GUIDE SPECIFICATION

Manufacturer:
QC Construction Products
P.O. Box 599
Madera, CA 93639
T: 800.453.8213
F: 559.673.0773
www.qcconstructionproducts.com

SECTION 03310

ARCHITECTURAL CAST-IN-PLACE CONCRETE - INTEGRALLY COLORED

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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, cast-in-place, architectural concrete. A variety of finish options are available, including as-cast, retarder/water blast, abrasive blast, and texturing using form liners.

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.

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.

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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

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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.

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A. Special requirements for integrally colored, architectural cast-in-place concrete.

1.3 RELATED SECTIONS

A. Section 03100 - Concrete Formwork.
B. Section 03200 - Concrete Reinforcement.
C. Section 03300 - Cast-in-place Concrete.

1.4 SUBMITTALS

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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.

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A. Submit under provisions of Section 01300.
B. Indicate formwork shop drawings indicating pertinent dimensions, materials, and arrangement of joints, reinforcing, and ties.
C. Submit product data for tape, gaskets, integral colorant admixtures, form inserts [and liners], sealer, release agent, ties, waterstops, construction joints, and joint fillers.
D. Samples:
    1. Submit two, 12 inch by 18 inch by 2 inch thick samples showing required finishes using design mix proposed for finished Work.
    2. Sample approval will be for color, appearance and texture.
    3. Resubmit samples until approved.
E. Forward 2 (two) copies of design mixes and cylinder break certifications for each type of concrete to Architect for review at least 10 (ten) days prior to need.

1.5 FIELD SAMPLES

A. Prepare field samples under provisions of Section 01300 and coordinate with Section 03300. Locate where directed.

B. Construct and erect sample formwork panel for architectural concrete surfaces. Formwork to include vertical and horizontal form joints, form tie placement pattern, and typical rustication joints.
C. Size panel to indicate special treatment or finish required.
D. Use specified concrete.
E. Obtain acceptance of surface finish.
F. Maintain sample panel exposed to view for duration of concrete work. Remove when directed.
G. Remove formwork after casting concrete.

1.6 QUALITY ASSURANCE

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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.

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A. Perform work in accordance with ACI 301, 303, 304, 305, 306, and 309.
B. Obtain materials from same source throughout the Work.
C. Batch plant shall be able to show a minimum of 5 years experience in batching concrete. If required they shall furnish a list of similar sized jobs or special condition jobs performed during the last two years.

1.7 REGULATORY REQUIREMENTS

A. Conform to applicable building code.

1.8 TESTS

A. Testing, monitoring, and analysis of concrete will be performed under provisions of Section 01400.

1.9 COORDINATION

A. Notify responsible trades of schedules of concrete pours so as to allow adequate time for installation of their work.
B. Obtain anchor bolts and other miscellaneous steel items to be cast into concrete from material supplier.
C. Coordinate size and location of mechanical equipment concrete pads with applicable trades.

1.10 DELIVERY, STORAGE AND HANDLING

A. Deliver, store and handle materials in accordance with the requirements of Section 01610 and 01600.
B. Mix and deliver concrete to project ready-mixed in accordance with ASTM C94.
C. Schedule delivery so that continuity of any pour will not be interrupted for over 15 minutes.

D. Place concrete on site within 90 minutes after proportioning materials at batch plant.

PART 2 PRODUCTS

2.1 MATERIALS

A. Cement:

1. ASTM Cl50, Type I or III (as determined by project conditions), grey color.
2. Use only one brand, type and source of cement for entire Project.

B. Aggregate:

1. General:
   a) Provide fine and coarse aggregate for each type finish from one source for entire Project.
   b) Provide fine and coarse aggregate of color range and gradation to match approved samples.
2. Fine aggregate: ASTM C33.
   a) Manufactured sands from coarse aggregate or dust-free, silt-free, salt-free natural sand.
   b) Restrict deleterious reactive materials with alkalies in cement per ASTM C33.
3. Coarse aggregate:
   a) Normal weight aggregate: ASTM C33.
   b) Lightweight aggregate: ASTM C330.

