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# Special Specification 3051

## Pressure Grouting

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### 1. DESCRIPTION

Undersealing existing voids under the concrete pavement at locations shown on the plans or designated by the Engineer. This work includes drilling injection holes, placement of undersealing grout, testing to control lift of pavement, clean-up and other related work.

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### 2. SPECIAL REQUIREMENTS

Use a crew experienced and competent in the work of pressure grouting and pavement undersealing. Furnish crew and equipment with satisfactory production capabilities in the judgment of the Engineer.

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### 3. MATERIALS

Use pre-approved packaged grout materials meeting the requirements of DMS 4675, "Cementitious Materials for Miscellaneous Applications."

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### 4. EQUIPMENT

Provide machinery, tools, and equipment necessary for proper execution of the work. At a minimum, provide the following:

- 4.1. **Drill.** Use a drill capable of drilling holes of the required diameter and depth.
- 4.2. **Mixer and Pump.** Furnish a mixer and pump unit with the appropriate attachments capable of injecting the grout under the concrete slab at the depth(s) required in the plans.
- 4.3. **Level.** Provide control equipment to indicate slab movement.
- 4.4. **Testing Equipment.** Provide necessary grout testing equipment.

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### 5. GROUT

Proportion packaged grout material to meet the following requirements.

- The time of efflux from the flow cone must be between 10 and 20 seconds. Perform the flow test in accordance with Test Method Tex-437-A, "Method of Test for Flow of Grout Mixtures (Flow-Cone Method)."
- The compressive strength of the grout must achieve 500 psi before opening pavement to traffic. Mold specimens in accordance with Test Method Tex-447-A, "Making and Curing Concrete Test Specimens." Determine the compressive strength in accordance with Test Method Tex-418-A, "Compressive Strength of Cylindrical Concrete Specimens."

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### 6. DEFLECTION TESTING

Each designated area of the project is subject to be tested by the Engineer in cooperation with the Contractor using the Falling Weight Deflectometer (FWD). The Engineer will perform FWD testing before and after

grouting operations. FWD testing after grouting operations will be performed at least 24 hr. after grouting. The Engineer will use the deflection data to determine where re-grouting is necessary.

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## 7. CONSTRUCTION METHODS

- 7.1. **Drilling.** Drill 1-1/2 in. diameter (or other approved diameter) holes through the concrete pavement at the locations indicated on the plans or designated by the Engineer. Drill these holes to a depth sufficient to penetrate any stabilized base and into the subgrade. Subgrade penetration must not exceed 3 in. When drilling holes, the drills must be held as nearly perpendicular as possible to the pavement surface. Fill irregular or unsatisfactory holes which cannot be satisfactorily used in pressure grouting, and drill new holes. Do not drill more holes during a day's operations than can be grouted during the same day, unless specific approval is given by the Engineer.
- 7.2. **Grouting.** Unless otherwise allowed, after drilling the holes, lower a pipe connected to the discharge hose on the pressure grout pump into the holes. The discharge end of the pipe must extend below any overlays which might exist, but not below the lower surface of the concrete pavement.

During the grouting operations, use a positive means of monitoring lift. The upward movement of the pavement should not be greater than 1/8-in. or as directed by the Engineer. Pump each hole until maximum pressure is built-up, grout is observed flowing from hole-to-hole, or as directed by the Engineer. Maximum allowable pressure is such that the pavement is not lifted more than the allowable amount. Monitor the pressure by an accurate pressure gauge in the grout line that is protected from the grout slurry. Water displaced from the void structure by the grout must be allowed to flow out freely, but must not interfere with adjacent traffic. Prevent excessive loss of grout through cracks, joints, or from backpressure in the hose or in the shoulder area.

Do not perform pressure grouting when pavement surface temperatures are below 35°F or if the subgrade or base course material is frozen.

After the completion of grouting in any one hole, withdraw the discharge pipe from that hole and plug the hole immediately. Temporary plugs may be used since additional grout may be placed in particular holes to complete the required work in that area.

Remove temporary plugs when sufficient time has elapsed to permit the grout to set sufficiently so that back pressure will not force it through the hole, fill the space occupied by the plug with a reasonably stiff grout or an approved concrete mixture, and then compact.

In the event the Engineer determines that continued grout injection at any specific location is no longer economically feasible, he may direct the Contractor to cease grout injection at that location.

The Engineer may modify the construction methods outlined above, for sufficient justification, as field conditions dictate.

Use any measures necessary to keep all pavement surfaces adjacent to the actual grouting operations reasonably clean of excess grout and other materials at all times.

Prior to the placement of traffic on the work area, clean the pavement (including adjacent shoulders) to the satisfaction of the Engineer.

Keep all traffic off the grouted slab for at least 4 hr. or until opening to traffic strength is achieved.

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## 8. MEASUREMENT

The undersealing grout, mixed and placed as specified herein, will be measured by the cubic foot (dry measure) incorporated into the underseal, prior to mixing.

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**9. PAYMENT**

The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "Grouting."

This price is full compensation for all work covered by this Item, including but not limited to, drilling, temporary plugging and final sealing of holes in the concrete slabs; for securing and furnishing all materials; including all royalty, freight and storage involved; for mixing, proportioning and pumping the undersealing grout into the voids under the concrete slabs; for cleaning up and for all manipulation, labor, tools, equipment and incidentals necessary to complete the work.