

**(Specifier Notes:**

***The purpose of this guide specification is to assist the specifier in correctly specifying thin limestone adhered veneer and its installation. The specifier needs to edit this guide specification to fit the needs of each specific project.***

***Throughout the guide specification, there are Specifier Notes to assist in the editing of this guide specification. Brackets [ ] have been used to indicate when a selection or a decision is required. References have been made to MasterFormat Division numbers and titles and should be coordinated with other Sections.)***

SECTION 04 46 00

THIN LIMESTONE ADHERED VENEER

**(Specifier Note:**

***There are several installation methods available for thin limestone adhered veneer however this guide specification specifies the mortar bed, setting bed, and pointing mortar to comply with 6.3.2 of TMS 402/ACI 530/ASCE 5 – Building Code Requirements for Masonry Structures.***

***Local building codes may require a specific installation method, and if so, the appropriate editing of this guide specification will be necessary. Refer to 2006 International Building Code (1405.9 and 2101.2.6) or 2009 International Building Code (1405.10 and 2101.2.6). Both versions references TMS 402/ACI 530/ASCE 5 – Building Code Requirements for Masonry Structures (6.1 and 6.3), which then references TMS 602/ACI 530.1/ASCE 6 – Specification for Masonry Structures (3.3.C).***

***Several tile installation product manufacturers have developed installation methods that comply with the intent of the building code, but may not comply with the letter of the building code. Some authorities having jurisdiction will accept, approve, or permit some of these installation methods. Consider consulting with Laticrete (since their products are named as the basis of design) or other manufacturers for the installation methods to determine which of their installation methods have been accepted, approved, or will be permitted by the local authority having jurisdiction.)***

PART 1 - GENERAL

1.1 SECTION INCLUDES

**(Specifier Note: RETAIN one of bracketed options in paragraph below.)**

- A. Thin limestone veneer adhered over [cast-in-place concrete][precast concrete panels][concrete masonry][gypsum sheathed steel studs][cement board sheathed steel studs].

1.2 SUBMITTALS

- A. Product Data: Manufacturer's technical literature for each product indicated, specified, or required.
- B. Samples for Initial Selection:
1. Mortar samples showing full range of colors expected.
  2. Make samples using same materials to be used on Project.
  3. Label samples to indicate type and amount of colorant used.
- C. Samples for Verification:
1. Limestone Units: Full-size samples for each different unit showing full range of limestone color, finish, and dimension to be expected.
  2. Mortar: Samples using same ingredients to be used on Project; labeled to indicate types and amounts of pigments used.

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3. Accessories: Samples of manufactured products.
  4. Flashing: Samples of each shape, profile, intersection and transition required, not less than 12 inches long, including end dam, and splice/lap joint for lintel/shelf angle flashing; demonstrate soldering quality.
- D. Installer Qualifications: Written data for company, principal personnel, experience, and training required by PART 1 "Quality Assurance" Article.
- E. Limestone Availability Certification: After samples are approved, certify availability of each limestone variety in sufficient quantities for work.

### 1.3 QUALITY ASSURANCE

- A. Installer Qualifications:
1. Experience: Company with not less than 5 years experience in performing specified work similar to scope of this Project, and with a record of successful in-service performance, and sufficient production capability, facilities and personnel, to produce required work.
  2. Supervision: Installer shall maintain a competent supervisor who is on jobsite during times specified work is in progress and who has minimum 10 years experience in installing systems similar to type and scope required for Project.
- B. Sheet Metal Flashing Installer Qualifications: Sheet metal firm experienced with proper fabrication and installation of specified work similar in design, material and extent to scope of this project, and with a record of successful in-service performance and completion of projects for minimum 10 years.

