

State of Louisiana  
Department of Transportation and Development (DOTD)  
Materials and Testing Section Approved Materials Procedure  
for

**PATCHING MATERIALS FOR CONCRETE**

This Approved Material List Qualification Procedure evaluates patching materials for concrete elements. All products found herein for Type A and Type B patching applications meet the criteria for both rapid setting and non-shrinking patching materials.

**MATERIAL SPECIFICATION REFERENCE:**

DOTD Standard Specifications Section 830, Section 1016, Maintenance Specification MS 183-001, MS 185-001, and ASTM C928, modified as indicated herein.

Type A – Horizontal Patching Materials. For Department repairs of Portland cement concrete pavements, top of bridge decks, high early strength (HES) patching applications, dowel bar retrofit, joint repair, curb, gutter, sidewalks, driveway, and approach slab. Type A Patched may require the use of a bonding agent.

*\*NOTE: For epoxy mortar repairs, use a polymer concrete patch.*

*\*NOTE: When recommended by the manufacturer, use an approved Bonding Agent to improve the adhesion of the patching material to the existing concrete substrate.*

Type B – Vertical and Overhead Patching Materials. For Department repairs of locations such as columns, caps, beams, piles, concrete rails, girders, drainage structures, headers, walls, and other similar locations. Type B Patched may require the use of a bonding agent.

*\*NOTE: Newly cast structural elements shall be repaired to the satisfaction of the Fabrication Engineer prior to being stamped.*

*\*NOTE: When recommended by the manufacturer, use an approved Bonding Agent to improve the adhesion of the patching material to the existing concrete substrate.*

Type C – Standard (Non-Rapid) Patching Materials. These non-rapid materials may be either neat or extended to produce good quality repairs with highly desirable 28-day characteristics, which may be formed and poured.

**APPROVED MATERIAL EVALUATION SUBMITTAL:**

The manufacturer shall submit a completed Approved Materials Evaluation Submittal to the DOTD Materials and Testing Section Coordinator listed below.

## **PRELIMINARY REQUIREMENTS:**

The complete submittal must include:

- Complete Approved Materials Evaluation Form
- Letter requesting evaluation of the material
- Product Data Sheets
- Manufacturer's specifications
- Safety Data Sheet (SDS)
- Sample(s)
- Independent Laboratory Test Results - Patching Product and Bonding Agent (if applicable)
- AASHTO National Transportation Products Evaluation Program (NTPEP) Results

For detailed information, refer to the Operational Procedures of the AASHTO NTPEP available from the NTPEP Coordinator.

The address of the contact affiliated with AASHTO NTPEP is:

NTPEP Coordinator  
AASHTO National Transportation Products Evaluation Program  
444 N. Capitol St. N.W.  
Suite 249  
Washington, D.C. 20001  
Phone: (202) 624-3695  
Fax: (202) 624-5806  
<http://data.ntpep.org>

*\*NOTE: Evaluation will not begin until all required items listed above are received by the Materials and Testing Section Coordinator listed below.*

### Certifications and/or Test Reports

The manufacturer shall have successfully completed the requirements of the AASHTO NTPEP for "Evaluation of Rapid Set Concrete Patch Materials for Portland Cement Concrete" prior to submitting an "Approved Materials Evaluation Form" to the Materials and Testing Section. The laboratory results obtained from the AASHTO NTPEP report will be used to determine conformance of the material to LA DOTD's Standard Specifications.

For test requirements not covered herein by the NTPEP evaluation process, the manufacturer shall provide a Certificate of Analysis (CA) from an independent third party laboratory showing that the patching material and bonding agent (if applicable) conforms to the physical and chemical requirements according to LA DOTD's Standard Specifications.

**PRELIMINARY REQUIREMENTS CONTINUED:**

Product Data Sheets shall provide all pertinent information relative to the material to be evaluated, including but not limited to:

- Manufacturer's specifications
- Mixing instructions
- Yield and packaging
- Surface preparation and application
- Intended use of the material
- Typical analysis
- Typical working time, drying time, curing time, etc.
- Recommended bonding agent (when required)

**TEST REQUIREMENTS:**

Laboratory Testing

Any material containing chlorides which exceed a maximum of 0.6 lb./yd<sup>3</sup> (0.015% when tested in accordance to AASHTO T 260) shall not be accepted. If a bonding agent is required with the proposed patching material, an Independent Third Party Lab CA meeting the requirements of AASHTO M 235/ASTM C881 shall be submitted for record.

Sample (to be furnished at no cost to the Department)

Submit an adequate amount of patching material to make at least 1 ft<sup>3</sup> of mixed product for verification testing. Submit one (1) unit of each component A & B of the recommended bonding agent (if applicable)

Type A – Horizontal Patching Materials shall meet the physical properties stated in Table 1 or Table 2 based upon the material composition.

