

03 00 00 Cast in Place Concrete

Revision 01/04/2019

Purpose:

The Architect and/or Engineer shall incorporate the Rice specific requirements indicated in this standard's section into their design. The Architect and/or Engineer shall further produce project specifications in line with industry standards that are updated to reflect these Rice specific requirements.

1. Sustainability

- a. Rice University projects, including major renovations, shall attempt to meet and exceed the requirements of Materials and Resources Credit 4 – Recycled Content and Credit 5 – Regional materials under the current LEED rating system for this material. Generally, the use of cement substitutes and additives in the concrete design that promote the use of recycled materials such as fly ash and slag shall be considered. Concrete materials and products should be extracted, recovered and manufactured within 500 miles of Rice University.

2. Sidewalks

- a. Rice University standard is an exposed aggregate. Color and texture shall be specified to match the current campus design:
 - i. Concrete to be 3000 psi, 5 sack Portland cement, with hard rock or river rock coarse aggregate. No limestone aggregate should be used.
 - ii. Pea gravel size to be screened 3/8" to 5/8"
 - iii. Pea gravel color: To match adjacent pea gravel sidewalk
 - iv. 5" thick concrete
 - v. 10mil polypropylene film
 - vi. 1" thick sand base
- b. Sidewalks are typically 5" thick and 8' wide with treated pine expansion joints.
- c. Sidewalks are to be constructed with 1/8" cross slope (toward street where parallel) to promote drainage.
- d. 48 hours after concrete pour, SureClean 6000 to be used for cement residue removal.
- e. Architects/Engineers and Landscape Consultants shall coordinate designs so cleanouts, grates, and manholes are not located in sidewalks.

3. Curbs

- a. All curbs to be concrete job formed and finished. No extruded curbing.
- b. Curb height to be 6" typical, 7" maximum, curb width to be 6"

4. Curb Ramps

- a. Provide curb ramps at all intersections and wherever a sidewalk crosses streets or drives.
- b. At exposed aggregate sidewalks, ramps are to be constructed of natural gray concrete (no exposed aggregate).

- c. At natural grey concrete sidewalks, ramps are to be a dark gray concrete from addition of color pigment.
 - d. Ramps shall have horizontal score joints 2" on center perpendicular to the main slope.
 - e. Provide cross slopes and vertical scoring to promote drainage
 - f. Ramps to conform to current TAS (Texas Accessibility Standards).
5. **Wheel Stops**
- a. Provide precast wheel stops where vehicles may roll into pedestrian or hazardous areas.
 - b. Stops shall not create a barrier to accessible route or ramps.
 - c. Wheel stops shall be placed to avoid ponding.
6. **Architectural Concrete**
- a. Though not in common use as an exposed finish on the campus, cast-in-place architectural concrete may, in appropriate applications, be used with the prior approval of the Rice Project Manager.
 - i. Color and finish of the architectural concrete shall be chosen for consistency and ease of replication, long term stability, and ease of repair and maintenance. The Architect shall secure a "Design Reference Sample" during the selection of the project finishes for review and approval of the Rice Project Manager and to provide the Contractor a clear representation of the expected field finish.
 - ii. The Architect shall require Contractor to first provide minimum 1'x1' samples for the initial approval of their proposed match to the Architectural cast-in-place concrete. Once approved, Contractor will provide a field mock-up for each type (color and finish). The scope of the mock-up will be as approved by the Rice Project Manager. A suggested scope is to provide three 4'x4' samples to demonstrate the finish and consistency in its delivery.
 - iii. Architect shall require detailed formwork shop drawings showing all items that visually affect the final finish including form joints, inserts, embeds, and formwork ties.
7. **Insecticide Prior to Slab:**
- a. Prior to the installation of the basement slab, slab on grade, structural slab, or any other new building floor directly above ground, contractor shall be required to treat the area with an insecticide. Architect/Engineer in conjunction with the Rice Project Manager shall agree on the currently appropriate insecticide to be specified prior to 50% Construction documents.
8. **Cast-in-place Concrete - Slabs:**
- a. Architect shall confirm surface flatness and levelness tolerances for all slab construction with the Rice Project Manager for the intended room use for various areas of the building.
 - b. Architect shall recommend to the Rice Project Manager for approval of slab finishes for various areas of the building.
9. **Cast-in-place Concrete – Below Grade**
- a. Use continuous cast-in-place water stops in all below grade cast-in-place concrete structure to form a continuous diaphragm.

10. Concrete Floor and Slab Curing Agents:

- a. For all slabs that are to receive an adhered floor covering require that a resin dissipating curing compound be used.
- b. For floors and slabs to remain exposed such as mechanical, electrical, telecommunications and storage, use a chemical hardener and anti-dusting agent designed to be applied as a part of the curing process.
- c. For floors and slabs used in the drive and parking areas of a vehicular parking structure, use penetrating liquid floor treatment consisting of a clear, chemically active, waterborne solution of inorganic silicate or silicate materials and proprietary components. Must be odorless, colorless, and penetrates, hardens and densifies the concrete surfaces.

11. Installation hours

- a. The City of Houston has a noise ordinance that is in effect from 10 PM to 8 AM. If concrete is to be placed during these restricted hours, then:
 - i. Careful consideration must be given to the location on campus and proximity to residential neighbors, and
 - ii. Concrete delivery trucks should be routed to avoid the need to backup (due to backup alarms).
 - iii. The project is to involve the Director of University Relations

12. Field Mockup

- a. Full-scale sample
- b. Constructed on site with proposed equipment, materials, and construction procedures
- c. Incorporate both horizontal and vertical form or form liner joints
- d. Include a repaired area
 - i. Pre-certify repair techniques
 - ii. See how they look with age
- e. View as it is viewed in the project
- f. May be incorporated into project if pre-approved by Rice Project Manager
- g. Construct mock-up well in advance of scheduled site construction. Construct as soon as materials are identified.
- h. See section 01 45 00 Field Constructed Mock-Ups for more information.

13. Testing

- a. All concrete materials testing to be performed by an independent testing laboratory selected and contracted by Rice University. Contractor to submit a construction schedule indicating type, quantity, and number of site visits to coordinate material testing with independent testing laboratory.

14. Installation

- a. Pre-Construction meeting
 - i. Two weeks prior to any specific placement of concrete a detailed onsite pre-construction meeting will be conducted and will include:
 - 1. Architect
 - 2. Engineers of Record

03 00 00 Concrete

3. Testing Agency
 4. Ready-mix Supplier
 5. Contractor and associated Sub-contractors
 6. Rice University Facilities Engineering and Planning designated representatives
 7. Rice Project Manager
- ii. The full team should be advised and able to respond to questions which may be raised during the meeting.