



Stantec Architecture Inc.
410 17th Street, Suite 1400, Denver CO 80202

June 30, 2023
File: 2270 4721 02

Attention: Aurora Planning and Development Services
Planning Division
15151 E. Alameda Parkway, Ste. 2300
Aurora, Colorado, 80012

Dear Reviewers,

Reference: Innovus
Application Number: DA-2241-05
Case Number: 2023-6006-00; 2023-3005-00

Please see the following Architectural Materials Information including Product Data Specifications, Material Warranty Information, Material Manufacturing Information, and some examples of the installed materials.

Regards,


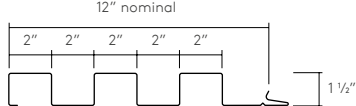
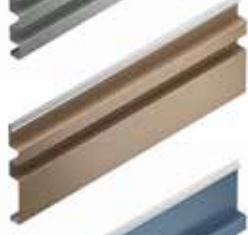
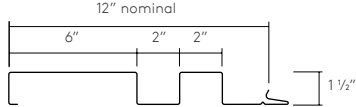
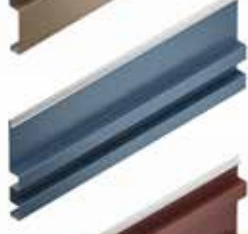
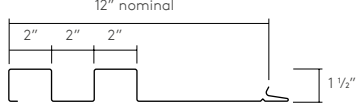

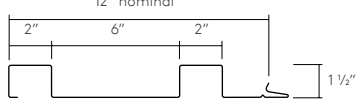

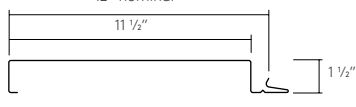

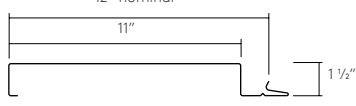

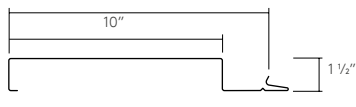

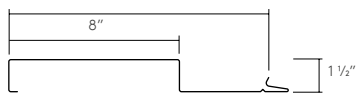
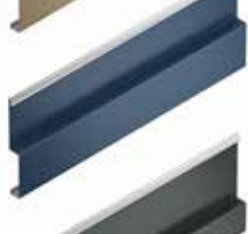
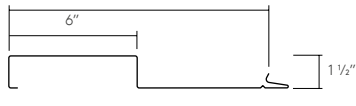

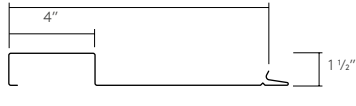
Stantec Architecture Inc.

Angelia Cowgill RA, LEED AP
Senior Associate, Senior Project Manager
Phone: 303 575 3434
Fax: 303 292 0845
angelia.cowgill@stantec.com

Matrix Wall Series®

Inspired by technology, Morin Matrix Series® is the next evolution in an integrated concealed fastener rainscreen wall panel system.



	Matrix MX-1	
	Matrix MX-2	
	Matrix MX-3	
	Matrix MX-4	
	Matrix MX-6	
	Matrix MX-7	
	Matrix MX-8	
	Matrix MX-9	
	Matrix MX-10	
	Matrix MX-11	

With ten unique panel profiles, as well as complimentary extruded aluminum trims and MiterSeam corners, the designer has all the tools necessary to create the next award winning design.

- Concealed clip and fastener design
- Can be installed horizontally or vertically
- Weather resistant or rainscreen rear ventilated application
- Ideal for new or retrofit projects
- Smooth surface standard, stucco embossed texture optional
- All PVDF painted finishes available
- Perforated options available
- Optional factory caulking available

Panel Depth:
1 1/2" (38mm)

Cover Width:
12" (305mm)

Lengths:
5' (1.52m) to 30' (9.14m) standard.
Shorter and longer lengths available

**Galvalume® / Zinalume®
Painted Steel Options:**
18 GA* (1.19mm) / 20 GA (1.0mm) /
22 GA (.80mm) / 24 GA* (.60mm)

Aluminum Options:
.032" (.80mm) / .040" (1mm) /
.050" (1.27mm)

Stainless Steel Options:
22 GA (.80mm) / 24 GA (.60mm)

Zinc Options:
20 GA (1.0mm) / 22 GA (.80mm)

Natural Copper Options:
20 oz. / 16 oz.



*Only available on certain profiles.



Easy Integration
Common joint allows
multiple panel integration
with Integrity Series and
Pulse Series®

Matrix MX-1

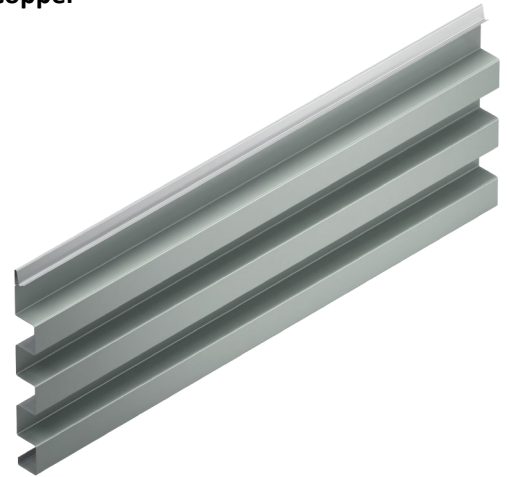
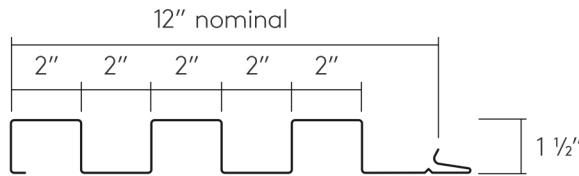
Primary application: Wall

Height 1.5" / 38.1mm

Width 12" / 305mm

Perforation options for aluminum, stainless steel, zinc, and copper

Produced at: Bristol CT, Fontana CA, DeLand FL



Suggested Metals

Galvalume 24, 22, 20, 18 ga

aluminum .032, .040, .050

zinc .8mm, 1mm

copper 16, 20 oz.

stainless steel 24, 22 ga

Testing Information

ASTM 1592 for aluminum and Galvalume

ASTM 283/331 for aluminum and Galvalume (solid panels)

FM Approval testing can be performed to job specifications

Florida Product Approval 22, 20, 18 gauge only

Span charts for untested gauges/materials are calculated using section properties. Untested/perforated panels require side stitching/exposed fasteners.



Morin HQ / East 685 Middle Street | Bristol | CT 06010

Morin West 10707 Commerce Way | Fontana | CA 92337

Morin South 1975 Eidson Drive | DeLand | FL 32724

T: (860) 584-0900 F: (860) 582-7503 Toll Free: 1-800-640-9501

T: (909) 428-3747 F: (909) 428-6433 Toll Free: 1-800-700-6140

T: (860) 584-0900 F: (860) 582-7503 Toll Free: 1-800-640-9501

www.morincorp.com

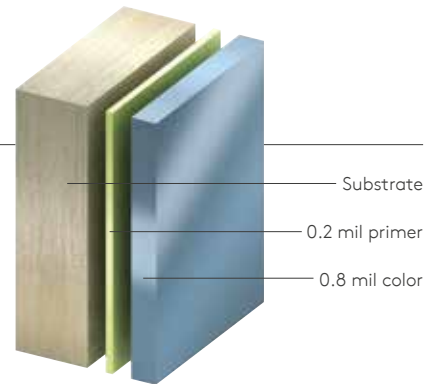
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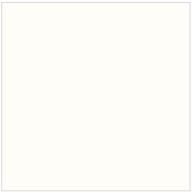





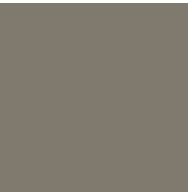
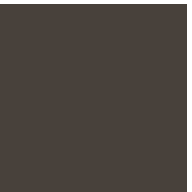







Color Options

Standard Colors

Fluoropon® PVDF – Kynar500®

Formulated with 70% Kynar 500® proprietary resin, Fluoropon® is a premium fluoropolymer coating. Factory applied and baked on, it provides excellent adhesion and flexibility properties with aluminum, HDG steel or Galvalume® components.



					
Regal White SR:0.70 E:0.86 SRI:85 RGB: 205 208 207	Ascot White SR:0.69 E:0.85 SRI:83 RGB: 205 207 207	Bone White SR:0.69 E:0.84 SRI:83 RGB: 212 210 198	Sandstone SR:0.61 E:0.85 SRI:72 RGB: 184 180 166	Dove Gray SR:0.47 E:0.86 SRI:53 RGB: 143 145 144	Zinc Gray SR:0.35 E:0.86 SRI:37 RGB: 100 97 93
					
Chromium Gray SR:0.56 E:0.86 SRI:65 RGB: 166 166 164	Surrey Beige SR:0.48 E:0.86 SRI:54 RGB: 154 139 121	Sierra Tan SR:0.38 E:0.85 SRI:40 RGB: 145 129 115	Parchment SR:0.53 E:0.85 SRI:61 RGB: 154 148 136	Antique Bronze SR:0.43 E:0.86 SRI:48 RGB: 127 119 109	Spartan Bronze SR:0.31 E:0.85 SRI:31 RGB: 71 65 59
					
Dark Bronze SR:0.27 E:0.85 SRI:26 RGB: 55 51 50	Redwood SR:0.38 E:0.86 SRI:41 RGB: 116 69 63	Colonial Red SR:0.32 E:0.86 SRI:33 RGB: 87 51 50	Patina Green SR:0.41 E:0.84 SRI:44 RGB: 106 113 98	Evergreen SR:0.26 E:0.85 SRI:24 RGB: 56 70 62	Slate Blue SR:0.28 E:0.85 SRI:27 RGB: 75 103 115
					
Bristol Black SR:0.26 E:0.86 SRI:25 RGB: 45 43 42	Blue Gray SR:0.27 E:0.85 SRI:26 RGB: 59 61 62	Regal Blue SR:0.26 E:0.85 SRI:24 RGB: 43 68 87			

To find out more and to see the complete range, visit: www.morincorp.com

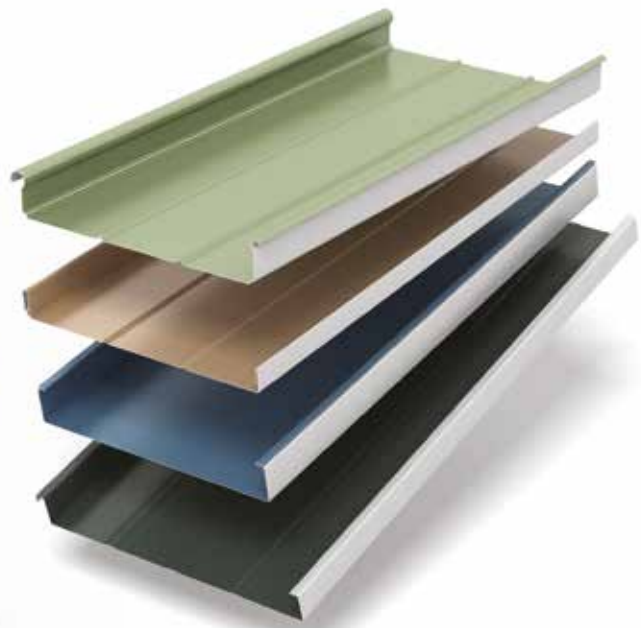
Innovative Design Solutions

The Morin story goes well beyond the panels. We thrive in helping customers bring their most challenging design ideas to life. Beyond panels we offer a complete suite of metal finishes including perforations, corners, coordinated louvers and fasteners and custom extrusions for a complete look.

The Industry's Most Versatile Single Element Metal Wall and Roof Panels

We offer over 100 wall and roof panel options with a wide range of panels with unique profiles including over 30 integrated panels. Our Matrix, Integrity and Pulse series of panels all have interlocking joinery and can be easily integrated.

Morin Systems provide for a complete, finished, custom fabricated look. Rounded or miter corners, extrusions, foam backers and custom cut components will make for a more professional looking, longer lasting job.



We know we are just one part of many in a project, we want to make our part look its best and have all the tools available from design to installation for you.

To find out more and to see the complete range, visit: www.morincorp.com



Architectural Metal Wall & Roof Systems
Color Options

Design Options

Morin can supply all the elements you need to create a totally unique design for your building.

Design options include:

- **Perforations**
Air flow, sun screen, sound reduction or security.
We have 6 standard patterns or we can produce custom repeat patterns.
- **Curving**
We can fabricate and ship crimp and stretch curving, or for larger panels we roll form on-site and bend to order.
- **Louvers**
Morin profile matching louvers are designed to blend with adjacent panels in material and finish. Get that finished look and we can design panels that conceal the louver location.
- **Mitred Corners**
Miterseam corners can be supplied at various angles and lengths to suit a multitude of design options, fabricated from the same materials as the adjacent panels.
- **Matching fasteners**
Fasteners with custom color matching to assure your panel installation is punch list free.
- **Extrusions**
Extruded aluminum trim can be furnished for panel systems up to 3" deep.

