

GUIDE SPECIFICATION

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SECTION 02751

PORTLAND CEMENT CONCRETE PAVING - INTEGRALLY COLORED

This guide specification has been prepared by QC Construction Products, in printed and electronic media, as an aid to specifiers in preparing written construction documents for integrally colored concrete site paving for roads, parking areas, sidewalks, plaza decks, etc. A variety of finish options are available, including hard trowel, broom, scored, retarder/water blast, abrasive blast, chemical etching, and imprinting with stamping tools.

Edit entire master to suit project requirements. Modify or add items as necessary. Delete items which are not applicable. Words and sentences within brackets [_____] reflect a choice to be made regarding inclusion or exclusion of a particular item or statement. Where a value, word, or phrase is followed by a bracket, the preferred value, word, or phrase occurs first, with the other choices following inside the brackets. This section may include performance, proprietary, and descriptive type specifications. Edit to avoid conflicting requirements. Editor notes to guide the specifier are included between lines of asterisks to assist in choices to be made.

This guide specification is written around the Construction Specifications Institute (CSI), Section Format standards references to section names and numbers are based on MasterFormat 95.

For specification assistance on specific product applications, please contact our offices above or any of our local product representatives throughout the country. Additional technical information is available in our CSI formatted Product Information Bulletins.

QC Construction Products reserves the right to modify these guide specifications at any time. Updates to this guide specification will be posted to the manufacturer's web site and/or in printed matter as they occur. QC Construction Products makes no expressed or implied warranties regarding content, errors, or omissions in the information presented.

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Provisions established within the General and Supplementary Conditions of the Contract, Division 1 - General Requirements, and the Drawings are collectively applicable to this Section.

1.2 SECTION INCLUDES

Edit the "Section Includes" paragraph to briefly describe the content of the section. After editing section, refer back to this paragraph to verify no conflicts occur.

- A. Integrally colored concrete [sidewalks], [steps], [curbs], [gutters,] [and streets].
- B. Formwork and Reinforcement.

- C. Surface finishing.
- D. Curing.

1.3 RELATED SECTIONS

Sections paragraph below to suit project requirements; Delete sections that will not be used.

- A. Section 02300 - Earthwork: Preparation of site for paving.
- B. Section 027XX - Asphaltic Concrete Paving: Asphaltic paving.
- C. Section 02765 - Pavement Marking: Pavement marking.
- D. Section 07920 - Joint Sealants: Sealant for joints.

1.4 QUALITY ASSURANCE

Include quality assurance requirements below which are consistent with the size and scope of the project and extent of work of this section. Only request qualification statements you intend to review, and which are necessary to establish qualifications of the product, manufacturer, or installer.

- A. Perform work in accordance with ACI 301, 302, 303.
- B. Obtain materials from same source throughout.

1.5 REGULATORY REQUIREMENTS

- A. Conform to applicable codes and regulations for paving work performed on public property.

1.6 TESTS

- A. Perform testing and analysis under provisions of Section 01400.
- B. Submit proposed mix design for each class of concrete to appointed firm for review prior to commencement of work. Testing firm will review mix designs and make recommendations for modifications.
- C. Testing firm will take cylinders and perform slump and air entrainment tests in accordance with ACI 301.
- D. Four concrete test cylinders will be taken for every 50 [100] or less cu. yds. of each class of concrete placed each day.
- E. One slump test will be taken for each set of test cylinders taken.

1.7 SUBMITTALS

Include submittal requirements below which are consistent with the scope of the project and extent of work of this section. Only request submittals which are necessary for review of design intent.

Do not request submittals if drawings sufficiently describe the products of this section or if proprietary specifying techniques are used. The review of submittals increases the possibility of unintended variations to drawings.

- A. Submit product data under provisions of Section 01300.
- B. Include data on joint filler, admixtures and curing/sealing compounds.
- C. Submit manufacturer's instructions under provisions of Section 01300.
- D. Provide field samples of surface colors [textures] [and patterns] specified for architect approval prior to beginning work, 48 x 48 inch in size illustrating paving finishes.

