

## SECTION 03 30 00

### CAST-IN-PLACE CONCRETE

#### PART 1 GENERAL

##### 1.1 SCOPE:

- A. This Contractor shall furnish all material and labor necessary to complete execution of all concrete portions of this project, including the following items and other items of concrete or cement work which may be essential to complete that portion of the work as shown on the contract drawings and as hereinafter specified.
  - 1. Footings, foundations and structural members as shown, including piers if required.
  - 2. Concrete finish floor slabs.
  - 3. All concrete steps, landings, walks, curbs, etc.
  - 4. Non-Shrink and Epoxy Grout
  - 5. Concrete Accessories
  - 6. Concrete Floor Densifier/Hardener
  - 7. Clear Sealer (Water and Oil Repellent)
  - 8. Concrete Minimum Finish Tolerances & Standards
  - 9. Concrete Slab Moisture Mitigation
  - 10. Observation and Required Special Inspections
  - 11. Concrete Mix Design Submittal Form

##### 1.2 RELATED WORK SPECIFIED ELSEWHERE:

- A. Section 01 40 00 – Quality Control: Required Special Inspections
- B. Section 03 11 00 - Concrete Form Work
- C. Section 03 21 00 - Concrete Reinforcement
- D. 03 35 20 Polished Concrete Finish System
- E. Section 04 22 00 Concrete Unit Masonry
- F. Section 09 91 00 - Painting
- G. Section 31 23 00 - Structural Excavation, Backfill and Compaction
- H. Section 32 16 00 - Walks

##### 1.3 QUALITY ASSURANCE:

- A. Standards: Provisions of American Concrete Institute "Building Code Requirements for Structural Concrete" (ACI 318-Current Edition). American Concrete Institute "Specifications for Structural Concrete" (ACI 301-Current Edition), Concrete

03 30 00-1

Reinforcing Steel Institute "Manual of Standard Practice" (Current Edition), American Concrete Institute "Guide to Presenting Reinforcing Steel Design Details" (ACI 315-Current Edition) and " Guide to Formwork for Concrete" (ACI 347-Current Edition) are adopted except that where additional or more stringent requirements are required by these specifications.

- B. Tests: As listed in Standard Practice for Sampling Freshly Mixed Concrete ASTM C 172-Current Edition.
- C. Control Joints and Expansion Joints: Follow Provisions of American Concrete Institute concerning maximum area for placement of expansion and control joints unless shown or noted otherwise on drawings and specifications. If contractor requests adjustments to control joint placement or additional control joints and/or expansion joints, consult Architect prior to concrete placement.
- D. **Slabs must be replaced that have a crack(s) with a width of 0.05" or greater. In high visibility areas all cracks in slabs will be subject to replacement of slab sections at the discretion of the Architect.**

#### 1.4 SUBMITTALS:

- A. Test Reports: Reports of concrete compression, yield, and slump tests.
- B. Certificates:
  - 1. Manufacturer's certification that materials meet specification requirements.
  - 2. Material content per cubic yard of each class of concrete furnished:
    - a. Dry weights of cement.
    - b. Saturated surface-dried weights of fine and coarse aggregate.
    - c. Quantities, type and name of admixtures.
    - d. Weight of water.
  - 3. Ready-mix delivery tickets, ASTM C 94-Current Edition.
- C. Fully completed concrete mix design submittal form found at the end of this section for each type of concrete to be placed.

#### 1.5 PRODUCT AND ENGINEERING DATA:

- A. Submit data for design mixes, proposed admixtures, etc. per Section 01 33 00.
- B. The Contractor shall be responsible for checking quantities and dimensions in accordance with contract drawings and field conditions. Where discrepancies in dimensions are noted, the Contractor shall notify the Architect of such discrepancies and corrected dimensions noted on submittal drawings.
- C. Contract drawings receive precedence over shop drawings unless authorized in writing.

03 30 00-2

- D. Shop drawings furnished for reinforcing steel shall contain fabrication details as well as placement drawings which are to be used in conjunction with contract drawings.
- E. Detailing and fabrication of reinforcing shall conform to " Guide to Presenting Reinforcing Steel Design Details", (ACI 315-Current Edition).