***(Specifier Note: RETAIN paragraph below if local building code requires a specific installation method and compliance with the code named.)***

- C. Quality Standards: In addition to specified requirements, comply with TMS 402/ACI 530/ASCE 5 for adhered masonry classification and prescriptive requirements, unless local building code has jurisdiction, whichever is more stringent.
- D. Mockups: Before beginning work of this Section, build as many mockups as required to verify selections made under submittals and to demonstrate aesthetic effects and for work execution. Use materials and installation methods specified.
1. Build 48 inch square for each type of veneer finish.
  2. Locate at locations indicated or, if not indicated, as directed by Architect; facing south.
  3. Clean exposed faces.
  4. Notify Architect 7 days in advance of dates and times when mockups will be constructed.
  5. Protect approved mockups from elements with weather-resistant covering.
  6. Maintain during construction in an undisturbed condition as a standard for judging completed work.
  7. Approval is for following qualities; approval does not constitute approval of deviations from Contract Documents, unless specifically approved by Architect in writing:
    - a. Color, texture, and blending of limestone units.
    - b. Color and blending of mortar.
    - c. Relationship of mortar and sealant colors to limestone colors.
    - d. Tooling of joints.
    - e. Effectiveness of cleaning.
    - f. Other aesthetic qualities as determined by Architect.
  8. When directed, demolish and remove mockups from site, including foundations.

E. Pre-Installation Conference:

1. Conduct at Project site.

***(Specifier Note: EDIT attendees in brackets that are appropriate to project conditions.)***

2. Attendees include Owner, Contractor, Architect, thin limestone veneer installer, [cold-formed steel stud framing installer], [sheathing installer], [concrete masonry installer], [cast-in-place concrete installer], Technical Representative of Manufacturer, and Owner's testing agency.
3. Review Contract Document requirements.
4. Review approved submittals.
5. Review installation procedures, including, but not limited to:
  - a. Handling, storing and protecting products and materials.
  - b. Evaluation of substrates on which work will be installed.
  - c. Fabrication and placement of flashings.
  - d. Preparation and mixing of mortar, including testing.
  - e. Setting limestone units.
  - f. Curing.
  - g. Protecting installed work, including stain prevention.
  - h. Cleaning installed work.
6. Tour representative areas of required work, discuss and evaluate for compliance with Contract Documents, including substrate conditions, surface preparations, sequence of installation and other preparatory work performed by other installers.
7. Review required inspection and testing.
8. Review forecasted weather conditions and procedures for coping with unfavorable conditions.
9. Record discussions, including decisions and agreements reached, and furnish copy of record to each party attending.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Limestone and Accessories: Store and handle according to following:

1. To prevent deterioration or damage due to contaminants, breaking, chipping, or other causes.
2. ILI's The Contractors Handbook on Indiana Limestone.

1.5 FIELD CONDITIONS

A. Stain Prevention: Prevent mortar and soil from staining exposed limestone.

1. Protect base of walls from rain-splashed mud and mortar splatter.
2. Protect sills, ledges, projections, and adjacent construction from mortar droppings.
3. Prevent rain from splashing mortar droppings or dirt from scaffolding onto face of exposed limestone.

B. Cold Weather Requirements:

1. Do no cementitious work when ambient temperature is less than 32 degrees F or when 40 degrees F or less and falling.
2. Provide heat and protection to protect work from freezing for not less than 48 hours after installation.
3. Distribute heat uniformly to prevent concentration of heat near sources; provide deflection or protective screens.

C. Warm Weather Requirements:

1. Protect work against uneven and excessive evaporation and from strong flows of dry air, both natural and artificial.
2. Apply and cure work as required by climatic and job conditions to prevent dryout during cure period.
3. Provide suitable coverings, moist curing, barriers to deflect sunlight and wind from work during cure period.

***(Specifier Note: RETAIN one of bracketed options in paragraph below; 25 years for installations over cast-in-place masonry, precast concrete panels, and concrete masonry and 15 years for installations over sheathing over metal studs.)***

1.6 WARRANTY

A. Installation Material Manufacturer Special Warranty: Furnish labor and material warranty agreeing to replace thin limestone adhered veneer due to following, for a period of [25][15] years from date of substantial completion, signed by authorized representative of installation materials manufacturer using manufacturer's standard form:

1. Manufacturing defects of installation materials.
2. Deterioration of thin limestone adhered veneer and installation materials under normal usage.
3. Installation workmanship of installation materials.

