



**Iowa Department of Transportation**

SPECIAL PROVISIONS

FOR

COLORED CONCRETE

Buchanan County

Project Number

HRRR-C010(69)--5R-10

Effective Date

January 18, 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.

## COLORED PORTLAND CEMENT CONCRETE

### 1. GENERAL.

- 1.1. Summary: This work includes the construction of colored PCC pavement as shown on the plans as the center truck apron. As an option, the contractor may choose to use colored PCC for the curb and gutter PC concrete, within the center truck apron as per plan. The work shall include all labor, materials, equipment, and transportation required to install the colored PCC pavement. For the coloring materials used, all limitations and recommendations specified by the manufacturer shall be used and adhered to.
- 1.2. Color shall be dark red concrete. Color samples shall be supplied to the Engineer and approved by Engineer prior to use. The color selected shall be from the standard color pallet.
- 1.3. Finishing. All surfaces shall be broomed to provide a macro textured, non-skid surface when completed.
- 1.4. Concrete shall be Class C concrete. Methods of placement and furnishing shall meet requirements of Section 2301, except that hand methods may be used and except as modified below.
- 1.5. Joints shall match joints in abutting pavement, or be as shown in the plans, unless otherwise approved by the Engineer.
- 1.6. Concrete color admixture shall be added at the batch plant. The minimum concrete batch size shall be 3.0 cubic yards in 1.0 cubic yard increments.
- 1.7. Thoroughly clean mixer drum to assure absence of contaminates which may affect consistency of color.
- 1.8. On site color variation shall not be significant, such that a uniform red color appearance is achieved.

### 2. QUALITY ASSURANCE.

- 2.1. Design Criteria: The concrete mix used with pigment added shall meet the requirements of the Standard Specifications. The aggregate, cement, and integral color shall be from the same source throughout the entire 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.
- 2.2. If water is added at the site, a consistent amount shall be added to each load. The intent of this requirement is to provide a uniform color throughout the continuous work.
- 2.3. Color admixture shall be added in strict accordance with manufacturer's recommendations. The responsibility for batching and mixing the color admixture shall be that of the Ready Mix Supplier. Color admixture shall not be added to the ready mix concrete at the construction site. Concrete mix design products such as cement, aggregate and admixtures used in Architecturally colored PCC shall be from the same source, type and brand used through the duration of the project. Should the Ready Mix Supplier choose to use a powder color admixture, the supplier shall empty color material contents directly into mixer or shall ensure that the biodegradable bags are thoroughly mixed and disintegrate during the batching process.

- 2.4. Once the color is approved, the corresponding final concrete mix design must remain consistent through the duration of the project to ensure uniform color, texture and finish of the Colored PCC.
- 2.5. The Contractor shall take all necessary precautions to protect 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.
- 2.6. All colored PCC joints shall be sealed with a color matching joint sealant or material as approved by the Engineer. The following shall be considered approved joint sealant products:
  1. Sonneborn Building Products, ChemRex, Inc – NP2.
  2. Tremco – Dymeric 240 FC.
  3. Sika – Sikaflex – 2c NS.
  4. Approved Equal.
- 2.7. The above materials, methods and construction techniques, are intended to replicate the finish and color as desired by the Contracting Authority and Engineer. Should the contractor have an alternate process or method, which will replicate the finish and color as desired by the Contracting Authority and Engineer, the contractor shall submit the alternate process or methods for approval by the Engineer.
- 2.8. Contractor shall use consistent materials, methods and construction techniques through the duration of the project to ensure uniform color and finish of the colored PCC.
- 2.9. Test Reports: Submit certified test reports of pigment showing compliance with ASTM C 979. Color pigments shall be light fast, wettable, weather resistant, alkali resistant, and free of deleterious fillers and extenders.

### **3. CURING.**

- 3.1. Fresh concrete shall be protected from premature drying and moisture loss for a total of 7 days using methods that follow the manufactures recommendations.
- 3.2. During periods of high temperatures (above 80°F) low humidity and high winds, Contractor shall provide protection to prevent excessive drying of concrete during placement and curing in accordance with ACI 305R.
- 3.3. During finishing operation, evaporation-retarding agent may be applied in accordance with manufacturer's recommendations to prevent plastic shrinkage cracking; depending on condition, application of evaporation-retarding agent may be required more than one time during concrete finishing operation. Under no circumstance shall any portion of the evaporation-retarding agent be finished into the concrete surface.

### **4. INTEGRAL (FULL DEPTH) COLOR.**

- 4.1. Product Description  
An admixture of special pigments designed to color, beautify, strengthen, and improve the workability of concrete.

4.2. Mix Design

The Contractor shall use the lowest slump concrete for the placement and finishing methods being used. Water additions shall be kept to a minimum and total water added to the mix shall be kept as consistent as possible for all concrete. Calcium chloride shall not be allowed.

4.3. Batching and Mixing

Mix half of the cement, coarse aggregate, fine aggregate, and water. With mixer running, add the color and mix for at least a minute before adding the balance of materials. Turn the drum at mixing speed for an additional 3 to 5 minutes before the truck leaves the yard. 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. On jobs requiring more than one truck load of concrete, use the same size truck for each load. Monitor slump closely during batching. Slump variations often indicate that water content has changed. Changes in water content cause color variations.

4.4. Finishing and Curing Flatwork

Do not start finishing colored concrete until the bleed water has evaporated. Finishing too early causes discoloration and a weak, non-durable surface. The Contractor shall finish the concrete surface using a magnesium float to remove any trowel marks or irregularities. Steel trowel finishing will not be permitted on exterior air entrained concrete. Use one-way finishing motion to create a more uniform colored surface. Move edgers in one direction only to produce a more uniform color. Time the pour to avoid having sunlit and shaded areas.

**5. METHOD OF MEASUREMENT.**

- 5.1. The quantity of Standard or Slip Form Portland Cement Concrete pavement, Class C, Class 3I durability, Red, 13 inch constructed will be the square yard quantity indicated in the plans. Deductions will not be made for fixtures.

**6. BASIS OF PAYMENT.**

- 6.1. For the area of Standard or Slip Form Portland Cement Concrete pavement, Class C, Class 3I durability, Red, 13 inch, the Contractor will be paid the contract unit price per square yard. This payment shall be full compensation for all materials, equipment, tools, and labor to construct Standard or Slip Form Portland Cement Concrete pavement, Class C, Class 3I durability, Red, 13 inch as specified in the contract documents.