") or TRUFAST® SIP LD 3.5"
Steel Hat Channel (minimum 33 mil, 33 ksi)	Masonry[8] (medium/normal hollow CMU per ASTM C90)	See footnote 8	15	1	3/16" x 2.25" Tapcon® Hex Screw or TRUFAST® SIP LD 2.5"
				1.5	3/16" x 2.75" Tapcon® Hex Screw or TRUFAST® SIP LD 3"
				2	3/16" x 3.25" Tapcon® Hex Screw or TRUFAST® SIP LD 3.5"
				3	¼" x 5" Tapcon® Hex Screw or TRUFAST® SIP LD 4"
			18	1	3/16" x 2.25" Tapcon® Hex Screw or TRUFAST® SIP LD 2.5"
				1.5	3/16" x 2.75" Tapcon® Hex Screw or TRUFAST® SIP LD 3"
				2	¼" x 3.25" Tapcon® Hex Screw or TRUFAST® SIP LD 3.5"
				3	¼" x 5" Tapcon® Hex Screw
			22	1	3/16" x 2.25" Tapcon® Hex Screw or TRUFAST® SIP LD 2.5"
				1.5	¼" x 2.75" Tapcon® Hex Screw or TRUFAST® SIP LD 3"
				2	¼" x 3.25" Tapcon® Hex Screw or TRUFAST® SIP LD 3.5"
				3	¼" x 5" Tapcon® Hex Screw
			25	1	¼" x 2.25" Tapcon® Hex Screw or TRUFAST® SIP LD 2.5"
				1.5	¼" x 2.75" Tapcon® Hex Screw or TRUFAST® SIP LD 3"
				2	¼" x 3.25" Tapcon® Hex Screw or TRUFAST® SIP LD 3.5"
				3	5/16" x 5" Tapcon® Hex Screw
Steel Hat Channel		See footnote 9	22	1	3/16" x 2.75" Tapcon® Hex Screw or TRUFAST® SIP LD or TRUFAST® TRUGRIP 3"

Furring Material	Framing Member[2,3,4,20]	Min Fastener Penetration into Wall Framing[5]	Cladding Weight[16] (psf)	Max Distance from the Face of Framing to the Underside of the Furring Material[14] (in)	Fastener Type & Minimum Size[10,11,12,17,18,19] (dia. x length)
(minimum 33 mil, 33 ksi)	Concrete[9] (minimum 2,500 psi)			1.5	3/16" x 3.25" Tapcon® Hex Screw or TRUFAST® SIP LD or TRUFAST® TRUGRIP 3.5"
				2	3/16" x 3.75" Tapcon® Hex Screw or TRUFAST® SIP LD or TRUFAST® TRUGRIP 4"
				3	3/16" x 5" Tapcon® Hex Screw or TRUFAST® SIP LD or TRUFAST® TRUGRIP 5"
			25	1	3/16" x 2.75" Tapcon® Hex Screw or TRUFAST® SIP LD or TRUFAST® TRUGRIP 3"
				1.5	3/16" x 3.25" Tapcon® Hex Screw or TRUFAST® SIP LD or TRUFAST® TRUGRIP 3.5"
				2	3/16" x 3.75" Tapcon® Hex Screw or TRUFAST® SIP LD or TRUFAST® TRUGRIP 4"
				3	¼" x 5" Tapcon® Hex Screw or TRUFAST® SIP LD or TRUFAST® TRUGRIP 5"

