SECTION 31 32 23
PRESSURE GROUTING SOIL STABILIZATION

PART 1 - GENERAL

1.1 DESCRIPTION

This section specifies furnishing and installing a single component liquid polyurethane chemical grout that is injected under pressure into voids in the ground. Upon reaction, expansion, and curing: the polyurethane fills the voids between the soil particles to stabilize soils and, if sufficiently installed, can form a water-resistant barrier. All works shall be done as directed by the Resident Engineer and as shown on the drawings.

1.2 QUALITY ASSURANCE

A. Manufacturing qualifications: The manufacturer of the specified product shall have an established program of training and technically supporting an organized Approved Applicator program.

B. Contractor qualifications: Contractor shall be an Approved Applicator of the manufacturer of the specified product, who has completed a program of instruction in the used of the specified product Contractor shall maintain qualified personnel who have received product training by a manufacturer's representative And Shall be able to demonstrate past performance on at least five jobs of similar scope and size.

C. Install materials in accordance with all safety and weather conditions required by manufacturer or as modified by applicable rules and regulations of local, state and federal authorities having jurisdiction. Consult Material Safety Data Sheets for complete handling recommendations.

D. Make all arrangements and pay all costs to have manufacturer’s authorized technical representative on the job at the beginning of all major phases of the work.

1.3 RELATED WORK:

A. Materials testing and inspection during construction: Section 01 45 29, TESTING LABORATORY SERVICES.

B. Protection of existing utilities, fire protection services, existing equipment, roads, and pavements: Section 01 00 00, GENERAL REQUIREMENTS.

1.4 APPLICABLE PUBLICATIONS

A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by basic designation only.

B. American Society for Testing and Materials (ASTM):

ASTM D4878-08.....Standard Test for Polyurethane Raw Materials: Determination of Viscosity of Polyols.

ASTM D1310-14 .....Standard Test for Flash Point and Fire Point of Liquids by Tag Open-Cup Apparatus.

ASTM D3505-13 .....Standard Test Method for Density or Relative Density of Pure Liquid Chemicals.

ASTM D4219-08 .....Standard Test Method for Unconfined Compressive Strength Index of Chemical-Grouted Soils.

ASTM D1586 .....Standard Test Method for Standard Penetration Test (SPT) and Split-Barrel Sampling of Soils

1.5 SUBMITTALS:

A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Submit two copies of manufacturer's literature, to include: Product Data Sheets, and appropriate Material Safety Data Sheets (MSDS)

C. The Contractor shall submit a complete list of equipment and procedures for the proposed use of the grout.

D. The Contractor shall submit to the Engineer for approval, a detailed procedure for the installation of the water – reactive grout.

PART 2 - PRODUCT

2.1 MATERIALS

A. Basis of Design: DeNeef® Soil PURe by Grace Construction Products (800) 732-0166. The chemical grout will be a hydrophobic polymer phalate free material, jobsite conditions may dictate product selection, and material is installed by use of the injection probe method.

C. The accelerator will be based on a tertiary amine and have a viscosity of 15 cps (75°F). The accelerator will be able to shorten the reaction/gel time of the chemical grout depending upon the amount of accelerator add and temperature. The accelerator material will be as specified by the manufacturer of the chemical grout. Addition of the accelerator to the chemical grout will not cause any reaction to occur.

2.2 Performance Criteria

A. Properties of the cured polyurethane grout:

1. Compressive Strength psi, 905 min.
2. Viscosity at 77deg F 40 CPS
3. Relative Density at 77deg. F 1.10
4. Service Range: -40deg to 16F (-400 to 770C)

Note: Tests were performed with material and curing conditions at 71-75F and 45-55% relative humidity.

PART 3 - EXECUTION

3.1 PROCEDURE

A. The Contractor shall submit for approval by the Engineer a detailed grouting plan showing the spacing, orientation, and the depth of the grout tubes, as well as the type of polyurethane to be used, range of gel times, equipment, mixing procedures, recommended injection pressure, techniques for monitoring grout travel, and any other pertinent information. The grouting plan shall be in accordance with the provisions set for the in this section.

3.2 INSPECTION AND CONTROL

A. The work shall be under the direct inspection of a representative of the testing lab who will measure the specific gravity of the mixture, determine suitable operation of the equipment used, and determine the point of injection refusal.

B. Acceptance of the soil stabilization shall be on the basis of continuous on site inspection and testing by a representative of the testing lab. At the testing labs discretion, on site testing may include before and after testing of the sub-grade soils to evaluate the stabilization process. After tests will typically be performed at seven days after injection to assure interaction with the polyurethane chemical grout and soil mixture. Typical tests may include standard penetration tests in accordance with ASTM D1586 or similar test as considered applicable by the testing laboratory. The Contractor may be required to inject portions of the site with polyurethane chemical grout more than once to meet the approval of the testing lab.

- - - E N D - - -