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If a special aggregate type, gradation, and color is desired, state below.

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   c) [Provide special mix, gradation, and color[s] as follows:]
      1) [_____].

C. Water: Clean, fresh and potable.

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Admixtures can alter 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 written approval of QC Construction Products. Consult with QC Construction Products for assistance in selecting type "D" as there are various levels of retarding mixtures available.

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D. Admixtures:

1. Only use admixtures which have been tested and accepted in mix designs.
2. Air Entrainment: ASTM C260.

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E. Integral Coloring Admixture:[QC ColorTech-E] by QC Construction Products, synthetic iron 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].

1. Calcium chloride or admixtures containing chloride ions or other salts are not permitted.

F. Reinforcing Steel: Refer to Section 03200. Use stainless steel or plastic coated type chairs, bolsters, bar supports, and spacers adjacent to architectural concrete surfaces, sized and shaped as required, inc compliance with CRSI, Class 1.

G. Formwork Materials: Refer to Section 03100. Utilize new plywood sheets conforming to PS-1 High Density Overlaid, Class I, or other materials to provide continuous, straight, smooth, formed surfaces. Verify that form release agent will not discolor or other have detrimental affect on architectural concrete. [Refer to Section 03100 for form liners.]

H. Form Release Agent: Material that will not stain concrete finish and will not have detrimental affect on application of sealants.

I. Joint Fillers: Non-Asphaltic Joint Fillers: ASTM D1752, Type I.

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Select F.1 for applications where puncture resistance of horizontal joints is not a requirement. Select F.2 for areas where a shore A modulus of 40 is desirable for horizontal joints subject to frequent foot traffic. Select F.3 for vertical applications.

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J. 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.
3. Urethane, NS grade as specified in Section 07920.

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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.

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K. 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.]

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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. Contact manufacturer for suggested maintenance coatings for periodic renewal of finish. 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, and is formulated to match color of concrete.
QC Ultra Seal or QC Solvent Seal VOC III: Solvent based, non-yellowing, penetrating sealer, to protect against dusting, staining, and dirt.
QC Solvent Seal18 or 27: Same as above, but do not comply with some VOC regulations.
QC *PermaSeal:* Water based, single component, epoxy-modified, penetrating sealer.

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

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L. Sealing and Finish Coatings:
   1. [QC Colorwax by QC Construction Products.]
   2. [QC Solvent Seal VOC II by QC Construction Products.]
   3. [QC Solvent Seal 18 or 27 by QC Construction Products.]
   4. [QC PermaSeal by QC Construction Products.]
   5. [QC Cemseal by QC Construction Products.]

2.2 CONCRETE MIX

A. Refer to Section 03300.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify lines, levels, and measurements before proceeding with formwork.

3.2 FORMWORK ERECTION

A. Minimize form joints. Symmetrically align joints and make watertight to prevent leakage of mortar. Symmetrically align form ties in a uniform pattern.
B. Arrange and assemble formwork to permit stripping, so that concrete is not damaged during its removal.
C. Provide bracing to ensure stability of formwork. Strengthen formwork liable to be overstressed by construction loads.
D. Provide temporary ports in formwork to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain. Close ports with tight fitting panels, flush with inside face of forms, neatly fitted so that joints will not be apparent in exposed concrete surfaces.
E. Provide chamfer strips on all external corners and other rustications and reveals of sizes and types indicated.
F. Construct formwork to maintain tolerances in accordance with ACI 301 and 303.
G. [Utilize form liners to match approved [sample] [mock-up].
H. Refer to Section 03100 for additional requirements.

3.3 APPLICATION OF FORM RELEASE AGENT

A. Apply form release agent of composition approved by manufacturer on formwork in accordance with manufacturer's instructions. Apply prior to placing reinforcing steel, anchoring devices, and embedded items.

