

## QUALITY CONTROL AND GUIDE SPECIFICATIONS

### Portland Cement

#### **1.01 Description**

This work consists of mixing in-place soil, Portland cement and water, then spread, mix and compact the mixture to the lines, grades and dimensions shown on the plans or as specified in these specifications or special provisions.

#### **1.02 Materials**

**In-place material** to be treated shall contain no rocks or solids other than soil clods larger than 2 1/2 inches in any dimension. Removing and disposing of said rocks or solids larger than 2.5 inches/60 millimeters will be paid for as extra work.

**Portland Cement**, Type GU (general use). Portland cement shall be protected from moisture until used and be sufficiently dry to flow freely when handled.

**Water** shall be clean and potable and shall be added as needed during mixing operations, during compacting, during the curing period, and to keep the cured material moist until covered.

#### **1.03 Proportioning / Spreading**

The Portland Cement shall be spread in one operation to the required width, grade, and cross section. Portland Cement shall be evenly spread at the designated rate and shall not vary by more than 10 percent on any area. Only a mechanical spreader able to provide a uniform distribution of the Portland Cement throughout the treatment area shall spread the Portland Cement. The Portland Cement shall be added in a dry state and precautions shall be taken to prevent dusting.

A certified shipping weight ticket shall be provided at time of delivery.

Tailgate spreading of the Portland Cement will not be permitted. The spreader truck shall demonstrate the ability to maintain a consistent spread rate over variable travel speeds. The contractor will demonstrate the consistency of the spread rate by conducting multiple pan tests. The pan will be provided by the contractor and will be 1x3 sq. ft. in size.

No traffic other than the mixing equipment or other related construction equipment will be allowed to pass over the spread Portland Cement until after completion of mixing.

#### **1.04 Mixing**

Mixing equipment shall be equipped with a visible depth indicator showing mixing depth and a controllable water additive system for regulating water added to the mixture.

Mixing equipment shall be of the type that can mix to the full depth of the desired thickness on the first pass and leave a relatively smooth bottom of the treated section. Mixing and re-mixing, regardless of equipment used will continue until the material is uniformly mixed, free of streaks or pockets of cement. Moisture content shall be minimum of **1 to 2 percent** over the treated soils design optimum after the mixing.

Portland cement treated material shall not be mixed or spread while the atmospheric temperature is below 35 F or below 1.67 C.

The entire mixing operation shall be completed within 2 hours of the initial spreading of cement, unless otherwise permitted by the Engineer.

#### **1.05 Compacting**

The Portland Cement treated soil shall be compacted to a minimum relative compaction determined by ASTM 1557 modified by using the maximum wet density compared to the in-place wet density, and ASTM 1556 wet method using a nuclear gauge in the field.

The maximum compacted thickness of a single layer may be any thickness the contractor can demonstrate to the Engineer that his equipment and method of operation will provide the required compacted density throughout the layer. Initial compaction shall be performed by means of sheepsfoot compactor.

Final rolling shall be by means of steel-tired or pneumatic tired rollers. Areas inaccessible to rollers shall be compacted to the required compaction by other means satisfactory to the Engineer.

All excess material above the grade tolerance specified by the plans should be removed from the grade prior to final compaction of the treated soils. This excess material can be used in areas inaccessible to mixing equipment, provided it is place within a 2-hour window. The trimmed and completed surface shall be rolled with steel or pneumatic tired rollers. Minor indentations may remain in the surface of the finished material as long as no loose material remains in the indentations.

#### **1.06 Final Grading**

Final grading shall be completed within 3 hours after compaction requirement has been achieved. Contractor shall complete all grading of treated areas on the same day of treatment. The engineer may order micro cracking with a 10-ton smooth drum roller prior to paving.

### **1.07 Curing**

The surface of each compacted layer of soil-cement shall be kept moist until covered by a subsequent layer of rock etc. If treated section is to be exposed for more than 5 days, then a curing seal, consisting of SS or CSS grade asphaltic emulsion, can be applied.

Curing seal shall be applied at a rate of between 0.45 – and 0.90-L per square meter of surface. Curing seal shall not be placed when the atmospheric temperature is below 5°C.