#### 1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING:

- A. Cement: Store in weather tight enclosures and protect against dampness, contamination, and warehouse set. Any cement damaged by moisture, or which fails to meet any of the specified requirements shall be rejected and removed from the work.
- B. Aggregates:
  - 1. Stockpile to prevent excessive segregation, or contamination with other materials or other sizes of aggregates.
  - 2. Use only one supply source for each aggregate stockpile.
- C. Mixing: Ready-mixed concrete shall be mixed and delivered in accordance with Standard Specifications for Ready-Mixed Concrete" (ASTM C94-Current Edition).

#### 1.7 ENVIRONMENTAL REQUIREMENTS:

- A. Allowable Concrete Temperatures
  - 1. Cold Weather: Minimum 40 degrees. With temperatures lower than 40 degrees, approval by the Architect shall be required.
  - 2. Hot Weather: Maximum 90 degrees F.
- B. Do not place concrete during rain, sleet, or snow unless protection is provided which is approved by Architect.

#### 1.8 CONCRETE SLAB MOISTURE MITIGATION:

- A. It will be the responsibility of the Contractor to obtain moisture levels at or below the required percentages as required for installation of all floor covering products by the time the products are ready to be installed. If moisture levels are not reached at the scheduled time to install floor coverings, the Contractor will pursue other means to meet floor covering moisture requirements at no additional cost to owner. This will not be a reason to delay project completion.

#### 1.9 CERTIFICATION

- A. Ready Mix concrete batch plant to be NRMCA (National Ready Mixed Concrete Association) certified. Submit proof of certification with submittals.
- B. Concrete Flatwork Finishers to be ACI certified. Submit proof of certification to the Architect for approval.

03 30 00-3

## PART 2 PRODUCTS

### 2.1 MATERIALS

#### A. Concrete:

1. Portland Cement: Type 1 Portland, meeting "Standard Specifications for Portland Cement", (ASTM C150-Current Edition) shall be used.
2. Aggregates: All aggregates shall be limestone, clean, hard strong and durable particles free of chemicals or foreign material that may affect the bonding of cement paste and shall conform to "Specifications for Concrete Aggregates" (ASTM C33-Current Edition). Coarse aggregate gradation shall be within the limits of 1 inch to No. 4 standard sieve analysis. Alternate aggregate materials must be reviewed and approved by the architect.
3. Mixing Water: Water shall be fresh, clean, and potable.
4. Slump: 5 inch maximum: plus, tolerance 0 inches, minus tolerance 2 inches.
5. Mix proportioning: To produce 28-day minimum compressive strength of moist cured laboratory samples. Provide the following minimum compressive strengths at listed locations unless noted otherwise in other specification sections or on drawings:
  - a. 3000 psi for all footing and foundation stem walls.
  - b. 3000 psi for all exterior sidewalk/stoop/patio locations.
  - c. 3500 psi for all interior slabs-on-grade.
  - d. 3000 psi for all other concrete items, unless noted otherwise in other specifications.

#### B. Curing Material: Chemical curing products: AmeriPolish PCA curing agent, manufactured by AmeriPolish Architectural Concrete Products, (800) 592-9320. 1100-CLEAR, manufactured by W.R. Meadows Inc, (800)342-5976. L&M CURE, manufactured by Laticrete (800)243-4788. The contractor is to verify with floor covering manufacturers that they will warrant their product if a curing agent is applied where the floor covering is to be installed.

#### C. Below-slab vapor barrier shall be as specified in Section 07 10 00, but no less than 15 mils thick.

#### D. Reinforcement: See Section 03 21 00

### 2.2 CONCRETE FLOOR DENSIFIER/HARDENER AND SEALER

#### A. Penetrating Hardener/Densifier: (Clear liquid reactive lithium-silicate based.)

1. Retroplate 99 by Advanced Floor Products.
2. Consolideck LS, by Prosoco.
3. 3D HS, by Ameripolish
4. Approved alternate by other manufacturer specified herein.