3.4 INSERTS, EMBEDDED PARTS, AND OPENINGS

A. Provide formed openings where required for work embedded in or passing through concrete.

B. Locate and set in place items which will be cast directly into concrete.

C. Coordinate work of other Sections in forming and setting openings, slots, recesses, chases, sleeves, bolts, anchors, and other inserts.

D. Install accessories in accordance with manufacturer's instructions, level and plumb. Ensure items are not disturbed during concrete placement.

E. Install waterstops in single lengths where possible. Install where detailed and wherever water penetration through construction joints is anticipated. Make provisions to support and protect water stops during progress of the work.

F. Close temporary openings with tight fitting panels, flush with inside face of forms, and neatly fitted so joints will not be apparent in exposed concrete surfaces.

3.5 FORMWORK TOLERANCES

A. Construct formwork to maintain tolerances required by ACI 301.

3.6 FORMWORK FIELD QUALITY CONTROL

A. Inspect erected formwork, shoring, and bracing to ensure that work is in accordance with formwork design, and that supports, fastenings, wedges, ties, and items are secure.

3.7 REINFORCING PLACEMENT

A. Place reinforcement in accordance with CRSI "Placing Reinforcing Bars" and ACI 318, with provisions of ACI 318 governing.

B. Move bars as necessary to avoid interference with other reinforcing steel, conduits, or embedded items.

C. If bars are moved more than one bar diameter or enough to exceed tolerances, submit resulting arrangement of bars to Architect for review.

D. Place, support, and secure reinforcement against displacement. Do not deviate from alignment or measurement. Place in accordance with approved shop drawings and CRSI recommendations. Do not heat, cut or bend bars without Architect's approval. Provide minimum 36 bar diameter lap (18 inches minimum) at splices unless specifically noted otherwise on drawings. Stagger splices in adjacent bars.

E. Place reinforcement, at time of concrete placing, free of mud, oil, or other materials that adversely affect or reduce bond.

F. Reinforcement with rust, mill scale, or both shall be considered satisfactory, provided minimum dimensions, including height of deformation, and weight of hand-wire- brushed test specimen are not less than ASTM A 615 requirements.

G. Support reinforcement and fasten together to prevent displacement by construction loads of placing concrete. Use No. 16 gauge black annealed wire at all joints and crosses to accurately position reinforcing in place.
H. Use plastic tipped bar chairs and spacers to support reinforcement. Use noncorrosive or corrosion protected accessories within 1/2 in. of concrete surface.
I. Bars having splices not shown on shop drawings will be subject to rejection.
J. Do not bend reinforcement after being embedded in hardened concrete.
K. Do not allow bars to be in contact with dissimilar materials.
L. Refer to Section 03200 for additional requirements.

3.8 EXAMINATION PRIOR TO PLACING CONCRETE

A. Verify anchors, seats, plates, reinforcement, [form liners,] and other items to be cast into concrete are accurately placed, held securely, and will not cause hardship in placing concrete.
B. Correct unsatisfactory work prior to placing concrete.
C. Remove rubbish from formwork immediately prior to placing concrete.
D. Remove ice and excess water from excavations and formwork.

3.9 PREPARATION PRIOR TO PLACING CONCRETE

A. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent. Apply bonding agent in accordance with manufacturer's instructions.
B. At locations where new concrete is doweled to existing work, drill over-sized holes in existing concrete, insert steel dowels, and pack solid with non-shrink grout.

