



**SPECIAL PROVISIONS
FOR
DECORATIVE PCC PAVEMENT**

**Butler County
HDP-014-7(036)--3C-12**

**Effective Date
May 15, 2012**

THE STANDARD SPECIFICATIONS, SERIES 2009, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SPECIAL PROVISIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

090210.01 DESCRIPTION.

A. Description of Work.

This part of the Specifications includes all labor, materials, transportation, tools, equipment, and supervision required to furnish and install/construct integral (full depth) colored and stamped PCC sidewalk accent paving including layout, subgrade preparation, forming, dowel bars, color concrete with stamped pattern finish, colored antique release agent, curing and sealing agents, expansion joint material, colored joint sealer, and all other incidental materials and labor required for providing colored and stamped paving at the locations and grades on the plans and as specified herein. For the coloring and stamping products used, all limitations and recommendations by the manufacturer shall be used and adhered to unless more stringent requirements are set forth.

B. Action Submittals.

1. Product Data: Submit manufacturer's complete technical data sheets for the following:
 - a. Colored admixture.
 - b. Powder antiquing release agent.
 - c. Imprinting/Texturing tools.
 - d. Curing & Sealing compound.
 - e. Slip resistant additive.
 - f. Colored joint sealer.
2. Samples for Verification: Provide minimum sized samples of 12 inch by 12 inch.
 - a. Submit one sample for each specified color. Include Manufacturer's standard color chart.
 - b. Submit one sample for each pattern and texture specified. Include Manufacturer's catalog of textures.

3. Concrete Mix Design: Submit mix design; include alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustment.
4. Shop Drawings: Joint layout.

C. Informational Submittals.

1. Qualification Data: For qualified Manufacturer, Installer and ready-mix concrete manufacturer.
2. Material Certificates: For the following, from manufacturer:
 - a. Cementitious materials.
 - b. Dowel bars and dowel bar accessories.
 - c. Admixtures.
 - d. Releasing Agent.
 - e. Curing and Sealing Compounds.
 - f. Applied finish materials.
 - g. Bonding agent or epoxy adhesive.
 - h. Joint fillers.
3. Material Source Information specified in Article 090210.01, D.
4. Minutes of pre-installation conference.

D. Quality Assurance.

1. Manufacturer Qualifications: Manufacturer with 10 years experience in production of specified products.
2. Installer Qualifications: An employer of workers trained and approved by manufacturer of decorative concrete paving systems (coloring and stamping).
 - a. Installer shall have a minimum of 5 years experience with work of similar scope and quality. Provide a list of five local projects completed by Installer that Engineer can examine.
 - b. The Installer shall provide a qualified foreman or supervisor who has a minimum of 5 years' experience with work of similar scope and quality required by this project.
3. Ready-Mixed Supplier Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment. Ready-Mix Supplier shall be trained and approved by manufacturer of color admixture. Responsibility for batching and mixing the color admixture shall be that of the Ready Mix Supplier.
4. Comply with the requirements of ACI 301, applicable portions of the Standard Specifications and Manufacturer's recommendations.
5. Material Source: Obtain each specified material from same source and maintain high degree of consistency in workmanship throughout Project. The material sources and mix proportions used during the project shall be accurately recorded and furnished to the Engineer at the completion of the project.
 - a. Obtain each aggregate from single source.
 - b. Obtain cementitious material of the same brand from same manufacturer's plant.
 - c. Obtain admixtures from single source from single manufacturer.

