

Bid Specifications for Raising Concrete using Polyurethane

Material

The material used for raising concrete slabs shall be a water blown high-density polyurethane. The material shall be hydrophobic. The high-density, closed cell, polyurethane system shall exhibit the following physical characteristics and properties:

<u>Density (lb/Ft.3)</u>	<u>Compressive Strength (psi)</u>
ASTM1622	ASTM 1621
3.0	40 PSI
3.5	50 PSI
4.0	60 PSI
5.0	110 PSI

The polyurethane foam system will have a free rise density of 3.0 – 3.2 lb/ft³, with a minimum compressive strength of 40 psi. The expansion of the polyurethane foam under pressure increases the foam density above the original free rise density value. The compressive strength is a function of density of the tested material; therefore the foam produce during the lifting process will normally have a higher compressive strength than foam produced without restriction (free rise). When the material is used for void filling, the final in-place density will be slightly higher than the free rise density, as some packing of material will occur to insure fill.

Equipment

A listing of lifting and undersealing equipment shall be submitted to the Engineering Department for review. The minimum list of equipment required shall be as listed below. The listing is a minimum and shall not preclude the use of additional equipment.

- ❑ A drill capable of drilling 5/8 inch diameter holes
- ❑ A truck-mounted pumping unity capable of injection the high-density polyurethane formulation between the concrete pavement and the sub-base and capable of controlling the rate of rise of the pavement.
- ❑ A digital manometer or laser leveling unit to ensure that the concrete is raised to an even plane and to the required elevations.

Construction Methods

Drilling: The injection hole shall be drilled in the following manner: A series of 5/8-inch holes shall be drilled at six to eight-foot intervals through the concrete. The Contractor shall determine the exact location and spacing of the holes.

Injecting: The high-density polyurethane formulation will be injected under the slab. As the polyurethane chemically reacts, it expands and hardens, exerting the necessary lifting forces. The amount of rise shall be controlled, using the pumping unit, by regulation the rate of injection of the high-density polyurethane material. When the nozzle is removed from the hole, any excessive polyurethane material shall be removed from the area and the hole sealed with a nonexpansive cementitious grout.

Elevations: Final elevations shall be within 1/4-inch of the elevations proposed by profile. A tight string line may be used to monitor and verify elevations for slab lengths of 50 feet or less. For longer sections, a digital manometer or laser level will be used to monitor and verify elevations. Elevations can also be verified by flooding the area to confirm that the paving has been realigned properly. The contractor shall be responsible for any blowouts or excessive lifting which may result from process and shall repair the damaged area to the satisfaction of the Engineer without additional cost.

Curing Time: The high-density polyurethane formulation shall reach 90% of full compressive strength within 15 minutes for injection.

Units: The units for pricing shall be the total square footage of the affected area, up to and including each solid slab of concrete between all expansion joints and or pivot cracks in the concrete.

Warranty

Contractors provides the following warranty for the work performed: The contractor guarantees if any adjustments are necessary due to the loss of stability or the failure of the mechanical resistance of the injected material in the injected areas within one (1) year from date of completion of the contracted work. The contractor will adjust the settled area by re-injection at no additional cost to the owner. This guarantee does not include external causes not dependent on our material, for example this guarantee does not include and is not limited to ground subsidence or settlement of native soils, structural problems, dynamic or static loads much higher than the design loads at the time of the repair, damages caused by excavations, product tampering, natural catastrophes such as storms, floods, drought, tides, earthquakes, explosions, or fire. The contractor warrants that the injected materials will not shrink or deteriorate for a period of ten (10) years from the date of completion. The contractor will replace, during the warranty period, by reinjection, any material, which fail to perform as warranted. This limited warranty supersedes any other warranties, expressed or implied.