1.8 ENVIRONMENTAL REQUIREMENTS

- A. Do not place pavement when base surface or ambient temperature is less than 40° F, or if base surface is wet or frozen.

PART 2 PRODUCTS

2.1 CONCRETE MATERIALS

- A. Cement: ASTM C150, type I/II, portland cement, gray or white color.
- B. Fine and Coarse Aggregates: ASTM C33.
- C. Water: Clean and not detrimental to concrete.

2.2 FORM MATERIALS

- A. Conform to ACI 301. If using metal, material shall be free from deformities. If using wood, use construction grade lumber, sound and free of warp, minimum 2" nominal thickness, except where short radii of curves require thinner forms.
- B. Contraction Joint Devices: Galvanized sheet metal, keyed profile, with knock-outs for reinforcing and dowel steel.

2.3 REINFORCEMENT

- A. Reinforcing Steel: ASTM A615; 60 ksi yield grade; deformed billet steel bars, uncoated finish.
- B. Welded Steel Wire Fabric: Plain type, ANSI/ASTM A185; in flat sheets; uncoated finish.
- C. Tie Wire: Annealed steel, minimum 16 gage size.
- D. Dowels: ASTM A615; 40 ksi yield grade, plain steel, uncoated finish.
- E. Miscellaneous Reinforcing Accessories: Spacers, chairs, ties, and other devices necessary for properly placing, spacing, supporting, and fastening reinforcement in place.

Select F below if polypropylene fibers are desired in concrete mix to inhibit excessive bleed water and limit the shrinkage cracking.

- F. Meeting ASTM C948, collated, fibrillated, 3/4 inch long virgin polypropylene fibers, equal to QC Fibers by QC Construction Products.

2.4 ACCESSORIES

Select A.1 below for color coordinated curing on concrete that will be regularly maintained and recoated; select A.2 below for concrete which will be allowed to weather naturally; A3 below is the same as A2, but is a lower gloss version. Contact manufacturer for suggested maintenance coatings for periodic renewal of finish.

- A. Curing Compound: Meeting ASTM C309, water based emulsion, and as follows:
 - 1. [QC Color Cure by QC Construction Products.]
 - 2. [QC Clear Cure by QC Construction Products.]
 - 3. [QC Clear Cure Matte Finish by QC Construction Products.]
 - 4. [QC Cure & Seal SB Matte or Gloss Finish by QC Construction Products.]

QC Construction Products has a broad line of concrete sealers to enhance the beauty of colored concrete and minimize the damaging effects of petroleum based contaminants and overall effect of weathering. Refer to manufacturer's product usage recommendations. The following is a brief description of each recommended sealer for integrally colored concrete:

QC Colorwax: Water based, wax-modified, acrylic formula coating works as both a curing membrane and as a long-lasting, durable and decorative finish to colored concrete. Is formulated to match color of concrete
QC Ultra Seal or Solvent Seal VOC III: Solvent based, non-yellowing, penetrating sealer, to protect against dusting, staining, and dirt.

QC Solvent Seal 18 or 27: Same as above, but do not comply with some VOC regulations.

QC Cemseal: Water based, 100% acrylic emulsion, with excellent resistance to penetration of oil, gas, and water.

QC PermaSeal: Water based, single component, epoxy-modified, penetrating sealer.

- B. Sealing and Finish Coatings:
 - 1. [QC Colorwax by QC Construction Products.]
 - 2. [QC Solvent Seal VOC III by QC Construction Products.]

