**MODEL SPECIFICATION FOR POLYURETHANE CONCRETE PAVEMENT/SLAB STABILIZATION APPLICATIONS**

1. SCOPE
   1. The work consists of designing, furnishing, and installing two-part, high-density polyurethane material according to the project Plans and this specification.
   2. The parties and contract terms referred to in this specification are as follows:
      1. The Owner is the person or entity that owns the facility or will own the facility once it is completed. The Owner may have contractual agreements with, and be represented by, other parties such as engineers, architects, or contractors that perform services under the direction of the Owner. Where Owner is used in the specification, it refers to the Owner or the Owner’s contracted representatives separate from the Installing Contractor.
      2. The Installing Contractor installs the polyurethane material and possibly performs other tasks associated with the project.
      3. The Plans refer to the contract documents; including but not limited to the drawings and specifications for the project.
   3. The work may include void filling, stabilizing and/or lifting pavement and slab structures, or undersealing pavement and faulted joints where required.
   4. The Owner will provide suitable access to the construction site for the Installing Contractor’s personnel and equipment.
   5. Unless otherwise noted, the Installing Contractor shall provide all labor, tools, equipment, and material necessary to accomplish the work.
   6. Unless specifically noted otherwise in the contract documents, the Owner will remove and replace structures, utilities, or other surficial improvements in the work area as necessary to facilitate the work.
   7. The Owner will be responsible for overall construction oversight to preclude the development of unsafe conditions.
   8. The Owner will be responsible for any soil density testing subsequent to the polyurethane injection, unless otherwise noted.
   9. The Owner will be responsible for providing monitoring services during installation to verify stabilization and/or lift of the slab or structure, unless noted otherwise in the contract documents.
   10. The work does not include any post-installation monitoring unless specifically noted otherwise in the contract documents.
2. REFERENCES
   1. American Society for Testing and Materials (ASTM)
      1. ASTM S1621: Compressive Properties of Rigid Cellular Plastics
      2. ASTM D1622/D1622M: Apparent Density of Rigid Cellular Plastics
      3. ASTM D1623: Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics
      4. ASTM C273: Shear Properties of Sandwich Core Materials
      5. ASTM D2842: Water Absorption of Rigid Cellular Plastics
3. APPROVED POLYURETHANE FOAM MANUFACTURERS
   1. Supportworks®, Inc., 11850 Valley Ridge Drive, Papillion, NE 68046; Phone: (800) 281-8545; Fax (402) 393-4002.
   2. Due to the special requirements for design and manufacturing of polyurethane foam, the material shall be obtained from Supportworks®, Inc., or other qualified manufacturer with an approved equivalent product. A request to substitute any other manufactured polyurethane foam product must be submitted to the Owner for review not less than seven (7) calendar days prior to the bid date. The request must include:
      1. Documentation of at least five years of production experience manufacturing polyurethane products for similar applications,
      2. Documentation that the manufacturer’s polyurethane products have been used successfully on at least five similar projects within the last three (3) years, and/or,
      3. Product acceptance by the local building code official(s) having jurisdiction over the project.
4. ACCEPTABLE PRODUCTS
   1. Two-part, closed-cell, polyurethane foam products PolyLevel® PL250H and PolyLevel® PL400H manufactured in accordance with the requirements of Sections 5.1 and 5.2 of this specification.
5. MATERIALS
   1. PolyLevel® PL250H Two-part, High-density Hydrophobic Polyurethane Foam
      1. Two-part, one to one ratio by volume, closed-cell, high-density polyurethane foam system. Used in applications where water may be present beneath the slab.
      2. Unit Weight: The unit weights of the resin and diisocyanate are 9.25 lb/gal and 10.25 lb/gal, respectively, in accordance with ASTM D1475.
      3. Free-rise density of 2.5±0.3 lb/ft3 per ASTM D1622.
      4. Minimum parallel to rise compressive strength of 25 psi per ASTM D1621.
      5. Minimum parallel to rise tensile strength of 25 psi per ASTM D1623
      6. Minimum shear strength of at least 25 psi per ASTM C273.
      7. Maximum water absorption less than or equal to 2% per ASTM D2842.
      8. Achieve 90% compressive strength in 30 to 60 minutes, depending upon placed thickness.
   2. PolyLevel ® PL400H Two-part, High-density, Hydrophobic Polyurethane Foam
      1. Two-part, one to one ratio by volume, closed-cell, high-density polyurethane foam system. Used in applications where water may be present beneath the slab.
      2. Unit Weight: The unit weights of the resin and diisocyanate are 9.25 lb/gal and 10.25 lb/gal, respectively, in accordance with ASTM D1475.
