SECTION 31 32 00

SOIL STABILIZATION AND GROUND MODIFICATION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Stabilization, consolidation, and binding of water bearing soils through permeation injection of polyurethane resin creating a solid mass of soil and rigid resin.

B. Creation of a barrier in water bearing soils to reduce water migration through permeation injection of polyurethane resin creating a solid mass of soil and rigid resin.

1.2 REFERENCES

A. ASTM D-3574 - Standard Test Method for Linear Dimensional Changes of Plastics Caused By Exposure to Heat and Moisture.

B. ASTM D-1042/D-756 - Standard Test Method for Determination of Weight and Shape Changes of Plastics Under Accelerated Service Conditions

1.3 SUBMITTALS

A. Submit under provisions of Section 01 30 00.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Minimum 5 year experience manufacturing similar products.

B. Installer Qualifications: Minimum 2 year experience installing similar products.

C. Test Section: Provide a test section for evaluation of injection techniques and application workmanship.
   1. Finish areas designated by Engineer.
   2. Do not proceed with remaining work until workmanship is approved by Engineer.
   3. Refinish test section as required to produce acceptable work.

1.5 PRE-INSTALLATION MEETINGS

A. Convene minimum two weeks prior to starting work of this section.
   1. Review the latest Technical Data Sheets, Material Safety Data Sheets, and instructions from manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store products in manufacturer's unopened packaging bearing the brand name and manufacturer's identification until ready for installation.

B. Keep lids on tightly to prevent moisture from entering containers. Avoid direct contact with product. Use caution when opening as pressure may build up inside containers.

C. Handling: Handle materials to avoid damage.

1.7 PROJECT CONDITIONS

A. Low temperatures will increase viscosity making product more difficult to pump. Low temperatures or cold water will slow down the reaction time. pH of reaction water should be between 3 and 10 for optimum product quality. Keep lid tightly closed.

B. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Alchatek; 4508 Bibb. Blvd Suite B5, Tucker, GA 30084. Tel: (404) 618-0438. Fax: (678) 805-4783. Email: info@alchatek.com. Web: www.alchatek.com.

B. Substitutions: Not permitted.

2.2 APPLICATIONS/SCOPE

A. Product: AP Soil 600 as manufactured by Alchatek.

B. Material:
1. One component, moisture activated, low viscosity, hydrophobic polyurethane soil grout.
2. Accessory: AP Cat 600 (optional)
3. Accessory: AP Pump Flush.
4. Accessory: AP Soak 130.

C. Physical Properties 77 degree F (25 degree C) – Liquid:
1. Viscosity 25-35 Centipoise.

D. Physical Properties – Cured:
1. Tensile Strength (ASTM D-3574): 175 psi.
2. Shrinkage (ASTM D-1042/D-756): None.
3. Compressive Strength (with fine sand) (ASTM D-575/D695): 2,085 psi.
4. Properties will vary depending on application conditions.

E. Reaction Times at 73 degrees F (23 degrees C):

Catalyst	AP Cat 600	Set Time
0.0%	0 oz. to 5 gal.	3 hrs.
0.5%	3.2 oz. to 5 gal.	2 hrs. 30 min.
1.0%	6.4 oz. to 5 gal.	2 hrs.
1.5%	9.6 oz. to 5 gal.	1 hrs. 20 min.
2.0%	12.8 oz. to 5 gal.	55 min.
2.5%	16.0 oz. to 5 gal.	30 min.
3.0%	19.2 oz. to 5 gal.	25 min

PART 3 . EXECUTION

3.1 PREPARATION

A. Condition material overnight to 70 degree to 80 degree F (21 degree to 26 degree C). Heat bands or hot water bath may be used to warm containers. Do not heat above 80 degrees F (26 degree C).

B. Equipment: Single component diaphragm pump or airless sprayer recommended.

C. Drive pipes into the ground to the lowest depth that needs to be injected.

D. Personal Protection: Use safety goggles, face shield, impermeable gloves, long sleeves and pants.

E. Use in well ventilated areas. Open doors and windows. In confined areas use mechanical ventilation to keep vapor concentrations low. Prevent direct contact with skin and eyes. Refer to MSDS.

3.2 INSTALLATION

A. Mixing if not using catalyst: None

B. Mixing:
1. Mix only the amount of material to be used within a few hours.
2. Use a low speed drill with a mixing paddle.
3. Be careful not to whip too much air into the mixture.
4. Pour in catalyst while mixing.
5. Wear safety glasses or goggles whenever handling or mixing chemicals.
6. Keep lid tightly sealed when not in use and avoid splashing water into pails.

C. Install in accordance with manufacturer's instructions.
1. Inject material at a rate to allow material to permeate the soil.
2. Flow rate will vary according to soil conditions, but typically no more than ½ gallon per minute in sandy soil.
3. High pressure and high volume pumping can result in fracturing of the soil which produces lenses of resin rather than tight columns. Ideally, keep pump pressures between 40 and 100 psi.
4. Pressure may need to be increased above these levels if the soil is too tight to take material.
5. Inject resin as necessary to improve the soil per the scope of the project.
6. Lift pipes in one foot intervals to begin injection at the next level and repeat steps above.

D. Cured material is chemically inert and safe to dispose of in landfill. Cleanup any spilled liquid resin and place in a suitable sealed container. Dispose of in accordance to applicable environmental regulations.

3.3 Cleanup

A. Remove injection pipes from the ground.

B. Cleanup any cured or wet injection resin.

3.4 CLEAN-UP

A. Flush injection equipment with AP Pump Flush when necessary. Remove cured material from metal components by soaking in AP Soak 130.

B. Clean off of skin with soap and water.

3.5 PROTECTION

A. Protect adjacent work area using plastic sheeting if necessary.

END OF SECTION