SI: 1 in = 25.4 mm, 1 psf = 0.0479 kN/m^2

1. Lath shall be minimum 2.5-lb. metal lath having a minimum 0.020" thickness and shall be attached in accordance with Section 6.9. Tensile strength of the lath steel shall be minimum 43,900 psi.
2. Where furring is installed vertically over wall studs, maximum stud spacing shall be 16" o.c., and furring shall be attached to each stud at a maximum of 7" o.c. along the length of the stud. Where furring is attached vertically to concrete or masonry walls, it shall be spaced a maximum of 16" o.c. and fastened a maximum of 7" o.c. vertically.
3. Where furring is installed horizontally over wall studs, maximum stud spacing shall be 16" o.c., and furring shall be installed at a maximum 7" o.c. along the length of the stud and attached to each wall stud. Where furring is attached horizontally to concrete or masonry, it shall be spaced a maximum of 7" o.c. and shall be fastened to the concrete or masonry with fasteners spaced a maximum of 16" o.c.
4. Wood furring shall be a minimum ¾" thick. Wood furring and wood studs shall have a minimum specific gravity of 0.42.
5. Nails supporting the furring strips shall penetrate the studs a minimum of 1½". Steel hat-channel furring shall be a minimum 33 mil thick steel (33 ksi) with a depth of ⅞".
6. Wood Construction – Nails shall penetrate wood framing a minimum of 1½" and have a head size or a washer with a diameter sufficient to prevent the head from pulling through the openings in the lath. Screws shall penetrate the studs a minimum of 1¼".
7. Steel Framing – Screws shall be corrosion-resistant, self-drilling, self-tapping and penetrate a minimum of ⅜" and have a wafer or pancake head or a washer with a diameter sufficient to prevent the head from pulling through the openings in the lath.
8. Masonry Construction – Tapcon® fasteners shall penetrate a minimum of 1". TRUFAST® SIP LD and TRUGRIP fasteners shall penetrate a minimum of 1½".
9. Concrete Construction – Tapcon® fasteners shall have a minimum penetration depth of 1½". TRUFAST® SIP LD and TRUGRIP fasteners shall penetrate a minimum of 1½".
10. Corrosion-resistant, self-drilling, self-tapping screw fasteners for connection of siding to steel framing shall comply with the requirements of AISI S200. Other approved fasteners of equivalent or greater diameter and bending strength shall be permitted.
11. Nail fasteners shall be common or box nails and shall comply with ASTM F1667, except nail length shall be permitted to exceed ASTM F1667 standard lengths. Minimum bending yield strength for nails with a diameter up to 0.148", 0.162", and 0.225" shall be 90,000 psi, 90,000 psi, and 80,000 psi respectively.
12. A minimum 2x wood furring shall be used where the required wall covering fastener penetration into wood material exceeds ¾" (19 mm) and is not more than 1½" (38 mm), unless approved deformed shank siding nails or siding screws are used to provide equivalent withdrawal strength, allowing the wall covering connection to be placed into 1x wood furring.
13. Continuous insulation shall be foam plastic sheathing with a minimum compressive strength of 15 psi in accordance with ASTM C578 or ASTM C1289.
14. The total distance from the face of the stud, concrete, or masonry to the underside of the furring shall not be more than the maximum thickness listed above. This includes any additional sheathing materials such as OSB, plywood, Gypsum, Densglass®, rain screen, or airspace incorporated in the design of the wall assembly. Cladding shall be attached to the furring in accordance with the manufacturer installation instructions. Not all fasteners are commonly available in the lengths specified. Proprietary fasteners of equal strength and size are permitted.
15. This table provides some options evaluated by DrJ for the attachment of Westlake Royal Stone products over foam plastic insulating sheathing. Other methods, such as Cascadia clips or Knight Wall Systems, may be considered, but have not been evaluated by DrJ.
16. Materials in the assembly, other than the veneer, lath, and mortar setting bed and furring, are assumed to be separately attached and are not included in the fastener size calculations. Furring weight shall be included as part of the listed cladding weight.
17. HeadLOK® Screws are proprietary fasteners manufactured by OMG®, Inc. (DBA FastenMaster®). For HeadLOK® fastener code compliance issues, see the manufacturer product literature and code compliance reports.
18. Tapcon® fasteners are proprietary fasteners manufactured by ITW Buildex. For Tapcon® fastener code-compliance issues, see the manufacturer product literature and code-compliance reports

Furring Material	Framing Member[2,3,4,20]	Min Fastener Penetration into Wall Framing[5]	Cladding Weight[16] (psf)	Max Distance from the Face of Framing to the Underside of the Furring Material[14] (in)	Fastener Type & Minimum Size[10,11,12,17,18,19] (dia. x length)
19. TRUFAST® fasteners are proprietary fasteners manufactured by TRUFAST®, LLC. For TRUFAST® fastener code-compliance issues, see the manufacturer product literature and code-compliance reports.					
20. Framing is defined as wood studs, steel studs, concrete, or masonry substrates.					

5.4 *Transverse Wind Loads*

5.4.1 Westlake Royal Stone products shall not be installed in areas where the design wind pressure exceeds the capacity of the cladding and its attachment to resist the load in accordance with Table 5.

