

3 Concrete

GENERAL

Designers shall verify that all applicable portions of these standards are incorporated into the project's design, drawings, specifications and final construction. Requests for variances from these standards shall be submitted in writing to the DCM Project Manager, using the KU Standards Variance Request Form found in [Appendix A1.1](#), for review and written approval or rejection as indicated on the form.

RELATED DOCUMENTS & REQUIREMENTS

Refer to the following for requirements that also apply to work of this section.

- Division 1 - General Requirements**; refer to sections regarding construction testing and field quality control requirements.
 - Quality Control Testing: Unless directed otherwise, the Owner shall separately contract for quality control testing during construction, not the Contractor. Verify with DCM for each project.
 - On smaller projects, concrete and geotechnical testing may be included as part of the Contractor's work, if approved by DCM.
- Division 2 – Sitework**: Includes sections regarding walks, paving, curbs and gutters.

CONCRETE STAIRS – DESIGN GUIDELINES

All concrete stairs shall be detailed to indicate the following.

- Railings shall be detailed to maintain no less than 1" clear from edge of railing to side of concrete and shall be returned to the ground at their ends, or shall otherwise avoid leaving ends of railings protruding as a potential hazard to pedestrians.
- Riser faces shall have a continuously sloped face, projecting 1" out to nosings.
- Interior stairs with an exposed concrete finish shall have cast-in-place abrasive steel or aluminum nosings (latter with asphaltic bond break where in contact with concrete).
- Exterior stairs shall receive a broom finish and a ¼" radius nosing, but no cast nosings.
- Exterior stairs shall include cheek walls along each edge.
- Exterior stair treads shall be noted to slope ¼" from rear to nosing.

CAST-IN-PLACE CONCRETE – 03300

Standards: Concrete work shall be specified to meet the latest requirements of the American Concrete Institute standards.

Quality Control Testing: An independent testing lab shall test all concrete. Test cylinders shall be taken in accordance with American Concrete Institute standards.

- Specs shall require that one set of three cylinders shall be taken for every 50 cubic yards of concrete poured in one day. One cylinder shall be broken at seven days, one at 28 days and one shall be held in reserve until project is complete.
- If Contractor plans to pour a small quantity of concrete and testing agency has confirmed that Contractor's personnel have demonstrated proper ACI methodologies, Contractor may be required to make test cylinders and deliver same to testing lab.

Concrete Mix – Exterior Slabs and Walks:

- 4,000 psi; slump between 3" and 4"; 6% entrained air, +/- 1%.
- The use of calcium chloride shall be prohibited.

Subgrade:

- The engineering geologist shall test and approve all subgrades for compliance with compaction and moisture content requirements, prior to placement of concrete. Contractor shall arrange for geologist to re-inspect any subgrades that may have changed due to weather conditions or traffic.
- Granular Bed: Require per geotechnical engineer's recommendations, 2" minimum thickness for leveling.
 - Sand is NOT an acceptable underbed material, beneath slabs or walks.

Backfilling: Contractor shall backfill walls immediately after form removal.

Vapor Barriers: Provide under all slabs-on-grade, 6 mil minimum thickness, 6" minimum laps, placed *beneath* granular bed.

Slab Reinforcing:

- Welded wire reinforcing shall be specified to be in flat sheets, not rolls.
- Wire reinforcing shall be placed on concrete bricks or sand plate chairs or runners.
- Specs shall stipulate that clay bricks shall NOT be allowed, and wire reinforcing shall NOT be lifted into position only, in lieu of other supports.

Floor Sealers: All bare concrete not receiving another finish shall receive a clear sealer finish placed on it as a final maintenance surface.

- The Contractor shall provide technical data and Material Safety Data Sheets (MSDS) for any seals or finishes applied as a final maintenance surface.

Formwork: Insulated concrete forming systems, such as "Blue Maxx", shall NOT be used unless specifically approved in advance by DCM.

Equipment Bases: Require 3-1/2" high concrete bases to be provided beneath all floor-mounted mechanical or electrical equipment, or where three or more conduit penetrate floor slabs.

- Show and note locations and approximate sizes of pads on floor plans in bid documents.
- Note that Mechanical & Electrical Contractors are to verify actual sizes required.
- Note that bases are to be provided by General Contractor, based upon actual sizes provided by others.

CAST-IN-PLACE ARCHITECTURAL CONCRETE – 03331

Standards: Architectural concrete work shall be specified to meet the latest requirements of the American Concrete Institute (ACI) standards.

Design Approval: The use of architectural or precast concrete shall be discussed in detail with Office of Design and Construction Management regarding color and texture conformity with the campus building materials palette.

Sample Walls: Architectural concrete will require a sample to be constructed by the General Contractor and reviewed for approval by the Designer and the Office of Design and Construction Management.

PRECAST STRUCTURAL CONCRETE – 03410

Standards: Structural precast concrete work shall be specified to meet the latest requirements of the Precast Concrete Institute (PCI) standards.

- Plants fabricating precast units shall be PCI-certified for the types of precast work to be done at each location. Certifications shall be documented and approved together with other submittals

Architectural Standards: Structural precast concrete units that are to be left exposed to view as finished components of the building shall also be required to comply with the requirements of Precast Architectural Concrete – 03450.

PRECAST ARCHITECTURAL CONCRETE – 03450

Standards: Architectural precast concrete work shall be specified to meet the latest requirements of the Precast Concrete Institute (PCI) standards.

- Plants fabricating precast units shall be PCI-certified for the types of precast work to be done at each location. Certifications shall be documented and approved at time of other submittals.

Design Approval: The use of architectural precast concrete shall be discussed in detail with Office of Design and Construction Management regarding color and texture conformity to the campus building materials palette.

Sample Walls: Architectural precast concrete will require a full-scale sample of an appropriate size to be constructed by the General Contractor and reviewed for approval by the Designer and the Office of Design and Construction Management.

Damaged Panels: The Project Architect, Office of Design and Construction Management and the Division of Architectural Services shall review all damaged precast concrete.

- Damage that affects structural performance or aesthetics shall be rejected and replaced.
- Patching of imperfections or damaged areas or the use of paints or coatings to cover them is NOT acceptable.

Storage: Precast panels are not to be stored on the ground and are to be protected from staining, discoloration or damage as work progresses.

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