      3. Free-rise density of 4.0±0.3 lb/ft3 per ASTM D1622.
      4. Minimum parallel to rise compressive strength of at least 60 psi per ASTM D1621.
      5. Minimum parallel to rise tensile strength of 60 psi per ASTM D1623
      6. Minimum shear strength of at least 60 psi per ASTM C273.
      7. Maximum water absorption less than or equal to 2% per ASTM D2842
      8. Achieve 90% compressive strength in 30 to 60 minutes, depending upon placed thickness.
6. QUALIFICATIONS OF INSTALLING CONTRACTOR
   1. The Installing Contractor shall submit to the Owner a proposal including the documentation required in this section. Work shall not begin until all the submittals have been received and approved by the Owner. All costs associated with incomplete or unacceptable submittals shall be the responsibility of the Installing Contractor.
   2. Evidence of the Installing Contractor’s competence in the installation of polyurethane materials shall be provided to the Owner’s satisfaction and may include any or all of the following:
      1. Polyurethane manufacturer’s certificate of competency in installation of polyurethane materials,
      2. A list of at least three similar projects completed in the previous three years wherein the Installing Contractor installed polyurethane similar to those shown in the project Plans. Such a list shall include names and phone numbers of those project representatives who can verify the Installing Contractor’s participation in those projects, and/or,
      3. A letter from the polyurethane manufacturer or manufacturer’s representative expressing ability and intent to provide on-site supervision of the polyurethane installation.
   3. A listing of all safety violations lodged against the Installing Contractor within the previous three years and the current status or final resolutions thereof. Descriptions of safety improvements instituted within the previous three years may also be submitted, at the Installing Contractor’s discretion.
7. PRE-CONSTRUCTION SUBMITTALS
   1. Within two (2) weeks of receiving the contract award, the Installing Contractor shall submit the following documentation:
      1. Certification that the proposed polyurethane material meets the requirements of Section 5.
      2. Qualifications of the Installing Contractor per Section 6.2.
      3. Minimum and/or maximum estimated quantity of polyurethane material.
      4. Soil testing procedures and failure criteria, if applicable.
      5. Proof of insurance coverage as stated in the general specifications and/or contract.
8. POLYURETHANE INSTALLATION
   1. Installing Contractor shall furnish and install polyurethane material per the project Plans. In the event of conflict between the project Plans and the Installing Contractors proposed installation method, the Installing Contractor shall not begin work until conflict has been resolved with the Owner.
   2. The Owner shall request marking of underground utilities by an underground utility location service as required by law, and the Installing Contractor shall avoid contact with all marked underground utilities.
   3. The portion of the construction site occupied by the Installing Contractor, including equipment and material stockpiles, shall be kept reasonably clean and orderly.
   4. The installation of polyurethane may be observed by representatives of the Owner for quality assurance purposes. The Installing Contractor shall give the Owner at least 24 hours’ notice prior to starting the polyurethane installation.
   5. The polyurethane will be installed with a truck, trailer, or buggy mounted pumping unit capable of injecting high-density polyurethane material under the concrete slab or pavement. The pumping unit will be capable of controlling the temperature and rate of flow of the material, as well as measuring the total amount of material injected.
   6. If 5/8-inch diameter holes are required for the placement of the polyurethane material, the hole locations may be approved by the Owner prior to installation. After installation, the drilled holes will be cleaned out and filled with non-shrink grout, high-strength mortar mix, or other product approved by the Owner.
   7. The Owner will be responsible for providing monitoring services to verify stabilization and/or lift of the slab or structure, unless noted otherwise in the contract documents. Measuring equipment may include laser levels, surveyor levels, manometers, dial indicators, string lines, straight edges, or other devices capable of detecting slab movement within 0.1 inch.
   8. The rate, temperature, and amount of material required will be determined by the Installing Contractor and approved by the Owner.
9. INSTALLATION RECORD SUBMITTALS
   1. The Installing Contractor shall provide the Owner copies of the polyurethane material usage record within 24 hours after each installation section has been completed. Formal copies shall be submitted within 30 days following the completion of the polyurethane installation. The material usage record shall include, but is not limited to, the following information:
      1. Date and time of installation
      2. Location of installation
      3. Total material used
      4. Comments pertaining to interruptions, obstructions, and other relevant information
10. CLEANUP
    1. With one week of completion of the work, the Installing Contractor shall remove any and all material, equipment, tools, debris, or other items belonging to the Installing Contractor or used under the Installing Contractor’s direction.
11. METHOD OF MEASUREMENT
    1. The high-density polyurethane material shall be measured by the pound. Weight of the injected material will be recorded and documented at each location and at the end of each work shift.