B. Exclusions:

1. Cracks in thin limestone adhered veneer due to structural movement or excessive deflection.
2. Deterioration of installation materials due to deterioration of thin limestone.

PART 2 - PRODUCTS

2.1 LIMESTONE

A. Material Quality Standard: ASTM C 568, Classification II or III.

2.2 THIN LIMESTONE UNITS

A. Basis of Design: Contract Documents are based on thin limestone units fabricated by Earthworks, Inc. to establish a standard of quality.

***(Specifier Note: RETAIN one of bracketed options in subparagraph below.)***

1. Selection: [Aux Vases][Cottonwood][Country Villa][Dove Gray][EW Gold][Fox Tail Blend][Harvest Mix][Ozora Tumbled Rubble][Rustic Cleft][Weathered Fieldstone][Woods Blend].
2. Dimensions: [ - insert for width, length, height, and depth as required - ].

***(Specifier Note: RETAIN one of bracketed options in subparagraph below.)***

3. Finish: [Snapped][Tumbled].

2.3 INSTALLATION MATERIALS

***(Specifier Note: EDIT materials in this article to coordinate with other specifications and installation method.)***

***(Specifier Note: Engineered wood products are not recommended as exterior sheathing as the substrate for thin limestone adhered veneer.)***

A. Gypsum Sheathing:

1. Description: ASTM C 1177, Type X, glass-mat gypsum board; paperless, treated, water resistant, noncombustible, gypsum core with inorganic glass mat partially or completely embedded on both faces; acrylic coated on one face; 5/8 inch thick; maximum lengths and widths available that will minimize short-edge-to-short-edge butt joints and to correspond to support system indicated.
2. Basis of Design: National Gypsum Co.; Gold Bond Brand e<sup>2</sup>XP Extended Exposure Sheathing.

B. Cement Board Sheathing:

1. Description: ANSI A 118.9 or ASTM C 1325, cementitious panels composed of portland cement, aggregates, glass mesh on both faces, and manufacturer's proprietary ingredients; capable of remaining unaffected by prolonged exposure to water; 1/2 inch thick
2. Basis of Design: National Gypsum Co.
  - a. Straight: PermaBase Cement Board.
  - b. Curved: PermaBase Flex Cement Board.

C. Screw Fasteners for Gypsum Sheathing and Cement Board:

1. Product Quality Standards:
  - a. Metal Framing Members less than 0.030 in Thick: ASTM C 1002, Type S.
  - b. Metal Framing Members from 0.033 in to 0.112 in Thick: ASTM C 954, Type S-12.
2. Description: Bugle head, self-drilling, self-tapping, steel screws with Phillips-head recess of size, holding power, and other properties recommended by manufacturer; minimum 1 inch long; with corrosion-protective coating having a salt-spray resistance of more than 800 hours according to ASTM B 117.

D. Mortar Bed:

1. Description: Factory prepared polymer fortified cementitious mortar.
2. Basis of Design: Laticrete International, Inc.; 3701 Fortified Mortar Bed.

E. Waterproofing Material:

1. Description: ANSI A 118.10 and A 118.12, load-bearing, single component, self-curing liquid rubber polymer that forms seamless, flexible membrane; resists cracks in substrate up to 1/8 inch wide.
2. Basis of Design: Laticrete International, Inc.; Hydro Ban.

F. Setting Mortar:

1. Description: ANSI A 118.4, factory prepared, low-VOC, non-sag, polymer fortified cementitious mortar specifically intended for adhering thin limestone; only requiring addition of water; includes antimicrobial to inhibit mold and mildew growth.
2. Basis of Design: Laticrete International, Inc.; Masonry Veneer Mortar.

