

## **TerraClad™ General Specifications**

### **PRODUCT NAMES:**

Terra cotta Panels and Related Work

### **MANUFACTURER:**

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## TECHNICAL SPECIFICATIONS: TERRA COTTA PANEL RAIN SCREEN SYSTEM

### PART 1 – GENERAL

[Items in brackets provide options or call for project specific information]

#### 1.1 SUMMARY

- A. The work of this section includes, but shall not be limited to, [unitized (panelized) or stick built] terra cotta panel rain screen system, a component of the exterior cladding system, consisting of the following:
1. Aluminum vertical track and clip (secondary support) system.
  2. Extruded hollow terra cotta panels.
  3. Silicone gaskets and isolators.
  4. Anchors, fasteners, flashings, weatherseals, cover plates and formed metal trim through and at the perimeter of the terra cotta panel rain screen system and other accessories required for a complete installation.
- B. Related work:
1. Division 3, Cast-in-place and precast concrete.
  2. Division 4, Unit masonry assemblies.
  3. Division 5, Cold-formed metal framing.
  4. Division 6, Exterior sheathing, Rough Carpentry.
  5. Division 7, Insulation, flashings, firestop systems, air and vapor barriers, and joint sealers.
  6. Division 8, Exterior aluminum curtain wall framing, windows, glass, and glazing.

#### 1.2 SYSTEM DESCRIPTION

- A. Design Criteria: Terra cotta panel rain screen system to be based on Construction Documents and Specifications, which indicate sizes, profiles, finishes, and dimensional requirements and shall consist of:
1. Hollow terra cotta panels hung on a pre-engineered aluminum track system with aluminum clip supports, gasket and trim.
  2. Silicone gaskets inserted into vertical track and silicone isolators wrapped around clips; provide [shadow line (standard black) or color consistent (custom color)] at vertical joint and compression bubbles in every track to maintain panel position across the façade and prevent wind induced rattle.
  3. Track to be attached to specified portion of wall assembly structurally sufficient to carry the terra cotta panel rain screen system and associated loads. TerraClad™ standard system weighs approximately 16-17 lbs/sq.ft.
- B. System shall be designed as a "rain screen" to allow for the following:
1. [Ventilated or Pressure equalization] in the air space behind the terra cotta panel.
  2. Movements within the structure, as specified in 1.3 Performance Requirements of this Section, and to fit within the space allotted without projections into adjacent finished space.
- C. Flatness: System shall be flat with no noticeable warp, buckling, deflections or other surface irregularities within manufacturer's specified tolerances.