#### B. Clear Sealer: Refer to specification 09 91 00 Paint & Finishing

03 30 00-4

## 2.3 MIXES:

- A. Proportions: Ready-mix concrete shall meet "Specifications for Ready-Mixed Concrete" (ASTM C94-94). Proportions of concrete shall produce the required strength and be workable to the extent that it can be worked into the corners and angles of forms and around reinforcement. Collection of excess free water on the surface will not be permitted nor a segregation of the materials in the mixture.
- B. Free surface moisture on aggregates shall be included as part of the mixing water.
- C. Water-cement ratios for project concrete mix shall be such that the relationship between the required strength and water-cement ratio of ingredients used has been previously established by reliable tests and data. Copies of previous test data, along with design mix data shall be submitted to the Architect by the Contractor for approval. Where such data is not available or is insufficient, water-cement ratios shall meet the requirements of Table 4.2.2 of ACI 318-Current Edition. Cementitious content shall be the total weight of all Portland cement and fly ash in a given mix.
- D. Admixtures shall comply with the ASTM Specifications for Chemical Admixtures. (ASTM C494-Current Edition).
  - 1. Mid-Range Water Reducing Admixture: Mira 110, manufactured by Grace Concrete Products, 877-423-6491, Master Builders Polyheed 1720, manufactured by BASF or approved alternate product. Non-chloride, non-corrosive. Admixture to meet ASTM C494 Type A & F requirements. Comply with manufacturer's instructions for dosage. Admixture to be incorporated with mix at batch plant.
    - a. other admixtures may be used as a concrete mix component only with approval of the Architect.
    - b. Use all admixtures in accordance with recommendations of the manufacturer.
  - 2. For concrete containing HRWR admixture (super- plasticizer) when approved by Architect: slump shall be 6"-8".
  - 3. In no case shall the use of the admixtures produce a compressive strength less than that specified in this section.
  - 4. Fly ash (Type C or F per ASTM C618) may be used as an admixture in concrete which is not exposed to view and does not require surface finish. Use of only one type of fly ash throughout the project shall be permitted. Such areas are limited to footings, below grade foundation walls, filled masonry voids, etc. The use of fly ash as an admixture **shall not be permitted** in concrete where surface finish is required. Such areas as floor slabs, exposed concrete walls, exposed concrete structure, etc., shall not be poured with concrete containing fly ash. Other admixtures may be used only with the approval of the Architect. Each delivery record shall indicate mix design. Concrete will be subject to rejection if mix design is not called out on invoice at time of delivery.

5. All concrete installed at the exterior on a permanent basis shall be air entrained. Interior slabs shall not contain air entrainment. If admixture is desired, obtain approval through Architect.
  6. Air-entraining admixture if used, shall meet "Specifications for Air-Entraining Admixtures" (ASTM C260-Current Edition) and shall produce air content by volume between 5 to 7%.
- F. Use same Portland cement manufacturer throughout project for all interior concrete. Portland cement manufacturer may be different for exterior concrete but must be the same Portland cement manufacturer for all exterior concrete.

## 2.4 NON-SHRINK AND EPOXY GROUT

- A. Non-Shrink Grout, Non-Metallic Grout: Factory premixed grout conforming to CRD-C-621-80, "Corps of Engineers Specification for Non-Shrink Grout".
1. Acceptable Manufacturers:
    - a. EUCO NS, the Euclid Chemical Company
    - b. SonogROUT, Sonneborn-Contech
    - c. Masterflow 713, Master Builders
    - d. DuragROUT, L & M Construction Chemical Co.
- B. Epoxy Grout: Structural epoxy adhesive conforming to ASTM C881.
1. Acceptable Manufacturers:
    - a. Sikadur 32 Hi-Mod by Sika Corporation
    - b. Sonneborn Epogel by Chemrex, Inc.
    - c. Epcon C6 by ITW Ramset/Redhead
    - d. Hilti HY-200

## 2.5 ACCESSORIES

- A. Bentonite Waterstops: Surface applied Bentonite waterstop to be Volclay RX Waterstop by American Colloid Company or approved alternate.
- B. Safety Nosing
1. Provide nosing inserts manufactured by Wooster Products, Inc., 1000 Spruce Street, PO Box 896, Wooster, OH 44691, Phone 1-800-321-4936, or approved alternate product.
    - a. Type #1: "Spectra" WP2J" profile, black infill. Embed into concrete steps.

## PART 3 EXECUTION

### 3.1 OBSERVATIONS AND SPECIAL INSPECTIONS

- A. All reinforced concrete construction shall be performed under the personal supervision of the Building Superintendent. This superintendent shall keep a record of all concrete poured on the job. The record shall show in detail the area placed, the time and date of

03 30 00-6

the placement and weather conditions which existed at the time of the placement. Upon completion of the work, this record of Concrete Placement shall be included in the close out documents.