G. Pointing Mortar:

1. Description: ASTM C 91, factory prepared, cementitious mortar specifically intended for pointing thin limestone in joints ranging from 1/2 inch to 1-1/4 inches; color as selected from manufacturers standard colors available; only requiring addition of water; includes antimicrobial to inhibit mold and mildew growth.
2. Basis of Design: Laticrete International, Inc.; Masonry Pointing Mortar with 1776 Grout Enhancer.

H. Flashing Mortar:

1. Description: ANSI A 118.10, multiple component, factory prepared, epoxy based waterproofing specifically intended for sealing seams, gaps, and joints between various substrates that when cured forms a flexible membrane.
2. Basis of Design: Laticrete International, Inc.; Latapoxy Waterproof Flashing Mortar.

2.4 EMBEDDED FLASHING MATERIALS

A. Sheet Metal Flashing

***(Specifier Note: Consider using Type 316 stainless steel in humid, coastal areas because it has more resistance to corrosion than Type 304.)***

1. Material:
  - a. Product Quality Standard: ASTM A 240 or A 666, Type 304.
  - b. Description: Stainless steel, 2D annealed finish, not less than 0.0250 inch (24 ga) thick, unless noted otherwise.
2. Solder:
  - a. Product Quality Standard: ASTM B 32, Grade Sn60.
  - b. Description: Solder with acid flux of type recommended by stainless steel sheet manufacturer; use a noncorrosive rosin flux over tinned surfaces.

2.5 SHEET METAL FLASHING FABRICATION

- A. Field Measurements: Where metal flashing is to fit, cope, or be tailored to other construction, check actual dimensions of other construction by accurate field measurements before fabrication.
- B. Fabrication Procedures: Fabricate continuous flashings in sections 96 inches long minimum, but not exceeding 12 feet. Provide splice plates at joints of formed, smooth metal flashing.
  1. Shop form flashing on a bending brake in lengths practical for application.
  2. Shape, trim and hand seam on bench as far as practical with proper tools.
  3. Form exposed metal work without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated.
  4. Make angle bends and folds for interlocking metal with full regard for expansion and contraction to avoid buckling or fullness in metal after installation.
  5. Form materials to shape indicated with straight lines, sharp angles and smooth curves.
  6. Fold and hem exposed edges of flashings.
- C. Flashing Joinery: Fabricate interior and exterior corners, intersections, and complex flashing conditions in shop, rather than in field, with properly folded, constructed and continuous soldered joints. Field fabricated units are not permitted and will not be allowed.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

#### A. Acceptance of Surfaces and Conditions:

1. Examine substrates for compliance with requirements, installation tolerances and other conditions affecting performance.
2. Proceed only when unsatisfactory conditions have been corrected in a manner complying with Contract Documents.
3. Starting work within a particular area will be construed as acceptance of surface conditions.

### 3.2 PREPARATION

- #### A. Substrate Condition: No defects or deficiencies that would result in poor or potentially defective installation of thin limestone adhered veneer, or would cause latent defects in work.

### 3.3 INSTALLATION

- #### A. Installation Quality Standards: In addition to standards specified elsewhere, perform work according to following, unless otherwise specified:

1. ILI – Indiana Limestone Handbook.
2. Delegated engineering.
3. Approved submittals.

***(Specifier Note: EDIT installation articles to coordinate with other specifications and installation method.)***

- #### B. Gypsum Sheathing: Install according to GA-253 and ASTM C 1280.

1. Install sheathing with coated face out, vertically or horizontally as recommended by manufacturer, with vertical edges centered over flanges of steel studs, with edges and ends fit tightly.
2. Avoid installing imperfect, damaged, wet, or damp sheathing.
3. Cut sheathing at penetrations, edges, and other obstructions of the work; fit tightly against abutting construction, except provide maximum 3/8 inch setback where sheathing abuts structural elements or materials that may retain moisture.
4. Coordinate installation with flashings so materials are installed in sequence and manner that prevent exterior moisture from passing through thin limestone adhered veneer.
5. Install screws at perimeter and within field to each steel stud approximately 8 inches on centers; set back minimum 3/8 inch from edges and ends; apply so screw heads bear tightly against sheathing face but do not cut into facing.
6. Avoid bridging building expansion joints with sheathing; cut and space edges to match spacing of structural support elements.