### 1.3 PERFORMANCE REQUIREMENTS

- A. General: Design, fabricate and install components so that the completed exterior wall system will withstand live loads, the inward and outward pressures specified, and loads stipulated by the Building Code in effect for this Project.
1. The system shall have a design load of positive and negative pressures [project specific pressure up to 45 psf] when tested in accordance with ASTM E 330.
  2. Deflections within the system are to be limited to L/360 of their clear span or 5/8", whichever is less when tested in accordance with ASTM E 330.
  3. The system shall be attached to a wall whose deflections are limited to L/360 or 5/8", whichever is less.
- B. Movement: Design, fabricate and install system to withstand building seismic and thermal movements including deflections, temperature change without buckling, distortion, joint failure, panel fallout or breakage or undue stress on system components, anchors or permanent deformation of any kind in accordance with:
1. AAMA 501.4 for Static Seismic and Wind Induced Interstory Drifts
  2. AAMA 501.6 for Dynamic Seismic Drift.
- C. Infiltration/Penetration: The work of this Section shall be constructed to prevent air and water infiltration as outlined below:
1. ASTM E 283 - Air Infiltration: Allowable air infiltration will be 0.06 cfm or less per square foot when tested under a constant pressure of 6.24 psf.
  2. ASTM E 331 - Water Penetration: No uncontrolled water penetration shall occur when tested in static and dynamic modes, under a constant pressure of 15 psf with 5 gallons of water per hour applied per square foot for a period of 15 minutes.
  3. AAMA 501.1 – Standard Test Method for Exterior Windows, Curtain Wall and Doors for Water Penetration Using Dynamic Pressure.
  4. The complete system is to be designed to evacuate any moisture which penetrates beyond the outside surface materials and to weather proof with membrane flashing around all perimeters and openings through the system.
- D. [High Velocity Hurricane Zone - System to be able to withstand the following tests associated with HVHZ and Miami-Dade NOA
1. TAS 201-94 - Impact Test Procedures - Large Missile Impact
  2. TAS 202-94 – Criteria for Testing Products Subject to Cyclic Wind Pressure Loading
  3. TAS 203-94 – Criteria for Testing Impact & Non Impact Resistant Building Envelope Components Using Uniform Static Air Pressure
  4. ASTM E 1886 - Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials
  5. ASTM E 1996-06 – Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors and Impact Protective Systems by Windborne Debris in Hurricanes.]
- E. Color/Finish: Terra Cotta Panels shall be fired clay materials that achieve their final through-body or glaze color and texture through a kiln firing process forming permanent bonds.
- F. Testing:
1. Absorption (ASTM C67): 4.0% to 7.0%.

2. Modulus of Rupture (ASTM C99): 2,231 to 3,717 psi.
  3. Flexural Strength (ASTM C880): 2,280 to 3,457 psi.
  4. Weight (ASTM C67): 130 to 135 lbs/cu.ft.
  5. Weight per Unit Area (standard panel): 13 to 16 lbs/sq.ft.
  6. Linear Coefficient of Thermal Expansion:  $3.5 \times 10^{-4} \%$ .
  7. Freeze and Thaw (ASTM C67): 300 cycles.
  8. Hardness (Various Standard Colors): 7 to 9 Mohs scale.
  9. Efflorescence (ASTM C67): Not effloresced.
  10. Chemical Resistance (ASTM C126): No change in color or texture.
- G. Fabrication tolerances:
1. Dimensional Tolerance: 0.039 inch for any cut length up to 60 inches.
  2. Height: Plus or minus 1/16 inch up to 10 inches; plus or minus 3/32 inch up to 15 inches; plus or minus 1/8 inch up to 20 inches, plus or minus 5/32 inch up to 24 inch.
  3. Thickness, Cross Section of Panel: Plus or minus 1/16 inch.
  4. Straightness ("sweep"): Plus or minus 0.25 % of length.
  5. Diagonal Flatness: Plus or minus 0.25 % of diagonal.
  6. Vertical Flatness: Plus or minus 1.0 % of height.
  7. Torsion: Plus or minus 0.25 % of diagonal.

#### 1.4 SUBMITTALS

- A. Shop Drawings: Complete shop drawings shall be submitted for approval prior to fabrication including:
1. Elevations for each condition indicating terra cotta panel type and location.
  2. Section details, to convey proper fabrication/installation for terra cotta panel types.
  3. Shop drawings for wall assembly to receive terra cotta panel rain screen system to be coordinated with terra cotta panel rain screen system shop drawings.
- B. Samples: 3 sets of the following samples in the selected finish and color.
1. Initial color, if custom, will be submitted on a 6”h x 6”w tile. Standard colors may be selected from manufacturer’s color box.
  2. Two 12-inch long by full size profile of each type of panel. Samples shall represent the full range of color and texture proposed for the Work.
  3. [One 12-inch long by full profile sample of each type sheet metal trim and closure piece.]
- C. Product Data: Manufacturer’s latest published literature describing each product selection.
- D. [LEED Information:
1. Manufacturer shall supply a document on company letterhead stating:
    - A. Material & Resources requirement 1
    - B. Material & Resources requirement 2. . ]
- E. [Project Specific Tests: If Project Specific Test are required:
1. Manufacturer and fabricator to certify that performance tests specified have been performed and that products or systems, including finishes, comply with specified requirements.
  2. Submit 2 copies of test reports, prepared by the testing agency, for each specified test showing required performance criteria and test results.