5.4.2 Table 5 provides the maximum design wind pressure allowed for the installation of this product. The maximum wind speed that corresponds with this wind pressure is provided to aid the user in determining where the product can be used. See the applicable building code for the maximum design wind speed allowed for the location of the building. The wind speed listed in Table 5 shall exceed the required design wind speed from the applicable code.

Table 5. Maximum Allowable Wind Pressure and Wind Speeds for Westlake Royal Stone Product Lath Fasteners

Exposure Category	Maximum Allowable Wind Pressure[2,5] (psf)	Maximum Wind Speed[1,3,4], V_{ult}/V_{asd} (mph)
B	70	≤ 200/155
C		≤ 185/145
D		≤ 170/130

SI: 1 psf = 0.0479 kN/m^2, 1 mph = 1.61 km/h

1. The first wind speed listed is V_{ult}, per ASCE 7-10 and 7-16, and is the maximum allowed wind speed for the Exposure Category shown with a maximum Mean Roof Height (MRH) of 30'. The second wind speed capacity shown for each exposure category is the ASCE 7-10 and 7-16 ultimate wind speed converted to V_{asd} for allowable stress design and rounded to the nearest 5 mph.
2. Design wind pressure is per ASCE 7-10 and 7-16 for components and cladding, Method 1 for the condition shown.
3. Maximum allowable wind speeds are based on the average ultimate loads tested for each condition divided by an allowable stress design reduction factor of 1.6, in accordance with SDPWS Section 3.2.1.
4. Pressure Equalization factor in accordance with ASTM D5206, Procedure B equals 1.0.
5. Wind pressure resistance is based on the lowest published withdraw capacity for the fasteners shown. Fasteners of equal or greater withdrawal resistance and equal or greater head size are permitted.

5.4.3 Where the application exceeds the limitations set forth herein, design shall be permitted in accordance with accepted engineering procedures, experience, and technical judgment.

5.4.4 For additional information or use in other applications, consult the manufacturer installation instructions:

5.4.4.1 Eldorado Stone: eldoradostone.com/resources

5.4.4.2 Dutch Quality Stone: dutchqualitystone.com/resources

5.4.4.3 Cultured Stone: culturedstone.com/resources

5.4.4.4 Stonecraft: stonecraft.com/resources/

5.5 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.

6 Installation

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

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

6.3 Westlake Royal Stone products shall be installed in accordance with the manufacturer published installation instructions (Section 6), the Masonry Veneer Manufacturer Association's Installation Guide, and this TER. In the event of a conflict between the manufacturer's installation instructions, the Masonry Veneer Manufacturer Association's Installation Guide and this TER, the more restrictive shall govern.

6.4 Installation is subject to the conditions of use set forth in Section 9.

6.5 Veneer must be applied to a wall framing system in which the studs are spaced a maximum of 16" o.c. (406 mm).

6.6 Westlake Royal Stone products may be installed over continuous insulation on masonry or concrete walls and attached in accordance with Table 3.

6.7 Westlake Royal Stone products may be installed over continuous insulation on wood or steel-framed walls, with or without WSP sheathing, and attached in accordance with Table 1, Table 2, or Table 4.

6.7.1 Where WSP sheathing is used, it shall be installed in accordance with the applicable building code or other standards as permitted by the building code (such as SDPWS or WFCM) and shall comply with one of the following minimum requirements:

6.7.1.1 Minimum $^{7}/_{16}$" Structural 1, Exposure 1 OSB complying with PS 2

6.7.1.2 Minimum ½" Structural 1 rated, exterior grade plywood complying with PS 1

6.8 Westlake Royal Stone products must be installed over two (2) layers of a water-resistant barrier (WRB) in accordance with IBC Section 1403.2[9] and Section 2510.6 and IRC Section R703.2. The base layer WRB may be liquid-applied, a sheet material, or a rigid continuous insulation with taped joints where the continuous insulation is approved for use as a WRB.

6.8.1 Exception: Where installed over concrete or masonry substrate, the WRB is not required.

6.9 Weep screeds and code compliant flashing must be installed at the bottom of walls; the top of windows, doors and fenestrations; and at all horizontal terminations of the veneer.

6.9.1 The weep screed must comply with and be installed in accordance with IBC Section 1404.10.1.2.1[10] and Section 2512.1.2 or IRC Section R703.7.2.1.