The Complete Solution

Let us help guide you through the process. From material selection to installation, we can help with the technical files as well as all the components needed for a finished project.

Morin has technical support available from start to finish. We are there to help you through every phase of building from technical CAD support to on-site installation.

We have on-site technical staff to help with drawings, design, cost-effective construction application and technical designs for complicated projects. We also offer on-site installation guidance and support from our expertly trained knowledgeable team.

Our nationwide sales network and in-house technical service teams provide innovative solutions for today's progressive architecture. Visit www.morincorp.com for access to profiles, specifications, AutoCAD details, load span charts and technical manuals.

Morin's knowledgeable sales staff provides AIA/CES approved seminars on single element architectural metal wall and roof systems.

To find out more and to see the complete range, visit: www.morincorp.com

LOCAL EXAMPLES OF MORIN MATRIX PRODUCT



**CHERRY CREEK INNOVATION CAMPUS
8000 S. CHAMBERS RD.
CENTENNIAL, CO 80112**



**BOULDER VALLEY SCHOOL DISTRICT ADMINISTRATION
CAMPUS
BOULDER, CO**

LIMITED TWENTY (20) YEAR STANDARD FINISH WARRANTY

In accordance with hereinafter Definitions, this Warranty expressly warrants the factory-applied finish noted below against Chalking, Fading, Excessive Color Change, Noticeable Blisters, Chips, Cracks, Flaking or Peeling not within the Performance Standards set forth below.

Customer:

Project:

Morin Job #:

Substantial Completion Date:

Warranted Finish:

Color(s): Solid color

PERFORMANCE STANDARDS:

- (1) The Subject Material described above, which is intended to be furnished on the above noted project, will have an exterior protective coating of Morin's Fluropon coating which is applied in accordance with the coating manufacturer's specifications.
- (2) Morin Warrants that the above coating is a factory-applied film on Morin wall / roof panels, and will not, as a result of exposure to Normal Atmospheric Conditions:
 - (a) Chalk in excess of an ASTM D-4214-89 **Eight (8)** rating within a period of **Twenty (20)** years from the date of substantial completion.
 - (b) Fade. Morin warrants against any fade in excess of **Five (5)** numerical units within a period of **Twenty (20)** years when tested in accordance with ASTM D-2244-86. Fade is determined by cleaning the painted surfaces of excess deposits then by measuring the cleaned, painted surfaces against corresponding values measured on the original or unexposed-coated surfaces.
 - (c) Noticeable blisters, chips, cracks, flaking or peeling within **Twenty (20)** years when tested in accordance with either ASTM D-3359-87 or ASTM D-2798-94.

COMPLIANCE:

- (3) Morin Warrants that the goods furnished will comply with any performance standards stated above. No other Warranties, express or implied, have been made by Morin in reference to the goods which are purchased "AS IS" unless expressly included herein between Morin and the Customer.
- (4) In the event that the Subject Materials do not comply with this Warranty, Morin must be notified in writing along with a copy of this Warranty document within the period of this Warranty. The date of such notice to Morin will be the date upon which Morin receives such notice. Such Subject Materials will thereby be inspected by or at Morin's direction. If upon a finding that such Subject Materials do not comply with the warranty, Morin will, at its discretion, either refinish, recover, or replace the Subject Materials. Failure to acknowledge the performance of any work performed pursuant to the Warranty shall render the Warranty null and void.

CERTIFICATE NUMBER: _____

WARRANTY LIMITATIONS:

- (5) This warranty should apply only to the Warranted Finish as herein defined which has been exposed to normal atmospheric conditions, and shall not apply where any failure of the Warranted Finish is the result of fire, vandalism, radiation, harmful fumes, foreign substances in the atmosphere including corrosive or aggressive atmospheres such as those contaminated with chemical fumes or salt spray, mishandling, falling objects, acts of God; including hurricanes, tornadoes, floods, damage from winds, storm, etc; deliberate damage, riots, civil commotions, acts of war, improper handling by erectors, material corrosion, mechanical damage or any other physical damage. In addition, this Warranty shall not apply to any failure of, or damage to, the Warranted Finish as a result of moisture entrapment or other contamination which is detrimental to the Warranted Finish prior to its use by the Customer; nor to damage to the Warranted Finish as the result of improper handling, storage, fabrication, shipping, processing and/or installation of the coated material by the Customer; nor to any damage to the Warranted Finish resulting in corrosion from manufactured perforations or the installation thereof in circumstances where it is subjected to continuously generated abrasive forces or continual or periodic submersion in water or any other circumstances where the Warranted Finish would be subjected to continual washing or abrading conditions. Owner is required to adhere to maintenance instructions attached. Morin requires a documented bi-annual fresh water rinse down of exposed panel system and inspection. Morin must be contacted prior to inspection to be given the option of attending.

ASSIGNMENT:

- (6) This Warranty shall only extend to the Customer as the purchaser, and to the ultimate original consumer of the Warranted Finish and shall be null and void upon any other assignment or upon the cessation of the Consumer's usual course of business, or should the Consumer become insolvent or bankrupt.

WARRANTY EFFECTIVE DATE:

- (7) This Warranty only becomes effective upon remittance of payment in full and when Morin receives a signed copy within 90 (ninety) days from the date the Customer receives the original Warranty.
- (8) No other Warranties, or agreements, express or implied, have been made by Morin in reference to the Subject Materials unless expressly included herein between Morin and the Customer.

† DEFINITIONS:

As used herein, the following words shall be ascribed the respective meanings as set forth below:

- (a) Customer - The person, firm, or corporation to whom this Warranty runs.
- (b) Normal Atmospheric Conditions - This term as used herein shall exclude any and all atmospheric conditions not in compliance with the established air quality standards set forth in the U.S. Clean Air Act as well as any and all other applicable laws of the U.S. government or any state or local governmental body upon the date the Subject Material is hereby Warranted.
- (c) Morin - Morin Corp. or Morin Corporation.
- (d) Warranted Finish - The exterior finish used herein when applied to vertical wall or roof panels and when exposed to normal atmospheric conditions.
- (e) Chalk - Chalk or Chalking is the gradual erosion of film.
- (f) Fade - Fade or Fading is the change of color in the film.
- (g) Subject Material - The product purchased by the Customer from Morin to which this Warranty applies.

* NOTE: All other words used herein shall be attributed with meanings particular to Morin's custom, trade, or usage.

Original warranty MUST be signed and returned for warranty to be valid.

Morin

By: _____

David McCriston-Technical Manager

Date: _____

Owner: _____

By: _____

Date: _____

Customer: _____

By: _____

Date: _____

SUMMIT BRICK MATERIAL + EXAMPLES



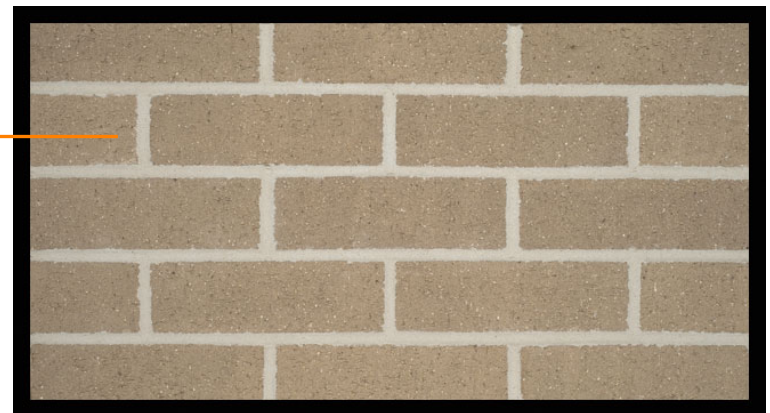
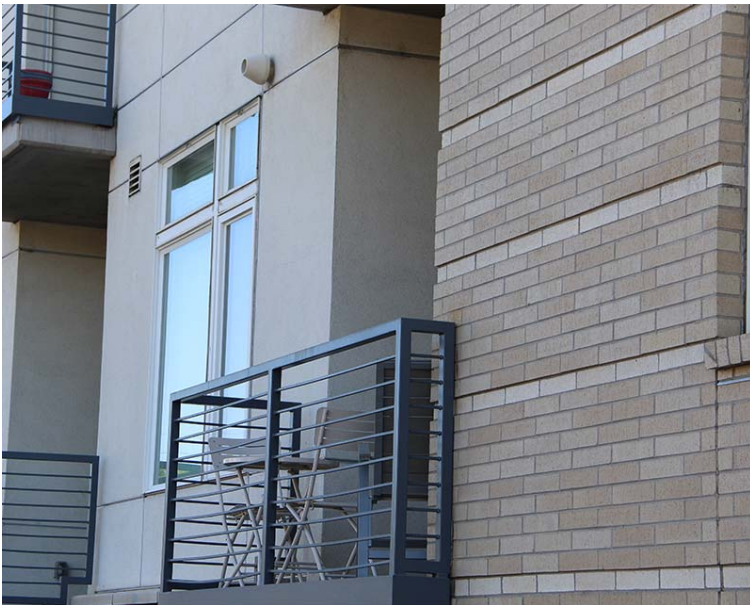
DOVE

PRODUCTION PLANT: PUEBLO

COLOR CLASSIFICATION: WHITE/GRAY

SIZE: MODULAR

TEXTURE: GRAIN



DARK GRAY

PRODUCTION PLANT: LAKEWOOD

COLOR CLASSIFICATION: GRAY

SIZE: MODULAR

TEXTURE: GRAIN

Pueblo Plant

Facebrick (Veneer)

Nominal Size (Inches)	Actual Size (Inches)	Name of Brick Size	Number Per Square Foot	Approximate Weight*	Number Per Bundle	Number Per Pack	Minimum Order Quantity**
4 x 2.6 x 8	3 ⁹ / ₁₆ x 2 ¹ / ₄ x 7 ⁹ / ₁₆	Modular	6.86	3.50	500	100	40,000
4 x 2.6 x 8.4	3 ⁹ / ₁₆ x 2 ¹ / ₄ x 8	8" Modular	6.50	3.60	500	100	40,000
4 x 4 x 8	3 ⁹ / ₁₆ x 3 ⁹ / ₁₆ x 7 ⁹ / ₁₆	Utility Modular (Closure)	4.50	5.20	300	60	25,000
3 x 3.2 x 9	2 ⁷ / ₈ x 2 ³ / ₄ x 8 ⁵ / ₈	Performance King	5.00	3.85	380	95	40,000
4 x 2.6 x 12	3 ⁹ / ₁₆ x 2 ¹ / ₄ x 11 ⁹ / ₁₆	Norman	4.50	5.20	300	100	33,000
4 x 4 x 12	3 ⁹ / ₁₆ x 3 ⁹ / ₁₆ x 11 ⁹ / ₁₆	Utility Norman (Utility)	3.00	8.20	180	60	20,000
4 x 4 x 16	3 ⁹ / ₁₆ x 3 ⁹ / ₁₆ x 15 ⁹ / ₁₆	Super Four Inch	2.25	11.20	134	68	10,000
4 x 4 x 16	3 ⁹ / ₁₆ x 3 ⁹ / ₁₆ x 15 ⁹ / ₁₆	Super Four Inch	2.25	11.20	180	N/A - Pallet	10,000

Super 16" Norman and Super Four Inch sizes are packaged in both bundles and on pallets depending on quantity and color selected. Please contact the plant for packaging type on your order.

Thin Brick (Thin Veneer)

Nominal Size (Inches)	Actual Size (Inches)	Name of Brick Size	Number Per Square Foot	Approximate Weight*	Number Per Bundle	Number Per Pack	Minimum Order Quantity**
.5 x 2.6 x 8	1 ¹ / ₂ x 2 ¹ / ₄ x 7 ⁹ / ₁₆	Modular Thin Brick	6.86	0.72	2500	50/box	50/box
.5 x 4 x 2.6 x 8	1 ¹ / ₂ x 3 ⁹ / ₁₆ x 2 ¹ / ₄ x 7 ⁹ / ₁₆	Modular Thin Brick Corner	5 per LF	1.20	1250	25/box	25/box

Additional sizes and thicknesses are available in thin brick. Please contact your representative for availability.

