

BRIDGE JOINTS

2010 Resident Engineer's Workshop





THE PLAN

- TRAINING
 - IMPROVE OUR MATERIALS AND SPECIFICATIONS AND DEVELOP A QUALITY CONTROL PROGRAM
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North Carolina Department of Transportation
Research Project No. HWY-2007-10

Material Property and Quality Control Specifications for
Elastomeric Concrete Used at Bridge Deck Joints



ELASTOMERIC CONCRETE

(1-27-10)

1.0 DESCRIPTION

Elastomeric concrete is a mixture of a two-part polymer consisting of polyurethane and/or epoxy and kiln-dried aggregate. Provide an elastomeric concrete and binder system that is preapproved. Use the concrete in the blocked out areas on both sides of the bridge deck joints as indicated on the plans.

2.0 MATERIALS

Provide materials that comply with the following minimum requirements at 14 days (or at the end of the specified curing time).

ELASTOMERIC CONCRETE PROPERTIES	TEST METHOD	MINIMUM REQUIREMENT
Compressive Strength, psi (MPa)	ASTM D695	2000 (13.8)
5% Deflection Resilience	ASTM D695	95
Splitting Tensile Strength	ASTM D3967	625 (4.31)
Bond Strength to Concrete, psi (MPa)	ASTM D882 (D882M)	450 (3.10)
Durometer Hardness	ASTM D2240	50

Old Spec

→ 2800

→ 450

BINDER PROPERTIES (without aggregate)	TEST METHOD	MINIMUM REQUIREMENT	Old Spec
Tensile Strength, psi (MPa)	ASTM D638	1000 (6.89)	→ 800
Ultimate Elongation	ASTM D638	150%	→ 150
Tear Resistance, lb/in (kN/m)	ASTM D624	200 (34.9)	→ 90

In addition to the requirements above, the elastomeric concrete must be resistant to water, chemical, UV and ozone exposure and withstand temperature extremes. **Elastomeric concrete systems requiring preheated aggregates are not allowed.**

3.0 PREQUALIFICATION

Manufacturers of elastomeric concrete materials shall submit samples (including aggregate, primer and binder materials) and a Type 4 certification in accordance with article 106-3 (F) of the Standard Specifications for prequalification to:

North Carolina Department of Transportation
Materials and Tests Unit
1801 Blue Ridge Road
Raleigh, NC 27607

Prequalification will be determined for the system. Individual components will not be evaluated, nor will individual components of previously evaluated systems be deemed prequalified for use.

The submitted binder (a minimum volume of 1 gallon) and corresponding aggregate samples will be evaluated for compliance with the Materials requirements specified above. **Systems satisfying all of the Materials requirements will be prequalified for a one year period. Before the end of this period new product samples shall be resubmitted for prequalification evaluation.**

If, at any time, any formulation or component modifications are made to a prequalified system that system will no longer be approved for use.

4.0 MATERIAL CERTIFICATION AND INSTALLATION

Provide a Type 5 certification in accordance with article 106-3 (F) of the Standard Specifications, verifying that the materials satisfy the above requirements and proof of NCDOT prequalification.

Prior to placing the elastomeric concrete, thoroughly clean and dry all concrete surfaces.

Sandblast the concrete surface in the blockout and clear the surface of all loose debris.

Provide a manufacturer's representative at the bridge site during the installation of the elastomeric concrete to ensure that all steps being performed comply with all manufacturer installation requirements including, but not limited to weather conditions (ambient temperature, relative humidity, precipitation, wind, etc), concrete deck surface preparation, binder and aggregate mixing, primer application, elastomeric concrete placement, curing conditions and minimum curing time before joint exposure to traffic.



5.0 FIELD SAMPLING

Provide additional production material to allow freshly mixed elastomeric concrete to be sampled for acceptance. A minimum of six 2 inch cube molds and three 3x6 inch cylinders will be taken by the Department for each day's production. Compression, splitting tensile, and durometer hardness testing will be performed by the Department to determine acceptance. Materials failing to meet the requirements listed above are subject to removal and replacement at no cost to the Department.

6.0 BASIS OF PAYMENT

No separate payment will be made for elastomeric concrete. The lump sum contract price bid for "Evazote Joint Seals" will be full compensation for furnishing and placing the Elastomeric Concrete.

Evazote Joint Seals

- No changes to this provision since August 2004
- There are some Elastomeric Concrete details in the Evazote Joint Seal provision, so look for overlaps.

