SUGGESTED SPECIFICATIONS FOR LIGHT-DUTY CONCRETE PARKING AREAS, NON-REINFORCED PARKING AREAS AND DRIVEWAYS

CP-1. General Conditions

The general conditions of the contract and the supplemental general conditions bound herewith are part of this specification. The contractor shall consult all conditions in detail for instructions pertaining to work under the contract.

CP-2. Scope of Work

The contractor shall furnish all labor, materials, form-work, equipment, and services required to complete all the concrete parking area work shown on the drawings and specified herein.

CP-3. Definitions

3.1 “Approved”-Approved or permitted by the architect, engineer, or other authorized representative of the owner.

3.2. “Project drawings”-All drawings that accompany this specification and complete the description for concrete paving work.

3.3. “Light Vehicular”-Automobiles and pickups.

3.4. “Light Truck”-Typical delivery trucks (single axle weight up to 10,600 lbs., tandem axle weight up to 18,500 lbs.) including an occasional tractor-trailer delivery.

CP-4. Concrete Materials

4.1. Cement shall conform to the latest revised Standard Specification for Portland Cement, American Society for Testing and Materials, ASTM C150, or Standard Specification for Blended Hydraulic Cements, ASTM C595. Cement shall correspond to that cement on which the selection of concrete proportions was based.

4.2. Concrete aggregates shall conform to the latest revised Standard Specifications for Concrete Aggregates, ASTM C33. Maximum coarse aggregate size shall be not more than one-fourth the slab thickness.

4.3. All mixing water shall be clean and free from deleterious amounts of acids, alkalies, or organic materials.

4.4. Expansion-joint material where required shall be *-in.-thick asphalt-impregnated premolded fiber conforming to the latest revised Standard Specification for Preformed Expansion Joint Filler for Concrete, ASTM D1752.

4.5. Curing compound shall conform to the latest revised Standard Specifications for Liquid Membrane-Forming Compounds for Curing Concrete, ASTM C309.

4.6. Air-entraining admixtures for concrete shall conform to the latest revised Standard Specifications for Air-Entraining Admixtures for Concrete, ASTM C260.

4.7. Mineral admixtures shall conform to ASTM C618 except that loss on ignition shall be 3.5% or less.

4.8. All other materials used in the concrete shall conform to current applicable ASTM specifications.

CP-5. Concrete Requirements

5.1. Concrete shall be manufactured and delivered in accordance with the latest revised Standard Specification for Ready Mixed Concrete, ASTM C94.

5.2. In Virginia, in lieu of establishing flexural strengths, all concrete shall have a minimum 28-day compressive strength of 4000 psi and contain a total air content of 6% plus or minus 1 1/2% by volume. If a ready mix producer can demonstrate flexural strength meeting the guidelines of ACI 330R-87 using a lower compressive strength mix, then this mix may be substituted.

5.3. Concrete slump shall be:
a) 1 – 4 inches if placement and consolidation is by mechanical method such as vibratory screed; or
b) 1 -5 inches if placement and consolidation is by other means, unless a super plasticizer is used in accordance with the manufacturer's recommendations.

CP-6. Concrete Thickness

6.1. For light vehicular parking areas and driveways, a 4″ minimum pavement thickness is required.

6.2. For light truck traffic lanes, a 5″ minimum pavement thickness is required.

6.3. For heavy truck traffic lanes and outside pavement edges subject to wheel load transfers, refer to Table 3 of PCA Publication ·Building Quality Parking Areas or to ACI Committee 330 Report (ACI 330 R-87) Guide for Design and Construction of Concrete Parking Lots."

CP-7. Subgrade Preparation

The bottom of the excavation or the top of the fill shall be known as the pavement subgrade and shall conform to the lines, grade, and cross sections shown in the plans.
In most situations with most soils, simple removal of topsoil and excavation down to the desired pavement subgrade is sufficient preparation for the direct application of concrete pavement.

In situations where the subgrade contains sections of soft and yielding soil, such soil must be removed. It must be replaced with a material (or soil) that will, after compaction, bring the subgrade to a firm, unyielding; and uniformly dense condition. (If soil is used as a replacement material, it should be compacted at or slightly above optimum moisture.)

All unity trenches and structure excavations shall be backfilled to natural or finished grade with granular material or controlled density fill as soon as conditions permit. All backfill shall be compacted with mechanical tampers in layers not over 6 inches in compacted thickness to densities similar to that of surrounding soils. Under these conditions, no other base or subgrade material is required.