6.9.1.1 Exception: Where installed over concrete or masonry substrate, the weep screed is not required.

6.10 Veneer must be installed over 2.5 lb/yd^2 (1.4 kg/m^2) galvanized diamond mesh metal lath, 3.4 lb/yd^2 (1.8 kg/m^2) ⅜"-thick (9 mm) galvanized expanded metal lath, 18 gage (0.051"-thick [1.30 mm]) galvanized woven wire mesh, or other code-approved lath of equal or better performance.

6.9 Lath shall be:

6.9.1 Installed per the manufacturer installation instructions or ASTM C1063.

6.9.2 Installed over the two (2) WRB layers, unless one of the following conditions are met:

6.9.2.1 Lath is paper-backed, in which case only one (1) additional WRB is required, except as noted in Section 6.5.

6.9.2.2 If foam sheathing is used and has been qualified by the manufacturer to perform as a WRB, then only one (1) additional WRB is required.

6.9.2.3 If a rain screen is used, only one WRB is required, in accordance with IBC Section 2510.6.

[9] 2015 IBC Section 1404.2

[10] 2015 IBC Section 1405.10.1.2.1

6.9.3 Fastened through continuous insulation to each stud at 7" o.c. (178 mm) vertically along the stud or as shown in Table 2 and Table 4.

6.9.4 When the lath is installed over furring, the furring shall be fastened to the wood, steel, or concrete substrate in accordance with Table 4.

6.10 Westlake Royal Stone products shall be adhered to the supporting walls with a ½"-thick to ¾"-thick (13 to 19 mm) mortar setting bed.

6.10.1 The mortar shall comply with IBC Section 2103.2 or IRC Table R606.2.8[11] for the application.

6.10.2 Other mortars of equal or greater performance shall be permitted, when installed in accordance with the manufacturer installation instructions.

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

7 Substantiating Data

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

7.1.1 Wind-load resistance testing in accordance with ASTM E330

7.2 Information contained herein may include the result of testing and/or data analysis by sources that are approved agencies (i.e., ANAB accredited agencies), approved sources (i.e., RDPs and/or professional engineering regulations. Accuracy of external test data and resulting analysis is relied upon.

7.3 Where pertinent, testing and/or engineering analysis is based upon provisions that have been codified into law through state or local adoption of codes and standards. The developers of these codes and standards are responsible for the reliability of published content. DrJ's engineering practice may use a code-adopted provision as the control sample. A control sample versus a test sample establishes a product as being equivalent to the code-adopted provision in terms of quality, strength, effectiveness, fire resistance, durability, and safety.

7.4 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, Listings, certified reports, duly authenticated reports from approved agencies, and research reports prepared by approved agencies and/or approved sources provided by the suppliers of products, materials, designs, assemblies, and/or methods of construction. These are presumed to be minimum properties and relied upon to be accurate. The reliability of DrJ's engineering practice, as contained in this TER, may be dependent upon published design properties by others.

7.5 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.[12]

7.6 Where additional condition of use and/or code compliance information is required, please search for Westlake Royal Stone Adhered Masonry Veneer on the DrJ Certification website.

[11] 2015 IRC Section R606.2.7

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

8 Findings

8.1 As delineated in Section 3, Westlake Royal Stone Adhered Masonry Veneer has performance characteristics that were tested and/or meet pertinent standards and is suitable for use pursuant to its specified purpose.

8.2 Fasteners used in accordance with Table 1, Table 2, Table 3, and Table 4 are adequate for the support of Westlake Royal Stone products in applications where there is a layer of continuous insulation installed between the products and the underlying substrate (e.g., light-frame wood- or steel-framed walls or concrete or masonry walls).

8.3 Any application specific issues not addressed herein can be engineered by an RDP. Assistance with engineering is available from Westlake Royal Stone LLC.

8.4 IBC Section 104.11 (IRC Section R104.11 and IFC Section 104.10[13] are similar) in pertinent part states:

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

8.5 **Approved**:[14] Building codes require that the building official shall accept duly authenticated reports[15] or research reports[16] from approved agencies and/or approved sources (i.e., licensed RDP) with respect to the quality and manner of use of new products, materials, designs, services, assemblies, or methods of construction.