- B. The Contractor shall plan his work so that adequate time is allowed for the Architect to properly observe all embedded work prior to actual placement of concrete. The Contractor shall notify the Architect of his intent to placement at least 24 hours prior to the time that he estimates the work will be ready for observation. The Contractor shall not place any reinforced concrete without the approval of the Architect.
- C. Contractor shall plan work and coordinate with independent testing lab to be present on-site throughout concrete placement.
- D. Inspection of concrete and concrete preparation for conformance to the construction documents and IBC shall be completed by the designated third-party Special Inspector.

### 3.2 INSTALLATION:

- A. Placing Concrete:
  - 1. Convey concrete from mixer to final position by method which will prevent separation or loss of material.
  - 2. Maximum time permitted before a placement of concrete after adding mixture water shall be as follows:
    - a. Air temperature above 78 degrees F. - 60 minutes.
    - b. Air temperature below 78 degrees F. - 90 minutes.
  - 3. Concrete shall not be placed until an observation by the Architect has been made and reinforcement placement, vapor barrier, etc., is approved.
  - 4. Excavations for footing shall be free of debris, loose dirt, mud and water just prior to placing of concrete.
  - 5. All forms shall be clean of debris and all embedded items shall be in place and secured prior to concrete placement.
  - 6. Wood forms shall be sprinkled with water and wet when concrete is placed, but pooling of water in forms is to be prevented.
  - 7. Maximum height of concrete free fall, 3 feet.
  - 8. Regulate rate of placement so concrete remains plastic and flows into position.
  - 9. Deposit concrete in continuous operation until panel or section is completed.

03 30 00-7

**10. Concrete Placement Tolerances & Standards:**

- a. Submit proposed slab pouring plan for review and approval by Architect prior to forming. For purposes of planning layout, approximately 5,000 to 7,000 sq.ft. is the maximum area allowed. Pending crew size and equipment larger square foot pour areas may be allowed by Architect. Provide diamond plate dowels at construction joints between placements. Refer to Section 03 21 00.
- b. **Control joints:** Saw cuts are to be performed within 12 hours after finishing. Use 1/8" thick blade, cutting no less than 1/3 of the slab thickness, unless noted otherwise.
- c. Place control joints for concrete slabs (slab-on-grade and elevated concrete slabs) no more than 8'-0" o.c. each way.
  - i. For other concrete slab thicknesses, refer to structural drawings for control joint spacing.
- d. **Note: Other placement methods may be considered only with approval of Architect.**

**11. Concrete Slab Levelness and Flatness:**

- a. Levelness: FL=35 for polished slabs. FL=20 for non-polished slabs.
- b. Flatness: FF = 50 for polished slabs. FF = 25 for non-polished slabs
- c. In areas with floor drains, maintain finished floor level elevation at walls and slope surfaces uniformly to drains.

12. Place concrete in horizontal layers, 18 inches maximum thickness.

13. For concrete on grade or fill, sub-grades shall be properly prepared and maintained as specified previously. Where concrete is placed in direct contact with the earth, the subgrade material shall be wet but not muddy at time of placement.

14. Under all slabs, provide crushed stone choked off with fines per specification Section 31 23 00, meeting ASTM C33-Current Edition, which shall be leveled and compacted. A vapor barrier, as specified in Section 07 10 00 and shown on the drawings shall be placed under all interior slabs-on-grade.

15. Removal of forms. Do not remove forms until concrete has hardened sufficiently to support its own weight and imposed construction loads. Remove forms in such manner as to ensure the complete safety of the structure and to prevent spalling or chipping of concrete. When removing forms, conform to the following:

- a. Non-Weight Supporting Forms: Form work for columns, walls, sides of beams and other parts not supporting the weight of the concrete may be removed as soon as concrete has hardened sufficiently to resist damage from removal operations, but in no case sooner than 24 hours.
- b. Weight Supporting Forms: Do not remove form work for beam soffits, supported slabs or other parts which support the weight of concrete until concrete has reached 75% of its specified 28-day strength based on the lab cured concrete cylinder tests, but no sooner than 7 days.

