



**SPECIAL PROVISIONS
FOR
VOID FILLING AND PAVEMENT LIFTING WITH POLYURETHANE FOAM
(URETEK METHOD)**

**Polk County
MPIN-235-1(702)11--0N-77**

**Effective Date
April 20, 2010**

THE STANDARD SPECIFICATIONS, SERIES 2009, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SPECIAL PROVISIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

090059.01 DESCRIPTION

This work consists of raising, filling voids, undersealing, or densification of base soils under Portland cement concrete or bituminous pavements by furnishing and injecting polyurethane material under the pavement or into the base soils at locations shown on the plans.

090059.02 MATERIALS

- A.** Material for raising and undersealing pavements shall be a water blown, closed cell, high density polyurethane system with the following physical characteristics:

Technical Property	Requirement
Density, min., per ASTM D 1622 (air rise)	3.0 lbs/ft ³
Compressive strength, min., per ASTM D 1621	40 psi
Density, max., per ASTM D 1622 (air rise)	4.2 lbs/ft ³
Volume Change, max. shrinkage (10 years)	5.0%
Curing Rate	90% of compressive strength within 15 minutes after injection

- B.** Material shall be hydro-insensitive in the material's component reaction such that the injected product is not significantly compromised by soil moisture or free water under the pavement.
- C.** Material shall have a warranty against shrinkage and deterioration for a period of 10 years. During the warranty period, the manufacturer shall replace, by injection, any failed material at no additional cost to the Contracting Authority.
- D.** Acceptance of the polyurethane material will be based on certification and test results.

- E. Uretek, USA Inc. (Uretek) shall provide the Engineer certification from the manufacturer stating that the material provided is in accordance with Article 090059.02 of this specification. The MSDS for all pertinent production material shall be included with the certification, at least 4 weeks prior to start of work.
- F. When requested by the Engineer, the Contractor shall perform a product density test by injecting a sample of the unit's polyurethane material into a test cylinder of known volume. This test will be performed on pumping units in service.
- G. When requested by the Engineer, Uretek shall inject the ambient temperature (70°F to 90°F) polyurethane material into a container holding 40 gallons of ambient temperature water at 70°F. The resulting product shall demonstrate consistent, closed cell polyurethane material meeting the property requirements of this specification.
- H. All stored polyurethane material shall be sealed and protected from contamination by dust or any foreign material.

090059.03 CONSTRUCTION

- A. Calibration of measurement equipment will be completed by the District Materials Office prior to start work.
- B. Uretek shall provide the pavement profile from laser level readings or string lines of each area where the pavement needs to be raised. Each profile shall be accepted by the Engineer prior to performing the work at the profile location. These profiles shall be tied to a specified location on the pavement with an assumed or known elevation, so that the pavement can be monitored for further settlement
- C. At locations where the pavement is to be raised or undersealed, a series of 9/16 to 3/4 inch diameter holes shall be drilled through the pavement and underlying base at the locations and depths as determined by Uretek. The pavement surrounding each hole shall not be damaged.
- D. The polyurethane material shall be injected through the drilled holes until all known or encountered voids under the pavement are filled. The rate and amount of material injected shall be determined by Uretek.
- E. The pumping unit shall be calibrated daily or as directed by the Engineer. If calibration results show inconsistencies from calibration to calibration, the work shall be stopped until the cause for the inconsistencies are corrected to the satisfaction of the Engineer.
- F. Injection nozzles shall prevent leakage during injection and shall be removed at completion of the injection. Any excessive material on the pavement surface shall be removed from the area.
- G. All drill tailings, excess polyurethane material and other debris shall be cleaned up at the end of each working day or before the lane is opened to traffic. When adjacent lanes are open to traffic, provisions shall be made to prevent material from encroaching onto the open lane or squirting onto passing vehicles. Polyurethane material shall not enter into gutters or closed drainage systems. Suitable means to restrict the infiltration of the residue into a closed drainage system shall be provided by the Contractor. Polyurethane material shall be removed from the pavement surface before any residue is blown by traffic action or wind. All removed material shall be disposed of according to federal, state, and local regulations.
- H. Corrections to the grade of adjacent slabs, if necessary, or as determined by the Engineer, shall be made in accordance with this specification. All raised pavement shall match the existing grade of adjacent slabs to provide positive drainage. Final elevations of raised pavement areas shall be within 1/4 inch of the required elevations as determined by the profile or the Engineer.

- I. Operations shall be performed such that, if necessary, alternating adjacent areas are filled and lifted so as to minimize cracking or other damage to the pavement. Any damage to the pavement as a result of poor installation practices shall be repaired by the Contractor as directed by the Engineer.
- J. The roadway may be open to traffic when the polyurethane material has reached 90% of the material's designed compressive strength
- K. Uretek shall transfer all warranties on the polyurethane material to the Contracting Authority upon acceptance of the work by the Engineer.
- L. Continuous laser level or dial indicator micrometer readings shall be in place and monitored by Uretek during injection to determine sufficient material usage and soils densification as indicated by pavement movement of 1/16 inch.
- M. Uretek shall keep daily records of operation times, pavement-lifting corrections accomplished with the Uretek Method, unanticipated occurrences, other records common to their procedure, etc for each site, and submit written reports to the Engineer within one week.
- N. Uretek shall fill all injection holes with non-shrink grout encompassing full pavement thickness and shall return to the site after 24 hours to verify that the hole grouting is adequate and to perform additional grouting if necessary.
- O. Uretek shall remove all excess materials and equipment from the work area at the completion of each individual work period.
- P. If the quantity of material at a single approach exceeds the plan quantity by more than 50%, with no explanation of over-run and with no progress being achieved, work shall be stopped at that approach until it can be reviewed by the Engineer.
- Q. Uretek shall stop all work and remove traffic control if bad weather arises. Bad weather is any weather condition that could adversely effect the movement of traffic through the work zone. Work shall also stop if there is an incident that affects traffic through the work zone.
- R. A Spill Prevention Plan shall be provided to the Engineer at the Preconstruction Meeting for review.

090059.04 METHOD OF MEASUREMENT

The amount of polyurethane material needed to accomplish the void filling and pavement lifting by the Uretek Method is not known, and is expected to vary from quantities included in the contract documents. The amount of raw polyurethane material used at each approach location during each day's work period shall be recorded by Uretek in pounds, and reported in writing to the Engineer on a daily basis.

090059.05 BASIS OF PAYMENT

Uretek's bid shall be based pounds of raw polyurethane material being used at each approach location as shown in contract documents. Each approach location is defined as all lanes of traffic (and paved shoulders if applicable) in a bridge approach section at either end of an individual bridge. Uretek will be paid the contract unit price for the pounds of raw polyurethane material used and accepted by the Engineer. Adjustments to the quantity of raw material per approach location, either higher or lower, will be paid for in accordance with Article 1109.03, B, of the Standard Specifications. This payment shall be full compensation for furnishing all labor, equipment, and materials to level the pavement by the Uretek method. Drilling and grouting of injection holes shall be incidental to this item.