Lakewood Plant

Facebrick (Veneer)

<i>Nominal Size (Inches)</i>	<i>Actual Size (Inches)</i>	<i>Name of Brick Size</i>	<i>Number Per Square Foot</i>	<i>Approximate Weight*</i>	<i>Number Per Bundle</i>	<i>Number Per Pack</i>	<i>Minimum Order Quantity**</i>
4 x 2.6 x 8	3 ⁹ / ₁₆ x 2 ¹ / ₄ x 7 ⁹ / ₁₆	Modular	6.86	3.55	500	100	40,000
4 x 2.6 x 8.4	3 ⁹ / ₁₆ x 2 ¹ / ₄ x 8	8" Modular	6.50	3.65	500	100	40,000
4 x 2.6 x 8	3 ⁹ / ₁₆ x 2 ¹ / ₄ x 7 ⁹ / ₁₆	Modular Solid	6.86	4.80	500	100	40,000
4 x 2.6 x 8	4 x 2 ¹ / ₄ x 8	4 x 8 Solid	6.50	5.50	500	100	40,000
4 x 2.6 x 12	3 ⁹ / ₁₆ x 2 ¹ / ₄ x 11 ⁹ / ₁₆	Norman	4.50	5.40	300	100	33,000

Thin Brick (Thin Veneer)

<i>Nominal Size (Inches)</i>	<i>Actual Size (Inches)</i>	<i>Name of Brick Size</i>	<i>Number Per Square Foot</i>	<i>Approximate Weight*</i>	<i>Number Per Bundle</i>	<i>Number Per Pack</i>	<i>Minimum Order Quantity**</i>
.5 x 2.6 x 8	1 ¹ / ₂ x 2 ¹ / ₄ x 7 ⁹ / ₁₆	Modular Thin Brick	6.86	0.72	2500	50/box	50/box
.5 x 4 x 2.6 x 8	1 ¹ / ₂ x 3 ⁹ / ₁₆ x 2 ¹ / ₄ x 7 ⁹ / ₁₆	Modular Thin Brick Corner	5 per LF	1.20	1250	25/box	25/box

* Weights are approximate. Please contact plant for weight of units from order-specific production runs for shipment purposes.

** Minimum Order Quantities are for production of special order items. All special order items require an order signature verifying the customer will pay for the full production amount ordered.



SUMMIT

BRICK COMPANY

Phone: 303.592.7080

Fax: 303.629.9316

7576 West 5th Avenue
Lakewood, CO 80226

RE: ASTM and Manufacturer Liability

To Whom It May Concern:

ASTM standards are used to protect both the manufacturer and the customer from disputes and costly changes. These standards set expectations of what is to be made and the quality. ASTM clearly states that once the brick are placed into usage, a manufacturer will not be held liable for any perceived issues with the brick. The time to reject any brick is at the point of the mock wall (***always required***) and at the point of delivery of the brick. The onus is on the Owner, Architect, and Contractor (OAC) to inspect this brick before it is installed and then deem if it is acceptable. After the brick is installed, the manufacture cannot remedy any issues and ASTM no longer applies. ***USAGE CONSTITUTES ACCEPTANCE PER ASTM.***

NOTE 13—After brick are placed in usage, the manufacturer or the manufacturer's agent are not responsible for brick conforming to the requirements of this specification for chippage and tolerances.

X10.1.7 Unfortunately, in many cases, chippage requirements and other imperfections are often not considered until the brick are in place. Users of this specification should understand that this specification applies only to brick before they are placed in usage and not after. The reason for this is that after a shipment of brick is accepted, the manufacturer no longer has control over their condition, and cannot be responsible for protecting them against subsequent damage (Ref (10)).

Once the brick have been placed into usage, Summit Brick Company will not be held liable for any monetary compensation or punitive damages due to imperfections of texture, color, size, cracks/ and or chippage, or any other brick issues. By placing an order with Summit Brick Company, you agree to these terms. ***Brick must be rejected by the OAC before being placed into usage, per ASTM. Being placed into usage means installing the brick anywhere on the project other than the mock wall.***

Thank you for allowing us to partner with you on this project. If there is anything else you need assistance with, please don't hesitate to contact me.

Take care,

John Welte
VP of Sales
Summit Brick Company
303.592.7080
john.welte@summitbrick.com

summitbrick.com

Maintenance of Brick Masonry

Abstract: Even though one of the major advantages of brick masonry construction is durability, periodic inspections and maintenance can extend the life of brickwork in structures. This *Technical Note* discusses the benefits and elements of suggested inspection programs and describes specific maintenance procedures including replacement of sealant joints, grouting of mortar joint faces, repointing of mortar joints, removal of plant growth, repair of weeps, replacement of brick, installation of a dampproof course, installation of flashing in existing walls and replacement of wall ties.

Key Words: anchors, cleaning, dampproof course, efflorescence, flashing, inspection, maintenance, moisture penetration, mortar, repointing, sealant, ties, weeps.

SUMMARY OF RECOMMENDATIONS:

- Perform periodic inspections, preferably each season
- Determine moisture source before attempting repairs to correct moisture penetration
- Remove and replace torn, deteriorated or inelastic sealants
- When repairing mortar joints, surface grout hairline cracks and repoint damaged or deteriorating mortar joints
- Repoint with prehydrated Type N, O or K mortar, mixed drier than for conventional masonry work
- Remove ivy and plant growth that contributes to moisture penetration or deterioration of brickwork
- Exercise care in opening existing or drilling new weeps, to ensure that flashing is not damaged
- Install a dampproof course if missing or required
- Install remedial anchors and ties in accordance with manufacturer's recommendations
- Inspect masonry and correct all deficiencies before application of external coatings

INTRODUCTION

This *Technical Note* discusses maintenance of brick masonry with an emphasis on preventing moisture penetration. All buildings are unique and may experience different problems. A given solution may not remedy similar problems on all buildings. It is therefore suggested that a repair method which will effectively suit the particular needs of a building be selected when a problem occurs.

Generally, if brickwork is properly designed, detailed and constructed, it is very durable and requires little maintenance. However, many of the other components incorporated in the brickwork such as caps, copings, sills, lintels and sealant joints may require periodic inspection and repair. Neglecting maintenance of these components may lead to deterioration of other elements in the wall.

Maintenance of buildings may be broken into two general categories: 1) general inspection to identify potential problems with the performance of exterior walls; and 2) specific maintenance to correct problems which may develop. This *Technical Note* addresses both general and specific maintenance procedures. A checklist is provided for general inspections and specific repair techniques are described.

GENERAL INSPECTION

A thorough inspection and maintenance program may help extend the life of a building. It is a good idea to become familiar with the materials used in a building and how they perform over a given time period. **Table 1** lists various building materials and the estimated time before repair may be needed, given normal exposure. These times are based on brickwork in vertical applications, constructed of proper materials and workmanship and exposed to normal weathering conditions in the United States. Sills, parapets, chimneys and copings which experience more severe exposures may require repairs at shorter intervals.

Periodic inspections should be performed to determine

TABLE 1
Estimated Time to Repair of Materials

Material	Use	Estimated Time to Repair (Years)
Brick	Walls	100+
Sealant	Joints	5-20
Metal	Coping/Flashing	20-75
Metal	Anchors & Ties	15+
Mortar	Walls	25+
Plastic	Flashing	5-25
Finishes		
Paint	Appearance	3-5
Water Repellents	Dampproofing	5-10
Stucco	Appearance	5-10

the condition of the various materials used on a building. These inspections can be performed monthly, yearly, biennially, or any time period deemed appropriate. “Seasonal” inspection periods are recommended so that the behavior of building materials in various weather conditions can be noted. Inspection records, including conditions and comments, should be kept to identify changes in materials, potential problems and needed repair. **Table 2** is a suggested checklist of conditions that may require maintenance or repair. It is not all-inclusive; however, it may establish a guideline for use during inspections.

Conditions that may necessitate maintenance or repair actions include efflorescence, spalling, deteriorating mortar joints, interior moisture damage and mold. Once one or more of these conditions becomes evident, the origin of the problem should be determined and action taken to correct both the cause and visible effect of the condition. **Table 3** lists various conditions affecting brickwork and their most probable sources. The items checked in the table represent each source that should be considered when such conditions are observed in brick masonry.

TABLE 2
Brick Masonry Inspection Checklist

LOCATION		ITEM OR CONDITION	BUILDING ELEVATION			
			NORTH	SOUTH	EAST	WEST
Above Grade	Masonry	Cracked Units				
		Loose Units				
		Spalled Units				
		Hairline Cracks in Mortar				
		Deteriorated Mortar Joints				
		Missing or Clogged Weeps				
		Plant Growth				
		Deteriorated/Torn Sealants				
		Out-of-Plumb				
		Efflorescence				
		Stains				
		Water Penetration				
	Flashing/ Counter- flashing	Damaged				
		Open Lap Joints				
		Missing				
		Stains				
Below Grade	Caps/Copings/ Sills	Inadequate Slope				
		Cracked Units				
		Hairline Cracks in Mortar				
		Loose Joints				
		Open Joints				
		Out-of-Plumb				
		Drips Needed				
	Foundation Walls	Deteriorated Mortar Joints				
		Cracks				
		Separation from Flooring				
		Inadequate Drainage				
		Water Penetration				
	Retaining Walls	Spalled Units				
		Deteriorated Mortar Joints				
		Cracks				
		Out-of-Plumb				
		Dampness				
	Other Elements	Inadequate Drainage				
		Roof Overhangs				
		Gutters/Leaders				
		Seal at Adjacent Materials				
		Grade/Drainage				

SPECIFIC MAINTENANCE

After investigating all of the possible contributors the actual cause(s) of distress conditions may be determined through the process of elimination. Often the source will be self-evident as with deteriorated and missing materials; however, in instances such as improper flashing or differential movement the source may be hidden and determined only through building diagnostics. In any case, it is suggested to first visually inspect for the self-evident source before performing a more extensive investigation as it may save time and money in detecting the cause. Such a process should always be followed if the condition involves water penetration. Once the source is determined, measures can be taken to effectively remedy the moisture penetration source and its effects on the brickwork.

TABLE 3
Possible Sources and Effects of Masonry Distress

Observed Condition	Potential Cause of Condition								
	Incompletely Filled Mortar Joints See <i>Technical Note 7B</i>	Missing/Clogged Weeps	Plant Growth	Deteriorated/Torn Sealants	Capillary Rise	Missing/Damaged Flashing See <i>Technical Notes 7 Series</i>	Differential Movement See <i>Technical Notes 18 Series</i>	Previous Acid Cleaning See <i>Technical Note 20</i>	Previous Sandblasting See <i>Technical Note 20</i>
Cracked Units	■		■				■		
Spalled Units	■	■		■	■	■	■		
Deteriorated Mortar	■	■	■		■	■	■	■	■
Mildew/Algae Growth	■	■	■	■	■	■			
Efflorescence See <i>TN 23 Series</i>	■	■		■	■	■		■	
Moisture Related Stains	■	■		■	■	■			
Corrosion of Backing Materials	■	■		■	■	■		■	
Damaged Interior Finishes	■	■		■	■	■	■		

Removing Efflorescence

Generally, efflorescence is water-soluble and easily removed by natural weathering or by scrubbing with a brush and water. Proprietary cleaners formulated specifically for use on brickwork are effective in removing stubborn efflorescence (see *Technical Note 20*).

Use solutions specifically manufactured to remove efflorescence from brickwork. Improper acid cleaning procedures such as insufficient prewetting, rinsing and strong acid concentrations may cause additional staining, etched mortar joints and increase moisture penetration in brickwork. Stains caused by improper cleaning are not water-soluble, but can be removed by proprietary cleaners.

All cleaning procedures should first be tried at different concentrations in an inconspicuous area to judge their effectiveness and potential harm to the

brickwork. Additional recommendations and cleaning methods for brick masonry are presented in *Technical Note 20*. After cleaning, the mortar joints should be inspected. Repointing or grouting of the joints, as discussed later in this *Technical Note*, may be necessary.

Sealant Replacement

Missing or deteriorated sealants in and between brickwork and other materials such as windows, door frames and expansion joints may be a source of moisture penetration. The sealant joints in these areas should be inspected closely to discover areas where the sealant is missing, or was installed but has deteriorated, torn or lost elasticity. Deteriorated sealants should be carefully cut out and the opening cleaned of all existing sealant material. The clean joint should then be properly primed and filled with a backer rod (bond breaker tape if the joint is too small to accommodate a backer rod) and a full bead of high-quality, elastic sealant compatible with adjacent materials.

Mortar Joint Repair

Repair of cracked or deteriorating mortar joints is very effective in reducing the amount of water that enters exterior masonry. Cracks in brickwork that are more than a few millimeters in width or that are suspected to have been caused by settlement or other structural problems (for example, cracks that continue through multiple brick units and mortar joints, or follow a stepped or diagonal pattern along mortar joint) are beyond the scope of this *Technical Note*. These cracks often require professional investigation to determine the cause and appropriate method of repair.

Grouting of Hairline Cracks. If the mortar joints develop small “hairline” cracks, surface grouting may be an effective measure to fill them. The impact of surface grouting on brickwork aesthetics should be considered before work begins as the appearance of the mortar joints will change somewhat. A recommended grout mixture is 1 part portland cement, 1/3 part hydrated lime and 1 1/3 parts fine sand (passing a No. 30 sieve). The joints to be grouted should be dampened. To ensure good bond, the brickwork must absorb all surface water. Clean water is added to the dry ingredients to obtain a fluid consistency. The grout mixture should be applied to the joints with a stiff fiber brush to force the grout into the cracks. Two coats are usually required to effectively reduce moisture penetration. Tooling the joints after the grout application may help compact and force the grout into the cracks. The use of a template or masking tape may be effective in keeping the brick faces clean.