6. Mockups: Build mockups to verify selections made under samples submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - a. Construct mockup a minimum of 45 days in advance of starting concrete work to allow for sufficient curing times before final inspection.
 - b. Build mockups of full-thickness sections of decorative concrete paving to demonstrate typical joints; surface color; pattern; and texture; curing; and standards of workmanship.
 - c. Build mockups of decorative concrete paving where directed by Engineer, and not less than 8 foot by 8 foot. Contract may, at his own risk, used one of the bike rack parking areas as the job mock-up. If mock-up is not acceptable, it shall be removed at the Contractor's expense.
 - d. For accurate color, the quantity of concrete mixed to produce the mockup shall not be less than 3 cubic yards (or not less than 1/3 the capacity of the mixing drum on the ready-mix truck) and shall always be in full cubic yard increments. Excess material shall be discarded according to local regulations.
 - e. Final color selection shall be approved upon review of field mockup for color, texture and finish.
 - f. Contractor shall construct the mockup(s) using processes and techniques intended for use on permanent work, including, antique, curing and procedures. Demonstrate methods of obtaining consistent visual appearance, including materials, workmanship, and antiquing and curing method to be used throughout project. Thirty days will be needed for determination of final color of mockup. Include samples of control, construction, and expansion joints in sample panels. Field mockup shall be produced by the individual workers who will perform the work for the Project.
 - g. Retain samples of cements, sands, aggregates, color additives, antiquing release agent, non-skid/slip resistant additives and curing and sealer compounds used in mockup for comparison with materials used in remaining work.
 - h. If mockup is rejected, the Contractor shall bear all costs associated with its construction and removal. Additional mockups shall be made until approval is obtained.
 - i. Additional mockups shall be made until approval is obtained.
 - j. Accepted mockup provides visual standard for work of Section, as well as verify and approve the adequacy of wet and dry slip resistance. Once the mockup(s) for color, texture and finish are approved, the corresponding final concrete mix design shall remain consistent through the duration of the project to ensure uniform color, texture and finish of the colored stamped concrete.
 - k. Accepted mockup is prerequisite for beginning work on job.
 - l. Approval of mockup does not constitute approval of deviations from the Contract documents contained in mockups unless Engineer specifically approves such deviations in writing.
 - m. Field sample shall remain through completion of the work for use as a quality standard for finished work.
 - n. Field samples may remain as part of the completed Work. Remove field sample (s) when directed by Engineer.
7. Notification: Give a minimum of 7 calendar days notice to manufacturer's authorized field representative before date established for commencement of Work

E. Delivery, Storage And Handling.

1. Delivery: Deliver materials in manufacturer's original unopened, undamaged packaging and containers, with labels clearly identifying product name, manufacturer, batch number, expiration date, color name and number, weight, mixing and placement instructions, as applicable.
2. Storage:
 - a. Store materials in clean, dry area protected from damage, construction activity, in strict accordance with manufacturer's instructions.

- b. Keep containers/packaging sealed until ready for use.
 - c. Keep liquids from freezing.
 - d. Reseal partial containers.
 - e. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.
 - f. Imprinting tools must be stored flat, textured face up, with no objects resting on top.
 3. Handling:
 - a. Handle materials in accordance with manufacturer's instructions.
 - b. Protect materials during handling and mixing to prevent damage or contamination.

F. Project Conditions.

1. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.
2. Environmental Requirements:
 - a. Schedule placements to minimize exposure to wind and hot sun before curing materials are applied.
 - b. Avoid placing concrete if rain, snow, or frost is forecast within 24-hours. Protect fresh concrete from moisture and freezing.
 - c. Comply with professional practices described in ACI 305R and ACI 306R.
 - d. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside of manufacturer's absolute limits.
3. Schedule delivery of concrete to provide consistent mix times from batching until discharge. Mix times shall meet manufacturer's written recommendations.

G. Pre-Installation Conference.

1. A pre-installation conference shall be scheduled a minimum of 14 days prior to construction of the mockup. Conference shall be conducted by Contractor. Contractor shall insure representatives from each entity directly concerned with decorative concrete paving are in attendance, including:
 - a. Contractor's superintendent.
 - b. Ready-mix concrete manufacturer.
 - c. Decorative concrete paving Installer.
 - d. Manufacturer's representative of decorative concrete paving system.
 - e. Contracting Authorities' Engineer.
2. Purpose of the meeting shall be to:
 - a. Discuss concrete mix proportions to insure compliance with specifications and admixture supplier requirements.
 - b. Discuss contractor's paving sequence and operations.
 - c. Discuss finishing work, including jointing, surface texturing, release agent and sealing operations.
 - d. Discuss any other issues needing resolution prior to paving to insure the quality of the final pavement product.
 - 1) Quality control of concrete materials and decorative concrete paving construction practices.
 - 2) Scheduling and coordination of work.

