

SECTION 321313 - CONCRETE PAVING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Driveways.
 - 2. Roadways.
 - 3. Parking lots.
 - 4. Curbs and gutters.
 - 5. Walks.

1.2 SUBMITTALS

Four paragraphs below are defined in Division 01 Section "Submittal Procedures" as "Action Submittals."

- A. Product Data: For each type of product indicated.
- B. Samples: For each exposed product and for each color and texture specified.
- C. Other Action Submittals:
 - 1. Design Mixtures: For each concrete paving mixture. Include alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

1.3 QUALITY ASSURANCE

- A. Ready-Mix-Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
- B. ACI Publications: Comply with ACI 301 (ACI 301M) unless otherwise indicated.
- C. Engineer requires that inspections be completed to ensure compliance with these plans.

PART 2 - PRODUCTS

2.1 STEEL REINFORCEMENT

- A. Plain-Steel Welded Wire Reinforcement: ASTM A 185/A 185M, fabricated from as-drawn steel wire into flat sheets.
- B. Deformed-Steel Welded Wire Reinforcement: ASTM A 497/A 497M, flat sheet.
- C. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420); deformed.

- D. Plain-Steel Wire: ASTM A 82/A 82M, as drawn.
- E. Deformed-Steel Wire: ASTM A 496/A 496M.
- F. Dowel Bars: ASTM A 615/A 615M, Grade 60 (Grade 420) plain-steel bars. Cut bars true to length with ends square and free of burrs.
- G. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars, welded wire reinforcement, and dowels in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete of greater compressive strength than concrete specified.

2.2 CONCRETE MATERIALS

- A. Cementitious Material: Use the following cementitious materials, of same type, brand, and source throughout Project:
 - 1. Portland Cement: ASTM C 150, gray portland cement Type I.
- B. Normal-Weight Aggregates: ASTM C 33 uniformly graded. Provide aggregates from a single source.
- C. Water: Potable and complying with ASTM C 94/C 94M.
- D. Air-Entraining Admixture: ASTM C 260.
- E. Chemical Admixtures: Admixtures certified by manufacturer to be compatible with other admixtures and to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material.

2.3 RELATED MATERIALS

- A. Joint Fillers: ASTM D 1751, asphalt-saturated cellulosic fiber or ASTM D 1752, cork or self-expanding cork in preformed strips.

2.4 CONCRETE MIXTURES. – See Utah State University Division 3 Specification

2.5 UNTREATED BASE COURSE

- A. Untreated base course shall be per the following table:

| Untreated Base Course | |
|-----------------------|--------------------------|
| Size | % by Weight Paving Sieve |
| 1" | 100 |
| 1/2" | 70-100 |
| #4 | 41-68 |

| | |
|------|-------|
| #16 | 21-41 |
| #50 | 10-27 |
| #200 | 4-13 |

PART 3 - EXECUTION

3.1 EXAMINATION AND PREPARATION

- A. Proof-roll prepared subbase surface below concrete paving to identify soft pockets and areas of excess yielding.
- B. Remove loose material from compacted subbase surface immediately before placing concrete.
- C. Use untreated base course under all curbs and gutters, sidewalks, exterior flatwork and paved areas. Base course shall be a minimum of 4 inches compacted base (95%) or minimum 4-3/4 inch crushed gravel.

3.2 EDGE FORMS AND SCREED CONSTRUCTION

- A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.
- B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

3.3 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

3.4 JOINTS

- A. General: Form construction, isolation, and contraction joints and tool edges true to line, with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline unless otherwise indicated.
- B. Construction Joints: Set construction joints at side and end terminations of paving and at locations where paving operations are stopped for more than one-half hour unless paving terminates at isolation joints.
- C. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, other fixed objects, and where indicated.

- D. Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness.
- E. Edging: After initial floating, tool edges of paving, gutters, curbs, and joints in concrete with an edging tool to a 1/4-inch (6-mm) radius. Repeat tooling of edges after applying surface finishes. Eliminate edging-tool marks on concrete surfaces.