3.10 PLACING CONCRETE

A. Notify Architect and testing laboratory a minimum of 24 hours prior to commencement of concreting operations.
B. Place concrete in accordance with ACI 301 and as specified below
    1. Unless protection is provided, do not place concrete in rain, sleet, or snow.
    2. Maximum height of concrete free fall is three feet. Where longer drops are necessary, use a chute, tremie or other approved conveyance to assist the concrete into place without separation. Do not place directly into any excavations (including piers) where water is standing. If the place of deposit cannot be successfully pumped dry, place through a tremie with its outlet end near the bottom of the place of deposit.
    3. Regulate rate of placement so concrete remains plastic and flows into position.
    4. Deposit concrete continuously until panel or section is completed. Place as near as possible to its final location; do not rehandle.
    5. Place concrete in horizontal layers 18" maximum thickness. Exercise special care to prevent splashing the forms or reinforcement with concrete.

Remove any hardened or partially hardened concrete which has accumulated on the forms or reinforcement before the work proceeds. Do not place concrete on previously deposited concrete which has hardened sufficiently to cause the formation of seams or planes of weakness within the respective member or section, except allow concrete to settle 2 hours where walls or columns are to receive superimposed loads.

6. Do not place concrete, under any circumstances, except in presence of testing laboratory.
7. Size and design equipment for chuting, pumping, and pneumatically conveying concrete so as to assure a practically continuous flow of concrete at the delivery end without separation of the materials. Do not use gravity-flow or aluminum chutes or conveyors for transporting concrete horizontally. Provide runways for wheeled concrete conveying equipment from the concrete delivery point to the locations of final deposit.
8. Consolidation
    a) Comply with requirements of ACI 309.
    b) Use mechanical vibrating equipment for consolidation.
    c) Do not use vibrators to transport concrete in forms.
    d) Use vibrators with sufficient speed and amplitude to consolidate effectively.
    e) Keep a spare vibrator on site during all concrete pours.
    f) Thoroughly consolidate concrete and work around reinforcement, embedded items and into corners of forms. Thoroughly consolidate layers of concrete with previous layers.
9. Construction Joints: Unless otherwise shown on Drawings, construct each footing, pier, column, beam, wall and slab monolithically. Each will be considered as a single unit of work. Where construction joints are absolutely unavoidable, locate joints at or near third-points of spans where approved by Architect. Provide appropriate keys in construction joints, plumb and level, whether horizontal or vertical. Place construction joints in exposed concrete work at detailed joints or rustications as approved by Architect.
10. Cold Weather Placement: Do not place concrete when temperature is below 40º F unless cold weather concrete procedures are followed as specified in ACI 306. Calcium chloride shall not be used.
11. Hot Weather Placement: Exercise special care to prevent high temperature in fresh concrete during hot weather in accordance with ACI 305. Use water reducing set-retarding admixtures in such quantities as especially recommended by manufacturer to assure that concrete remains workable and lift lines will not be visible.
12. Bonding: Before depositing any new concrete on or against previously deposited concrete which has partially or entirely set, thoroughly roughen

and clean the surfaces of the latter of all foreign matter, scum, and laitance. Retighten forms and re-coat the surface of the previously deposited concrete with specified bonding agent per manufacturer's directions.

13. Ensure reinforcement, inserts, embedded parts, and formed joints are not disturbed during concrete placement.

C. Maintain concrete cover around reinforcing as indicated on the structural drawings.

D. Place concrete continuously between predetermined construction and control joints.

E. Excessive honeycomb or embedded debris in concrete is not acceptable. Notify Architect/Engineer upon discovery.

F. Maintain record of concrete placement. Record date, location, quantity, air temperature and test samples taken.

3.11 CONCRETE CURING AND PROTECTION

A. General: Protect freshly placed formed concrete from premature drying and excessive cold or hot temperatures. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting, keep continuously moist for not less than 7 days.

B. Curing Methods: Perform curing of formed concrete by moist curing, or by moisture-retaining cover curing, as herein specified.

C. Curing Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces, by moist curing with forms in place for full curing period or until forms are removed. If forms are removed, continue curing by moisture cover curing method.

3.12 FORM REMOVAL

A. Do not remove forms, shoring and bracing until concrete has sufficient strength to support its own weight, and construction and design loads which may be imposed upon it.