H. Warranty.

Warranty shall be as required and specified in the Standard Specifications, including the following:

1. All material shall be warranted to be of consistent quality within standard acceptable manufacturing tolerances and shall not be defective.
2. Items covered under warranty shall be removed and replaced with new in accordance with contract documents; costs shall be incidental to contractor.

090210.02 MATERIALS.

A. Materials.

1. **Colored Admixture for Integrally Colored Concrete.**
 - a. Admixture shall be a colored, water-reducing, admixture containing no calcium chloride with coloring agents that are lime proof and UV resistant.
 - b. Colored admixture shall conform to the requirements of ACI 303.1, ASTM C979, ASTM C494, and AASHTO M194.
 - c. Admixture shall produce uniform and consistent color and be free of carbon black.
 - d. Color pigments shall be permanent, non-fading, wettable, weather resistant, non-bleeding, alkali resistant, stable to atmospheric conditions, and free of deleterious fillers and extenders.
 - e. Admixtures shall be non-corrosive and neither initiate nor promote corrosion of steel tie-bars embedded in concrete.
 - f. Colors: As indicated in drawings; exact color determination will be made from manufacturer's standard color palate and from job mockup.
 - g. Acceptable Manufacturer's: Subject to compliance with the requirements, following is a list of acceptable manufacturers for decorative concrete admixtures:
 - 1) L.M. SCOFIELD COMPANY, Douglasville, Georgia and Los Angeles, California
Phone: (800) 800-9900 or the Central Division Office – Phone: (630) 377-5959.
 - 2) BUTTERFIELD COLOR, Aurora, Illinois; Phone: (800) 282-3388
 - 3) DAVIS COLORS, Los Angeles, California; Phone: (323) 269-7311
2. **Stamping/Imprinting Tools and Materials.**
 - a. System of matched tools for imparting textures and patterns into freshly placed concrete surfaces.
 - b. Pattern skins or stamp mats shall be semi-rigid polyurethane with projected texture and ridged underside capable of imprinting texture and joint patterns to plastic concrete.
 - c. Pattern/Finish: As indicated in drawings; exact pattern/finish determination will be made from manufacturer's catalog of patterns/finishes and from job mockup.
3. **Powder Antiquing Release Agent.**
 - a. Release agent shall be non-fading finely ground, streak free, colored powder material formulated to break the bond between imprinting tools and surface of color-hardened concrete while imparting an antiqued appearance.
 - b. Release agent shall be compatible with integral color additives and shall not cause degradation of stamping/imprinting tools.
 - c. Shall conform to ASTM C 979 in reference to color stability.
 - d. Coloring agents shall be lime proof and have maximum resistance to the effects of sunlight (UV).
 - e. Shall not impair subsequent treatments of concrete surfaces.
 - f. Color: As indicated in drawings; exact color determination will be made from manufacturer's standard color palate and from job mockup.
4. **Curing and Sealing Compound.**
 - a. Clear, Solvent-Borne, Membrane-Forming Curing and Sealing Compound: ASTM C 1325, Type I, Class A, manufactured for use with colored concrete. No fillers, oils, waxes or saponifiable resins shall be contained in the mixture.
 - 1) Blend of 100% methacrylate Polymers & UV inhibitors in fast drying solvent.

D. Concrete Mixing.

1. Ready-Mixed Concrete: Measure, batch, and mix materials and concrete according to ASTM C 94. Furnish batch certificates for each batch discharged and used in the Work.
 - a. Comply with Section 2301 of the Standard Specifications.
 - b. Concrete color admixture shall be added at the batch plant in accordance with manufacturer's written recommendations. Add colored admixture to the mix according to manufacturer's written instructions in premeasured bags, not by weight of cement content. Color admixture may also be in liquid form.
 - c. Thoroughly clean mixer drum to assure absence of contaminants which may affect consistency of color.
 - d. The minimum concrete color batch size shall be 3.0 cubic yards in 1.0 cubic yard increments.
 - e. If the pigment is batched from large bags, always use a whole number of bags per truck. Do not batch partial bags. Using a partial bag of color pigments can cause changes in the concrete color.
 - f. Monitor slump closely during batching. Slump variations often indicate that water content has changed. Changes in water content cause color variations.
 - g. On jobs requiring more than one truck load of concrete, use the same size truck for each load.
2. Project Site Mixing: Mixing not allowed on project site.

