

SECTION 074229 – TERRA-COTTA WALL PANELS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

1. Aluminum sub-grits system with integrated clip-system.
2. Extruded hollow terra-cotta tiles panels.
3. Flashing, weather-seals, cover plates and formed metal trim.
4. Miscellaneous anchors, fasteners, adhesives, insulation, vapor barrier, sealants, and related accessories.

- B. Related Requirements:

1. Division 06 Section "Sheathing".
2. Division Section 07 "Weather Barriers" for weather-resistive barriers.

1.3 SYSTEM DESCRIPTION

- A. Complete, pre-engineered façade system composed of terra-cotta panels mounted using an integral attachment system to vertical aluminum rail. The tiles and vertical mounting rails shall attach to horizontal aluminum rails carried by aluminum clips with thermal isolation pads fastened to the building structure.

1.4 SUBMITTALS

- A. Shop Drawings: For terra-cotta rainscreen system. Include plans, elevations, sections, full-size details, and attachments to other work.
 1. Include details of provisions for draining moisture occurring within the assembly to the exterior.
 2. Include details of each vertical-to-horizontal intersection of terra-cotta rainscreen system, showing the following:
 - a. Joinery
 - b. Metal substructure
 - c. Anchorage.
 - d. Expansion provisions.
 - e. Flashing and drainage.

- B. Delegated-Design Submittal: For terra-cotta rainscreen system indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
 - a. Calculations: Submit calculations for the design of the exterior wall system, including deflections, in place stresses, negative pull-off loads and capacity of fasteners.
- C. Product Data: Manufacturer's latest published literature describing each product selection.
- D. Samples: Submit 3 sets of the following samples in the selected finishes and color for Architect approval.
 - 1. Each type and composition of tile of each color and texture required, at least 24 inches in length.
 - 2. 12 inch long by full profile sample of each type sheet metal trim and closure pieces.

1.5 QUALITY ASSURANCE

- A. Performance Test Standards: Provide exterior wall system which has been tested and certified by manufacturer when installed as indicated and tested in accordance with:
 - 1. AAMA 501, "Methods of Test for Metal Curtain Walls," for specified resistance to air and water infiltration
 - 2. ASTM 283-04 "Standard Test Method for Determining Rate of Air Leakage through Exterior Windows, Curtain Walls, and Doors under Specified Pressure Differences Across the Specimen"
 - 3. ASTM E330-02 -- "Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference"
 - 4. ASTM E331-00 "Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference"
- B. Field Test: Provide suitable small sample area for field testing by Owner testing consultant for resistance to air infiltration and water penetration of a small representative sampling of installed ceramic tile cladding assemblies and adjacent perimeter construction per requirements of AAMA 501.901 Test Method B.
 - 1. Resistance to air infiltration using static air pressure difference: ASTM E 783- Field Measurement of Air Leakage through Installed Exterior Windows and Doors.
 - 2. Resistance to water penetration using static air pressure difference: ASTM E 1105- field Determination of Water Penetration and Installed Exterior Windows, Curtain walls and Doors by Uniform and Cyclic Static Air Pressure Difference.
- C. Manufacturer's Qualifications: Provide exterior wall system manufactured by a firm experienced in manufacturing systems that are similar to those indicated for this project and have a record of successful in-service performance.
- D. Qualifications of Installers:
 - 1. The cladding installer shall be approved by the manufacturer of the cladding.
 - 2. The installer will have experience with 30,000 Sq. Ft. of rainscreen installation.
 - 3. For actual installation of cladding, use only competent and skilled mechanics completely familiar with the products and the manufacturer's currently recommended methods of installation.
- E. Source Responsibility: The complete rainscreen system including panels and substructure shall be manufactured by the same company.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver exterior wall system components packaged to comply with manufacturer's/fabricator's requirements and adequately protected from damage during shipment.
- B. Protect components from adverse job conditions prior to installation.
- C. Protect components from other trades after installation.
- D. Stack exterior wall system components on platforms or pallets, covered with tarpaulins or other suitable weather-tight ventilated covering. Store components so that water accumulations will drain freely.
- E. Do not store exterior wall system components in contact with other materials that might cause staining, denting, surface damage, or other deleterious effect.