B. Perform reshoring before removing original shoring. Leave reshoring in place until members have attained required compressive strength, or as long as required to support additional construction loads. In no case when shores are removed shall concrete be less than 85 percent of 28 day strength.

C. Reshore structural members due to design requirements or construction conditions to permit successive construction.

D. Remove formwork progressively so no unbalanced loads are imposed on structure.

E. Do not damage concrete surfaces during form removal.

F. Store reusable forms for exposed architectural concrete to prevent damage to contact surfaces.

G. When repair of surface defects or finishing is required at early age, remove forms as soon as concrete has hardened to resist damage from removal operation.

H. Loosen wood forms for openings as soon as loosening can be accomplished without damage to concrete.

I. Formwork for walls, sides of beams, and other parts not supporting weight of concrete may be removed as soon as concrete has hardened sufficiently to resist damage from removal operations.

J. When shores and other vertical supports are so arranged that nonload-carrying form facing material may be removed without loosening or disturbing shores and supports, form facing material may be removed at earlier age.

K. For exposed concrete surfaces, do not reuse formwork when it has deteriorated to the point where usage will affect the finished concrete appearance. Do not patch formwork.

L. Do not place wood forms which cannot be retrieved after concrete placement. Use steel forms.

3.13 FINISHING OF FORMED ARCHITECTURAL CONCRETE SURFACES

A. General:

1. Ensure exposed-to-view finish surfaces of concrete is uniform in color and appearance.
2. Treat surfaces in continuous operation to achieve uniform appearance.
3. Do not change equipment, materials, or procedure for surface treatment during Work.

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In "B" below, select one or more of the finish/texture options.

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B. Finish:

1. On exposed to view surfaces, provide final texture to match approved sample and as follows:
   a) [Perform abrasive blasting after casting when concrete strength has reached at least a minimum of 2,000 psi., and not less than that required for safe removal of forms and supports. Coordinate with formwork construction, concrete placement schedule, and formwork removal to ensure that surfaces to be abrasive blasted are treated at the same age for uniform results.
      1) Surface Continuity: Perform abrasive-blast finishing in as continuous an operation as possible, utilizing same work crew to maintain continuity of finish on each surface or area of Work. Maintain required patterns or variances in depths of blast to match design reference sample or mockup.
      2) Depth of Cut: Use an abrasive grit of proper type and gradation to expose aggregate and surrounding matrix

surfaces to match design reference sample or mockup, as follows:

.i Brush: Remove cement matrix to eliminate surface sheen and expose face of fine aggregate. No reveal.

.ii Light: Expose fine aggregate with occasional exposure of coarse aggregate and uniform color. Maximum reveal 1/16 inch (1.5 mm).

.iii Medium: Generally expose coarse aggregate with slight reveal. Maximum reveal 1/4 inch (6 mm).

.iv Heavy: Expose and reveal coarse aggregate to a maximum projection of one-third of its diameter; reveal 1/4 to 1/2 inch (6 to 12 mm).

3) [Abrasive Blasting: Abrasive blast corners and edges of patterns carefully, using back-up boards, to maintain uniform corner or edge line. Determine type of nozzle, nozzle pressure, and blasting techniques required to match design reference sample or mockup.]

b) Surface retarder and subsequent water blast to create exposed aggregate appearance.

1) Perform high-pressure water jetting on concrete with a minimum compressive strength of 1500 psi, and not less than that required for safe removal of forms and supports. Coordinate with formwork construction, concrete placement schedule, and formwork removal to ensure that surfaces to be high-pressure water-jet finished are treated at the same age for uniform results.

2) Surface Continuity: Perform high-pressure water-jet finishing in as continuous an operation as possible, utilizing same work crew to maintain continuity of finish on each surface or area of Work. Maintain required patterns or variances in depths of reveal to match design reference sample or mockup.]

c) [Form liner of pattern/texture specified on [entire panel face] [portion as detailed with balance of panel to be [_____].]

d) [Bush hammer:

1) Allow concrete to cure not less than 14 days before commencing bushhammer surface finish operations.