Include reports of failures and remedial actions taken in test reports.  
 Arrange with the testing agency to prepare test reports in accordance with reporting procedures described in the Project Specified Test Standards.]

## 1.5 QUALITY ASSURANCE

- A. Installer/Fabricator Qualifications: Engage an experienced Installer/Fabricator, who has specialized in the erection and installation of types of systems similar to that required for this Project, to erect the terra cotta panel rain screen system.
  - 1. Installer/Fabricator shall be trained by the manufacturer and has engaged in similar work for a period of no less than 5 years.
- B. Manufacturer's qualifications: Engage a Manufacturer experienced in the manufacture of terra cotta panel rain screen system similar to those indicated for the Project, and with a record of successful in-service performance.
- C. Single responsibility:
  - 1. The terra cotta panel rain screen system, including panels, vertical track, clips and gaskets/isolators, shall be provided by the same firm unless otherwise noted.
  - 2. The terra cotta panel rain screen system shall have been in use for at least 5 years.
- D. [Mockup: Provide one completely assembled wall area, as shown in the Construction Documents, installed with all related accessories, in composite configurations and representative of the design as shown on the Drawings.
  - 1. Product used to assemble the mockup shall be the same as that to be installed onto the building.
  - 2. Extent of mockup shall be the same as that which will be provided in the final work.
  - 3. Mockup shall be installed simulating actual construction conditions, including actual structural supports and connections. Use means, methods and techniques proposed for final installation.
  - 4. Locate mockup in location as directed by the Architect.
  - 5. Personnel assembling mockup shall be the same personnel that will perform the actual work at the project site.]
- E. [Pre-Construction Compatibility and Adhesion Testing: Submit to joint sealant manufacturer samples of material that will contact or affect joint sealants for compatibility and adhesion testing as indicated below:
  - 1. Use test methods standard with manufacturer to determine if priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
    - a) Perform tests under normal environmental conditions that will exist during actual installation.]
- F. Pre-Installation Inspection: Installer to contact manufacturer of the terra cotta panel rain screen system Owner and Architect, prior to installation of terra cotta panel rain screen system if site conditions adverse to proper installation of the system exist.

## 1.6 HANDLING

- A. Protect components from adverse job conditions prior to installation.
- B. Protect components from other trades after installation.

C. Storage:

1. Store components on platforms or pallets, covered with tarpaulins or other suitable weather-tight ventilated covering. Store components so that water accumulations will drain freely.
2. Do not store terra cotta panels in contact with other materials that might cause staining, surface damage, or other deleterious effect.
3. Do not stack platforms or pallets one on top of another.

### 1.7 SPECIAL WARRANTY

- A. Manufacturer shall warrant the material of this Section for a period of 5 years from date of Substantial Completion against possible material defects.
- B. Installer shall warrant the workmanship of this Section for a period of 2 years from date of Substantial Completion against defects in Workmanship.
- C. The installation warranty shall provide that the exterior wall system will remain weather tight during the warranty period and that if any leaks occur due to faulty installation practices, components of the system will be repaired or replaced as required to render the system weather-tight, at no cost to the Owner.
- D. The warranty shall cover labor and materials.