**Table 1**

<b>Horizontal Patching</b>		
Cementitious & Polymer-Modified Cementitious Concrete		
Test Description	Test Method	Value
Compressive Strength	ASTM C109 or ASTM C39	Min. 3,000 psi at 3 hrs.
		Min. 5,000 psi at 24 hrs.
		Min. 5,000 psi at 7 days
		Greater than 7 day at 28 days
Bond Strength by Slant Shear	ASTM C882	Min. 1,000 psi at 1 day
		Min. 1,500 psi at 7 days
Bond Strength by Direct Tension	ASTM C1583	Min. 250 psi at 28 days
Length Change	ASTM C157	Max. -0.15% at 28 days (Air)
		Max. +0.15% at 28 days (Water)
Splitting Tensile Strength	ASTM C496	Min. 400 psi at 28 days
Permeability <sup>1</sup>	DOTD TR233 or ASTM C1202	Min. 22 kΩ-cm at 28-31 days or Max. 2,000 coulombs at 28 days
Thermal Compatibility <sup>2</sup>	ASTM C884	Pass
Freeze/Thaw Resistance	ASTM C666 (Procedure A)	Min. 90% at 300 cycles

<sup>1</sup>Permeability Testing Not Required for Pavement Patching.

<sup>2</sup>Thermal Compatibility Only Applicable for Polymer-Modified Cementitious Concrete

**TEST REQUIREMENTS CONTINUED:**

**Table 2**

<b>Horizontal Patching</b>		
Polymer Concrete		
Test Description	Test Method	Value
Compressive Strength	ASTM C579	Min. 3,000 psi at 3 hrs.
		Min. 5,000 psi at 24 hrs.
		Min. 5,000 psi at 7 days
		Greater than 7 day at 28 days
Bond Strength by Slant Shear	ASTM C882	Min. 1,000 psi at 1 day
		Min. 1,500 psi at 7 days
Bond Strength by Direct Tension	ASTM C1583	Min. 250 psi at 28 days
Linear Shrinkage & Thermal Expansion	ASTM C531	Min. $5.0 \times 10^{-6}$ in/in/°F at 28 days
		Max. $9.0 \times 10^{-6}$ in/in/°F at 28 days
Gel Time <sup>1</sup>	ASTM C881	Min. 30 minutes
Permeability <sup>2</sup>	DOTD TR233 or ASTM C1202	Min. 22 kΩ-cm at 28-31 days
		or Max. 2,000 coulombs at 28 days
Thermal Compatibility	ASTM C884	Pass
Freeze/Thaw Resistance	ASTM C666 (Procedure A)	Min. 90% at 300 cycles

<sup>1</sup>*Gel Time Testing is for Informational Purposes Only*

<sup>2</sup>*Permeability Testing Not Required for Pavement Patching.*

**TEST REQUIREMENTS CONTINUED:**

Type B – Vertical and Overhead Patching Materials shall meet the physical properties stated in Table 3 or Table 4 based upon the material composition.

**Table 3**

<b>Vertical/Overhead Patching</b>		
Cementitious & Polymer-Modified Cementitious Concrete		
Test Description	Test Method	Value
Compressive Strength	ASTM C109 or ASTM C39	Min. 3,000 psi at 3 hrs.
		Min. 5,000 psi at 24 hrs.
		Min. 5,000 psi at 7 days
		Greater than 7 day at 28 days
Bond Strength by Slant Shear	ASTM C882	Min. 1,000 psi at 1 day
		Min. 1,500 psi at 7 days
Bond Strength by Direct Tension	ASTM C1583	Min. 250 psi at 28 days
Length Change	ASTM C157	Max. -0.15% at 28 days (Air)
		Max. +0.15% at 28 days (Water)
Flexural Strength	ASTM C348 or ASTM C78	Min. 1,000 psi at 28 days
Thermal Expansion	ASTM C531	Min. $5.0 \times 10^{-6}$ in/in/°F at 28 days
		Max. $9.0 \times 10^{-6}$ in/in/°F at 28 days
Modulus of Elasticity <sup>1</sup>	ASTM C469	Material shall be similar to patched element.
Permeability	DOTD TR 233 or ASTM C1202	Min. 22 kΩ-cm at 28-31 days or Max. 2,000 coulombs at 28 days
Freeze/Thaw Resistance	ASTM C666 (Procedure A)	Min. 95% at 300 cycles

<sup>1</sup>Modulus of Elasticity shall be reported for informational purposes only to help select the appropriate patching material.