Repointing Mortar Joints. Moisture may penetrate mortar which has softened, deteriorated or developed visible

cracks, as shown in **Photo 1**. When this is the case, repointing (sometimes referred to as tuckpointing) may be necessary to reduce moisture penetration. Repointing is the process of removing damaged or deteriorated mortar to a uniform depth and placing new mortar in the joint, as shown in **Photo 2** and **Figure 1**.

Prior to undertaking a repointing project, the following should be considered: 1) The potential for power tools to damage the brick surrounding the mortar being cut out. 2) Repointing operations should only be performed by qualified and experienced repointing craftsmen. An individual who is an excellent mason may not be a good repointing craftsman. Skills should be tested and evaluated prior to the selection of the contractor or craftsman. 3) When repointing for historic preservation purposes, refer to *Preservation Brief 2: Repointing Mortar Joints in Historic Masonry Buildings*. [Ref. 7]

The deteriorated mortar should be removed, by means of a toothing chisel or a special pointer's grinder, to a uniform depth (refer to **Figure 1b**) that is twice the joint width or until sound mortar is reached. Care must be taken not to damage the brick edges. Remove all dust and debris from the joint by brushing, blowing with air or rinsing with water.

Repointing mortar should be carefully selected and properly proportioned. For best results, the original mortar constituents and proportions should be duplicated. If this is not possible, select a mortar that is similar or lower in compressive strength. Type N, O and K mortar are generally recommended, as mortars with higher cement contents may be too strong for proper performance. Proper proportions for Type K mortars are 1 part portland cement, 4 parts hydrated lime and 11¼ to 15 parts fine sand. Refer to *Technical Note 8* for material proportions of Type N and O mortar.

The repointing mortar should be prehydrated to reduce excessive shrinkage. The proper prehydration process is as follows: All dry ingredients should be thoroughly mixed. Only enough clean water should be added to the dry mix to produce a damp consistency which will retain its shape when formed into a ball. The mortar should be mixed to this dampened condition 1 to 1½ hr before adding water for placement.

The joints to be repointed should be dampened, but to ensure a good bond, the brickwork must absorb all surface water before repointing mortar is placed. Water should be added to the prehydrated mortar to bring it to a workable consistency (somewhat drier than conventional mortar). The mortar should be packed tightly into the joints in thin layers (¼ in. [6.4 mm] maximum), as shown in **Figure 1c**. The joints should be tooled to match the original profile after the last layer of mortar is "thumbprint" hard, as in **Figure 1d**. As it may be difficult to determine which joints allow moisture to penetrate, it is advisable to repoint all mortar joints in the affected wall area.

If only portions of the wall area are repointed, the repointing mortar should match the color of the existing mortar. Mortar materials should be mixed and the color matched to existing mortar that has been wetted. Several mix proportions can be made and placed on extra brick. Selection is made after the mortar specimens



Photo 1
Mortar Joints in Need of Repointing



Photo 2
Repointing Mortar Joints

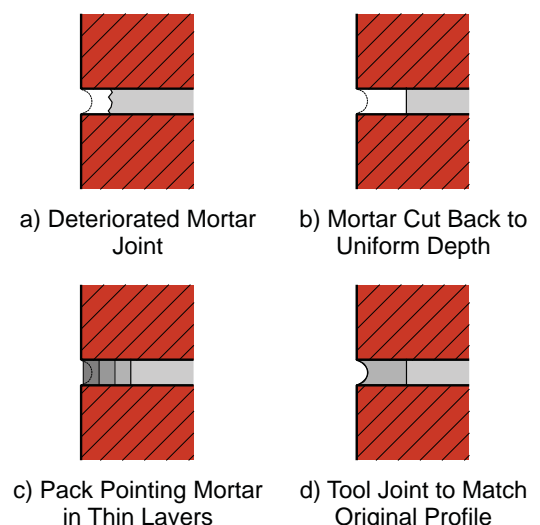
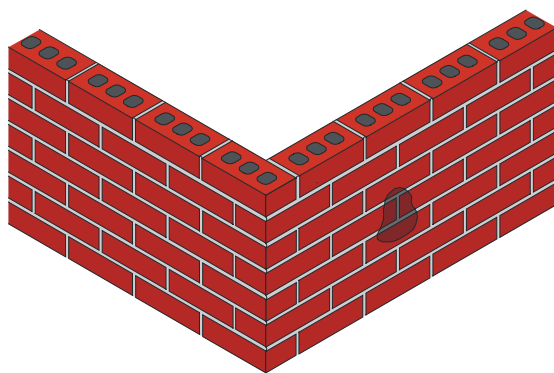
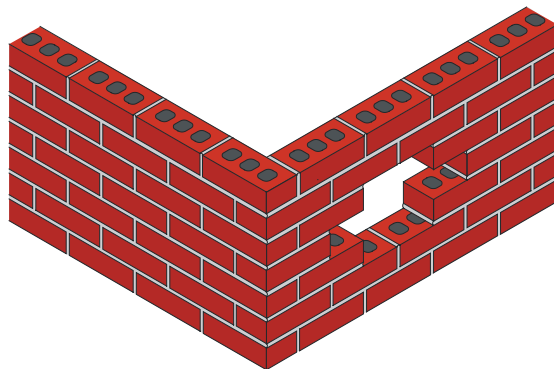


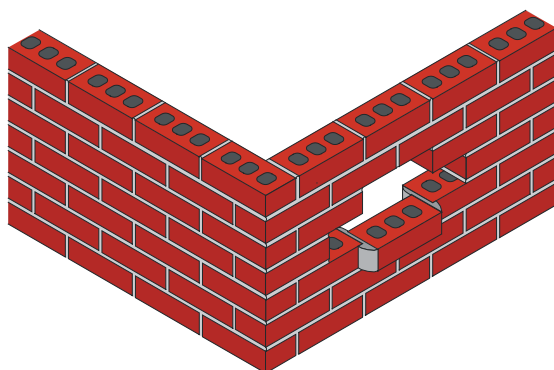
Figure 1
Repointing Mortar Joints



a) Damaged Brick



b) Remove Brick and Mortar



c) Butter Replacement Brick and Carefully Shove into Place

Figure 2
Replacement of Deteriorated Brick

Replacement of Brick

Moisture may penetrate brick that are broken or heavily spalled. When this occurs, it may be necessary to replace the affected units. The procedure shown in [Figure 2](#) is suggested for removing and replacing brick.

The mortar that surrounds the affected units should be cut out carefully to avoid damaging adjacent brickwork, as shown in [Figure 2b](#). For ease of removal, the brick to be removed can be broken. Once the units are removed, all of the surrounding mortar should be carefully chiseled out, and all dust and debris should be swept out with a brush. If the units are located in the exterior wythe of a drainage wall, care must be exercised to prevent debris from falling into the air space, which could block weeps and interfere with moisture drainage.

The brick surfaces in the wall should be dampened before new units are placed, but the masonry should absorb all surface moisture to ensure a good bond. The appropriate surfaces of the surrounding brickwork and the

are dried and compared to dry existing mortar.

Plant Removal

Certain types of plant growth may contribute to moisture penetration. For example, ivy shoots, sometimes referred to as “suckers”, penetrate voids in mortar and may conduct moisture into these voids. If this is the case, ivy removal may be necessary.

To effectively remove ivy and similar plants, the vines should be carefully cut away from the wall. The vines should never be pulled from the wall as this could damage the brickwork. After cutting, the shoots will remain. These suckers should be left in the wall until they dry up and shrivel. This usually takes 2 to 3 weeks. Care should be taken not to allow the suckers to rot as this could make them difficult to remove. Once the shoots dry, the wall should be dampened and scrubbed with a stiff fiber brush and water. Laundry detergent or weed killer may be added to the water in small concentrations to aid in the removal of the shoots. If these additives are used, the wall must be thoroughly rinsed with clean water before and after scrubbing.

To determine how the wall will appear once the ivy is removed, it is suggested that a small portion of the ivy (5-10 ft² [0.5 to 1.0 m²]) be removed from an inconspicuous area first. Repointing of the mortar joints may be necessary if the mortar has cracked or deteriorated.

Opening Weeps

Weeps should be inspected to ensure that they are open and appropriately spaced so that moisture within the walls is able to escape to the exterior. If weeps are clogged, they can be cleaned out by probing with a thin dowel or stiff wire. If the weeps were not properly spaced, drilling new weeps may be necessary. *Technical Note 7* outlines suggested types and spacing of weeps.

Since weeps are placed directly above flashing, care must be exercised to not damage the flashing when probing or drilling. The use of a stopper to limit the depth of penetration of the probe or drill bit may be effective in reducing the possibility of damaging the flashing where it turns up inside of the brick wythe.

replacement brick should be buttered with mortar. The replacement brick should be centered in the opening and pressed into position, refer to [Figure 2c](#). The excess mortar should be removed with a trowel. Pointing around the replacement brick will help to ensure full head and bed joints. When the mortar becomes “thumbprint” hard, the joints should be tooled to match the original profile.

Mortar proportions are selected as discussed in the section on Repointing. Matching the existing mortar color is important to keep the replacement location from being different in appearance. Similarly, replacement brick must match the color, texture and size of the existing brick. Locating a matching brick may take considerable effort.

Installation of a Dampproof Course

Moisture may migrate upward through brickwork by capillary action. This condition appears as a rising water line or “tide mark” on the wall and is referred to as “rising damp”.

Model building codes require the use of a dampproofing material on below grade masonry walls and flashing above grade. If these are omitted or improperly installed, rising damp may occur. The insertion of a dampproof course at a level above the ground, but below the first floor, may stop the rising moisture. The installation procedure can take one of two forms. One form is the injection of a synthetic chemical that forms a continuous dampproof barrier into an existing brick course. Holes are drilled into the course of brick and the synthetic material is injected. The other form of installation is the insertion of flashing through the brick wythe. One or more brick courses are removed, flashing is inserted, and the brick is replaced. Recommendations for brick removal and replacement are discussed in the following section.

Installation of Flashing

Flashing that has been omitted, damaged or improperly installed may permit moisture to penetrate to the building interior. If this is the case, a difficult procedure of removing brick, installing flashing and replacing the units may be required.

To install continuous flashing in existing walls, alternate sections of masonry in 2 to 5 ft (610 mm to 1.52 m) lengths should be removed. The flashing is installed in these sections and the masonry replaced, refer to [Photo 3](#). Alternately, temporary braces can be installed as longer sections of brickwork are removed, as shown in [Photo 4](#). The flashing can then be placed in these sections. The lengths of flashing should be lapped a minimum of 6 in. (152 mm) and be completely sealed to function properly. See *Technical Note 7* for other flashing installation recommendations. The opening is then filled as discussed under Replacement of Brick. The replaced masonry should be properly cured (5 to 7 days) before the intermediate masonry sections or supports are removed.



Photo 3
Flashing Installed in Alternating Sections



Photo 4
Flashing Installation Using Temporary Support

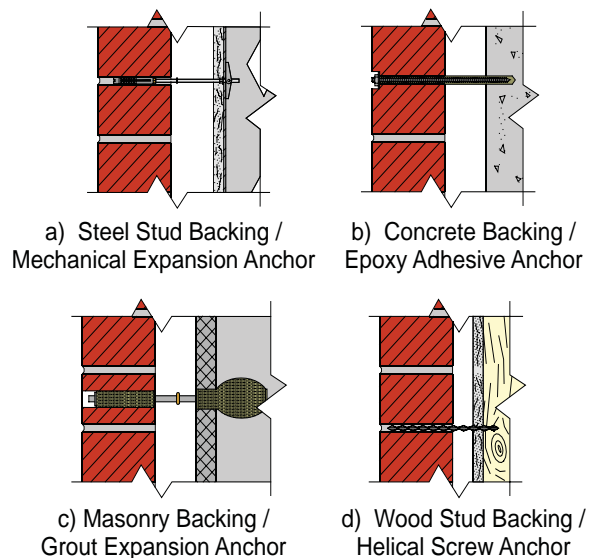


Figure 3
Masonry Re-Anchoring Systems

Installation of Wall Ties and Anchors

In instances where masonry walls have been constructed without a sufficient number of connectors or the existing connectors have failed, “retrofit” anchors may be used to attach the wythes or veneer and transfer lateral loads. Installing anchors in such a wall improves its strength and reduces the potential for cracking. Installation of most retrofit anchors involves drilling small holes in the masonry, usually in a mortar joint, through which the anchors are attached to the substrate. Generally, mechanical expansion, helical screws, grout- or epoxy-adhesive systems, shown in [Figure 3](#), are used to make the connection. Because the installation methods and limitations of each product are unique, consultation with the manufacturer is essential to assure proper application, detailing, installation, inspection, and performance.