- #### C. Cement Board Sheathing: Install according to ANSI A 108.11.

***(Specifier Note: RETAIN paragraph below if surface of concrete masonry needs to be floated before installation of thin limestone adhered veneer.)***

- #### D. Mortar Leveling Bed: Float surface of concrete masonry with mortar bed of appropriate thickness to produce plumb and true surface for subsequent installation of other materials; allow to cure.

- #### E. Mortar Bed Over Metal Lath: Apply mortar bed over metal lath with mortar bed of appropriate

thickness to produce plumb and true surface for subsequent installation of other materials; allow to cure.

F. Waterproofing:

1. Pre-treat cracks, joints, transitions, and penetrations with waterproofing material, allow to dry.
2. Apply two coats of waterproofing material without pinholes, voids, thin spots, or other defects.

G. Flashings: Install flashings to direct infiltrated water to exterior; Drawings may not necessarily indicate or describe full extent of work required for completion of flashings.

1. Set sheet metal flashings true to line and levels and in proper locations with outside hemmed edges flush with building face location indicated; minimize quantity of lap joints by using longest units possible.
2. Securely attach sheet metal flashings to substrate with screw fasteners.
3. Terminate ends of horizontal flashings with properly folded and constructed end dams with a depth of not less than 1 inch, with continuous soldered joints.
4. Form neat and aligned 4 inch lap joints of horizontal sheet metal flashings and bed overlapping sheet metal in flashing mortar.
5. Apply flashing mortar to seal seams, gaps, and joints between flashings and various substrates.

H. Setting Thin Limestone:

1. Lay out walls in advance for accurate spacing of surface bond patterns, uniform joint thicknesses, accurate location of openings, movement-type joints, returns, and offsets.
2. Coat substrate with as much veneer mortar as can be covered while mortar surface is wet and tacky.
3. Beat thin limestone unit into mortar to ensure full bedding and flatness.
4. Remove excess mortar; do not allow mortar to dry on face of thin limestone units.

I. Pointing Thin Limestone:

1. Point up joints with pointing mortar including corners, openings, and adjacent construction, to provide a neat, uniform appearance.
2. Prepare joints for application of sealants, where indicated.

### 3.4 EMBEDDED FLASHINGS

A. General: Drawings may not necessarily indicate or describe full extent of work required for embedded flashing.

B. Scheduled Locations: In addition to conditions shown on Drawings, install embedded flashings within limestone cladding cavity at following locations to direct downward flow of infiltrated water within cavity to exterior:

1. Shelf angles with end dams at through-wall openings; and with lap joints.
2. Lintels without end dams or laps.
3. Jambs at through-wall openings, full height from sill to head.
4. Other obstructions.

C. Flashings: Install flashings to direct infiltrated water to exterior.

1. Set sheet metal flashings true to line and levels and in proper locations with outside hemmed edges flush with building face location indicated; minimize quantity of lap joints

- by using longest units possible.
2. Securely attach sheet metal flashings to substrate with screw fasteners.
  3. Terminate ends of horizontal flashings with properly folded and constructed end dams with a depth of not less than 1 inch, with continuous soldered joints.
  4. Form neat and aligned 4 inch lap joints of horizontal sheet metal flashings and bed overlapping sheet metal in flashing mortar.
  5. Apply flashing mortar to seal seams, gaps, and joints between flashings and various substrates.

### 3.5 ADJUSTING

#### A. Damage Repair:

1. If acceptable to Architect, repair damage according to ILI's Repairing Damage to Indiana Limestone.
2. If damaged cannot be repaired, remove and replace limestone units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units and install fresh mortar, pointed to eliminate evidence of replacement.

### 3.6 CLEANING

#### A. Final Cleaning: Clean installed work according to following:

1. ILI's Indiana Limestone Handbook.
2. ILI's How to Avoid Small Area Stains and Blemishes.

END OF SECTION