

SECTION 03300

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL:

1.1 PROJECT INCLUDES

- A. Plant-Mixed Cast-In-Place Concrete:
 - 1. Footings, foundations, and basement walls.
 - 2. Slabs, columns, beams, and decks.
 - 3. Paving base and pads.
 - 4. Duct bank.
 - 5. Telephone, electrical, and steam, manholes.

1.2 QUALITY ASSURANCE

- A. ACI Flatwork Certification: Prepare, place and finish all interior and exterior slabs in the presence of and under the direction of an ACI Certified Concrete Flatwork Finisher or Technician. It is the Contractors responsibility to provide and pay for this technician. The cost of this service is a reimbursable cost of the work.
- B. All concrete mix design and sealing/curing systems and practices must be coordinated with floor finish manufacturers requirements.
- C. Testing: Independent testing laboratory will be engaged by Dartmouth College.
- D. Pre-Installation Conference: At least 7 days prior to placing concrete, the contractor will conduct a meeting to review detailed requirements for all interior and exterior flatwork. The intent of this meeting is to determine procedures for satisfactory concrete placement, finishing and curing operations, and to review the concrete mix designs. The architect, structural engineer, general contractor, concrete flatwork subcontractor, and Dartmouth College will be represented at this meeting.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Concrete Design Mixes required by the college, ASTM C 94, 28 Day Compressive Strength:
 - 1. Columns, Beams, Walls, Foundations, and Footings: [4000] psi.
 - 2. Slabs on Grade and Paving Base: [4000] psi.
 - 3. Concrete on Metal Deck: [4000] psi.
 - 4. Exterior Site Concrete and Pads Exposed to Weather: 4000 psi., 5.7% air entrained for exterior, maximum slump of 4 inches.
- B. Formwork: Plywood or metal panel formwork sufficient for structural and visual requirements.

1. Special forms for textured finish concrete.
 2. Metal, plastic or paper tubes for cylindrical columns and supports.
- C. Reinforcing Materials:
1. Reinforcing Bars: ASTM A 615, minimum, minimum Grade 60, deformed. Confer with DC on appropriate uses of epoxy coated reinforcing.
 2. Fiber Reinforcement: Engineered polypropylene fibers for secondary reinforcement of slabs.
 - a. 1.5 lbs. per cu. yd. for exterior slabs.
- D. Concrete Materials: Type II to be used on all sewer carrying utilities/structures
- E. Auxiliary Materials:
1. Reglets: Galvanized sheet steel reglets, minimum 26 gage.
 2. Waterstops: Rubber or PVC waterstops, minimum of 9 inches.
 3. Vapor Retarder: The architect must discuss the foundation vapor and insulation issues with DC as referenced in Division 7 (07160) and as noted in the following paragraph 4.
 4. Vapor Barrier: Premolded membrane, ASTM E 96, Method B, 0 vapor transmission rate. The design shall require three levels of vapor barrier protection. The first level being the vapor retarder noted above in paragraph E.3. Level 2 being the StegoWrap listed in paragraph a, and the Meadows product for level 3 protection. The StegoWrap product is a 15 mil thick plastic sheet that has 0 vapor transmission.
 - a. StegoWrap
 - b. Sealtight Premoulded Membrane by W.R. Meadows, Inc.
 5. Water-Based Acrylic Membrane Curing Compound: ASTM C 309, Type 1, Class B. Exterior Curing Compound: ProSoCo, Inc., Cur to Spec. MS. **The architect is asked to review the advantages and disadvantages of these two ProSoCo products for exterior slabs and a silane sealer.**
 6. Reinforcing shall be supported on factory made chairs and not on bricks or other miscellaneous devices.

PART 3 - EXECUTION

- A. Curing Methods:
1. Interior Slabs: Moist curing only. No curing compounds to be used. Coordinate all curing methods or materials used with flooring manufacturer requirements and precautions.
 2. Exterior Slabs: Water cure with burlap and soaker hoses for first 24 hours. Curing compound not allowed.
 3. Minimum 7 day cure time required on areas subject to vehicular traffic.
- B. Protection: Maintain security over exterior concrete to prevent graffiti and vandalism.
- C. The contractor is to coordinate the placement schedule with the college's project manager for the purpose of notifying abutters and town personnel of concrete placements that will require finishing machines used after normal business hours. The Town of Hanover site plan approval and noise ordinance may contain conditions restricting night work and the associated noise.
- D. Cold/hot weather concrete placement - A/E must state clearly if cold and hot weather is a determining factor in the concrete flatwork placement.

- E. Subfloors Under Materials Such as Concrete Toppings, Ceramic Tile, and Sand Bed Terrazzo shall meet or exceed an ASTM E 1155 floor flatness (Ff) of 15, and floor levelness (Fl) of 13.
- F. Subfloors Under Materials Such As Vinyl Tile, Epoxy Toppings, Paint, and Carpet shall meet or exceed an ASTM E 1155 floor flatness (Ff) of 20 and a floor levelness (Fl) of 17.
- G. All underground roof areas must be pitched to drain at a minimum of $\frac{1}{4}$ "/ft. See Division 7 for drainboard and membrane requirements.
- H. All Dartmouth College sidewalks shall conform to the following requirements:
 - 1. Remove existing concrete or asphalt and excavate two feet unless existing material is agreed by the college representative to be good gravel.
 - 2. Install one layer of filter cloth covered with 24 inches of gravel subbase, NHDPW&H 304.2.1.3 specification. Compact to 95% density.
 - 3. Use 4000 psi concrete, air entrained concrete with 1.5# fiber per CY added, one inch maximum, 0.40 maximum water-to-cement ratio, slump is not to exceed 4", ASTM C150 Type II Portland Cement. Nominal 6" finished sidewalk depth.
 - 4. Use 6x6 1.4/1.4 welded wire fabric held off the ground with 1.5 inch cement brick spaces for reinforcement.
 - 5. Provide expansion joints per Town of Hanover requirements.
 - 6. Maximum length of a single pour to be 30 feet. For longer lengths, sections must be alternately placed with minimum one day curing time between sections that abut.
 - 7. Medium broom finish will be used, perpendicular to normal traffic. Trowel finished borders (picture frame) will be 1- $\frac{1}{2}$ " wide.
 - 8. No curing compound to be permitted. Water cure with burlap and soaker hoses for the first 24 hours after the placement.
 - 9. Security must be maintained until initial set to avoid graffiti and damage to sidewalk.
 - 10. Install dowels between old walks and new. Dowels to be $\frac{1}{2}$ " stainless with 12" long sleeves and rods, 20" – 24" on center, no closer than 6" to the edge of the walk.
 - 11. When concrete has a granite curb on one side of the walk, install a brushed stone base under the walk and curb with a perforated drain under the curb that connects directly to a storm drain for drainage.
 - 12. Any time that sidewalks intersect other walks, patios, or other concrete surfaces with an angle of less than 60 degrees, the acute angle shall be filled with concrete formed with a minimum inside arc radius of 36" and a minimum dimension from the acute angle intersection to the arc of 36". This inside angle filler shall be constructed with the same cross section as the adjacent sidewalks.

END OF SECTION