16. Wall tie treatment. Wall ties shall be broken off after forms are removed and sealed against water penetration.
17. Slope all concrete floors to trench, or floor drains from corners of room, or as shown on drawings. Provide total slope of 1/2", unless noted otherwise on drawings.
18. Follow procedures as listed below for placement and routing of pipes, sleeves, and electrical conduit:  
(If any of these items are not met, pouring of concrete will not be allowed until corrected.)
  - a. **Do not** route groups of conduit, pipes or sleeves above footings, unless noted to do so. If conflict occurs, consult Architect/Engineer.
  - b. **Do not** route conduit, pipes, and sleeves below bearing walls when running parallel with wall.
  - c. Limit width of conduit, pipes and sleeves not to exceed 3'-0" in width as it passes under wall footing. As much as possible, align the items perpendicular to the footing as it passes below footing.
  - d. Provide a minimum spacing of 2'-0" between conduit or pipe groups as items pass under footings.
  - e. **Do not** route conduits, pipe or sleeves under or through column footings or pad footings unless prior approval is given by Architect/Engineer.
  - f. The top of all conduits, sanitary drain pipe, water supply pipe, etc. shall be installed at or below bottom of concrete slab where slab is on grade.
  - g. Where in-slab electrical floor boxes occur, the conduit shall slope down to below-slab elevation as soon as possible on exterior sides of floor box.

B. Consolidating Concrete at Steel Reinforcement:

1. Use mechanical vibrating equipment for consolidation.
2. Vertically insert and remove hand-held vibrators having minimum 1" diameter at points 18 inches to 30 inches apart.
3. Do not use vibrators to transport concrete in forms.
4. Minimum vibrator speed, 3600 rpm.
5. Vibrate concrete minimum amount required for consolidation, 3 to 5 seconds maximum.

C. Construction Joints:

1. Clean and roughen the surface of concrete and remove laitance.
2. Wet concrete surface and flush with neat cement grout before placing additional concrete.
3. Construction Joints for slabs on ground (floor joints) shall be plate dowel system. Plate dowel system sleeves shall be attached to 2 x wood members matching the depth of the slab for removal and reuse with steel stakes @ 2'-0" o.c. Form boards must have clean smooth top surface so finishing machines can pass over the top of the form.

- D. Plate Dowel System: Provide Diamond Dowel System manufactured by PNA construction technologies, "Speed Plate" System by Sika. or approved alternate. Refer to Section 03 21 00.
1. Install at all slab on grade construction joints.
- E. Expansion joints: Expansion joint filler, where indicated, shall meet "Specifications for pre-formed Expansion Joint Fillers for Concrete Paving and Structural Construction, Non-extruding and Resilient, Non-bituminous. (ASTM D1752-Type 1). Provide "Zip Strip" type filler so that top ½" can be provided for sealant installation.
- F. Isolation Joint Material:
1. Provide ½" thick closed cell foam material, separating steel or concrete columns from concrete slab at slabs-on-grade and at elevated slabs to prevent bonding and cracking of concrete from structure movement. Hold down from top of slab ½" and fill with sealant.
- G. Finishing:
1. Floor Finish
    - a. Edge forms and intermediate screed strips shall be placed accurately to give the desired elevations and contours. Strike-off templates or straight edges shall be used to give all floor slabs an even surface. Screeds are to be of such type not to interfere with reinforcing.
    - b. Troweled finishes shall be applied to floors where concrete is the walking surface, or to have floor coverings. Troweling shall begin after all surface water has disappeared naturally and surface has wood floated to a plane smooth surface. Initial troweling shall be done after concrete has hardened sufficiently to prevent excess fines from working to surface, to produce a smooth surface free from defects and a final troweling shall be done after sufficient hardening to remove trowel marks and give a hard, dense smooth surface. Drying shall be natural. The use of "dryers" by dusting cement or sand is not permitted.
    - c. Floors to receive tile or other bonded cementitious finishes shall, after wood floating to a smooth plane surface, be roughened with stiff brushes before final set.
    - d. All exterior concrete ramps, stairs, and landing slabs shall have a light broom finish of sufficient texture to prevent slipping.
  2. Walks: See Section 32 16 00
  3. Exposed Concrete Surfaces
    - a. Areas not receiving special coatings shall be wetted and rubbed with carborundum bricks or other abrasive to give a smooth finish with a uniform color and texture. All edges shall be eased to give a good appearance.
    - b. Areas receiving special coatings shall be free from imperfections such as voids and protrusions and shall be finished to a smooth and level surface.
- H. Curing: AmeriPolish PCA curing agent, manufactured by AmeriPolish Architectural Concrete Products, (800) 592-9320. 1100-CLEAR, manufactured by W.R. Meadows Inc, (800)342-5976. L&M CURE, manufactured by Laticrete (800)243-4788. Products must be approved for concrete floor slabs receiving Polished concrete finish. Contractor to

03 30 00-10

verify with floor covering manufacturers that they will warrant their product if a curing agent is applied where the floor covering is to be installed.