090210.03 CONSTRUCTION.**A. Installation.**

1. Examine subgrade and sub-base for compliance with requirement for dimensional, grading, and elevation tolerances.
2. Proceed with installation only after unsatisfactory conditions have been corrected.
3. Contractor shall take all necessary precautions to protect completed adjacent concrete surfaces from damage, splatter, staining or other contaminants by subsequent construction. The Contracting Authority and Engineer reserve the right to require replacement of compromised materials and surfaces.
4. Install concrete according to Section 2301 of the Standard Specifications and the manufacturer's recommendations.
5. Schedule delivery of concrete to provide consistent mix times from batching until discharge. Mix times shall meet manufacturer's written recommendations.
6. Do not add water to concrete mix in field.
7. Admixture: All admixtures must be approved by Engineer. Calcium chloride admixture is not allowed.
8. Joints:
 - a. When joining existing paving, place joints to align with joints in abutting sidewalk unless otherwise indicated.
 - b. Contraction Joints: Contraction joints shall be formed with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8 inch wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before developing random contraction cracks.

- c. Construction Joints: Set construction joints at side and end terminations of paving and at locations where paving operations are stopped for more than one-half hour unless paving terminates at isolation joints.
 - 1) Dowelled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or coat with asphalt one-half of dowel length to prevent concrete bonding to one side of joint.
 - 2) Butt Joints: Use bonding agent at joint locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
 - d. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, walks, other fixed objects, and where indicated.
 - 1) Extend joint fillers full width and depth of joint.
 - 2) During concrete placement, protect top edge of joint filler with metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.
 - 3) Seal with joint sealant in color to match color of concrete. When joint is between colored concrete and non-colored concrete, sealant shall match color of non-colored concrete.
 - e. Dowel bars, caps and other associated accessories shall be clean of loose rust and mill scale, earth, ice, or other bond-reducing materials. Bars shall be straight and free of distortions, bends, kinks and other irregularities.
9. Finishing and curing flatwork: Do not start finishing stamped colored concrete until the bleed water has evaporated. Finishing too early causes discoloration and a weak, non-durable surface. Use mechanical float or trowel, if possible. The one-way motion of the blades creates a more uniform colored surface than the back and forth motion used in hand finishing. Move edges in one direction only to produce a more uniform color. Time the pour to avoid having sunlit and shaded areas.

B. Stamping.

After floating and while concrete is plastic, apply stamped finish.

1. Apply color release agent in accordance with manufacturer's recommendations.
 - a. Pigmented Powder Release Agent: Uniformly distribute onto concrete at a rate of 3-4 pounds per 100 square feet. A more exact coverage rate shall be determined by casting representative field samples as described in Article 090210.01, D, Quality Assurance, and noting the amount of material needed per square foot.
 - b. Antiquing Release agent is intended to produce a mottled appearance.
2. After application of release agent, accurately align and place mats in sequence.
3. Uniformly load mats and press into concrete to produce imprint pattern, texture, and depth of imprint on concrete surface. Gently remove stamp mats. Hand stamp edges and surfaces unable to be imprinted by stamp mats.
4. Touch-up pattern and finish edges with hand tools as necessary.
5. Remove residual release agent according to manufacturer's written instructions, but no fewer than three days after stamping concrete. High-pressure-wash surface and joint patterns, taking care not to damage stamped concrete. Control, collect, and legally dispose of runoff.

C. Curing And Sealing.

1. Protect concrete from prematurely drying and from excessive cold or hot temperature that would alter normal curing process.

2. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot weather protection during curing.
3. Prior to sealing, the following conditions must be present:
 - a. Release agent has been removed.
 - b. Moisture content of concrete is low enough that alkali and other salts do not become trapped beneath sealer. This will require a minimum of 28 days subsequent to concrete placement, or longer if required.
 - c. No evidence of free water on concrete surfaces to receive curing and sealing compound.
4. Curing: The use of white-pigmented cure compounds, burlap, plastic sheeting, or fogging with water is not allowed. Sealant shall be specifically recommended by manufacturer of integral color admixture for use with their product.
5. Apply curing and sealing compound for integrally colored concrete according to manufacturer's instructions using manufacturer's recommended application techniques so compound will not mar surface. Apply curing and sealing compound at consistent time for each pour to maintain close color consistency. Apply uniformly over entire surface at coverage rate recommended by manufacturer and meeting or exceeding the moisture retention requirements of ASTM C309.
 - a. Apply two coats of specified curing and sealing compound according to manufacturer's written instructions. The final sealer product shall have a slip-resistant additive and shall be compatible with initial sealant.
 - b. Thoroughly mix slip-resistant additive in sealing compound according to manufacturer's instructions. Stir regularly to maintain uniform distribution of additive. Verify adequacy of slip resistance before opening up surfaces to pedestrian traffic.
 - c. Protect surface from construction damage, dirt, debris and foot traffic until final sealant has been applied and allowed to dry for the period of time recommended by manufacturer, or a minimum of 24 hours.
6. Precautions shall be taken in hot weather to prevent plastic cracking resulting from excessively rapid drying at surface as described in CIP 5 Plastic Shrinkage Cracking published by the National Ready Mixed Concrete Association.

D. Tolerances.

1. Minor variations in appearance of colored concrete, which are similar to natural variations in color and appearance of uncolored concrete, are acceptable.
2. Unless otherwise shown, finished surface of color concrete shall have a 1/4 inch per foot cross slope for drainage. Any areas not draining surface water shall be removed and replaced at no additional cost. Elevations of pavement shall match abutting pavement elevations, or be no more than 1/8 inch higher.
3. Finish surface of colored concrete shall be as shown on the plans within 1/8 inch.
4. Comply with tolerances in ACI 117 and as follows:
 - a. Lateral alignment and spacing of Dowels: 1 inch
 - b. Vertical Alignment of Dowels: 1/4 inch
 - c. Joint Spacing: 1 inch
 - d. Contraction Joint Depth, Plus 1/4 inch, no minus
 - e. Joint Width: Plus 1/8 inch, no minus
 - f. Elevation: 1/8 inch higher than adjacent abutting pavement, shall not be lower.

E. Repairs and Protection.

1. Remove and replace decorative concrete paving that is broken or damaged or does not comply with requirements in this Section. Remove work in complete sections from joint to joint unless otherwise approved by Engineer. Retain first paragraph below if stamping is required.
2. Detailing: Grind concrete "squeeze" left from tool placement. Color ground areas with slurry of color hardener mixed with water and bonding agent. Remove excess release agent with high-velocity blower.
3. Protect decorative concrete paving from damage. Exclude traffic from paving for at least 14 days after placement. When construction traffic is permitted, maintain paving as clean as possible by removing surface stains and spillage of materials as they occur.
4. Maintain decorative concrete paving free of stains, discoloration, dirt, and other foreign material. Sweep paving not more than two days before date scheduled for Substantial Completion inspections.

090210.04 METHOD OF MEASUREMENT.

The Engineer will compute in SQUARE YARDS, the total area of acceptable DECORATIVE PCC PAVEMENT placed from measurements of the finished surface.

- A. Deductions will not be made for fixtures having an area of 1 square or less.
- B. Initial mockup areas will be measured and included for payment. If planned bike parking area is used as a mock-up area, this area will only be measured once for payment.

090210.05 BASIS OF PAYMENT.

For the area of DECORATIVE PCC PAVEMENT measured, the Contractor will be paid the contract unit price per SQUARE YARD. This payment shall be full compensation for all transportation, materials, tools, equipment, supervision and labor to construct the Decorative PCC Pavement according to the contract documents. Removal of mock-up will not be measured or paid for separately, but shall be considered incidental to this bid item.