Coatings and Water Repellents

The use of external coatings on brick masonry should be considered only after completing repair and replacement of brick, mortar joints and other building elements, and careful consideration of the possible consequences. Properly designed and constructed brickwork can be expected to satisfactorily resist water penetration without the application of water repellents or external coatings. However, they may be used successfully to correct some deficiencies. For example, some coatings are helpful in reducing the amount of water absorbed by barrier walls and masonry subject to extreme exposures such as chimneys, parapets, copings and sills.

External coatings are most effective in reducing water penetration when their intended use corresponds with the nature of the existing water penetration problem. Water repellents and coatings should not be considered equivalent to essential, code-required details that resist water penetration. Use of coatings for reasons outside their intended application rarely reduces water penetration and may lead to more serious problems.

Only water repellents that permit evaporation and the passage of water vapor, such as siloxanes and silanes, should be used on exterior brickwork. Film-forming coating should not be applied to exterior brickwork. *Technical Notes 6 and 6A* and manufacturer’s literature should be consulted before any coating is applied to brickwork.

SUMMARY

This *Technical Note* has presented maintenance procedures for brick masonry. Routine inspection of the building is suggested to determine the condition of the brickwork and related materials. If distress is noted, appropriate maintenance tasks should be performed. If the problem is moisture related, the source of moisture should be determined and corrected before other repairs are initiated.

The information and suggestions contained in this Technical Note are based on the available data and the combined experience of engineering staff and members of the Brick Industry Association. The information contained herein must be used in conjunction with good technical judgment and a basic understanding of the properties of brick masonry. Final decisions on the use of the information contained in this Technical Note are not within the purview of the Brick Industry Association and must rest with the project architect, engineer and owner.

REFERENCES

1. *Brick Brief*, “Ivy on Brickwork”, Brick Industry Association, Reston, VA, July 2005.
2. *Brick Brief*, “Repointing (Tuck-Pointing) Brick Masonry”, Brick Industry Association, Reston, VA, July 2005.
3. Grimmer, Anne E., “A Glossary of Historic Masonry Deterioration Problems and Preservation Treatments”, Department of the Interior, National Park Service, Preservation Assistance Division, Washington, D.C., 1984.
4. Higgins, L.R., *Maintenance Engineering Handbook*, Fifth Edition, McGraw-Hill Publishing Company, New York, NY, 1995.
5. Kreh, Richard T., Sr., *Masonry Skills*, Fifth Edition, Delmar Learning, Clifton Park, NY, 2003.
6. *Old House Journal*, No. 5, Vol. XIII, Brooklyn, NY, June 1985.
7. *Preservation Briefs No. 2*, “Repointing Mortar Joints in Historic Masonry Buildings”, Heritage Preservation Services, U.S. Department of the Interior, Washington, D.C., October 1998.



TEST REPORT

100 Clemson Research Blvd.
Anderson, SC 29625
(864) 656-1094
Fax: (864) 656-1095
www.brickandtile.org

Results of Tests on brick Conducted in accordance with ASTM C 67-18 Standard Test Methods for Sampling and

Testing Brick and Structural Clay Tile

10/09/2019

Name:	Summit Brick Company 601 E13th Street Pueblo , CO 81001	Plant:	Pueblo Plant	*Temperature: 60 - 90F
Phone:	719-542-8278	Report Number:	9094-21556	*Humidity: 30% - 70%
Fax:		Received Date:	09/10/2019	
		Sampled Date:	09/10/2019	
		Lot:		
		Product Code:		
Sample Description:	200 Clay Series/700 Clay Series Includes all textures and ironspots for Alaskan, Twilight, Misty, Dove, Thistledown, Snow Branch, Silverton, Winter Sky, Pebble Gray, Onyx, and Stone Creek			

							Test Date
Absorption	1	2	3	4	5	Average	
24 Hour Submersion in Cold Water (%)	6.24	5.97	6.56	6.09	6.25	6.22	09/16/2019
5 Hour Submersion in Boiling Water (%)	8.42	8.21	8.64	8.27	8.40	8.39	
Saturation Coefficient (Ratio of 24H to 5H)	0.74	0.73	0.76	0.74	0.74	0.74	
Compressive Strength	1	2	3	4	5	Average	
<i>psi</i>	7,650	8,200	7,657	6,992	6,956	7,491	09/20/2019
<i>MPa</i>	52.7	56.5	52.8	48.2	48.0	51.6	
Efflorescence	11	12	13	14	15		
	Not Effloresced	Not Effloresced	Not Effloresced	Not Effloresced	Not Effloresced		09/25/2019
IRA (Oven Dried Method)	6	7	8	9	10	Average	
<i>g/min/30 in.²</i>	5.9	18.6	11.7	6.0	12.9	11.0	09/24/2019
Average % Void	22.9						09/20/2019

The brick represented by the test results shown here comply with the physical property requirements of the standards listed below:

ASTM C 216 - 17a Standard Specification for Facing Brick (Solid Masonry Units Made From Clay or Shale)
Grade: SW, MW

Michael Walker, Quality Manager

**The temperature and humidity of the Bishop Materials Laboratory is constantly kept between 60 -90F, and 30-70% RH
The results shown above apply only to the samples tested, which are provided by the customer.
This test report shall not be reproduced except in full, without written approval of the laboratory.*



TEST REPORT

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Results of Tests on brick Conducted in accordance with ASTM C 67-16 Standard Test Methods for Sampling and

Testing Brick and Structural Clay Tile

04/25/2017

Name:	Summit Brick & Tile P. O. Box 533 Pueblo, CO 81002-0533	Plant:	Summit Brick & Tile	*Temperature: 60 - 90F
Phone:	719-542-8278	Report Number:	7475-16255	*Humidity: 30% - 70%
Fax:	719-542-5243	Received Date:	04/04/2017	
		Sampled Date:	04/04/2017	
		Lot:		
		Product Code:		

Sample Description: **200 Light Buff**

200 Light Buff includes All Textures: Basalt, Bluebridge, Chicago, Dapple Gray, Dark Gray, Dark Pewter, Evening Sage, Frosted, Autumn Rose, Light Buff, Light Buff Mang. Spec., Light Gray, Light Pewter, Fossil Gray, Misty Gray Mang. Spec., Morning Sage, Mountain Rose, Old Rose, Primrose, San Juan Blend, Sierra, Smokey Mountain, Scottsdale (formerly St. Charles), Teton Gray, Victorian

							Test Date
Absorption	1	2	3	4	5	Average	
24 Hour Submersion in Cold Water (%)	6.80	6.99	7.05	7.22	7.26	7.06	04/10/2017
5 Hour Submersion in Boiling Water (%)	9.04	9.03	9.08	9.11	9.22	9.09	
Saturation Coefficient (Ratio of 24H to 5H)	0.75	0.77	0.78	0.79	0.79	0.78	
Compressive Strength	1	2	3	4	5	Average	
<i>psi</i>	11,959	11,008	8,303	10,147	10,730	10,429	04/10/2017
<i>MPa</i>	82.5	75.9	57.2	70.0	74.0	71.9	
Efflorescence	11	12	13	14	15		
	Not Effloresced	Not Effloresced	Not Effloresced	Not Effloresced	Not Effloresced		04/19/2017
IRA (Oven Dried Method)	6	7	8	9	10	Average	
<i>g/min/30 in.²</i>	20.2	22.7	21.8	25.9	25.0	23.1	04/17/2017
Average % Void	19.5						04/12/2017

The brick represented by the test results shown here comply with the physical property requirements of the standards listed below:

ASTM C 216 - 16 Standard Specification for Facing Brick (Solid Masonry Units Made From Clay or Shale)

Grade: SW, MW

Michael Walker, Quality Manager

*The temperature and humidity of the Bishop Materials Laboratory is constantly kept between 60 -90F, and 30-70% RH

The results shown above apply only to the samples tested, which are provided by the customer.

This test report shall not be reproduced except in full, without written approval of the laboratory.



Phone: 719-542-8278

601 East 13th Street
P.O. Box 533
Pueblo, CO 81002-0533

Fax: 719-542-5243

SUMMIT BRICK 50 YEAR LIMITED PRODUCT WARRANTY

Summit Brick Company ("Summit") provides this Limited Product Warranty to the property owner ("Owner") that the brick manufactured and sold by Summit comply with the applicable specifications and rules of the ASTM International (formerly American Society for Testing and Materials) in effect on the date of manufacture. This Limited Product Warranty is effective for a period of FIFTY YEARS from the purchase date of material.

Exclusions and Limitations

This Limited Warranty does not apply to failure, damage, deterioration and/or color change resulting from the following:

- Any act of God such as tornado, hurricane, earthquake, fire, storm, flood, lightning, etc.
- Settling or movement of the structure and/or foundation resulting in cracking or failure of brick
- Improper mortar or failure and deterioration of mortar, including using a colorant in mortar that may affect the aesthetics of the property
- Improper masonry workmanship and/or building practices resulting in structural and/or aesthetic defects in the structure
- Non-compliance by the general contractor, subcontractor and or mason with all applicable building codes
- Vandalism, collision or any other accidental or intentional acts and events
- Poor construction applications and/or alterations, exposure to chemicals, pollution or acid rain
- Incidental or consequential damages
- Any use of brick that is not approved by a certified engineer or is not considered a standard and/or practical use of brick

Summit shall have the right, but may not be obligated, to inspect any claim that may arise from this Limited Warranty. The Owner shall provide a Summit representative access to investigate the nature, extent and cause of the alleged damage or defect. If the brick is deemed by the both Summit and Owner to not comply with the provisions of this Limited Warranty, Summit, at its sole expense, will replace the material for the owner. The material will be from current Summit production and every effort will be made to match the existing product. Because brick is a natural product, Summit does not guarantee that the replacement brick will be an exact match.

All Claims Must Be Submitted In Writing To "Summit: Attention Limited Product Warranty" At The Above Address

THE REMEDY PROVIDED IN THIS LIMITED PRODUCT WARRANTY SHALL BE THE SOLE REMEDY FOR ANY BREACH OF SUCH WARRANTY, AND IN NO EVENT SHALL SUMMIT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES RESULTING FROM A BREACH OF SUCH WARRANTY.

SOME STATES DO NOT ALLOW EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION OF EXCLUSION MAY NOT APPLY TO YOU. THIS LIMITED WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, AND YOU MAY ALSO HAVE OTHER RIGHTS THAT VARY FROM STATE TO STATE.

KNOTWOOD

IT'S NOT WOOD, IT'S ALUMINUM

Extrusion Manual

Installation Guide and Section Profiles

Provided by Parallel Rep



KNOTWOOD

IT'S NOT WOOD, IT'S ALUMINUM

WHITE SHADES



ASPEN



DRIFTWOOD



ASH



BEACH WOOD



ZEBRANO

BLACK SHADES



BLACK ASH

YELLOW SHADES



IROKO



TASSIE OAK



LIGHT OAK



KNOTTY PINE



SPOTTED GUM



HICKORY



MAPLE



BLACKBUTT

YELLOW SHADES

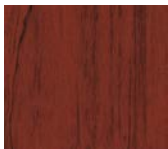


ATLANTIC
CEDAR

ORANGE SHADES



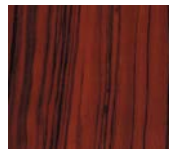
AUSTRALIAN
CEDAR



RED GUM



KOA



TIGER WOOD



MERBAU



IRON BARK

LIGHT BROWN SHADES



EASTERN
MAHOGANY



WESTERN RED
CEDAR



BUSH CHERRY



ELM



KWILA



TEAK BROWN

Stock Colors

Colors with a grey background are the Knotwood stock colors.

DARK BROWN SHADES



OLIVE TREE



BLACK WALNUT

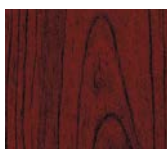


WENGE

RED SHADES



JARRAH



SYDNEY BLUE



ROSE
MAHOGANY

All Knotwood woodgrain finishes come with a **Limited Lifetime Warranty**. Unlike natural wood, Knotwood will NEVER rot, warp or crack. With next to no maintenance, these finishes will look like new from the day they are installed, and never need to be painted, stained or oiled.

What more could you ask for?

www.parallelrep.com

866.472.7255

**Colors shown are indicative only, please call Knotwood for a production prepared sample for final color selection.*

KNOTWOOD

IT'S NOT WOOD, IT'S ALUMINUM

CLADDING

Coated in Knotwood's award winning woodgrain finish, our cladding meets the highest finishing standards in the world. Backed by an industry leading limited lifetime warranty you can be sure that Knotwood cladding won't let you down. The unique hidden fastener system creates a clean finish that hides any unsightly screws or rivets. The interlocking system makes Knotwood cladding a smart choice when water penetration is a concern. Knotwood cladding requires next to no maintenance providing the benefits of wood without the drawbacks.



KNOTWOOD

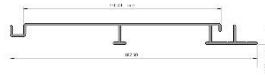
IT'S NOT WOOD, IT'S ALUMINUM

Profiles

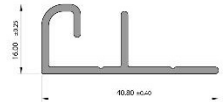
Cladding comes in 18' 6" lengths in any available Knotwood or powder-coat finish. Accessories come in 18' 6" lengths. Always consult the appropriate building codes when designing/constructing substructures.