8.5.1 Acceptability of an approved agency, by a building official, is performed by verifying that the agency is accredited by a recognized accreditation body of the International Accreditation Forum (IAF).

8.5.2 Acceptability of a licensed RDP, by a building official, is performed by verifying that the RDP and/or their business entity is listed by the licensing board of the relevant jurisdiction.

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

8.6 DrJ is an engineering company, employs RDPs, and is an ISO/IEC 17065 ANAB-Accredited Product Certification Body – Accreditation #1131.

8.7 Through ANAB accreditation and the IAF Multilateral Agreements, this TER can be used to obtain product approval in any jurisdiction or country that has IAF MLA Members and Signatories to meet the Purpose of the MLA – "*certified once, accepted everywhere*." IAF specifically says: "*Once an accreditation body is a signatory of the IAF MLA, it is required to recognise certificates and validation and verification statements issued by conformity assessment bodies accredited by all other signatories of the IAF MLA, with the appropriate scope*."[17]

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[13] 2018 IFC Section 104.9

[14] 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.

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

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

[17] https://iaf.nu/en/about-iaf-mla/#:~:text=required%20to%20recognise

9 Conditions of Use

9.1 Material properties shall not fall outside the boundaries defined in Section 3.

9.2 As defined in Section 3, where material and/or engineering mechanics properties are created for load resisting design purposes, the resistance to the applied load shall not exceed the ability of the defined properties to resist those loads using the principles of accepted engineering practice.

9.3 Installation shall be on exterior walls consisting of wood framing, steel framing, masonry, or concrete capable of supporting the imposed loads, including transverse wind loads.

9.4 Where the seismic provisions of IRC Section R301.2.2 apply, the wall assembly shall not exceed the weight limits of Section R301.2.2.2, unless an engineered design is provided in accordance with Section R301.1.3.

9.5 Walls shall be braced to resist in-plane shear (racking) load by other means and in accordance with the applicable code.

9.6 Exterior wall framing shall be limited to a maximum out-of-plane deflection of H/360 (H equals the height of the wall).

9.7 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:

9.7.1 Any calculations incorporated into the construction documents shall conform to accepted engineering practice, and, when prepared by an approved source, shall be approved when requirements of adopted legislation are met.

9.7.2 This TER and the installation instructions shall be submitted at the time of permit application.

9.7.3 This product has an internal quality control program and a third-party quality assurance program.

9.7.4 At a minimum, this product shall be installed per Section 6 of this TER.

9.7.5 The review of this TER, by the AHJ, shall be in compliance with IBC Section 104 and Section 105.4.

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

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

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

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

9.10 The actual design, suitability, and use of this TER, for any particular building, is the responsibility of the owner or the owner's authorized agent.

10 Identification

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

10.2 Additional technical information can be found at eldoradostone.com, dutchqualitystone.com, culturedstone.com, and stonecraft.com.

11 Review Schedule

11.1 This TER is subject to periodic review and revision. For the most recent version, visit drjcertification.org.

11.2 For information on the current status of this TER, contact DrJ Certification.

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

12.1 Westlake Royal Stone Adhered Masonry Veneer is included in this TER published by an approved agency that is concerned with evaluation of products or services, maintains periodic inspection of the production of listed materials or periodic evaluation of services, and whose TER Listing states either that the material, product, or service meets identified standards or has been tested and found suitable for a specified purpose. This TER 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, 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 Westlake Royal Stone Adhered Masonry Veneer 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).

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[18] that are not specifically provided for in any building code, the design strengths and permissible stresses shall be established by tests, where suitable load tests simulate the actual loads and conditions of application that occur.

1.2.5 The design strengths and permissible stresses of any structural material shall conform to the specifications and methods of design using accepted engineering practice.[19]

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

1.2.7 The AHJ shall accept duly authenticated reports from approved agencies in respect to the quality and manner of use of new materials or assemblies as provided for in IBC Section 104.11.[20]

