

BuildingName  
The Description of the Project  
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**SPECIFICATION DIVISION 3**

NUMBER            SECTION DESCRIPTION

**DIVISION 03 CONCRETE**

SECTION 033053 - MISCELLANEOUS CAST-IN-PLACE CONCRETE

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**DIVISION 03 CONCRETE**

**SECTION 033053 - MISCELLANEOUS CAST-IN-PLACE CONCRETE**

*THIS SECTION HAS BEEN PRE-EDITED TO APPLY ONLY TO VERY SMALL PATCHING-TYPE PROJECTS ONLY. USE AIA MASTERSPEC SECTION 033000 "CAST-IN-PLACE CONCRETE" FOR MORE SUBSTANTIAL PROJECTS.*

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Extent of concrete work is indicated on drawings.
- B. Refer to Division-07 section for joint fillers.

**1.2 SUBMITTALS**

- A. Manufacturer's Data: Submit mfr's product data with installation instructions for proprietary materials including admixtures, joint materials, hardeners, curing materials and others as requested by Owner.
- B. Laboratory Reports: Submit two (2) copies of laboratory test or evaluation reports for concrete materials and mix designs.

**1.3 QUALITY ASSURANCE**

- A. Codes and Standards: Except as otherwise noted, comply with applicable portions of ACI 301 "Specifications for Structural Concrete Buildings"; ACI 318, "Building Code Requirements for Reinforced Concrete"; and CRSI recommended practice for fabrication and placing of reinforcing steel.

**PART 2 - PRODUCTS**

**2.1 MIXING**

- A. Mix Proportions and Design:
  - 1. Measure and mix concrete in a manner complying with ACI 304.
  - 2. Submit written report to Architect for each proposed concrete mix at least 15 days prior to start of work. Do not begin concrete production until mixes have been reviewed and are acceptable to Architect.
  - 3. Mix designs may be adjusted when material characteristics, job conditions, weather, test results or other circumstances warrant. Do not use revised concrete mixes until submitted to and accepted by Architect.
    - a. Use air-entraining admixture in all concrete, providing not less than 4 percent nor more than 8 percent entrained air for concrete exposed to freezing and thawing, and from 2 percent to 4 percent for other concrete.
- B. Strength: Provide concrete with compressive strengths indicated on drawings, or if not indicated, as follows:

1. Compressive Strength at 28 Days: 3000 psi.

## 2.2 MATERIALS

- A. Portland Cement: ASTM C 150, Type as required.
- B. Aggregates: ASTM C 33, except local aggregate of proven durability may be used when acceptable to Architect.
- C. Water: Clean, drinkable.
- D. Admixture:

*SELECT SUPPLEMENTARY CEMENTING MATERIALS FROM SUBPARAGRAPHS BELOW, IF PERMITTED. BLENDING FLY ASH OR SLAG WITH PORTLAND CEMENT IS DONE AT READY-MIX PLANT.*

1. Fly Ash: ASTM C 618, Class C.

*FLY ASH BELOW IS NOT COMMON FOR WASHTENAW COUNTY.*

2. Fly Ash: ASTM C 618, Class F.
- E. Air-Entraining Admixture: ASTM C 260.
  - F. Water-reducing Admixture: ASTM C 494. Use water-reducing admixtures in concrete made with Type I or Type III Portland cement.
    1. Use only admixtures which have been tested and accepted in mix designs, and which are acceptable to Architect.
  - G. Calcium chloride and admixtures containing calcium chloride are not permitted in the following applications:

*EDIT BELOW TO SUIT PROJECT*

1. Concrete exposed to weather.
2. Concrete with embedded aluminum items.

## 2.3 RELATED MATERIALS

- A. Waterstops: Flat dumbbell or centerbulb type, size to suit joints, of either rubber (CRD C 513) or PVC (CRD C 572).
- B. Moisture Barrier: Clear 8 mils thick polyethylene.
- C. Membrane-Forming Curing Compound: ASTM C 309, Type I.
- D. Bonding Agent: Where indicated on drawings, provide bonding agent.
  1. Manufacturer; Product: Chem-Masters; "Polyweld" or equivalent.

## 2.4 FORMWORK

- A. Form Materials: Wood or metal forms, sufficient to withstand pressure of placed concrete without bow or deflection.

*RETAIN BELOW IF DESIRED*

1. Provide chamfer strips in the corners of concrete forms to produce beveled corners on walls and columns which will be exposed to view in finished construction. Provide chamfer sizes as shown on drawings, or if not indicated, 3/4-inch by 3/4-inch.

B. Form Ties: Snap-off type.

## **2.5 REINFORCING**

- A. Deformed Reinforcing Bars: ASTM A 615, Grade 60; comply with ACI 301 supplementary requirement. Provide bars deformed in accordance with ASTM A 305.
- B. Welded wire fabric: ASTM A 185.

## **PART 3 - EXECUTION**

### **3.1 INSPECTION**

- A. Notify Owner's Representative 48 hours before placing concrete. Do not place concrete before Architect has approved completed reinforcement installation.

### **3.2 INSTALLATION, GENERAL**

- A. In general, place concrete in accordance with relevant portions of ACI 304.

