

**ITEM #0401155A-PREPARATION OF CONCRETE PAVEMENT SURFACE FOR DIAMOND GRINDING (PARTIAL DEPTH PATCH)**

**Description:** Work under this item shall consist of the removal of spalled, delaminated or otherwise deteriorated concrete from the existing Portland Cement Concrete (PCC) Pavement. It shall also consist of removing any existing foreign materials or objects (including delineators) from the existing PCC Pavement. The areas of removal shall be repaired with a specified quick set patching material as shown on the plans, as directed by the Engineer, and hereinafter specified.

When the removal of unsound concrete, foreign materials or objects exceeds 113 mm in depth, the PCC Pavement shall be repaired utilizing the Item “Concrete Pavement Replacement for Roadway (Full-Depth)” or as directed by the Engineer.

**Equipment:** The equipment needed to complete this work shall conform to the requirements specified in the “Construction Methods” portion of this specification.

**Materials:** The patching material shall be a concrete composed of a quick setting cement, fine aggregate, coarse aggregate, air entrainment admixture, and water. This concrete shall develop a minimum compressive strength of 7.0 MPa within one hour after set and 21.0 MPa within three days.

The Contractor shall design and submit a quick setting concrete mix to the Engineer for approval 30 days prior to commencement of the aforementioned work. The mix proportions and method of application shall be in accordance with the manufacturer’s recommendations. Sources of supply of all the materials shall be clearly indicated.

Fine aggregate shall conform to the requirements of Subarticle M.03.01-2.

The coarse aggregate shall conform to the requirements of Subarticle M.03.01-1. It shall be size No. 67 and conform to the grading specified in the gradation table of Article M.01.01.

Water shall conform to the requirements of Subarticle M.03.01-4.

The mixture shall contain 4 – 7% entrained air.

Unless otherwise approved by the Engineer, the quick setting concrete mix shall be one of the following materials:

Gypsum Based Materials:

Duracal "AE"  
United States Gypsum Co.  
Chicago, IL 60680  
800-296-6770

Five Star Concrete Patch  
U.S. Grout Corporation  
Fairfield, CT 06430  
203-336-7900

FOX 928  
Fox Industries, Inc.  
Baltimore, MD 21211  
410-243-8856

IFSCEM 110  
American Stone Mix, Inc.  
8320 Bellona Avenue  
Towson, MD 21204  
410-296-6770

Cementitious Based Materials:

Emaco T-415  
Master Builders, Inc.  
23700 Chagrin Blvd.  
Cleveland, OH 44122  
800-628-7378

Perma-Patch  
Dayton Superior Corporation  
PO Box 355  
Oregon, IL 61061  
800-745-3707

Rapid Set DOT Cement  
CTS Cement Manufacturing  
1023 Dogwood Lane  
West Chester, PA 19382  
215-429-4956

Speed Crete Green Line  
Tamms Industries  
730 Casey Ave.  
Wilkes-Barre, PA 18702  
800-218-2667

Fastercrete  
Silpro Corporation  
2 New England Way  
Ayer, MA 01432  
508-772-4444

Other patching products not currently approved by the Department may also be substituted provided that the Contractor submits to the Department the manufacturer's literature and a sufficient quantity of the proposed patching materials for field testing and evaluation. Further information regarding approval procedures may be obtained by contacting the Department's Research and Materials Testing Laboratory at 280 West Street, Rocky Hill, CT 06067. No substituted patching material shall be used until it has been approved in writing by the Department.

**Construction Methods:** The partial depth patching operation shall proceed in accordance with the requirements of the "Maintenance and Protection of Traffic" and the "Prosecution and Progress" specifications.

The existing PCC Pavement shall be repaired so as to provide a clean, sound, and durable surface throughout. The Contractor will provide the Engineer clear and safe access to all areas of the roadway. The areas to be removed shall be identified and marked by the Engineer. All spalled, delaminated, and deteriorated concrete shall be identified and marked for repair. Any existing bituminous concrete patches or deteriorated patches consisting of any other material shall also be identified and marked for repair. All foreign objects such as delineators shall also be identified and marked for repair. All areas to be prepared and patched shall be inspected and approved by the Engineer prior to commencement of the work.

All work shall conform to the Contract Plans and as follows:

**(a) Surface Preparation:** Sound the pavement surface around any area that has been identified and marked for repair to insure that the condition of the existing concrete surrounding that area is suitable to remain in place. Mark the repair area limits approximately 75 mm beyond the edges of the areas identified for repair. All repair areas shall be squared up. Irregular and odd shaped repair areas shall not be used. Areas to be repaired shall be a minimum of 300 mm apart. If areas to be repaired are less than 300 mm apart, combine them into one repair area.