KED100S - 4" x 5/8"
(Decking/Cladding Board)
NON-STOCK



KED150 - 150 x 16
(6" x 5/8" Interlocking Decking/Cladding)
STOCK



KEDSTRADJ - 18' 6"
(Decking/Cladding Starter Strip)
STOCK



KECFBF - 18' 6"
(Decking/Cladding Female Flashing Base)
STOCK



KECFTTLM - 18' 6"
(Decking/Cladding Male Flashing Top Clip)
STOCK



KECFJBF - 18' 6"
(Decking/Cladding Female Joiner Base)
STOCK



KECTJM - 18' 6"
(Decking/Cladding Male Top Joiner)
STOCK



KECIECLM - 18' 6"
(Decking/Cladding Male Internal/External Corner)
STOCK

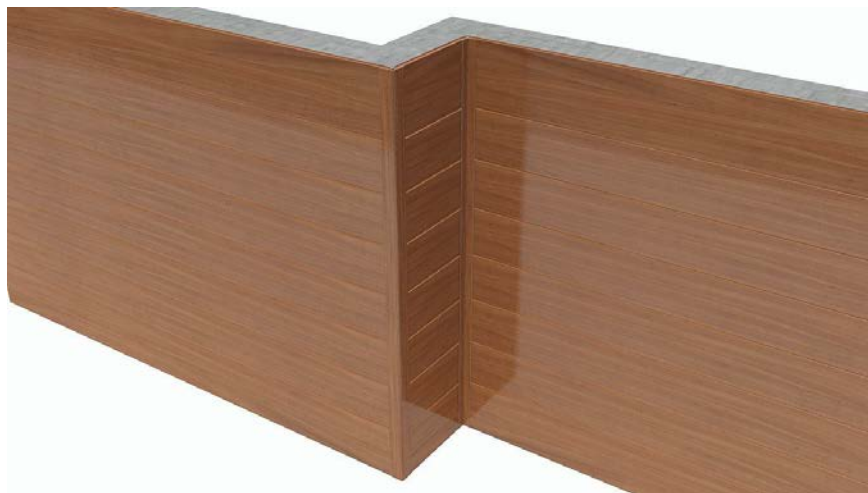
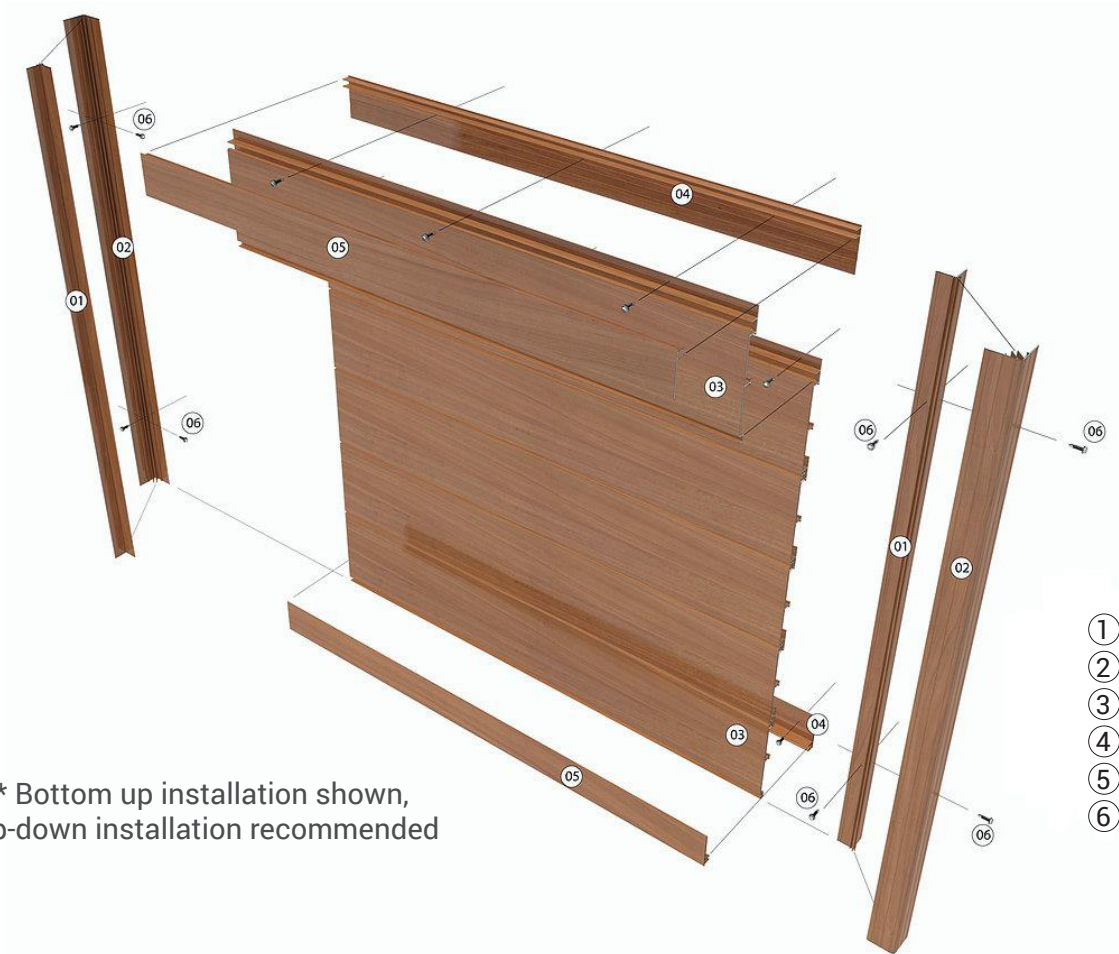


KECIECF - 18' 6"
(Decking/Cladding Female Internal/External Corner)
STOCK

KNOTWOOD

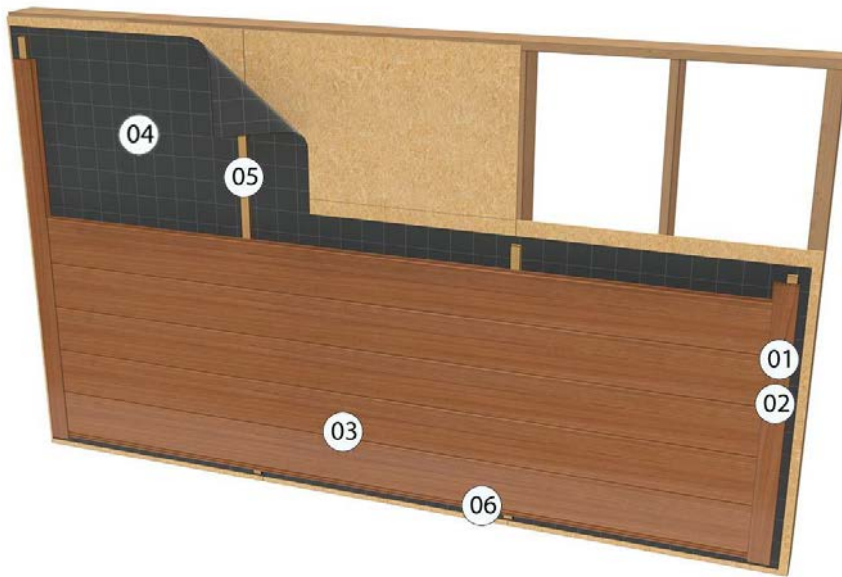
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INSTALLATION



KNOTWOOD

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- ① KECIECLM
- ② KECIECF
- ③ KED150
- ④ RAIN SCREEN (Per Spec)
- ⑤ BATTENS 6" Center (Per Spec)
- ⑥ KEDSTRADJ

* Bottom up installation shown,
top-down installation recommended

Starter Piece



- ① KEDSTRADJ
- ② KED150

KNOTWOOD

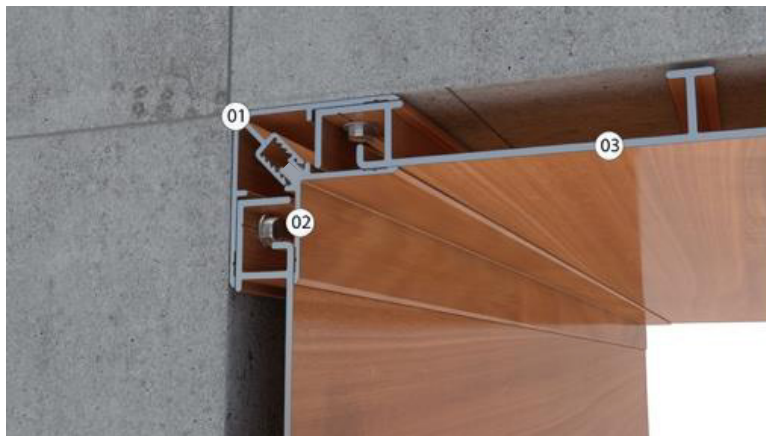
IT'S NOT WOOD, IT'S ALUMINUM



- ① KEDSTRADJ
- ② KED150

* Bottom up installation shown,
top-down installation recommended

Inside Corner



- ① KECIECF
- ② KECIECLM
- ③ KED150

KNOTWOOD

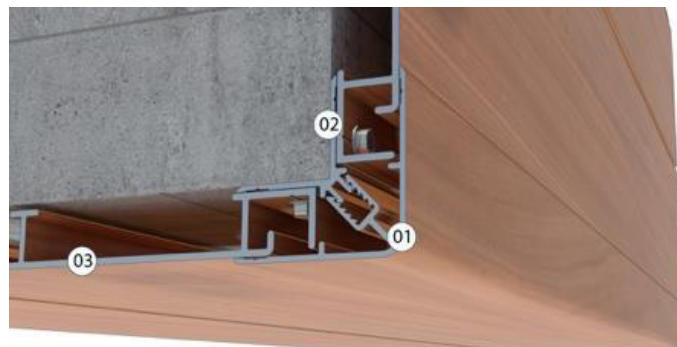
IT'S NOT WOOD, IT'S ALUMINUM

Outside Corner



- ① KECIECF
- ② KECIECLM
- ③ KED150

Finishing Pieces



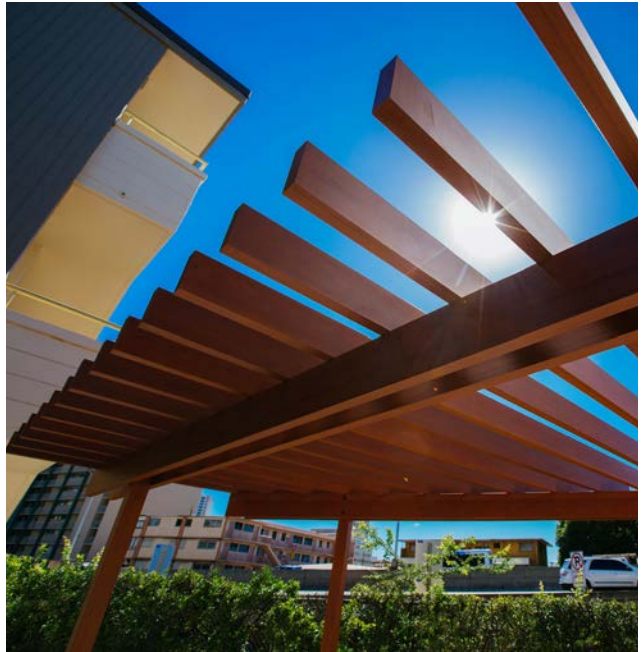
- ① KECFTTLM
- ② KECFBF
- ③ KED150

KNOTWOOD

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BATTENS AND PERGOLAS

Knotwood's Clip-Batten system is as revolutionary as it is eye-catching. A built-in bracket provides a unique floating look that hides unsightly bolts and provides a look you simply can't get anywhere else. Not only can you create stunning features, but the versatile system can be used to create an oasis in the form of a pergola or trellis.



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Profiles

Clip-Batten Profiles are designed for spans of up to 18' 6" without a joint. Wind loads may vary in different regions. Consult an engineer if unsure about the systems viability for a specific application. Profiles come supplied in any available color in an 18' 6" standard length. Battens are 36" on center.