***SEE AIA MASTERSPEC FOR CURRENT STANDARD FOR FLOOR FLATNESS AND LEVELNESS***

1. Provide formwork with dimensional tolerances which comply with tolerances suggested by ACI 347 for the following: Variation from plumb; variation from level; variation of linear building lines; variation of sizes; variation in cross-sectional area; footings and variation in steps.
- B. Job-Site Mixing: Use drum type batch machine mixer, mixing not less than 1-1/2 minutes for one cu. yd. or smaller capacity. Increase mixing time at least 15 seconds for each additional cu. yd. or fraction thereof.
- C. Ready-mix concrete: ASTM C 94.
- D. Formwork: Construct so that concrete members and structures are of correct size, shape, alignment, elevation and position.
  1. Provide openings in formwork to accommodate work of other trades. Accurately place and securely support items built into forms.
  2. Clean and adjust forms prior to concrete placement. Apply form release agents or wet forms, as required. Retighten forms during concrete placement if required to eliminate mortar leaks.

- E. Reinforcement: Locate and support with metal chairs, runners, bolsters, spacers and hangers, as required. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces. Follow CRSI recommendations.
  - 1. Install welded wire fabric in as long lengths as practicable, lapping at least one mesh.
- F. Joints: Provide construction, isolation, and control joints as indicated or required. Locate construction joints so as to not impair strength and appearance of structure. Place isolation and control joints in slabs-on-ground to stabilize differential settlement and random cracking.
- G. Installation of Embedded Items: Set and build into work anchorage devices and other embedded items required for other work that is attached to, or supported by cast-in-place concrete. Use setting diagrams, templates and instructions provided by others for locating and setting.

**INCLUDE BELOW IF BONDING AGENT REQUIRED**

- H. Application of Bonding Agent: Clean existing surfaces free of dirt, oil, grease and cleaning agents. Apply bonding agent in accordance with manufacturer's directions. Do not allow bonding agent to puddle in low spots. Place new concrete within time limits recommended by bonding agent manufacturer.
- I. Concrete Placement: Comply with ACI 304, placing concrete in a continuous operation within planned joints or sections. Do not begin placement until work of other trades affecting concrete is completed.
  - 1. Consolidate placed concrete using mechanical vibrating equipment with hand rodding and tamping, so that concrete is worked around reinforcement and other embedded items and into forms.
  - 2. Protect concrete from physical damage or reduced strength due to weather extremes during mixing, placement and curing.
  - 3. Comply with ACI 305, 306, and 308.

**3.3 CONCRETE FINISHES**

- A. Exposed-Surfaces: Provide a smooth finish for exposed concrete surfaces and surfaces that are to be covered with a coating or covering material applied directly to concrete. Remove fins and projections, patch defective areas with cement grout, and rub smooth.
- B. Slab Trowel Finish: Apply trowel finish to monolithic slab surfaces that are exposed-to-view or are to be covered with resilient flooring, paint or other thin film coating, as follows:
  - 1. Consolidate concrete surfaces by finish troweling, free of trowel marks, uniform in texture and appearance.

**SELECT ONE OF THE FOLLOWING TWO PARAGRAPHS.**

2. Flatness and Levelness Criteria: overall values F(F) 35, and minimum local values of flatness F(F) 24 flatness tolerance; overall values of levelness F(L) 25, and minimum values of levelness F(L) 17 levelness tolerance, when tested in accordance with ASTM E 1155.

*CRITERIA ABOVE APPLY TO FLOORS TO RECEIVE THINSET TILE OR RESILIENT FLOORING. CRITERIA BELOW APPLY TO CARPETED FLOORS. USUALLY SELECT ABOVE AND DELETE BELOW. SEE MASTERSPEC EVALUATION SHEETS FOR ADDITIONAL EXPLANATION. NOTE THAT EVEN USING THE ABOVE CRITERIA THERE MAY STILL BE A NEED FOR FLOOR LEVELING FOR THINSET OR RESILIENT TILE DUE TO CONCRETE CURLING AND RIGID ACCEPTANCE CRITERIA BY FLOORING CONTRACTORS. CONSIDER INCLUDING AN ALLOWANCE IN DIV. 09 SECTIONS FOR FLOOR PREPARATION.*

3. Flatness and Levelness Criteria: overall values F(F) 25, and minimum levels of flatness F(F) 17 flatness tolerance; overall values of levelness F(L) 20, and minimum values of levelness F(L) 15 levelness tolerance, when tested in accordance with ASTM E 1155.

#### **3.4 FORM REMOVAL**

- A. Do not remove formwork until cylinder break test indicates concrete has reached 2500 psi strength.

#### **3.5 CURING AND REPAIR**

- A. Curing: Begin initial curing as soon as free water has disappeared from exposed surfaces. Where possible, keep continuously moist for not less than 72 hours. Continue curing by use of moisture-retaining cover or membrane-forming curing compound. Cure formed surfaces by moist curing until forms are removed. Provide protections as required to prevent damage to exposed concrete surfaces.

#### **3.6 PATCHING DEFECTIVE AREAS**

- A. Cut out honeycomb, rock pockets, voids over 1/4" 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". 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 after bonding compound has dried.
- B. For patching exposed to view surfaces, blend white portland cement and standard portland cement so that, when dry, patching mortar will match color surrounding. Compact mortar in place and strike-off slightly higher than surrounding surface.
- C. Remove and replace concrete having defective surfaces if defects cannot be repaired to the satisfaction of the Architect.

**3.7 CONCRETE WASHOUT**

- A. Perform washout using proper disposal and washout practices. Perform washing of concrete trucks in designated areas or off site. Do not discharge concrete washout into storm drains, catch basins or to the sanitary sewer system.

**END OF SECTION 033053**