1.7 PRECONSTRUCTION TESTING OF TERRA-COTTA PANELS

- A. Absorption: Test according to ASTM C 67 using 24 hour submersion and 5 hours boiling (separate sets of specimens, minimum 5 specimens each). Absorption by submersion shall not exceed 1 percent average, 2 percent individual specimen. Absorption by boiling shall not exceed: 1 percent average, 3 percent individual specimen.
- B. Freezing and Thawing: Test according to ASTM C 67 for 100 cycles requiring minimum of 50 days (minimum 5 specimens). No specimen shall lose more than 3 percent of its original dry weight. No specimen shall crack, crumble or fracture. Specimens shall conform to approved color range samples before and after testing.
- C. Breaking Load: Test according to modified ASTM C 67 (minimum 5 specimens). Supports shall be actual hardware used for this project. Apply load at mid-span between supports. Report shall include breaking load, calculated section modules at mid-span, and calculated breaking stress.
- D. Separate sets of specimens are required to be tested for each combination of color and texture. For a given color and texture combination, the most common size tile for the project shall be tested, except for breaking load, where tile size corresponding to maximum span shall be tested. If multiple widths occur to maximum span, test width shall be selected by Architect.

1.8 MOCKUPS

- A. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
 - 1. Build mockup of typical wall area as shown on Drawings.
 - 2. Mock-up shall be subjected to testing criteria specified for final installation.
 - 3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 WARRANTY

- A. Warrant the material of this Section for a period of 10 years from date of Substantial Completion against defects.
- B. Warrant the workmanship of this Section for a period of 2 years from date of Substantial Completion against defects in workmanship.
- C. The warranty shall provide that exterior wall system will remain weather-tight during the warranty period and that if any leaks occur, that the system will be repaired or replaced as required to render the system weather-tight, at no cost to the Owner. The warranty shall cover labor and materials.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Design system to allow for all movements within structure, and to support loads transferred from the adjacent construction and to fit within the space allotted without projections into the finished space as shown on the drawings.
 - 1. The system shall have a design load of positive and negative pressures up to 40 psf.
 - 2. Deflections within the system are to be limited to $L/360$ or less when tested in accordance with positive and negative pressures and as required to prevent cracking or damage to tile facing.
 - 3. The exterior wall system shall be designed to meet all specified performance requirements. Where performance requirements result in more than one load or pressure, the load or pressure which produces the greatest stress shall govern.
 - 4. Live Load: Live load is defined as a 7.5 psf. force acting normal to wall at mid-height, cumulative to outward force.
- B. Movement: Design, fabricate and install system to withstand building, seismic and thermal movements including loading deflections, temperature change without buckling, distortion, joint failure, glass breakage, or undue stress on system components, anchors, or permanent deformation of any kind.
 - 1. Provide for thermal movement over an ambient temperature range of 120 deg. F. and a surface temperature range of 180 deg. F.
- C. Strength: Design system to withstand loadings as required by applicable codes, but not less than following minimum loadings.
 - 1. Wind: Uniform pressure of 25 psf. inward and outward wind pressures.
- D. Seismic: Conform to applicable codes. Allow for inter-story drift during seismic event. Inter-story drift at upper floors is calculated as 0.5" during a major seismic event.
- E. Condensation: System shall accommodate positive drainage for moisture entering or condensation occurring within panel system.
 - 1. Provide integral drainage to direct condensation and water infiltration within the wall to weeping points.
 - 2. Moisture entering joints and condensation occurring within cavity shall drain to exterior. Design drainage system to hold maximum anticipated moisture for 100 year rain cycle without overflowing.

- F. Flatness: The system is to have vertical aluminum joint spacer between panels to provide a uniformed joint dimension and align the panels vertically and prevent the panels from rattling and will assure perfectly flat façade.
 - 1. System shall be flat with no noticeable warpage, buckling, deflections or other surface irregularities.