KEB5050F - 50 x 50
(2" x 2" Batten Part B)
STOCK



KEB10050F - 50 x 100
(2" x 4" Batten Part B)
STOCK



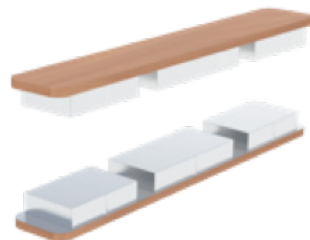
KEB15050F - 50 x 150
(2" x 6" Batten Part B)
STOCK



KEB20050F - 50 x 200
(2" x 8" Batten Part B)
STOCK



KEB5050M - 50 x 50
(2" x 2" Batten Part A)
STOCK



KAEC5050-R (2" x 2" Caps)
KAEC10050-R (2" x 4" Caps)
KAEC15050-R (2" x 6" Caps)
KAEC20050-R (2" x 8" Caps)

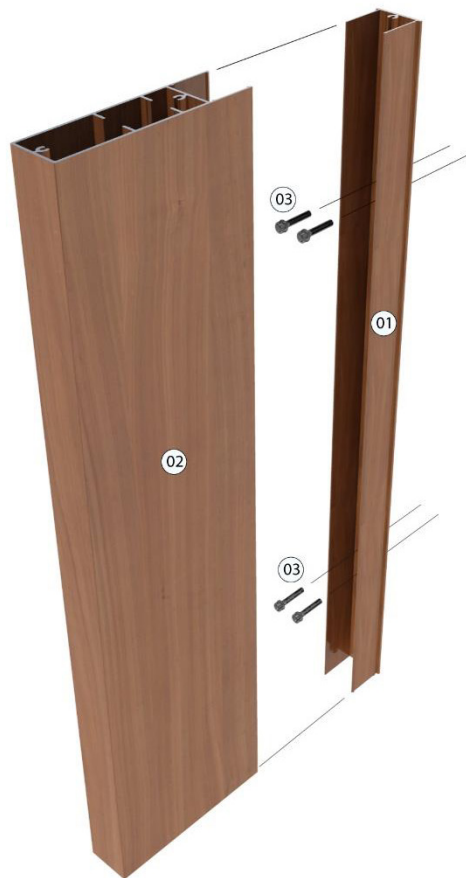
KNOTWOOD

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INSTALLATION

Any Part B can be used with the Part A Bracket. Installation Guides are for reference only.

Architectural Battens



- ① KEB5050M
- ② KEB15050F
- ③ SCREWS
- ④ KAEC5050-R (2x2 Caps)
KAEC10050-R (2x4 Caps)
KAEC15050-R (2x6 Caps)
KAEC20050-R (2x8 Caps)

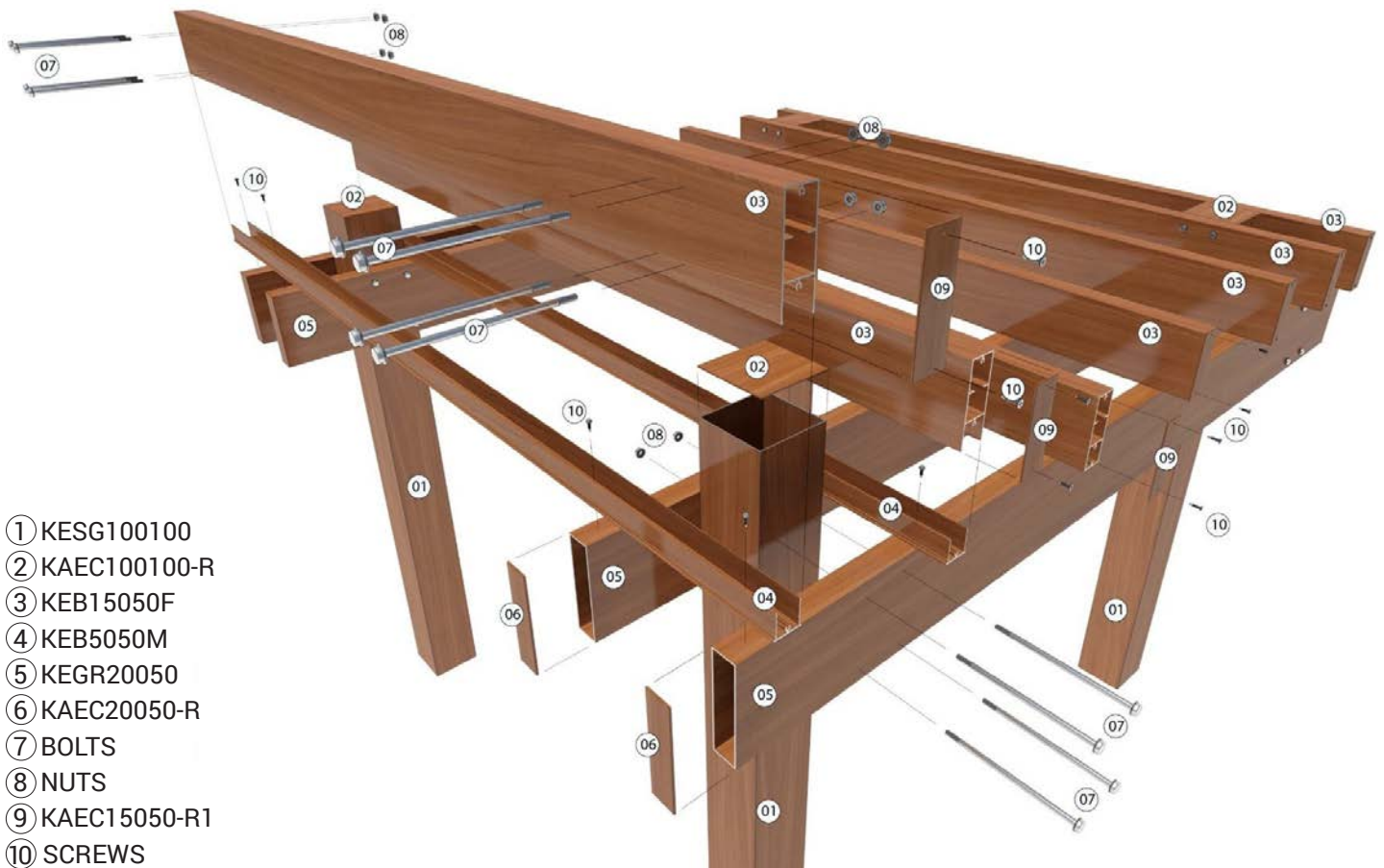
1. Attach KEB5050M to wall.
2. Clip KEB15050F onto the KEB5050M.
3. Repeat until complete.



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Pergolas



1. Install posts into ground (KEGS100100).
2. Bolt rails (KEGR20050) to posts (KEGS100100).
3. Screw (KEB5050A) to (KEGR20050) to either side of the posts.
4. Clip (KEB15050F) to (KEB5050M) and secure to posts with bolts.
5. Secure the remainder of the (KEB5050M) to rails at the desired spacing.
6. Clip the (KEB15050F) onto (KEB5050M)
7. Screw end caps (KAEC15050-R/KAEC20050-R) to batten and rails.



1. PRODUCT NAME

KNOTWOOD™
Batten System

2. MANUFACTURER

OmniMax International
30 Technology Pkwy. S, Suite 400
Peachtree Corners, GA 30092
Phone: 855.566.8966

3. PRODUCT DESCRIPTION

Knotwood™ Battens are made from 100% aluminum protected by a durable powder coat finish. They're immune to fire, rust, rot, insects and will never warp, split or crack. Even extreme heat or freezing cold can't damage Knotwood. Sublimated in Knotwood's award winning woodgrain finish or custom solid color coated, it meets the highest finishing standards in the world.

Knotwood's unique hidden fastener system creates a clean finish. The interlocking system makes Knotwood™ Battens a smart choice when water penetration is a concern. In addition, Knotwood™ Battens require next to no maintenance.

Sizes:
Battens are available in range of sizes from 1" x 2" up to 10" x 2" and even larger with the batten joiner.

Colors:
A wide variety of over 30 woodgrain colors as well as solid and custom color options.

4. TECHNICAL DATA

Material/Paint & Coatings Data:

- 100% Recyclable
- VOC-free coatings
- Lead free finishes
- LEED Certified Green Building Material

Non-Combustible Ratings:

- ASTM E84
- ASTM E84-17
- Class A Rating

5. INSTALLATION

Knotwood's ingenious batten click together system is a 2 part system designed for superior aesthetics. Knotwood™ does not rely on small clips to hold the battens either, it runs the whole length for easy attachment and strength.

6. AVAILABILITY & COST

Availability:

Batten systems are available through Knotwood™ distributors. A complete line of related Knotwood™ systems are available to complete any batten system. In addition, custom color matching is available.

Cost:

Contact Knotwood™ product distributors for current pricing. **Contact at -**
www.knotwood.com/contact-us

7. WARRANTY

Knotwood™ expressly warrants for a limited lifetime that its aluminum products are free from manufacturing defects in material or workmanship when installed according to Knotwood™ specifications and properly maintained.

WARRANTY (Continued)

The warranty provides for a 15-year warranty for the Knotwood™ finish, including checking/cracking, chalking, color change, gloss retention and adhesion of finish.

The full warranty details are provided at
www.knotwood.com/warranty

8. MAINTENANCE

Our products are designed to be effortless and low maintenance. Wash the surface with a mild solution of pure soap or mild non-abrasive kitchen detergent in warm water. Application should be with a sponge, soft cloth or soft bristle nylon brush, and should be gentle to prevent shiny spots. If cared for in this way, your Knotwood™ application should give many years of easy maintenance life.

9. TECHNICAL SERVICES

Complete technical information and literature available at
www.knotwood.com/architects - **Click here.**





www.static-coatings.com

Limited Lifetime Warranty for Knotwood™

Warrants to (name of Person or Entity where product is installed):	
--	--

That any Static Coatings (hereinafter referred to as "Static") aluminum products as identified by the Product Codes listed below. Static products will conform to the standards set out in Clause 1 and Clause 2 of this Warranty (attached), subject to the terms and conditions set out in Clause 3 of this Warranty (attached).

Print Name of Contractor or Owner:	
Project Name:	
Property Address:	
Substantial date of Completion:	
Description of product on job site:	
Product Order Number:	

I have read and agree to the terms of the Static Product 15-year finish warranty and acknowledge receipt of a copy of the Warranty Certificate.

Signature of Contractor or Owner:	
Date:	

Duly authorized on behalf of Static* – Name & signature:	
Date:	

*For purposes of this Warranty, OmniMax International, Inc. is the company providing the warranty for the Static products in North America as contained herein. All representations and responsibilities for the Static product in North America under this Warranty will be provided for by OmniMax International, Inc.

Clause 1. Static expressly warrants that its aluminum products are free from manufacturing defects in material or workmanship.

When installed according to Static specifications and properly maintained, such product is guaranteed against the following:

- 1.1 Buckling: The product itself will be free of any buckling that is not associated with the substrate and/or structure to which the Static system is attached. For the purpose of this warranty, buckling shall be defined as warping of the product(s) exceeding one sixteenth of an inch out of plane per linear foot.
- 1.2 Corrosion: When applied by an approved applicator and properly maintained, such product is further guaranteed against rusting and corroding. Subject to the limitations set out in Clause 3.
- 1.3 What we will do. If, during the Limited Warranty Period, the Product is defective in material or workmanship as noted in this Clause 1, Static will, in its sole discretion, replace the defective portion of the Product utilizing such normal materials, methods and workmanship as are needed to fulfill the original guarantee. Static's replacement of the defective Product of this Limited Warranty is the exclusive remedy for any defect in materials or workmanship. STATIC WILL NOT REFUND OR PAY ANY COSTS IN CONNECTION WITH LABOR OR ACCESSORY MATERIALS.

Clause 2. Static Finish

During the warranty period there will be:

- 2.1 Checking/Cracking. No visible checking or cracking of the Static Finish.
- 2.2 Chalking Resistance. No chalking of the Static Finish in excess of that represented by No.6 rating based on ASTM D4214.
- 2.3 Color Retention. No color change of the Static Finish greater than 5 (five) CIE Lab AE units calculated in accordance with ASTM 2244 Section 6.3. Color change shall be measured on the exposed paint surface which has been cleaned of oil, grease, chalk, oxidized film or other 3 contaminants, corresponding values shall be measured on the original retained batch panel. (Panel stored in the dark at temperatures below 30° C)
- 2.4 Gloss Retention. Coated surface will exhibit gloss retention of a minimum of 30% of the original. Gloss retention shall be measured on the exposed paint surface which has been cleaned of oil, grease, chalk, oxidized film or other contaminants, corresponding values shall be measured on the original retained batch panel. (Panel stored in the dark at temperatures below 30° C)
- 2.5 Adhesion. Adhesion of Static Finish when initially applied to test panels and measured by reference to AAMA 2604-02 Clause 7.4.1.1 will show no removal of the film.
- 2.6 What we will do. Static's exclusive liability under this Clause 2 warranty will be limited to refinishing, repairing and/or replacing, at Static's sole discretion, the defective portion of the Product. Static's replacement of the defective Product of this Limited Warranty is the exclusive remedy. STATIC WILL NOT REFUND OR PAY ANY COSTS IN CONNECTION WITH LABOR OR ACCESSORY MATERIALS.