## PART 2 - PRODUCTS

### 2.1 ACCEPTABLE MANUFACTURER

- A. Subject to compliance with requirements, manufacturer offering terra cotta panel rain screen system that may be incorporated in the work include the following:
  1. TerraClad™ by Boston Valley Terra Cotta USA (toll free 888.214.3655, tel. 716.649.7490 - www.bostonvalley.com)

### 2.2 MATERIALS

- A. Hollow terra cotta panels complying with the following:
  1. Finish: [Standard]
  2. Size: [As indicated on the Drawings]
  3. Color: [To be selected]
- B. Fasteners, clips, and vertical track: In accordance with manufacturer's recommendations to meet performance criteria specified.
- C. Vertical track:
  1. Aluminum alloy 6105 T5, mill finished.
- D. Flashing, Trim and other Accessories: Shop-fabricated, corrosion-resistant type capable of complying with the performance criteria specified and designed to allow adjustments of system prior to being permanently fastened.
- E. Supporting system fastening method: Pre-engineered aluminum track, and clip, complying with the following.
  1. Panels fastened at head grooves and base channels using aluminum clips inserted into vertical track.
  2. The aluminum vertical track is fastened to the building wall system as shown on the Construction Documents or Installation Contractor's Shop Drawings.
  3. The replacement of damaged panels, particularly in the field, must be

possible using simple methods and shall not require special tools nor damage the surrounding panels.

4. Silicone gaskets shall be colored black, unless specified by the Architect to match the panel color.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Terra cotta panel rain screen system installer to examine conditions affecting the work of this Section at site. If any conditions exist that would be detrimental to proper installation of terra cotta panel rain screen system, installer is to notify Architect and General Contractor / Construction Manager in writing.
- B. Correct conditions detrimental to the proper and timely completion of this work before proceeding with installation.

### **3.2 INSTALLATION**

- A. Do not install broken, chipped or cracked panels.
- B. Apply coat of bituminous paint on concealed aluminum surfaces to be in contact with steel, cementitious, and dissimilar materials.
- C. Install terra cotta panel rain screen system to wall assembly specified in accordance with the approved shop drawings and their manufacturer's instructions.
- D. [Conceal fasteners.]
- E. Place terra cotta panels in [stack bond] to lines and levels, plumb, with uniform, parallel joints, in accordance with their manufacturer's instructions.
  1. Use caution to prevent damage to terra cotta panels.
  2. When field-cutting, use caution to ensure that cuttings do not remain on exposed surfaces. Cut edges shall be sharp, without spalling.
  3. Cutting shall be performed with a diamond tipped wet saw.
- F. Ensure that assembly is plumb, level and free of warp or twist; maintain dimensional tolerances and alignment with adjacent work.
- G. [Built-in work:
  1. As work progresses, build in flashing and other items.
  2. Where applicable, remove protective film from finished aluminum surfaces.]
- H. Tolerances: Accurately align and locate components to column lines and floor levels; adjust work to conform to the following tolerances.
  1. Plumb: 1/8-inch in 10 feet; 1/4-inch in 40 feet; non-cumulative.
  2. Level: 1/8-inch in 20 feet; 1/4-inch in 40 feet; non-cumulative.
  3. Alignment: Limit offset to 1/16-inch where surfaces are flush or less than 1/2-inch out of flush, and separated by less than 2 inches (by reveal or protruding work); otherwise limit offsets to 1/8 inch.
  4. Location: 3/8-inch maximum deviation from measured theoretical location (any member, and location).
  5. Lipping between units: 1/16 inch maximum.
  6. Finished work shall be viewed from a distance of 15 feet per ASTM C216-07a.

### **3.3 CLEANING**

- A. Clean soiled surfaces using materials which will not harm terra cotta panels or adjacent materials, as recommended by the terra cotta panel manufacturer (clean with mild detergent using a natural bristle brush, starting from top of building to the bottom). Use non-metallic tools in cleaning operations. Pressure washer not to exceed 1200 psi.
- B. Upon completion of installation, remove protective coatings or coverings and clean aluminum surfaces, exercising care to avoid damage of finish.
- C. Remove excess sealant compounds, dirt or other foreign substances.
- D. Remove and replace terra cotta panels that are broken, chipped, cracked, abraded or damaged during construction period. Reinstall in accordance with their manufacturer's instructions.

**END OF SECTION**