2.2 MANUFACTURERS

- A. **Basis of Design** Manufacturer: Subject to compliance with requirements, *the Basis-of-Design manufacturer is “Kera20 System” by Agrob-Buchtal*, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following or equal: **[ADDENDUM NO.2]**
 - 1. **Basis-of-Design:** Agrob-Buchtal “Kera20 System”
 - 2. ~~Kingspan Products Boston Valley Terra Cotta~~
 - 3. ~~Porcelanosa USA NBK Architectural Terra Cotta~~

2.3 MATERIALS

- A. Hollow Terra-cotta Tiles complying with the following requirements:
 - 1. Size and Color: Matching Architect’s sample from manufacturer’s offerings.
 - 2. Finish: Glazed, matte
 - 3. Depth: 20mm as depicted in the drawings.
- B. Fasteners, Clips, and Anchor Channels
 - 1. Provide integral clips, anchors and channels in accordance with manufacturer’s recommendations to meet load requirements specified and to maintain a water-tight installation.
 - 2. The clips are integral to the system.
- C. Accessories: Corrosion resistant type capable of supporting cladding system and superimposed design loads; design to allow adjustments of system prior to being permanently fastened in place.
- D. Bituminous Paint: Cold-applied mastic, SSPC Paint 12, compounded for 30 mil thickness per coat.

2.4 SUPPORTING SYSTEM AND FASTENING

- A. Description: A complete, pre-engineered aluminum sub-girt system, complying with the following requirements:
 - 1. The panels are fastened at head grooves and base channels by means of integrated clips.
 - 2. Locate clips at corner points.
 - 3. The replacement of damaged panels, particularly in the middle sections, must be possible using simple methods and should not require special tools.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Supply metal anchors to be built in to other trades for placement. Provide insufficient quantity and direct placement.
- B. Ensure items built in by other trades for this work are properly located and sized.
- C. Establish lines, levels and shims as required. Protect from disturbance.
- D. Do not install broken, chipped or cracked tiles.

3.2 INSTALLATION

- A. Install anchor channels and clips as indicated and in accordance with manufacturer's instructions. Install sufficient anchorage devices to securely and rigidly fasten system to building. Fasteners to be concealed.
- B. Terra-Cotta Panel Installation
 - 1. Lay terra-cotta panels on mounting clips properly jointed with other work. Set terra-cotta tile in stack bond unless otherwise indicated.
 - 2. Place terra-cotta panels in accordance with lines and levels indicated, in strict accordance with manufacturer's instructions.
 - 3. Install system to allow adequate clearances around perimeter and to enable proper installation; allow for thermal movement within cladding assembly.
 - 4. Assemble and anchor various components to allow for expansion and contraction, maintaining watertight condition.
 - 5. Ensure assembly is plumb, level and free of warp or twist; maintain dimensional tolerances and alignment with adjacent work.
- C. Apply coat of bituminous paint on concealed aluminum surfaces to be in contact with steel, cementitious, or dissimilar materials.
- D. Tolerance: Accurately align and locate components to column lines and floor levels to the following tolerances:
 - 1. Plumb: 1/8" in 10' -0"; 1/4" in 40' -0"; non-cumulative.
 - 2. Level: 1/8" in 20' -0"; 1/4" in 40' -0"; non-cumulative.
 - 3. Alignment: limit offset to 1/6" where surfaces are flush or less than 1/2" out of flush, and separated by less than 2" (by reveal or protruding work); otherwise limit offsets to 1/8".
 - 4. Location: 3/8" maximum deviation from measured theoretical location (any member, and location).
- E. Built-In Work: As work progresses, build in anchor bolts, flashing and other items supplied by other trades.
- F. Cutting: Remove field cuttings from exposed surfaces.
 - 1. All mitered cuts should be made in factory.

3.3 CLEANING

- A. Clean soiled surfaces using materials which will not harm terra-cotta tile panels or adjacent materials.
- B. Consult terra-cotta panel manufacturer for acceptable cleaners. Use non-metallic tools in cleaning operations.
- C. Upon completion of installation, remove protective coatings or coverings and clean aluminum surfaces, exercising care to avoid damage of finish.
- D. Remove excess sealant compounds, dirt or other foreign substance
- E. Remove and replace terra-cotta panels that are broken, chipped, cracked, abraded or damaged during construction period. Install replacement panels in accordance with manufacturer's instructions.

END OF SECTION 074229