CP-8. Concrete Placement

8.1. Ready mixed concrete hauled in truck mixers or truck agitators shall be mixed and delivered in accordance with ASTM C-94.

8.2. Before placing concrete, freestanding water, snow, ice, or other foreign materials shall be removed from subgrade. All forms shall be thoroughly cleaned, secured in position, and coated with a form release agent.

8.3. Concrete shall not be placed on a soft, spongy, frozen, or otherwise unsuitable subqrade. The subgrade shall be damp when concrete is placed.

8.4. Concrete shall be placed, struck off, and consolidated to plan grade with a mechanical placement machine, vibrating screed, or by hand finishing methods when approved. In lieu of fixed forms, the contractor may place concrete with a slipform paver designed to spread, consolidate, screed, and float finish the freshly placed concrete in one complete pass of the machine. Pavement shall be pitched to area drains or perimeter areas to remove water.

8.5. No reinforcement is required.

CP-9. Finishing

9.1. After concrete has been struck off and consolidated, a bullfloat may be used to remove any high or low spots. Bullfloat use shall be confined to a minimum.

9.2. Mechanical finishing machine floating is acceptable; however, under no circumstances shall the concrete surface be steel troweled.

9.3. A final skid resistant finish shall be made with a burlap drag or broom.

CP-10. Curing and Protection

10.1. Concrete must be cured by protecting it from loss of moisture, rapid temperature change and mechanical injury according to the latest edition of ACI 301.

10.2. When concrete is being placed in cold weather and the temperature may drop below 35·F., straw, hay, insulated curing blankets, or other suitable material shall be provided along the line of work to prevent freezing of concrete. Concrete injured by frost action shall be removed and replaced at the contractor's expense.

CP-11. Joints

11.1. Unless shown on the project drawings, a joining plan shall be prepared by the contractor and approved before paving begins.

11.2. Typical drying shrinkage cracking must be minimized and controlled by proper jointing. To minimize and control cracking, joints shall be:

a) continuous across the slab;
b) symmetrical (in squares or rectangles where possible);
c) spaced at no more than 2 1/2 times in feet the slab thickness in inches. (For example, the maximum joint spacing of a 4 inch thick slab would be 10 feet.)

11.3. Isolation joints (expansion joints) shall be used to isolate fixed objects abutting or within the paved area. They shall contain premolded joint filler for the full depth of the slab.

11.4. Control joints (contraction joints) should be produced by sawing (preferred), hand-tooling, or forming by use of premolded filler. (If premolded filler is used, note paragraph 11.7.) Joint depth shall be a minimum of one-fourth the slab thickness. Hand-tooled joints shall have a maximum edge radius of 1/4 inch. Sawing of joints shall begin as soon as the concrete has hardened sufficiently to permit sawing without excessive raveling. All joints shall be completed before uncontrolled shrinkage cracking occurs.

11.5. Construction joints (joints ending a day's pour) must allow wheel load transfer across the joints where necessary. In such cases, these joints shall be keyed or dowelled.

11.6. Joints shall extend completely through the curb when the curb is integrally formed with the slab.

11.7. Construction and control joint openings wider than 1/4 inch shall be cleaned and sealed before opening parking area to traffic. (Isolation joints as described in paragraph 11.3 will not require sealing.)

11.8. When approved, the contractor shall be permitted to make minor adjustments in joint location to make them coincide with drainage or other structures.

CP-12. Opening to Traffic

The pavement shall be closed to passenger-car traffic for at least three full days or until such time that the minimum compressive strength of the concrete is at least 75% of its design (compressive or flexural) strength. Traffic shall be restricted to passenger cars and light trucks for at least seven days after concrete is placed.

This suggested specification is based on the facts, tests and authorities stated herein. It is intended for the use of professional personnel competent to evaluate the significance and limitations of the reported findings and who will accept responsibility for the application of the material it contains. The Virginia Ready Mixed Concrete Advisory Council disclaims any and all responsibility for application of the stated principles or for the accuracy of any of the sources. The Virginia Ready Mixed Concrete Advisory Council accepts no responsibility for any work performed with reference to this suggested specification. We acknowledge the use of information from the Portland Cement Association, the American Concrete Institute and the American Society for Testing and Materials (ASTM).

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