



**SPECIAL PROVISIONS
FOR
AESTHETIC TREATMENT OF CONCRETE BARRIER**

**Johnson County
IM-080-6(354)239--13-52
IM-080-6(357)239--13-52
IM-080-6(359)239--13-52
IM-080-6(361)239--13-52
IM-080-6(379)239--13-52**

**Effective Date
July 30, 2019**

THE STANDARD SPECIFICATIONS, SERIES 2015, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SPECIAL PROVISIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

150537.01 DESCRIPTION.

The work consists of furnishing all labor, material, and equipment for integrally colored concrete and textured and rusticated concrete finishes utilized on concrete barriers for the project, as specified herein, shown on the plans, or as directed by the Engineer.

150537.02 MATERIALS.

A. Integrally Colored Concrete.

The bridge barriers shall utilize integrally colored concrete, concrete form liner texture (where specified) and rustication to provide a uniform aesthetic appearance to the barriers.

1. Concrete Strength: Concrete strength shall be as specified in the plans or Standard Specifications.
2. Color: The final color of the barrier concrete shall be a light buff limestone color. The color shall match SAE AMS-STD-595, Color Number 33717 as closely as possible utilizing pigments added to a gray Portland cement base mix.
3. Cement pigments shall comply with ASTM C979. Pigments shall be lightfast, wettable, weather resistant, alkali resistant and free of deleterious fillers and extenders. The pigments shall be composed of inorganic natural and/or synthetic iron oxides to obtain the specified color. The amount of incorporated cement pigment is not to exceed 7% by weight of Portland cement in the concrete mix.

4. The contractor shall verify with the pigment manufacturer the compatibility of cement pigment with concrete admixtures, form release compounds and cleaning and curing methods. The sources and composition of sands and aggregate shall remain consistent for all applications involving integrally colored concrete.
5. For integrally colored concrete, Class 3 durability coarse aggregate is required. Fly ash and calcium chloride shall not be used. Slag (GGBFS) may be used if it is in accordance with the manufacturer's recommendations.
6. Water to cement ratio shall be kept consistent with a maximum variation of +/- 0.02%.
7. Approved cement pigment suppliers include the following:
 - a. Scofield Systems (800) 800-9900
 - b. Davis Colors (800) 835-0849
 - c. Dynamic Color Solutions (800) 657-0737
 - d. Other suppliers submitted to and approved by the Iowa DOT Office of Materials.

B. Concrete Form Liners [for textured median barriers on Project Nos. IM-080-6(361)239--13-52 and IM-080-6(379)239--13-52 only].

1. The form liner pattern used to create the barrier surface texture as shown in the plan details shall produce the effect of a realistic, random dry-stacked stone masonry surface having natural, uncut stones of varying size and shape. Stone pattern shall not repeat at less than 10 foot intervals. Maximum texture relief shall be 0.75 inch deep from the bottom of the simulated mortar joints to the outermost surfaces of the texture. Simulated mortar joint width shall be a maximum of 0.75 inch. Maximum differential of stone surfaces across joints shall be 0.20 inch. All stone edges shall be rounded.
2. Only one texture pattern shall be used on the project. Texture produced shall be similar to the following patterns:
 - a. Architectural Polymers (Pattern No. 910 "Median Barrier Drystack")
 - b. SlipStone, Inc. (Pattern No. 2392 "Woodbridge Stack Stone")
 - c. Fitzgerald Formliners (Pattern No. 17008 "Brayman Drystack")
 - d. Other patterns meeting all requirements of these Special Provisions, submitted to and approved by the Iowa DOT, Office of Design.
3. Form liner systems shall be made of high-strength urethane elastomer, plastic or flexible foam materials capable of withstanding anticipated concrete pour pressures without leakage or causing physical defects.
4. Form liners shall easily attach to forms and be removable without causing concrete surface damage. If recommended by the form liner manufacturer, use structural backers to prevent deformation of the liner during loading of forms. The liners shall be designed to form surfaces conforming to the design intent including shape, lines and dimensions specified in the plans and to avoid visible pattern repeats.
5. Release agents shall be compatible with form liner materials and shall be non-staining. Apply release agents in accordance with the form liner manufacturer's recommendations.
6. If used, ties shall be made of non-corrosive materials when the portion permanently embedded in the concrete is less than 1 1/2 inches from the finished surface.

