

**STATE OF OHIO
DEPARTMENT OF TRANSPORTATION
SUPPLEMENTAL SPECIFICATION 843
PATCHING CONCRETE STRUCTURES
WITH TROWELABLE MORTAR**

April 18, 2003

- 843.01 Description**
- 843.02 Materials**
- 843.03 Test Requirements and Prequalification**
- 843.04 Removal of Concrete**
- 843.05 Surface Preparation**
- 843.06 Patching**
- 843.07 Curing**
- 843.08 Inspection and Sounding of Concrete Patches**
- 843.09 Method of Measurement**
- 843.10 Basis of Payment**

843.01 Description. This item consists of the removal of all loose and disintegrated concrete, preparation of the surface, and the mixing, placing, finishing and curing of the patches in the areas shown or noted on the plans or as directed by the Engineer. The work shall be performed upon concrete components in accordance with these specifications, and in reasonably close conformity with the plans and the manufacturer's specifications and recommendations.

843.02 Materials. The manufacturer will specify whether the product is designed for horizontal, vertical, or overhead patching. All materials shall be prepackaged and stored and incorporated in the work as recommended by the manufacturer. A manufacturer's representative shall be present at the job site until such a time as he and the Engineer are sure that the Contractor is qualified in all aspects of patching concrete structures with the selected materials.

843.03 Test Requirements and Prequalification. Trowelable mortar will meet the following test requirements.

Compressive Strength (ASTM C 109 Modified, 50mm [2-inch cubes])

1 DAY.....1500 psi (11.0 MPa)

7 DAY.....3000 psi (22.0 MPa)

28 DAY.....5000 psi (36.7 MPa)

Length Change (ASTM C 157) at 1,3,14 and 28 days

Max %.....+ 0.3

Min. %..... 0.0

Bond Strength (ASTM C882 modified*)

28 DAY..... 1500 psi (10.2MPa)

*Mortar scrubbed into substrate or as recommended by the manufacturer.

Modulus of Elasticity (ASTM C 469 @ 28 DAYS)...3,500,000 - 4,000,000 psi (24.2 - 27.6 GPa)

The trowelable mortar material is to be prequalified prior to use. The manufacturer of the material shall submit, to the Office of Materials Management, independent certified test data showing that the material, when mixed according to the manufacturer's recommendations, meets all of the requirements of this specification.

In addition to the certified test data, submit the following items:

1. Manufacturer's technical data sheet
2. Material safety data sheet
3. 1 bag, or 50 lb (20 kg), sample
4. A one liter (quart) sample of the solvent to be used for cleanup.
5. Mixing instructions

When the trowelable mortar material has been approved by the Office of Materials Management, further performance testing by the manufacturer will not be required unless the formulation or manufacturing process has been changed, in which case new certified test results will be required. Acceptance variances shall be established by the Laboratory.

The Contractor shall furnish the Engineer with a copy of the manufacturer's comprehensive job specific preparation, mixing and application instructions. Any significant changes to these instructions which are recommended by the representative for an unanticipated situation shall be approved by the Engineer prior to the adoption of such changes.

843.04 Removal of Concrete. The Engineer shall sound the structure and outline the areas to be removed. All loose, soft, honey-combed, disintegrated concrete, and 1/4 inch (6mm) depth of sound concrete shall be removed. Where the bond between the concrete and a reinforcing bar has been destroyed, or where more than one-half of the periphery of such a bar has been exposed, the adjacent concrete shall be removed to a depth that will provide a minimum 1/2 inch (13mm) clearance around the bar except where other reinforcing bars make this impractical. After completion of the secondary removal operation, the Engineer will resound the areas to ensure that only sound concrete remains. All work shall be done in a manner that will not damage or shatter the concrete that is to remain, and will not cut, elongate or damage the reinforcing steel in any way. Concrete may be removed by chipping or hand dressing. Chipping hammers shall not be heavier than the nominal 35 pound (15.9 kg) class. Where existing reinforcing bars would be less than 1 inch (25mm) from the proposed finished surface of concrete, they shall, if practical, be driven back into recesses cut in the masonry to obtain that coverage unless otherwise approved by the Engineer.

843.05 Surface Preparation. Cleaning shall precede application of the patching material by not more than 24 hours. The surface to be patched shall be cleaned by abrasive blasting followed by an air blast or by ultra-high pressure water blasting. Blasting abrasives containing more than 1% free silica will not be allowed. Exposed reinforcing and structural steel shall be cleaned to remove all loose and built-up rust, asphalt residue, and all other contaminants detrimental to achieving an adequate bond. It may be necessary to use hand tools to remove scale from the reinforcing steel or anchor bolts. The surface shall be free of spalls, laitance and all traces of foreign material. If necessary, detergent cleaning shall precede blast cleaning to ensure the removal of contaminants that are detrimental to achieving an adequate bond. Ultra-high hydro-demolition of 10,000 psi (69 MPa) or more is an acceptable method of total surface preparation. Any additional surface preparation shall be in accordance with the manufacturer's recommendations for the patching material which is used. All un-chipped surfaces that will receive new material shall be mechanically roughened.

843.06 Patching. The mixing, proportioning, placing and curing procedures, as well as, tools, equipment, labor and materials used shall be in accordance with the manufacturer's specifications and recommendations. The finished surface of the repair area shall be flush with the surrounding area and conform to the original concrete surface.

843.07 Curing. Patches shall be cured in accordance with the manufacturer's recommendations.

843.08 Inspection and Sounding of Concrete Patches. After curing and before final acceptance, all patches shall be sounded. All unsound or cracked patch areas shall be removed and re-patched according to this specification at the Contractor's expense. Aerosol paint for outlining shall be provided by the Contractor. All sounding and replacement of rejected areas will be the responsibility of the contractor and included in the unit bid price for this item. Sounding and re-patching shall continue until only sound, un-cracked patches remain.

843.09 Method of Measurement. The quantity shall be the actual area of the exposed surface of all accepted patches, irrespective of depth or thickness of the patch. If the patch includes corners or edges of members, all of the exposed surfaces shall be included. The cost of all labor, equipment, incidentals and materials for sounding and patching shall be included in the unit price bid for this item.

843.10 Basis of Payment. Payment will be made at the contract price bid for:

Item	Unit	Description
843	Square foot (Square meter)	Patching concrete structures with trowelable mortar