Clause 3. Warranty Terms and Conditions

- 3.1 The "Warranty Period" for the warranties in Clause 1 shall mean the lifetime of the product for as long as the "owner", "purchaser" named above shall live and own the property on which the material was originally installed and for the warranty in Clause 2 shall mean fifteen (15) years, commencing on the date of completion.
- 3.2 Registration of the product is required for the warranty to be in effect. This warranty is valid for the original purchaser and one other owner of the structure where the product(s) have been installed.
- 3.3 One time transfer of warranty. Upon change of ownership, this Warranty, if still in effect, may be transferred to the new owner by the original purchaser under the terms and conditions of this Warranty, provided that the transfer must be registered not later than 90 days after transfer of the legal title to the property on which the product is installed; and provided that after the transfer, the Warranty shall be prorated based upon the date of installation.

The right to transfer this Warranty is limited to the original purchasers and does not extend to transferees. If the transfer is not registered within ninety (90) days after transfer of the legal title, then Static shall have no further obligation under this Warranty.

3.4 If, in Static's sole opinion, it is not commercially practical to repair, refinish or replace the product under either Clause 1 or 2, Static will as the sole exclusive remedy refund an amount up to the owner's original purchase price of the defective product.

3.5 The warranty will not extend or cover:

- a. Damages to the coated metal caused by handling, shipping, processing and/or installation; or
- b. Damages to the coated metal caused by scratching or abrading after installation; or
- c. Damages to the coated metal as a result of standing water in horizontal installations.
- d. Color variation and blemishes that occur as a direct result of the normal sublimation process. The product is designed to look like real wood, so there will be some color and image inconsistencies and not every piece of the product is designed to be exactly the same.
- e. The warranty will not be applicable to damage or failure, which is caused by acts of God, falling objects, external forces, explosions, fire, riots, civil commotion's, acts of war, or other such similar or dissimilar occurrences beyond Static's control.
- f. Customer shall make available to Static the dates of the installation of the coated metal, the maintenance records including details of washing and cleaning procedures in compliance with the annual cleaning requirements as stated in the Required Maintenance section of this warranty. Customers shall demonstrate that the failure of the coated metal was due to a breach of the warranty stated herein.
- g. Claims must be made in writing to Static within 30 days of the discovery of a problem and authorization obtained prior to beginning any repair and/or refinishing work. The claimant must provide proof of coverage. Claims can be made by writing to Static at the Product Performance Department. After receiving such notice, Static must be given a reasonable opportunity to inspect and verify the claim.
- h. The warranty on any refinished, repaired or replaced coated metal supplied hereunder shall be for the remainder of the warranty period applicable to the originally coated metal. All warranty work will be performed by a company or contractor selected by Static. Color variance between refinished and/or repainted product and original shall not be indicative of a defect.

3.6 **EXCLUSION OF WARRANTIES.** THIS WARRANTY REPRESENTS THE ENTIRE AGREEMENT BETWEEN PARTIES IN RELATION TO ITS SUBJECT MATTER AND SUPERSEDES ANY PREVIOUS AGREEMENT WHETHER WRITTEN OR ORAL BETWEEN THE PARTIES IN RELATION TO ITS SUBJECT MATTER. THE LIMITED WARRANTIES STATE THE ENTIRE LIABILITY OF STATIC WITH RESPECT TO THE PRODUCTS COVERED BY THEM. STATIC SHALL HAVE NO LIABILITY FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES. NO PERSON IS AUTHORIZED TO MAKE ANY REPRESENTATION OR WARRANTY ON BEHALF OF STATIC EXCEPT AS EXPRESSLY SET FORTH ABOVE, AND ANY SUCH STATEMENT SHALL NOT BE BINDING ON STATIC EXCEPT AS EXPRESSLY SET FORTH ABOVE, STATIC MAKES NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. WARRANTIES SHALL BE THE DURATION OF THE LIMITED WARRANTY OR SUCH SHORTER DURATION AS PROVIDED UNDER APPLICABLE LOCAL LAW. THESE LIMITED WARRANTIES GIVE YOU SPECIFIC LEGAL RIGHTS, AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM AREA TO AREA.

3.7 NOTHING IN THIS WARRANTY SHALL BE CONSTRUED AS A WARRANTY OF THE WORKMANSHIP OF ANY INSTALLER OR AS IMPOSING ON STATIC ANY LIABILITY FOR UNSATISFACTORY PERFORMANCE CAUSED BY FAULTY WORKMANSHIP IN INSTALLATION.

3.8 Required Maintenance. On an annual basis use a soft sponge or cloth, water and mild detergent, non-abrasive soap with the pH range of 5-9 to clean the powder coated area of dirt, grime and other debris. Pressure washing and the use of harsh detergents or chemicals is not recommended. Include in your maintenance records the following: date, time, specific products used, name of maintenance person and their designation, maintenance company name and general condition of the powder coated finish. Static requires freshwater cleaning and maintenance program be in effect to prevent corrosion from accumulated deposits.

The frequency of cleaning shall be more frequent in more corrosive areas according to the classification of exterior environments as defined in AS4312-2008. Consistent with the warranty and standards stated by the AkzoNobel Interpon powder coating warranty, in environments with very high corrosivity levels, such as industrial or marine, the normal frequency of cleaning should be at the minimum levels set forth in the below table:

Category (AS4312]	Corrosivity Level	Environmental Type	Required Cleaning
C1 & C2	Very Low & Low	Non-hazardous Environment	Every 12 months
C3/T	Medium	Typical Environment	Every 12 months
C4	High	Swimming & Leisure Pools / Light Industrial	Every 6 months
C4	High	Coastal Environment	Every 6 months
C5-M	Very High	Beach Front / Marine	Every 3 months
C5-I	Very High	Heavy Industrial Environment	Every 3 months

LOCAL EXAMPLES OF JR BUTLER GLAZING SYSTEM



PRISM
999 17TH ST
DENVER, CO 80202



SOUTHLANDS (20 BUILDINGS IN FINAL PHASE)
SOUTHLANDS, CO

Curtain Wall Performance

Captured Curtain Wall

-J3015t Captured System carries an NFRC 102 U-Factor of .39 (Based on 1" IGU with air infill)

-J3015t Captured System carries acoustic values of 32 STC / 26 OITC per ASTM E-1332
(Based on 1" IGU with air infill)

-J3015t Captured System carries a CRFf of 74 / CRFg of 69 (Based on 1" IGU with air infill)

Captured/SSG Curtain Wall

-J3015t System carries an air infiltration rating of <0.01 cfm/sf @ 6.24 psf

-J3015t System carries a static water pressure rating of 15 psf

Glazing Systems

Aluminum System

-3" wide x ~7" deep J3015t unitized curtain wall system
-2.25" x 4.5" Thermal Factory-Glazed Storefront Ribbon System

Aluminum Finish

-Aluminum Finish to be 2-coat 70% PVDF Kynar

Perimeter Conditions

-Vertical Perimeters: Captured
-Horizontal Perimeters: Captured

Intermediate Conditions

-Intermediate Verticals: Captured
-Intermediate Horizontals: Captured

Infill

-GL2: 1" Viracon VRE1-4322 (1/4" clear outboard lite, 1/2" argon VTS airspace, 1/4" clear inboard lite)
-GL3: 1" Viracon VRE1-3117 (1/4" clear outboard lite, 1/2" argon VTS airspace, 1/4" clear inboard lite)
-GL4: 1" Viracon VRE35-4322 (1/4" mid-iron outboard lite, 1/2" argon VTS airspace, 1/4" mid-iron inboard lite)

Anchorage

-System to anchor into studs with Tek Screws.

Warranty

-Manufacturer's standard warranty has been included. Standard warranties are issued from date of shipment of materials, not from date of acceptance and/or final completion.

-Manufactured curtain wall carries up to a 10 year warranty.

-Two-year installation warranty by JR Butler has been included from date of completion of the installation of materials on the project.

BOK MODERN SUNSHADES + EXAMPLES



BÖK Modern Sunshades are available in four distinct designs: Bracketed Sunshades, Full Height Bracketed Sunshades, Bracketless Sunshades, and Trellis Structures.

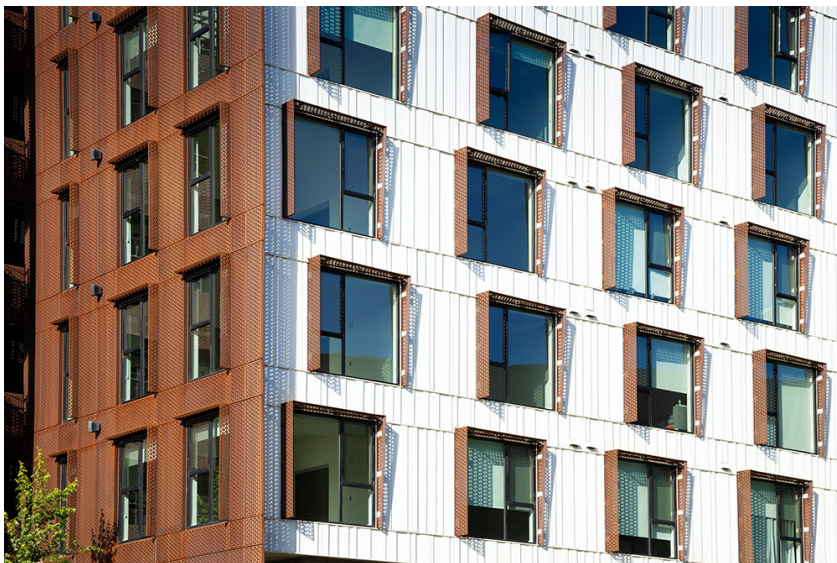
Sunshade Types

Bracketed Sunshades - provide sun-shading or rain protection by either a perforated or solid-panel style. These sunshades can be configured for one, two, three or four sides of the window. They can also be shaped into various tapered forms.

Bracketless Sunshades - BÖK's newest sunshade product, eliminates the need for a bracket protruding from the structure for a clean, uninterrupted visual appeal. It utilizes a 'nail-on' continuous attachment much like a 'nail-on' window fin. It is easier to install, easier to waterproof around, and because it does not require a bracket protruding from the building, they do not interfere with scaffolding placement, providing advantages during installation.

Customization

BÖK's panels can be created from a variety of flat sheet metals that are strategically designed and laser-cut in a customizable selection of patterns and shapes. The panels can be custom formed to an infinite variety of 3-dimensional configurations.

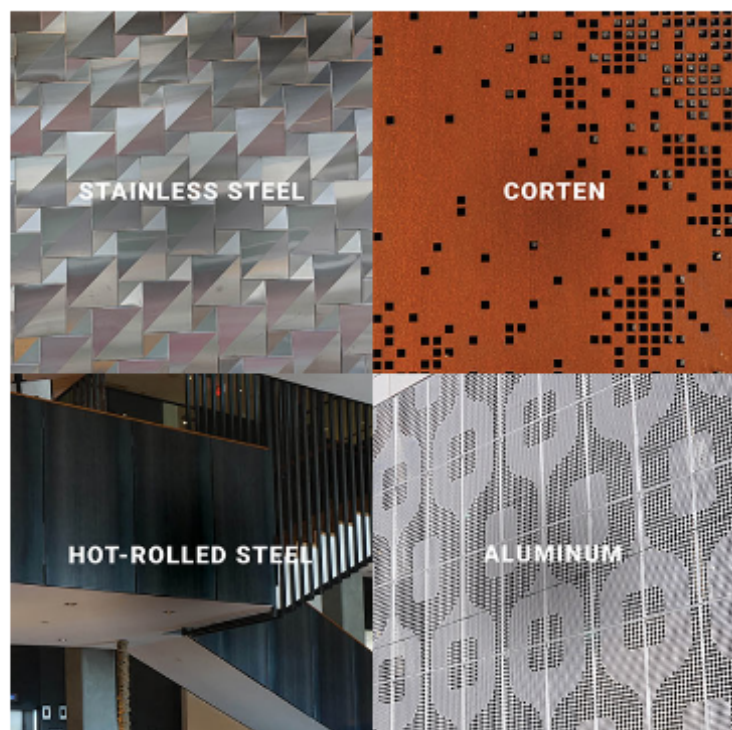


Panels:

Solid
Picket-style
Custom laser cut patterns to your specification.
Materials:

Aluminum
weathering steel
Finishes:

Kynar, IFS (AAMA 2605)
Powder coat (AAMA 2604)
Anodized



Material

Aluminum: 1/8", 3/16", 1/4"

Cold Rolled Steel: 12 Gauge, 10 Gauge

Cor-ten Steel: 12 Gauge, 10 Gauge

Hot Rolled Steel: 12 Gauge, 10 Gauge

Stainless Steel: 12 Gauge, 10 Gauge

Material gauges should be selected based on product type, panel size, and other engineering requirements for different applications. Please contact us for recommendations.



Finishes

Factory applied powder coat: Tiger Drylac Series 38 and 39, IGP Series 42, 59, and 57, 2-coat system for exterior and interior applications.

Factory-applied Kynar Fluoropolymer, PPG Valspar, Duranar, Duranar XL, 2-coat and 3-coat system, with a 10-year (or option for 20-year) warranty.

Factory anodized clear, light bronze, medium bronze, dark bronze, and black finishes are available. Contact us to learn more about color variations.