A few key aspects...

Evazote Joint Seals

1.0 Seals

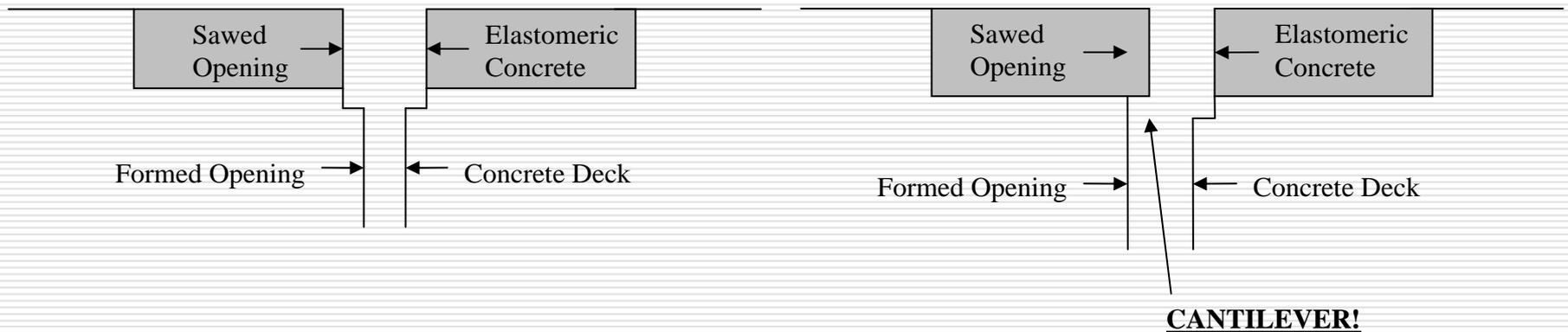
- Have the top of the evazote seal clearly shop marked.

2.0 Adhesives

- Use an adhesive that is workable to 40°F (4°C).

3.0 Sawing the Joints

- When the plans call for sawing the joints, the joints shall be initially formed to a width as shown on the plans.







Evazote Joint Seals

4.0 Preparations for Sawed Joints

- Immediately before sealing, clean the joints by sandblasting with clean dry sand.
- Bond the seal to the blast cleaned surface on the same day the surface is blast cleaned.

5.0 Preparations for Armored Joints

- Submitting catalog cuts of the proposed material is required. In addition, direct the joint supplier to provide an angle segment placing plan.
 - Prior to placing the elastomeric concrete, thoroughly clean and dry all concrete surfaces. Sandblast the concrete surface in the blockout and clear the surface of all loose debris.
 - Clean the armored joint opening with a pressure washer rated at 3000 psi (20.7 MPa) minimum at least 24 hours after placing the elastomeric concrete. Dry the cleaned surface prior to installing the seal.
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Evazote Joint Seals

6.0 Seal Installation

- Apply the mixed epoxy to the sides of both the joint material and both sides of the joint, making certain to completely fill the grooves with epoxy.
 - With gloved hands, compress the material and with the help of a blunt probe, push it down into the joint until it is recessed approximately 1/4 inch (6 mm) below the surface.
 - Clean the excess epoxy off the surface of the joint material *quickly* and *thoroughly*. Do not use solvents to remove excess epoxy. Remove excess epoxy in accordance with the joint manufacturer's recommendations.
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THE PLAN

- TRAINING
 - REVIEW OF MATERIALS AND SPECIFICATIONS
 - INCREASED INSPECTION
-

INCREASED INSPECTION

- ❑ THE BCE WILL REVIEW THE REQUIREMENTS IN THESE PROVISIONS WITH THE INSPECTOR AND CONTRACTOR PRIOR TO INSTALLATION
 - ❑ THE BCE MAY OR MAY NOT BE PRESENT DURING INSTALLATION, BUT ON THE FIRST PROJECT VISIT AFTER INSTALLATION, THE BCE WILL INSPECT THE JOINT
 - ❑ THE BCE WILL INSPECT ALL JOINTS AT THE DECK AND RAIL OR FINAL INSPECTION
 - ❑ THE BCE WILL INSPECT ALL JOINTS AT THE 12 MONTH GUARANTEE REVIEW
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Ray Moore, Structure Design Unit

“New joints are similar to new outhouses – they look and smell good until they are in use”

Let's work to change this perception!