3.5 CONCRETE PLACEMENT

- A. Moisten subbase to provide a uniform dampened condition at time concrete is placed.
- B. Comply with ACI 301 (ACI 301M) requirements for measuring, mixing, transporting, placing, and consolidating concrete.
- C. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.
- D. Screed paving surface with a straightedge and strike off.
- E. Commence initial floating using bull floats or darbies to impart an open-textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.
- F. Before concrete is poured, check with all trades to insure proper placement of all openings, sleeves, curbs, conduits, bolts, inserts etc. relating to work.
- G. Concrete tests shall be made by testing laboratory as directed by the owner. In general one test shall be made for each 50 cubic yards of concrete, or each days port if less than 50 cubic yards. Each test shall consist of 5 cylinders of which one shall be tested at 7 days, 2 tested at 28 days, and two retained in reserve for later tests, if required. Specimens shall be made and tested in accordance with ASTM C-172, C-31, and C-39 standards. Slump and air entrainment test shall also be made with each set of cylinders taken. Contractor shall provide the cylinders. The testing laboratory shall transport all cylinders. The owner shall pay for all tests.
- H. Formwork not supporting weight of concrete, such as sides of beams, walls, columns, and similar parts of the work, may be removed after cumulatively curing at no less than 50 degrees for 24 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form removal operations, and provided curing and protection operations are maintained.
- I. Protect freshly placed concrete from premature drying and excessive cold or hot temperature as per ACI 318 and maintain without drying at a relatively constant temperature for a period of time necessary for hydration of cement and proper hardening.
- J. Cold weather curing and protection requirements for concrete shall conform to the requirements of ACI 306 when depositing concrete at freezing temperature or below, the concrete mix shall have a temperature of at least 50 degrees but not more than 80 degrees. The concrete shall be maintained at a temperature of not less than 50 degrees and in a moist condition for not less than 7 days after placing or as directed by the engineer. The use of chemicals or additives to prevent freezing will not be permitted. Contractor shall prevent frost from penetrating under footings or interior slabs on grade or postpone concrete pour.
- K. All concrete shall be properly vibrated in place using internal vibrating rods.

- L. Engineer shall be notified 48 hours prior to pouring any concrete in order to observe reinforcing placement.

3.6 FLOAT FINISHING

- A. General: Do not add water to concrete surfaces during finishing operations.
- B. Float Finish: Begin the second floating operation when bleed-water sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.
 - 1. Medium-to-Fine-Textured Broom Finish: Draw a soft-bristle broom across float-finished concrete surface perpendicular to line of traffic to provide a uniform, fine-line texture.

3.7 PAVING TOLERANCES

- A. Comply with tolerances in ACI 117 and as follows:

ACI 117 establishes few paving tolerances; those in subparagraphs below are based on ACI 330.1.

- 1. Elevation: 3/4 inch (19 mm).
- 2. Thickness: Plus 3/8 inch (10 mm), minus 1/4 inch (6 mm).
- 3. Surface: Gap below 10-foot- (3-m-) long, unlevelled straightedge not to exceed 1/2 inch (13 mm).
- 4. Joint Spacing: 3 inches (75 mm).
- 5. Contraction Joint Depth: Plus 1/4 inch (6 mm), no minus.
- 6. Joint Width: Plus 1/8 inch (3 mm), no minus.

3.8 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. Soils under footings, walls and other areas as needed shall have to following compaction and testing requirements: 95% compaction of modified proctor every 5000 square feet for pit run and road base.
- C. Reinforcement for slab on grade sidewalks and drive approaches shall have the following testing requirements: Engineer shall be notified prior to installation of concrete for inspection.
- D. Reinforcement for retaining walls and placement of concrete retaining walls shall have the following testing requirements: Engineer shall be notified prior to installation of concrete for inspection.

3.9 REPAIRS AND PROTECTION

- A. Remove and replace concrete paving that is broken, damaged, or defective or that does not comply with requirements in this Section. Remove work in complete sections from joint to joint unless otherwise approved by Architect.

- B. Protect concrete paving from damage. Exclude traffic from paving for at least 14 days after placement. When construction traffic is permitted, maintain paving as clean as possible by removing surface stains and spillage of materials as they occur.
- C. Maintain concrete paving free of stains, discoloration, dirt, and other foreign material. Sweep paving not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION 321313