

**KANSAS DEPARTMENT OF TRANSPORTATION
SPECIAL PROVISION TO THE
STANDARD SPECIFICATIONS, EDITION OF 2007**

Delete SECTION 826 and replace with the following.

SECTION 826

CONCRETE SURFACE REPAIR

826.1 DESCRIPTION

Remove the unsound concrete surface and replace the concrete according to the details in the Contract Documents.

<u>BID ITEM</u>	<u>UNITS</u>
Concrete Surface Repair	Square Foot
Note: If this bid item is not included in the Contract Documents, this work is subsidiary to other items in the contract.	

826.2 MATERIALS

Provide materials that comply with the applicable requirements.

Concrete	DIVISION 400
Concrete Curing Materials	DIVISION 1400
Reinforcing Steel for Concrete	DIVISION 1600
Fibrous Reinforcement for Concrete	DIVISION 1700
Shotcrete Concrete	DIVISION 1700 (this specification)

- a.** When specified, provide one of the following types of concrete:
- (1) Formed. Use Grade 4.0 (AE)* concrete that complies with **SECTION 401**. Provide concrete with slump that is appropriate for the intended use and acceptable to the Engineer.
 - (2) Pneumatically Applied. Use Shotcrete concrete that complies with **DIVISION 1700** (this specification) and has a 28-day compressive strength of 4000 psi*. Wet or dry process is permitted.
 - (3) Hand packed. Use Grade 3.5 (AE)* with the following exceptions:
 - (a) Do not include any coarse aggregate (provide a concrete mortar).
 - (b) Include fibers as specified in **SECTION 1722**.
- b.** If no type of concrete is specified, provide either **subsection 826.2a.(1)** or **(2)**.

* Unless otherwise shown on the plans.

826.3 CONSTRUCTION REQUIREMENTS

Depending on the nature and size of the concrete surface repair, the Engineer will designate the type of concrete used for the repair and the process used for the repair (such as formed and poured, hydraulically applied or hand packed) in the Contract Documents.

- Remove the unsound concrete to the limits designated in the Contract Documents or as directed by the Engineer. The maximum size of chipping hammer allowed for concrete removal is 15 pounds.
- Remove the existing concrete to a depth of 2½ inch (minimum), or deeper if necessary to expose sound concrete. Remove the existing concrete at least ¾ inch beyond any existing steel reinforcement exposed during the removal of the unsound concrete.

- Do not wedge the tip of the chipping hammer between the concrete and reinforcement during concrete removal. Do not impact directly on reinforcement. Debonding of concrete caused by such actions will be repaired at no cost to the State.
- Confirm reinforcement bond adjacent to the repair area. Do this by sounding concrete over the reinforcement in the presences of the Engineer prior to placement.
- Chip the perimeter edge of the repair area to near perpendicular (to the concrete surface). Do not feather the edge of the repair area.
- Sandblast, then use compressed air (90 psi min) to clean the prepared repair area and exposed steel reinforcement to remove all bond-inhibiting materials.
- Dampen the clean surface to a surface saturated dry condition just prior to concrete placement.
- Place the repair concrete as specified in the Contract Documents. Match the lines of the existing surface unless shown otherwise in the Contract Documents.
- Cure the concrete as directed by the Engineer.

Additional Requirements for Shotcrete: During the preconstruction meeting, demonstrate competence of the nozzleman by providing a copy of a current ACI Shotcrete Nozzleman certificate for the appropriate application.

Apply the shotcrete according to the manufacturer's recommendations. Provide the Engineer with a printed copy of the manufacturer's recommendations.

826.4 MEASUREMENT AND PAYMENT

When shown as a bid item in the contract, the Engineer will measure the concrete surface repairs by the square foot. If the bid item for this work is not included in the Contract Documents, the Engineer will not measure the concrete surface repairs for payment.

Payment for "Concrete Surface Repair" at the contract unit price is full compensation for the specified work.

Add a new SECTION in DIVISION 1700.

SHOTCRETE CONCRETE

1.0 DESCRIPTION

This specification covers shotcrete concrete used to repair, reinforce or modify concrete structures.

2.0 REQUIREMENTS

a. Provide material that complies with the following:

TABLE 1: SHOTCRETE CONCRETE PROPERTIES		
Hardened Properties	Test Method	Requirement
Slant Shear Bond Strength @ 24 hours	ASTM C 882 Modified*	1200 psi, min.
Drying Shrinkage @ 28 days	ASTM C 157 Modified**	0.08%, max.
Rapid Chloride Permeability @ 28 days	ASTM C 1202*** / AASHTO T 277***	750 coulombs, max.
Volume of Permeable Voids @ 7 days	ASTM C 642***	10%, max.
Freeze-Thaw Resistance @ 300 cycles	ASTM C 666, Procedure A	95% RDM, min.
Flexural Strength @ 24 hours	ASTM C 348	650 psi, min.
Compressive Strength @ 24 hours	ASTM C 109	2500 psi, min.

*No epoxy bonding agent used.

** ICRI Guideline No. 03733, "A Guide for Selecting and Specifying Materials for Repair of Concrete Surfaces", 1"x1"x10" prism, air cured

***Either Rapid Chloride Permeability or Volume of Permeable Voids can be used.

b. If the mix is not in bag or tote form (pre-blended in a manufacturer's controlled environment), then provide a mix design with weight quantities of each component for a cubic yard of finished product. All components are required to be prequalified.

c. Provide material with a corrosion inhibitor.

d. Material may contain fibers.

e. Provide material to satisfy application requirements – vertical, overhead, low-pressure spraying, or hand packed.

3.0 TEST METHODS

Test as specified in **subsection 2.0**.

4.0 PREQUALIFICATION

a. Manufacturers interested in prequalifying material under **subsection 2.0a**. must submit the following to the Bureau of Materials and Research:

- (1) A complete description, literature, and set of instructions and recommendations,
- (2) A copy of test results performed in accordance with the tests stated in **subsection 2.0a.**,
- (3) Certificate stating results comply with **subsection 2.0a.**, and
- (4) Material Safety Data Sheets (MSDS).

b. The Bureau of Materials and Research will maintain a list of qualified materials. Products will remain on the list as long as field performance is satisfactory.

5.0 BASIS OF ACCEPTANCE

- a. Prequalification as specified in **subsection 4.0**.
- b. Receipt and approval of a Type D certification as specified in **DIVISION 2600**.
- c. Visual inspection by the Field Engineer.

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