- I. Patching: After removal of forms, all honeycomb areas, voids, air pockets, tie holes and surface cracks shall be immediately patched.
- J. Application of Floor Densifier/Hardener:
  - 1. Apply to **polished and unpolished** interior concrete slabs and exterior porch or patio areas scheduled to be exposed to view.
  - 2. Apply per manufacturer's instruction to all exposed trowelled concrete floor areas and other areas as called out on finish schedule. Product to be applied as soon after curing period as manufacturer's instructions allow. Application must be smooth and even. No excess application or puddling of the product will be allowed.
    - a. Clean floors where densifier/hardener is applied with manufacturers cleaners.

### 3.3 GRIND ONLY AT SEALED CONCRETE FLOORS

- A. At sealed concrete floors
  - 1. Progressively polish slab surface with 200 grit resin-bonded, phenolic diamond heads. 1 pass.
  - 2. Seal with DNS-400 Sprayable Acrylic Sealer by Ameripolish.

### 3.4 ACCEPTANCE OF CONCRETE:

- A. Concrete not meeting the strength requirements of these specifications shall be tested at critical locations designated by the Architect by a laboratory approved by the Architect. These tests shall be at the Contractor's expense. Such tests performed shall be in accordance with the Building Code Requirements for Structural Concrete: (ACI 318-Current Edition). If these tests still indicate below required strengths, or if inconclusive, then the Contractor shall proceed at his own expense as follows:

Remove and replace or reconstruct all under strength concrete in an approved manner or perform load tests in accordance with the "Building Code Requirements for Structural Concrete" (ACI 318-Current Edition). If load test results are not acceptable then Contractor shall remove and replace or reconstruct all designated under strength concrete to meet requirements of these specifications.

- B. Concrete improperly placed, cured, reinforced, damaged or not meeting testing tolerances shall be considered potentially deficient and shall be tested and replaced if necessary, in accordance with Paragraph a) above.
- C. Concrete not meeting the tolerances of "Recommended Practice for Concrete Formwork: (ACI 347) and concrete not formed as shown on plans shall be considered as not acceptable and shall be removed and replaced by Contractor at his own expense unless Architect permits patching and repairing of such work. Finished repair work shall meet criteria mentioned above or shall be removed and replaced.

### 3.5 TESTING AND SAMPLING:

- A. Slump Tests: A minimum of two (2) slump tests shall be made each day concrete is placed with one (1) test being made at the time test cylinders are made. Slump tests are to be made in accordance with "Standard Test Method for Slump of Hydraulic-Cement Concrete" (ASTM C-143-Current Edition). Where slump exceeds five inches (5") or the average 28 day strength of the three (3) test specimens falls below the strength specified for the class of concrete tested, or below proportional minimum seven (7) day strengths, (80 percent of specified 28 day strength) the proportions, water content or temperature conditions shall be changed to secure the required properties, and, at the discretion of the Architect, portions of the structure containing such concrete shall be removed and replaced, or reinforced as necessary. No concrete below 3" slump shall be accepted. Follow guidelines of ASTM C94 for water added to mix on site. Do not exceed design specifications.
- B. Strength Tests. The compression strength test shall be performed in accordance with "Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens" (ASTM C39-Current Edition). Samples for concrete cylinders shall be made in accordance with "Method of Sampling Fresh Concrete" (ASTM C172-Current Edition), and test cylinders shall be prepared, and laboratory cured in accordance with "Method of Making and Curing Concrete Compression and Flexure Test in the Field" (ASTM C31-Current Edition).
- C. Cylinders. Five (5) cylinders from the same batch shall be prepared by a certified technician for each 50 cubic yards or fraction thereof placed, but not less than four (4) cylinders for each day of concrete operations shall be made. **Location of batch as to placement on the subject and supplier mix ID# shall be noted on report, and cylinders so designated. Maximum and minimum initial curing temperatures as recorded per ASTM C31 shall be included in this report.** No tests shall be required for sidewalks. One (1) cylinder shall be tested at seven (7) days and three (3) at 28 days. **If cylinder break is lower than required, the testing company to contact Contractor and Architect immediately for direction. The remaining cylinder shall be maintained in proper curing conditions until specified 28-day compressive strength has been affirmed.**
- D. A minimum of nine (9) cylinders shall be tested for each class of concrete used on the project and the average of any three (3) consecutive strength tests at 28 days shall be equal to or greater than the specified strength with no test less than 500psi below the design strength.
- E. The contractor shall bear expense of all testing by a Laboratory approved by the Architect prior to award of the contract. Testing results shall be sent directly to the Architect's office, Contractor, and the Concrete Producer. Architect is to be notified of high slump concrete or low early strength (<75% of design at 7 days) immediately.