**TEST REQUIREMENTS CONTINUED:**

**Table 4**

<b>Vertical/Overhead Patching</b>		
Polymer Concrete		
Test Description	Test Method	Value
Compressive Strength	ASTM C579	Min. 3,000 psi at 3 hrs.
		Min. 5,000 psi at 24 hrs.
		Min. 5,000 psi at 7 days
		Greater than 7 day at 28 days
Bond Strength by Slant Shear	ASTM C882	Min. 1,000 psi at 1 day
		Min. 1,500 psi at 7 days
Bond Strength by Direct Tension	ASTM C1583	Min. 250 psi at 28 days
Linear Shrinkage & Thermal Expansion	ASTM C531	Min. $5.0 \times 10^{-6}$ in/in/°F at 28 days
		Max. $9.0 \times 10^{-6}$ in/in/°F at 28 days
Thermal Compatibility	ASTM C884	Pass
Gel Time <sup>1</sup>	ASTM C881	Min. 30 minutes
Permeability	DOTD TR233 or ASTM C1202	Min. 22kΩ-cm at 28-31 days or Max. 2,000 coulombs at 28 days
Freeze/Thaw Resistance	ASTM C666 (Procedure A)	Min. 95% at 300 cycles

<sup>1</sup>*Gel Time Testing is for Informational Purposes Only*

**TEST REQUIREMENTS CONTINUED:**

Type C – Standard (Non-Rapid) Patching Material shall meet the physical properties stated in Table 5.

**Table 5**

<b>Standard (Non-Rapid) Patching</b>		
Test Description	Test Method	Value
Compressive Strength	ASTM C39	Min. 5,000 psi at 28 days
Bond Strength by Slant Shear	ASTM C882	Min. 2,500 psi at 28 days
Bond Strength by Direct Tension	ASTM C1583	Min. 250 psi at 28 days
Length Change	ASTM C157	Max. -0.15% at 28 days (Air)
		Max. +0.15% at 28 days (Water)
Splitting Tensile Strength	ASTM C496	Min. 400 psi at 28 days
Permeability <sup>1</sup>	DOTD TR233 or ASTM C1202	Min. 22kΩ-cm at 28-31 days or Max. 2,000 coulombs at 28 days
Linear Shrinkage & Thermal Expansion	ASTM C531 or AASHTO T336 (Form & Pour w/ Large Aggregate)	Min. 5.0 x 10 <sup>-6</sup> in/in/°F at 28 days
		Max. 9.0 x 10 <sup>-6</sup> in/in/°F at 28 days
Freeze/Thaw Resistance	ASTM C666 (Procedure A)	Min. 90% at 300 cycles

<sup>1</sup>Permeability Testing Not Required for Pavement Patching.



**TEST REQUIREMENTS CONTINUED:**

Field Evaluation

The Department may require a field evaluation to ensure satisfactory installation and performance of the material prior to placement on the Approved Materials List (AML). The field evaluation will consist of applying the material as a patch on a trafficked pavement or bridge deck in the field. Performance over a period of time (minimum 1 year) will be observed. The compatibility of the new material with the existing concrete will be a factor in acceptance of the material, along with the ability to remain in place and perform over a period of time.

Sample (to be furnished at no cost to the Department)

Submit an adequate amount of material for use in three (3) patches approximately 4 feet wide x 4 feet wide x 3 inches deep in size. The manufacturer may be required to furnish or rent a portable concrete mixer in order to mix the material to a uniform consistency. It is also requested that a company representative be present, if possible, to observe placement of material.

**GENERAL:**

Upon completion of the evaluation, the submitter will be notified in writing concerning the results of the evaluation and whether the material will or will not be added to the Approved Materials List (AML). The DOTD Materials and Testing Section Coordinator shall be notified in writing of any change from the original material submittal. The Department reserves the right to re-evaluate any material at any time. A Certificate of Analysis (CA) of the material shall be submitted every five (5) years to the DOTD Materials and Testing Section Coordinator to remain on the AML.

It is also the manufacturer's responsibility to supply the contact information of the representative responsible for the material to the Materials Section Coordinator to remain on the AML. This is done by completing the Approved Materials Evaluation Form every two (2) years or when there is a change in the manufacturing representative responsible for the material.

**PROJECT ACCEPTANCE REQUIREMENTS:**

The inclusion of any material on the AML is not blanket approval for its use. All materials, regardless of prior approval, shall be sampled in accordance to the Materials Sampling Manual.

**DISQUALIFICATION AND REMOVAL:**

Any material may be removed from the AML at any time. Causes for removal from the AML may include, but are not limited to the following:

- Non-conformance with specifications
- Performance requirements
- Failure to notify the Department of any change in material formulation
- Failure of the supplier to provide proper certifications as required by this procedure
- Failing test results obtained by the Materials Section of project verification samples
- Failure to supply current contact information for the material representative in accordance with this procedure

**REQUALIFICATION:**

Any material, which has been disqualified and/or removed from the AML, will be considered for re-evaluation only after submission of a formal request along with acceptable evidence that the problems causing the disqualification and/or removal have been resolved.

**DOTD MATERIALS & TESTING SECTION COORDINATOR**

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Approved 07/01/2020



7-1-2020

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