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

[19] IBC 2021, Section 1706.1 Conformance to Standards

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

1.3 **Approved**[21] **by Los Angeles**: The Los Angeles Municipal Code (LAMC) states in pertinent part that the provisions of LAMC are not intended to prevent the use of any material, device, or method of construction not specifically prescribed by LAMC. The Department shall use Part III, Recognized Standards in addition to Part II, Uniform Building Code Standards of Division 35, Article 1, Chapter IX of the LAMC in evaluation of products for approval where such standard exists for the product or the material and may use other approved standards, which apply. Whenever tests or certificates of any material or fabricated assembly are required by Chapter IX of the LAMC, such tests or certification shall be made by a testing agency approved by the Superintendent of Building to conduct such tests or provide such certifications. The testing agency shall publish the scope and limitation(s) of the listed material or fabricated assembly.[22] The Superintendent of Building roster of approved testing agencies is provided by the Los Angeles Department of Building and Safety (LADBS). The Center for Building Innovation (CBI) Certificate of Approval License is TA24945. Tests and certifications found in a CBI Listing are LAMC approved. In addition, the Superintendent of Building shall accept duly authenticated reports from approved agencies in respect to the quality and manner of use of new materials or assemblies as provided for in the California Building Code (CBC) Section 1707.1.[23]

1.4 **Approved by Chicago**: The Municipal Code of Chicago (MCC) states in pertinent part that an Approved Agency is a Nationally Recognized Testing Laboratory (NRTL) acting within its recognized scope and/or a certification body accredited by the American National Standards Institute (ANSI) acting within its accredited scope. Construction materials and test procedures shall conform to the applicable standards listed in the MCC. Sufficient technical data shall be submitted to the building official to substantiate the proposed use of any product, material, service, design, assembly and/or method of construction not specifically provided for in the MCC. This technical data shall consist of research reports from approved sources (i.e., MCC defined Approved Agencies).

1.5 **Approved by New York City**: The NYC Building Code 2022 (NYCBC) states in pertinent part that an approved agency shall be deemed[24] 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[25] (i.e., ANAB, International Accreditation Forum (IAF), etc.).

[21] See Section 8 for the distilled building code definition of **Approved**.

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

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

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

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

1.6 **Approved by Florida**: Statewide approval of products, methods, or systems of construction shall be approved, without further evaluation, by 1) A certification mark or listing of an approved certification agency, 2) A test report from an approved testing laboratory, 3) A product evaluation report based upon testing or comparative or rational analysis, or a combination thereof, from an approved product evaluation entity; 4) A product evaluation report based upon testing or comparative or rational analysis, or a combination thereof, developed and signed and sealed by a professional engineer or architect, licensed in Florida. For local product approval, products or systems of construction shall demonstrate compliance with the structural wind load requirements of the Florida Building Code (FBC) through one of the following methods; 1) A certification mark, listing, or label from a commission-approved certification agency indicating that the product complies with the code; 2) A test report from a commission-approved testing laboratory indicating that the product tested complies with the code; 3) A product-evaluation report based upon testing, comparative or rational analysis, or a combination thereof, from a commission-approved product evaluation entity which indicates that the product evaluated complies with the code; 4) A product-evaluation report or certification based upon testing or comparative or rational analysis, or a combination thereof, developed and signed and sealed by a Florida professional engineer or Florida registered architect, which indicates that the product complies with the code; 5) A statewide product approval issued by the Florida Building Commission. The Florida Department of Business and Professional Regulation (DBPR) website provides a listing of companies certified as a Product Evaluation Agency (i.e., EVLMiami 13692), a Product Certification Agency (i.e., CER10642), and as a Florida Registered Engineer (i.e., ANE13741).

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 Building Code 2018 of New Jersey in IBC Section 1707.1 General,[26] 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)”.[27] Furthermore N.J.A.C 5:23-3.7 states: Municipal approvals of alternative materials, equipment, or methods of construction. **(a) Approvals**: Alternative materials, equipment, or methods of construction shall be approved by the appropriate subcode official provided the proposed design is satisfactory and that the materials, equipment, or methods of construction are suitable for the intended use and are at least the equivalent in quality, strength, effectiveness, fire resistance, durability and safety of those conforming with the requirements of the regulations. 1. A field evaluation label and report or letter issued by a nationally recognized testing laboratory verifying that the specific material, equipment, or method of construction meets the identified standards or has been tested and found to be suitable for the intended use, shall be accepted by the appropriate subcode official as meeting the requirements of (a) above. 2. Reports of engineering findings issued by nationally recognized evaluation service programs, such as, but not limited to, the Building Officials and Code Administrators (BOCA), the International Conference of Building Officials (ICBO), the Southern Building Code Congress International (SBCCI), the International Code Council (ICC), and the National Evaluation Service, Inc., shall be accepted by the appropriate subcode official as meeting the requirements of (a) above. The New Jersey Department of Community Affairs has confirmed that technical evaluation reports, from any accredited entity listed by ANAB, meets the requirements of item 2 given that the listed entities are no longer in existence and/or do not provide “reports of engineering findings”.