Sawcut the perimeter of the repair area to a depth of 50 mm. Remove the existing concrete, foreign material or object from the repair area to a minimum depth of 50 mm using a chipping hammer weighing not more than 13.6 kg. Operate the chipping hammer at an angle not exceeding 45 degrees when measured from the pavement surface. For repair areas greater than 50 mm deep, the sides of the repair areas below the sawcut shall be chipped as close to vertical as possible. The bottom of the repair area shall be chipped to form a relatively flat surface.

In situations where the repair area encroaches a longitudinal or transverse joint, the joint shall be reformed prior to placement of the patch material. Unless otherwise specified, the transverse contraction, transverse expansion, or longitudinal joint shall be restored to its original shape and condition. Any equipment or materials needed to restore the joint to its original condition shall be approved by the Engineer and included in the cost of the work.

Cut and remove any wire mesh reinforcement that is exposed during the chipping of the repair area.

Clean exposed surfaces of the repair area of all loose and foreign material initially by sandblasting or waterblasting. Use air blasting as the final cleaning. For air blasting, use a compressed air stream, free of oil, moisture, and other contaminants, of at least 0.69 MPa measured at the source. All blasting operations shall be performed using techniques approved by the Engineer, taking care to protect all pedestrians, traffic, and adjacent property.

The prepared repair area shall be checked thoroughly by the Engineer and shall be free from all rust, oil, solvent, grease, dirt, dust, bitumen, loose particles, and foreign material just prior to patching.

If during the preparation of the repair area the existing concrete is in any way damaged so that it must be repaired utilizing the Item “Concrete Pavement Replacement for Roadway (Full-Depth)“, the Contractor shall bear the full cost of the full-depth repair.

**(b) Mixing, Placing, Finishing, and Curing:** All mixing, placing, finishing, and curing shall be done in accordance with the manufacturer’s recommendations unless otherwise specified herein. Before using the quick set patching material, the Contractor shall schedule to have a technical representative from the manufacturer or supplier present at the project site for at least one (1) day to provide instruction, training, and recommendations for proper use of the material. The Engineer shall be notified in writing five (5) days prior to the scheduled date.

Mixing and placing the patching material should not be done unless the ambient temperature and the temperature of the existing concrete are above 2°C and rising. All mixing shall be accomplished by means of a standard drum-type portable mixer. A continuous type mobile mixer may be used if permitted by the Engineer. The Contractor shall calibrate the mobile mixer under supervision of the Engineer. Calibration shall be in accordance with the applicable sections of ASTM method C685. The total mix shall be limited to the quantity that can be mixed and placed in 15 minutes.

Use vibration or tamping to consolidate the quick set patching material. Work material into sawcuts extending beyond the corners of the repair area. Strike-off and shape the material to match the surrounding pavement. Do not patch across a joint and sawcut later.

The surface shall be float finished.

Finishing operations shall be completed before initial set takes place.

Any cured patch having a hollow sound when sounded (indicating delamination), shall be replaced by the Contractor at its expense until a patch acceptable to the Engineer is in place.

**(c) Testing:** The Contractor shall make and perform compressive strength tests on representative cylinders under the supervision of the Engineer. The dimensions, type of cylinder mold, and number of cylinders shall be specified by the Engineer. Traffic shall not be permitted on patched surfaces until the patch material attains a strength of 12.4 MPa as determined by breaks of the test cylinders. A portable compression testing machine shall be provided by the Contractor and available on site for cylinder testing. All testing equipment shall conform to ASTM C39. This includes calibration of the compression machine.

**Method of Measurement:** This work shall be measured for payment by the number of cubic decimeters of patching material used in acceptable partial depth patches placed.

The actual number of cubic decimeters of patching material will be determined by the actual product yield per bag or container based upon the Contractor’s mix design as determined by the Department’s Material Testing Lab.

The Contractor shall provide the Engineer with a statement certifying the number of bags of patching material incorporated into the work.

**Basis of Payment:** This work will be paid for at the contract unit price per cubic decimeter for “Preparation of Concrete Pavement Surface for Diamond Grinding (Partial Depth Patch).” This price shall include all equipment, labor, materials, and tools (including the portable compression testing machine) incidental thereto.

Pay Item	Pay Unit
Preparation of Concrete Pavement Surface for Diamond Grinding (Partial Depth Patch)	dm <sup>3</sup>