- F. Floor Flatness and Floor Levelness test shall be performed in accordance with “Standard Test Method for determining FF Floor Flatness and FL Floor Levelness Numbers” (ASTM E1155- Current Edition) for entire interior slab on grade.

END OF SECTION

03 30 00-13

**CONCRETE MIX DESIGN SUBMITTAL FORM**  
(Section 03 30 00 - Cast-in-Place Concrete)

**Submitted Mix Design**

Date Submitted: \_\_\_\_\_

Location and Type (pump or chute) of Placement

**Concrete Information**

Supplier Mix Design #: \_\_\_\_\_

Design Strength (f'c), psi \_\_\_\_\_

Water/Cementitious Ratio \_\_\_\_\_

Total Air Content, % \_\_\_\_\_

(Entrapped or Entrained) \_\_\_\_\_

Density:

Wet, pcf \_\_\_\_\_

Dry, pcf \_\_\_\_\_

Slump:

Without WR, in. \_\_\_\_\_

With WE, in. \_\_\_\_\_

**Admixture Information**

		ASTM Designation	Product & Manufacturer	Dosage (oz/cy)
Water Reducing				
Accelerating				
Retarding				

**Architect's Approval** \_\_\_\_\_

**Structural Engineer's Approval** \_\_\_\_\_

03 30 00-14

**Mix Design Proportions Per Cubic Yard**

	Identification (Type, size, source)	Weight (lbs)	Density (SSD)	Volume (cubic ft)	% Aggregate Absorption
Cement					
Fly Ash					
C.A. #1					
C.A. #2					
C.A. #3					
F.A. #1					
F.A. #2					
Water					
% Air					
	<b>Totals</b>				

03 30 00-15

### Coarse and Fine Aggregate Gradation

Sieve Size	% Passing Each Sieve (All sieve sizes must be entered)					Combined% Passing	Combined % Retained	
	C.A. #1	C.A. #2	C.A. #3	F.A. #1	F.A. #2		Cumulative	Individual
1-1/2"								
1"								
3/4"								
1/2"								
3/8"								
#4								
#8								
#16								
#30								
#50								
#100								
#200								
% of Vol.								

### Required Attachments and Supplemental Documentation

\_\_\_\_\_ Portland Cement mill test  
 report/certification  
 \_\_\_\_\_ Fly ash mill test  
 report/certification  
 \_\_\_\_\_ Separate aggregate gradation reports including all required sieve sizes  
 Note: \* All gradation reports shall be dated within 60 days of submittal  
 \* Separate gradation reports required for each coarse and fine  
 aggregate material in the  
 mix  
 \_\_\_\_\_ Product data for all admixtures including, but not limited  
 to:  
 \* WR  
 \* Set retarder  
 \* Set accelerator

03 30 00-16

\* Air entrainer

Concrete compressive strength data used for standard deviation  
calculations

### Concrete Supplier Information

Supplier Name: \_\_\_\_\_  
Technical Contact: \_\_\_\_\_ Cell # \_\_\_\_\_  
Sales Contact: \_\_\_\_\_ Cell # \_\_\_\_\_

#### Primary Plant:

Location: \_\_\_\_\_  
Miles from Site: \_\_\_\_\_  
Travel Time to Site: \_\_\_\_\_  
NRMCA Certified (Y/N): \_\_\_\_\_  
AHTD Certified (Y/N): \_\_\_\_\_  
Batch Mixing Typer (Dry/Central Mix): \_\_\_\_\_

#### Secondary Plant:

Location: \_\_\_\_\_  
Miles from Site: \_\_\_\_\_  
Travel Time to Site: \_\_\_\_\_  
NRMCA Certified (Y/N): \_\_\_\_\_  
AHTD Certified (Y/N): \_\_\_\_\_  
Batch Mixing Typer (Dry/Central Mix): \_\_\_\_\_

03 30 00-17