3. [QC Ultra Seal by QC Construction Products.]
 4. [QC Solvent Seal 18 or 27 by QC Construction Products.]
 5. [QC Cemseal by QC Construction Products.]
 6. [QC PermaSeal by QC Construction Products.]
- C. Imprinting Tools and Accessories:
1. Mat type imprinting tools for texturing freshly placed concrete, in [running bond brick] [cobblestone] [flagstone] [weathered wood] [quarried stone] [_____]
[custom pattern/texture as selected by Architect.]
 2. Release powder, composed of a dry blend of chemical powders and color pigments, designed to provide clean release of texturing tools and mats, provided in [same] [contrasting] color as primary concrete color selected, equal to QC Release Powder by QC Construction Products.]]
- D. Form release agent: As acceptable to concrete colorant manufacturer, non-staining, dissipative type.
- E. Vapor Retarding Membrane: [6] [10] mil [reinforced] polyethylene.]

2.5 JOINT FILLERS

Select one or more of the following joint fillers. "A" is used where an architectural statement needs to be made. "B" is more utilitarian. "C" is used as backing for joint filler specified either below or in Section 07920.

- A. Redwood Boards: Construction heart grade redwood, sound and free of checks, splits or other defects, [3/4] 1-1/2] inch thick.
- B. Asphaltic Joint Filler: Asphalt impregnated fiberboard, ASTM D1751, 1/2 inch thick.
- C. Non-Asphaltic Joint Fillers: ASTM D1752, Type I.

Select D.1 for applications where puncture resistance of horizontal joints is not a requirement. Select D.2 for areas where a shore A modulus of 40 is desirable for horizontal joints subject to frequent foot traffic.

- D. Sealants: Two part polyurethane sealants, of grade as required to suit application, meeting ASTM C920, in manufacturer's [standard] [custom] colors, and as follows:
 1. Urethane, SL grade, as specified in Section 07920.
 2. Urethane, SL-TB grade as specified in Section 07920

2.6 ADMIXTURES

Admixtures improve desired properties of concrete mix. Do not use admixtures which permit cold weather concreting that is detrimental to concrete properties and do not use super-plasticizers without prior experience. Consult with QC Construction Products for assistance in selecting type "D" as there are various levels of retarding mixtures available.

- A. Air Entrainment: ASTM C260.

QC Construction Products manufacturer two types of integral colorants as follows and must be selected in B@ below:

QC ColorTech-E is a premium admixture, meeting the requirements of ASTM C979, C494 and ISO 9002, and is packaged in 1 bag / c.y.d. dosing rate in disintegrating bags.

QC Colortech uses the same pigments as QC ColorTech-E, meets ASTM C979 as well as ISO 9002, and is packaged in 1, 5 and 25 lb disintegrating bags for exact c.y.d. dosing.

- B. Integral Coloring Admixture:[QC ColorTech-E] [QC ColorTech] by QC Construction Products, synthetic oxide pigment, meeting ASTM C979 and C494, [type A, cement dispersing/water reducing] [type D, set retarding/water reducing], in [[_____] color] [color to match Architect's sample] [to be selected by Architect from manufacturer's standard and custom available colors].

- 2.7 CONCRETE MIX
- A. Mix and deliver concrete in accordance with ASTM C94, Alternate 2.
 - B. Use accelerating admixtures containing no calcium chloride in cold weather only when approved by testing laboratory. Use of admixtures will not relax cold weather placement requirements.
 - C. Use set-retarding admixtures during hot weather only when approved by testing laboratory.
 - D. Add air entraining agent to concrete mix for concrete work exposed to exterior, in amounts of 4-7% of total concrete volume or as otherwise recommended by testing laboratory.
 - E. Add coloring admixture where scheduled in quantities recommended by coloring admixture manufacturer to achieve selected color.
 - F. [Add polypropylene fiber reinforcement at the ratio of 1.5 lbs of fibers per c.y.d. of concrete.]
 - G. Maintain water-cement ratio to produce a minimum of 3 to maximum of 5 inch slump.
 - H. Use of calcium chloride is strictly prohibited.