C. Concrete Rustications and Forms.

1. Rustication strips shall be made of steel, high-strength urethane elastomer, plastic or flexible

- foam materials capable of withstanding anticipated concrete pour pressures without leakage or causing physical defects. Do not use wood.
2. If barriers are formed using cast-in-place forms, do not use plain plywood for the outside barrier face. Acceptable form face materials are steel, High Density Overlaid (HDO) plywood, Medium Density Overlaid (MDO) plywood, or plastic.
 3. If barriers are formed using cast-in-place forms, rustication strips shall easily attach to forms and be removable without causing concrete surface damage.
 4. Release agents shall be compatible with rustication strip materials and shall be non-staining.
 5. If used, ties shall be made of non-corrosive materials when the portion permanently embedded in the concrete is less than 1 1/2 inches from the finished surface.

150537.03 CONSTRUCTION.

A. Submittals.

Provide manufacturers literature for proposed concrete pigment and two colored concrete manufacturer's samples containing only gray Portland cement base mix.

B. Barrier Mockup Panel.

1. The contractor shall construct a 10 foot long, full size barrier mockup in accordance with the Standard Specifications and these Special Provisions for review by the Engineer. Locate mockup near the project site as directed by the Engineer. The mockup shall represent the median side barrier as detailed in the bridge plans. The mockup shall utilize integrally colored concrete with the proposed mix proportions and pigment color that are intended to be used for final production. The mockup shall also utilize the proposed concrete texture, shall demonstrate typical forming operations, and use and position of ties, if required. If slip-forming methods are proposed, the mockup shall demonstrate all aspects of the slip forming method as part of the mockup installation. Following removal of mockup forms, patching methods for defects and form tie holes shall be demonstrated on the mockup. Patching of voids and tie holes may require adjustment of the mortar mix proportions so that the cured patches match adjacent concrete.
2. Mockup shall be produced at least 2 weeks before start of actual barrier production. Additional mockup(s) may be ordered by the Engineer until an acceptable result is achieved. Actual barrier production may not proceed until final approval of the mockup.
3. The mockup shall remain at the project site for comparison to actual barriers as they are produced. Upon completion of the project, the mockup shall become the property of the Contractor and shall be removed from the project site.
4. Complete records of the casting process, including mix design, water content, cement pigment and rate of incorporation, mixing sequence, form release compounds and patching, curing and cleaning methods used on the approved mockup shall be submitted to the Engineer.

C. Execution.

1. The Contractor shall take particular care in all aspects of casting the barriers in order to achieve a consistent color and quality in the finished barriers.
2. Minimize the number of splices in rustication strips and textured form liners. Forms shall be watertight.

3. Concrete mixing, batching and transporting equipment shall be thoroughly cleaned and rinsed prior to mixing and delivering colored concrete to the concrete barrier forms. The contractor shall follow pigment manufacturer's specifications for measuring pigment and distribution throughout the concrete prior to placement.
4. During loading of forms with concrete, take extra care to adequately vibrate concrete in order to maintain all intended features in the final surface. The completed surface shall be free of blemishes, surface voids and conspicuous form marks to the satisfaction of the Engineer. The Contractor shall correct, at his own costs, any surface defects.
5. Strip formwork after the concrete has sufficient strength to avoid surface damage. Clean and repair form liners and rustication strips prior to re-use. Do not re-use form liners or rustication strips if damaged from previous use on the project.
6. After removal of forms, the colored concrete barriers are to be cleaned with potable water and a stiff wire brush only. Care shall be taken to avoid damage to the concrete texture and rustications during cleaning operations.
7. Cure barriers using a method preventing moisture loss and at a uniform temperature above 40°F during the curing period. If forms remain in place during the first 12 hours, exposed concrete surfaces shall require wet burlap application. Continued wet curing methods may be required to reduce the incidence of shrinkage cracks and to enhance cement hydration for achieving required concrete strengths. Do not apply any sealers to completed barriers.

150537.04 METHOD OF MEASUREMENT.

Aesthetic treatments for concrete barriers shall not be measured for individual payment.

150537.05 BASIS OF PAYMENT.

All costs for furnishing and providing integrally colored concrete for barriers, concrete texture, rustications, constructing mockup panel(s), and all labor, equipment and incidentals needed to complete the work shall be considered incidental to the bid item Concrete Barrier Railing, Aesthetic.