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

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

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[28] and Part 3280,[29] the Department encourages innovation and the use of new technology in manufactured homes. The design and construction of a manufactured home shall conform with the provisions of Part 3282 and Part 3280 where key approval provisions in mandatory language follow: 1) "All construction methods shall be in conformance with accepted engineering practices"; 2) "The strength and rigidity of the component parts and/or the integrated structure shall be determined by engineering analysis or by suitable load tests to simulate the actual loads and conditions of application that occur."; and 3) "The design stresses of all materials shall conform to accepted engineering practice."

1.10 **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.[30]

1.10.2 For innovative alternative products, materials, designs, services and/or methods of construction, in the absence of approved rules or other approved standards…the building official shall accept duly authenticated reports (i.e., listing and/or research report) from approved agencies with respect to the quality and manner of use of new materials or assemblies.[31] A building official approved agency is deemed to be approved via certification from an accreditation body that is listed by the International Accreditation Forum[32] or equivalent.

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.[33] An approved source is defined as a PE subject to professional engineering laws, where a research and/or a technical evaluation report certified by a PE, shall be approved.

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

1.11.1 Permit participation of conformity assessment bodies located in the territories of other Members (defined as GATT Countries) under conditions no less favourable than those accorded to bodies located within their territory or the territory of any other country,

1.11.2 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.

1.11.3 State that conformity assessment procedures are not prepared, adopted, or applied with a view to or with the effect of creating unnecessary obstacles to international trade. This means that conformity assessment procedures shall not be more strict or be applied more strictly than is necessary to give the importing Member adequate confidence that products conform to the applicable technical regulations or standards.

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

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

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

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

[32] Please see the ANAB directory for building official approved agencies.

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

1.11.4 **Approved**: The purpose of the IAF MLA is to ensure mutual recognition of accredited certification and validation/verification statements between signatories to the MLA, and subsequently acceptance of accredited certification and validation/verification statements in many markets based on one accreditation for the timely approval of innovative materials, products, designs, services, assemblies and/or methods of construction. Accreditations granted by IAF MLA signatories are recognised worldwide based on their equivalent accreditation programs, therefore reducing costs and adding value to businesses and consumers.

Appendix B: Eldorado Stone

Profile Name	Weight of Total Façade Includes Lath, Scratch, Bond Mortar & Stone, Saturated (psf)	Weight of Total Façade Includes ½" Cement Board, Bond Mortar & Stone, Saturated (psf)
Ashlar	20.4	17.1
Bluff Stone	19.3	16.1
Brick, Adobe	21.1	17.8
Brick, Arabian	18.5	15.3
Brick, Modena	17.0	13.7
Brick, Roma	19.6	16.3
Brick, Tundra	16.8	13.6
Brick, Via	18.4	15.1
Broken Top	22.4	19.2
Castlestone, English	20.0	16.7
Cliffstone	20.7	17.4
Coarsed Stone	21.3	18.0
Coastal Reef	20.6	17.3
Cobblestone	22.8	19.6
Country Rubble	21.0	17.7
Country Rubble, Oversized	24.9	21.7
Cut Coarsed Stone	22.2	19.0
Cypress Ridge	19.6	16.3
European Ledge Cut	22.2	18.9
Field Ledge	19.2	15.9
Top Rock	20.4	17.1
Hillstone	22.0	18.8
Latitude30	21.6	18.3
Ledgecut33	22.3	19.0
Limestone	21.2	18.0
Longitude24	21.6	18.3
Mountain Ledge Panel	22.0	18.8
Mountain Ledge	22.1	18.9
Ridgetop 18	21.6	18.3
River Rock, Northwest	21.7	18.5
River Rock, Creek Cobble	16.7	13.5

Profile Name	Weight of Total Façade Includes Lath, Scratch, Bond Mortar & Stone, Saturated (psf)	Weight of Total Façade Includes ½" Cement Board, Bond Mortar & Stone, Saturated (psf)
River Rock, Streamstone	22.5	19.3
River Rock, White Water	20.2	16.9
Rough Cut	22.2	18.9
Rustic Ledge	20.1	16.9
Shadow Rock	23.3	20.1
Sierra Cut24	27.3	24
Stack Stone	19.4	16.1
Vantage30	21.6	18.3
Vintage Ranch	20.5	17.2
Weathered Edge	22.0	18.8
Zen24	21.6	18.3

SI: 1 psf = 0.0479 kN/m^2

1. This table is provided by the manufacturer to aid in selecting fasteners. DrJ Engineering has not independently verified the values in these tables.