PART 3 EXECUTION

- 3.1 INSPECTION
- A. Verify compacted [subgrade] [granular base] [stabilized soil] is ready to support paving and imposed loads, free of frost, smooth and properly compacted.
 - B. Verify gradients and elevations of base are correct, and proper drainage has been provided so that water does not stand in the area to receive paving.
 - C. Beginning of installation means acceptance of existing conditions.
- 3.2 PREPARATION
- A. If no vapor retarding membrane is placed, moisten base to minimize absorption of water from fresh concrete.
 - B. Notify Architect and testing laboratory, minimum 24 hours prior to commencement of concreting operations.
- 3.3 FORMING
- A. Construct and remove forms in accordance with ACI 347.
 - B. Place and secure forms to correct location, dimension, and profile. Adequately brace to withstand loads applied during concrete placement.
 - C. Assemble formwork to permit easy stripping and dismantling without damaging concrete.
 - D. Place joint fillers vertical in position, in straight lines. Secure to formwork during concrete placement.
- 3.4 INSERTS AND ACCESSORIES
- A. Make provisions for installation of inserts, accessories, anchors, and sleeves.

Vapor retarders are useful in exterior paving applications, especially where slip resistance is important (as in tennis courts) and where surface condensation during certain climatic conditions are undesirable.

 - B. [Place vapor retarder continuously over subgrade. Overlap joints a minimum of 12 inches and seal with a joint tape of same permeance as sheeting material.]
- 3.5 REINFORCEMENT
- A. Accurately place reinforcement in middle of slabs-on-grade.
 - B. Discontinue every other bar of reinforcement at control and expansion joints.
 - C. Place reinforcement to achieve slab and curb alignment as detailed.
 - D. Steel shall be free of rust, mill scale, dirt and oil.
 - E. Provide doweled joints at interruptions of concrete with one end of dowel set in capped sleeve to allow longitudinal movement. Provide support at both ends of dowels.
 - F. Support reinforcing on bar chairs. Securely saddle tie at intersections. Rigidly secure in place to minimize displacement during concrete pour.

3.6 JOINTS

- A. Intentional stoppage of concrete placing shall be at planned location of either an expansion joint or contraction joint.
- B. When stoppage occurs at an expansion joint, install joint assembly with a bulkhead of sufficient section drilled to accommodate required dowels. Provide expansion joints at maximum 40'-0" [_____] o.c.e.w. in parking lots, 40'-0" [_____] o.c. for curbs and maximum 20'-0" o.c.e.w. at pedestrian paving.
- C. When stoppage occurs at a contraction joint, install sheet metal joint assembly of sufficient section to prevent deflection, shaped to concrete section. Drill bulkhead to permit continuation of longitudinal reinforcing steel through construction joint.
- D. Stoppage at Unintentional Location
 - 1. Immediately upon unintended stoppage of concrete placing, place available concrete to a line and install bulkhead perpendicular to surface of pavement and at required elevation. Place and finish concrete to this bulkhead. Remove and dispose of concrete remaining on subgrade ahead of bulkhead.
 - 2. When placing of concrete is resumed before concrete has set to extent that concrete will stand on removal of bulkhead, new concrete shall be rodded with the first; otherwise, carefully preserve joint face.
 - 3. Provide a joint seal space at edges created by a construction joint of this type shall have a joint seal space as detailed on Drawings.
- E. Provide sawed contraction joints in vehicular paving and curbs spaced as detailed on Drawings, but in no case greater than 20 [_____] foot o.c. spacing.
 - 1. Saw joints after completion of finishing operations as soon as concrete has hardened to extent necessary to prevent revealing of joint or damage to adjacent concrete surfaces.
 - 2. Saw joints same day that concrete is placed except that sawing of joints in concrete placed late in day may be delayed until morning of following day.
 - 3. In any event, saw joints within 18 hours after placing concrete.
 - 4. Use a power-driven concrete saw made especially for sawing concrete and maintain in good operating condition.
 - 5. Saw blades shall make a clean, smooth cut, producing a groove 1/8" to 3/16" wide and a depth equal to 1/4 of slab thickness, minimum one inch (1") depth.
 - 6. Align joints in vehicular paving with joints in adjacent pedestrian paving.
 - 7. Cut joints through curbs at right angles to back of curb.
- F. Place joint filler between paving components and building or other appurtenances. [Recess top of filler 1 inch for backing rod and sealant placement.]
- G. Provide scored joints in sidewalks and plazas to a depth of 1/4 the slab thickness, and at intervals as indicated, but in no case spaced greater than width of walk.