2) Surface Continuity: Perform bushhammer finishing in as continuous an operation as possible, utilizing same work crew to maintain continuity of finish on each surface or area of Work. Maintain required patterns or variances of

cut to match design reference sample, mockup, or as shown on Drawings.

3) Surface Cut: Maintain required depth of cut and general aggregate exposure. Use power hammerheads for large, flat surfaces and hand hammers for small areas, at corners and edges, and for restricted locations where power tools cannot reach.

C. At surfaces onto which sealants are to bonded, create smooth surface, free of cracks, crevices, and rough aggregate.

3.14 PATCHING CONCRETE SURFACES

A. It is the intent of this section to provide for architectural concrete surfaces of such quality as to require a minimum of pointing and patching.

B. Methods and extent of patching concrete shall be reviewed with the Architect prior to application.

C. Exercise care in the forming, mixing and placing of the concrete as to assure reasonably uniform dense surfaces, free from blemishes, voids, or honeycombs.

D. Repair and patch defective areas with cement mortar and bonding agent mixture immediately after removal of forms, when acceptable to Architect.

1. Cut out honeycomb, rock pockets, voids over 1/4 inch in any dimension, and holes left by tie rods and bolts, down to solid concrete but in no case to a depth of less than 1 inch. Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water, and brush-coat the area to be patched with specified bonding agent. Place patching mortar before bonding compound has dried.

2. Blend cement and pigments is such a fashion so that, when dry, patching mortar will match color surrounding. Provide test areas at inconspicuous location to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.

E. Repair of Formed Surfaces: Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of Architect. Surface defects, as such include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets, fins and other projections on surface, and stains and other discolorations that cannot be removed by cleaning. Flush out form tie holes, fill with dry-pack mortar, or precast cement cone plugs secured in place with bonding agent.

1. Repair concealed formed surfaces where possible, that contain defects that affect the durability of concrete. If defects cannot be repaired, remove and replace concrete.

F. Repair isolated random cracks and single holes not over 1 inch in diameter by dry-pack method. Groove top of cracks and cut out holes to sound concrete and clean of dust, dirt, and loose particles. Dampen cleaned concrete surfaces and

apply bonding compound. Mix dry-pack, consisting of one part portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing. Place dry- pack before bonding compound has dried. Compact dry-pack mixture in place and finish to match adjacent concrete. Keep patched area continuously moist for not less than 72 hours.

G. Repair methods not specified above may be used, subject to acceptance of Architect.

3.15 DEFECTIVE CONCRETE

A. Modify or replace (at Architect's option) concrete not conforming to required levels and lines, details, elevations and appearance. Removal and replacement shall not impair the strength or appearance of the structure.

B. Repair or replace concrete not properly placed or of the specified type.

3.16 FIELD QUALITY CONTROL

A. Field inspection and testing will be performed under provisions of Section 01410.

B. Maintain records of placed concrete items. Record date, location of pour, quantity, air temperature, and test samples taken.

3.17 CLEANING OF FORMS

A. Clean forms to remove foreign matter as erection proceeds.

B. Ensure that water and debris drain to exterior through clean-out ports.

C. During cold weather, remove ice and snow from forms. Do not use de-icing salts. Do not use water to clean out completed forms, unless formwork and construction proceed within heated enclosure. Use compressed air to remove foreign matter.

3.18 FORM RE-USAGE

A. Thoroughly clean surfaces of forms and remove nails before reuse. Do not reuse damaged or worn forms. Inspect forms and retighten rustications as required.

B. Reuse of architectural forms is subject to Architect's approval. Forms which are damaged, worn, or unsuitable for producing quality finishes, in the Architect's opinion, shall be rejected.

END OF SECTION