Appendix C: Dutch Quality Stone

Profile Name	Weight of Total Façade Includes Lath, Scratch, Bond Mortar & Stone, Saturated (psf)	Weight of Total Façade Includes ½" Cement Board, Bond Mortar & Stone, Saturated (psf)
CastleStone	20.0	16.8
Drystack	20.5	17.3
FieldStone	19.6	16.3
Ledgestone	20.1	16.8
Limestone	20.7	17.5
Michigan Split Granite	22.0	18.8
River Rock	20.5	17.3
Stack Ledge	21.3	18.1
Tuscan Ridge	21.4	18.1
Tuscany Veneer	20.2	16.9
Weather Ledge	20.5	17.3

SI: 1 psf = 0.0479 kN/m^2

1. This table is provided by the manufacturer to aid in selecting fasteners. DrJ Engineering has not independently verified the values in these tables.

Appendix D: Cultured Stone

Product Style	Stone Saturated Weight (psf)	Saturated Density Stone and Scratch and Lath and Bonding Mortar (psf)	Saturated Density Stone and Cement Board and Bonding Mortar (psf)
Ancient Villa Ledgestone	11.4	21.4	18.1
Cast-Fit 12x24	12.0	22.0	18.7
Cast-Fit 8x16	13.8	23.8	20.5
Cobblefield	13.9	23.9	20.6
Coral Stone	10.1	20.1	16.8
Country Ledgestone	12.6	22.6	19.3
Cultured Brick Veneer-Handmade Brick	10.2	20.2	16.9
Cultured Brick Veneer-Used Brick	11.2	21.2	17.9
Del Mare Ledgestone	12.3	22.3	19.0
Dressed Fieldstone	14.3	24.3	21.0
Drystack Ledgestone	14.7	24.7	21.4
European Castle Stone	10.0	20.0	16.7
Hewn Stone 308	14.2	24.2	20.9
Hewn Stone 314	14.7	24.7	21.4
Hewn Stone 514	14.5	24.5	21.2
Hewn Stone 522	13.9	23.9	20.6
Hewn Stone 822	13.0	23.0	19.7
Limestone	13.6	23.6	20.3
Old Country Fieldstone	13.5	23.5	20.2
Pro-Fit Alpine Ledgestone	13.3	23.3	20.0
Pro-Fit Ledgestone	10.3	20.3	17.0
Pro-Fit Modera Ledgestone	12.0	22.0	18.7
Pro-Fit Terrain Ledgestone	12.2	22.2	18.9
River Rock	13.4	23.4	20.1
Rock Face	12.5	22.5	19.2
Southern Ledgestone	12.6	22.6	19.3
Split Face	13.3	23.3	20.0
Stream Stone	9.6	19.6	16.3

SI: 1 psf = 0.0479 kN/m^2

1. This table is provided by the manufacturer to aid in selecting fasteners. DrJ Engineering has not independently verified the values in these tables.

Appendix E: Stonecraft

Profile ID	Weight of Total Façade Includes Lath, Scratch, Bond Mortar & Stone, Saturated (psf)	Weight of Total Façade Includes ½" Cement Board, Bond Mortar & Stone, Saturated (psf)
Cobble	24.4	21.2
Dutchcraft	24.5	21.3
Farmledge	21.6	18.4
Fieldstone	20.7	17.5
Heritage	24.2	20.9
Laurel Cavern	22.3	19.0
Ledgestone	23.7	20.5
Monarch	20.9	17.7
River Rock	23.2	19.9
Top Rock	21.6	18.4

SI: 1 psf = 0.0479 kN/m^2

1. This table is provided by the manufacturer to aid in selecting fasteners. DrJ Engineering has not independently verified the values in these tables.