033000  CAST-IN-PLACE CONCRETE

PART 1: GENERAL

1.01 REACTIVE AGGREGATES

A. The Architect/Engineer should be aware that local aggregates have the potential for AAR (alkali aggregate reaction) which is a concern for concrete exposed to moisture. Cornell University prefers that concrete with the potential for moisture exposure be designed using strategies to reduce AAR, such as substituting 15% to 20% of cementitious material with class F fly ash conforming to ASTM C-618.

1.02 CONCRETE EXPOSURE CATEGORIES

A. The Architect/Engineer shall designate concrete exposure categories and classes in accordance with ACI 318-14 Table 19.3.1.1 durability requirements. Designate exposure category for each type of concrete used on the project in the concrete section of the general notes sheet.

1.03 SHRINKAGE DESIGNATION AND TESTING

A. The Architect/Engineer shall designate concrete applications sensitive to cracking in the concrete section of the general notes sheet. These applications could include exposed architectural concrete, polished concrete, watertight applications, large slabs, tall columns, long walls, etc. In these areas, proportion all concrete and provide shrinkage testing for a maximum allowable length change of 0.04% measured at 28 days after curing in lime-saturated water for seven days in accordance with ASTM C157 (using air storage thereafter). Engineer shall determine and include an allowance in the construction documents for a set length of reinforcement to be added to the rebar layout at their discretion once the construction sequence is determined. Critical areas for additional reinforcement include overly restrained areas such as at dowels between foundation and wall, construction joints, re-entrant corners, change in support conditions, change in member thickness such as drop panels.

1.04 CHLORIDE LIMITS

A. Concrete producers shall provide verification that submitted concrete mixes do not exceed maximum water-soluble chloride ion (Cl⁻) limits per exposure class as stated in ACI 318-14 Table 19.3.2.1.
1.05 CHLORIDE ION PERMEABILITY

A. The mix designs for all concrete placed in parking garage applications or exposed to de-icing salts shall limit chloride ion permeability to 1000 coulombs when tested at 56 days according to either ASTM C 1202, AASHTO T259, or AASHTO T277.

1.06 CONCRETE PLACING/CURING REQUIREMENTS

A. Methods and product data (if applicable) to be used by the Contractor in curing cast-in-place concrete along with construction joint locations shall be submitted for review to the Design Team.

1.07 PARKING GARAGE DESIGN


1.08 PRE-CONCRETE PLACEMENT MEETING

A. A mandatory meeting will be held in advance of commencing concrete placement on all University Capital Projects, or as determined by Facilities Engineering. The meeting shall include representatives from the architect, engineer, contractors, material suppliers, owner’s testing agency, Civil Section of Facilities Engineering, and University project management team. The purpose of the meeting will be to discuss concrete procedures and mitigating risks to the project. Furthermore, the design team shall identify critical concrete components of the structure and critical service conditions. Collectively the attendees will establish and coordinate procedures to best address these items. Key points would include mitigating weather conditions including high evaporability, moisture sensitivity of floor coverings, proper curing procedures, minimizing shrinkage cracking, mix design, cement paste content, aggregate gradation, placement and finishing techniques, protecting base course prior to slab on grade placement, flatness/levelness criteria, construction joints, vapor barriers, list of critical items for inspection, water control, communication, and key concrete tolerances.

1.09 WET CURING

A. Portions of the structure identified in CU Standard 033000, Section 1.03 as susceptible to cracking along with all concrete in ACI 318-14, Table 19.3.1.1 exposure category W1, C1, C2, F1, F2, and F3 shall utilize a minimum seven day wet cure.
1.10 AGGREGATES

A. Portions of the structure identified as ACI 318-14 Table 19.3.1.1 exposure category C1, C2, F1, F2, and F3 shall have the following aggregate restrictions:

• Coarse and fine aggregates shall be on the New York State DOT list of approved aggregate sources and shall not be designated as having ASR potential.
• The minimum bulk SSD specific gravity of the coarse aggregate on the New York State DOT posted test results shall be 2.67.
• The maximum absorption of the coarse aggregate on the New York State DOT posted test results shall be 1.2%.

1.11 FINISHER CERTIFICATION

A. A minimum of one finisher or finishing supervisor shall be currently certified as an ACI Flatwork Concrete Finisher when installing all exterior exposed concrete flatwork and interior exposed polished concrete flatwork. Contractor shall submit ACI certification credentials (certificate or wallet card) of concrete finishers on project. ACI credentials must be current and not expired.

1.12 WATER CONTENT

A. Water in addition to the approved quantity on the submitted mix design shall not be permitted without permission of the structural engineer. The contractor is required to clearly note on the delivery ticket the quantity of water withheld at the batching plant that can be added onsite.

PART 2: PRODUCTS

2.01 FORM TIES

A. Concrete form ties shall be factory fabricated and either removable or snap-off. Wire ties or embedded PVC pipe shall not be permitted. Ties shall be submitted for review by the design professional.

2.02 CONCRETE CURING COVER

A. Where a wet cure is required, concrete curing covers shall comply with ASTM C-171 for reflectance/moisture retention and contain either an un-pigmented non-woven polypropylene fabric or 10 oz. burlap. Utilize Transguard 4000 by Reef Industries, UltraCure DOT by Sika, Burlene or an approved equal.