3.7 PLACING CONCRETE

- A. Place concrete in accordance with ACI 301, 302, and 304. Deposit concrete so that specified slab thickness will be obtained after vibrating and finishing operations. Minimize handling to prevent segregation. Consolidate concrete by suitable means to prevent formation of voids or honeycombs. Exercise care to prevent disturbance of forms and reinforcing and damage to vapor retarder. Place concrete to lines and levels shown, properly sloped to drain [into adjacent] [yard areas] [drainage structures].
- B. Hot Weather Placement: ACI 305.
- C. Cold Weather Placement: ACI 306.
- D. Ensure reinforcement, inserts, embedded parts, and formed joints are not disturbed during concrete placement.
- E. Place concrete continuously between predetermined construction joints. Do not break or interrupt successive pours such that cold joints occur.
- F. [While concrete is still in its plastic state, apply the tool/texture pattern to the surface of the concrete. Properly tamp tools into the surface to achieve the required texture, with uniformity of pattern and depth of stamping. Utilize bond breaker to keep tools from sticking to fresh concrete.]

- G. After consolidating and screeding, float concrete to gradients indicated. Use a straight edge to level and test surface in longitudinal direction to required grade. Finish edges to provide a smooth dense surface with 1/8" radius.
- H. Place curing compound on exposed concrete surfaces immediately after finishing. Apply in accordance with manufacturer's instructions.

3.8 FINISHING SCHEDULE

- A. Vehicular Paving: [Heavy broom] [Light Broom] [Light Sand Blast] [Medium Sand Blast] [Retarder and water blast for [] exposure] [Imprinted to [] pattern].
- B. Sidewalk Paving: [Light broom] [Light Sand Blast] [Medium Sand Blast] [Retarder and water blast for [] exposure] [Imprinted to [] pattern].
- C. Curbs and Gutters: [Light broom] [Light Sand Blast] [Medium Sand Blast] [Retarder and water blast for [] exposure].
- D. Curb Ramps for the Disabled: "V" grooved perpendicular to slope for entire width and sides of ramp, with distinctive color difference from surrounding pavement.
- E. Inclined Vehicular Ramps: [Broom perpendicular to slope] [V-joint perpendicular to slope] [Herringbone V-joint] []].

3.9 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed under provisions of Section 01400.
- B. Maintain records of placed concrete items. Record date, location of pour, quantity, air temperature, and test samples taken.

3.10 PROTECTION

- A. Immediately after placement, protect concrete under provisions of Section 01500 from premature drying, excessive hot or cold temperatures, and mechanical injury.

3.11 SCHEDULES

Provide a schedule when differing types of concrete mixes are required in differing locations. The following examples may assist in developing such a schedule.

- A. Concrete Sidewalks: 3,000 [] psi 28 day concrete compression strength, 4 inches thick, 3 inch minimum and 5 inch maximum slump.
- B. Parking Area Pavement and Curbs: 3,000 [3,500] psi 28 day concrete compressive strength, 5 [6] inches thick, 3 inch minimum and 5 inch maximum slump.
- C. Fire Lane and Frequent Truck Traffic Pavement and Curbs: 4,000 [] psi 28 day concrete compressive strength, 6 [7] inches thick, 3 inch minimum and 5 inch maximum slump.

END OF SECTION