SECTION 347
PORTLAND CEMENT CONCRETE - CLASS NS

347-1 Description.

The requirements of this Section are applicable to concrete designated as Class NS hereinafter referred to as concrete. Use concrete composed of a mixture of portland cement, aggregates, and water, with or without chemical admixtures, slag, or pozzolanic materials. Deliver concrete to placement site in a freshly mixed, unhardened state. Ensure the concrete is placed and cured in a manner to ensure that the strength and durability of the concrete is maintained.

347-2 Materials.

347-2.1 General: Certify that all materials used in concrete are from Department approved sources, and free from frozen or other detrimental matter.

Meet the following requirements:

Portland Cement	Section 921
Coarse Aggregate	Section 901
Fine Aggregate	Section 902
Water	Section 923
Chemical Admixtures	Section 924
Pozzolans and Slag	Section 929

347-2.2 Admixture Requirements: Chemical admixtures may be added at the dosage rates recommended by the manufacturer.

347-2.3 Substitution of Materials: Approved material sources may be substituted for similar materials indicated on the originally approved mix design. Use originally approved mix components and proportions, when unsatisfactory test results are obtained from the use of the substituted material(s).

347-2.4 Material Storage: Use a concrete production facility that meets the following requirements:

347-2.4.1 Cementitious Materials Storage: Provide a separate and clearly labeled weatherproof facility to store each brand or type of cementitious material without mixing or contamination. Provide a suitable, safe and convenient means of collecting cementitious material samples at each storage facility.

347-2.4.2 Aggregate Storage: Provide suitable bins, stockpiles or silos to store and identify aggregates without mixing, segregating or contaminating different grades or types of materials. Identify Department approved pit number and aggregate ~~type/~~gradation. Handle the aggregates in a manner to minimize segregation and meet the specification requirements when recovered from storage. Continuously and uniformly sprinkle coarse aggregate with water, for 24 hours preceding introduction into the concrete mix. Maintain stored aggregates in a well-drained condition to minimize free water content. ~~Provide access for the Engineer to sample the aggregates from the recovery side of the storage facility.~~

347-3 Production, Mixing and Delivery.

347-3.1 Concrete Production Requirements: Deliver concrete from a production facility that is certified by the National Ready-Mixed Concrete Association (NRMCA) ~~or~~ and approved by the District Materials Office, or meeting the requirements of Section 346. The

District Materials Office may inspect the concrete production facility~~'s~~ to verify compliance with the Specifications. Produce concrete utilizing equipment that is in good operating condition and operated in a manner to ensure a consistent product. Within two hours prior to each day's batching, ensure that the concrete production facility determines the free moisture for the coarse and fine aggregates, unless moisture meters are used. Determine the free moisture content of aggregates at 4 hour intervals during continuous batching operations~~,~~ and at any time a change in moisture content becomes apparent. ~~On concrete placements expected to exceed three hours, perform an additional moisture test approximately half way through the batching operations and a~~Adjust batch proportions accordingly.

Ensure that the calibration of the measuring devices of the concrete production facilities meets the requirements of Chapter 531 of the Florida Statutes. At least quarterly, ensure that all scales, meters and other weighing or measuring devices are checked for accuracy by a qualified representative of a scale company registered with the ~~Bureau of Weights and Measures of the Florida Department of Agriculture~~Bureau of Standards, Weights and Measures, of the Florida Department of Agriculture and Consumer Services. Have the accuracy of admixture measuring dispensers certified annually by the admixture supplier.

When Volumetric Mixers are used, deliver concrete in accordance with the requirements of Volumetric Mixer Manufactures Bureau (VMMB) and ensure that the vehicle has a VMMB registered rating plate.

Substitution of structural concrete in lieu of non-structural concrete may be used if approved by the Engineer. If structural concrete is used in lieu of non-structural concrete, obtain the concrete from a production facility meeting the requirements of Section 346. Acceptance is based on the requirements of Section 347.

347-3.2 Mixers: Ensure that mixers are capable of combining the components of concrete into a thoroughly mixed and uniform mass, free from balls or lumps of cementitious materials, and capable of discharging the concrete uniformly. Operate concrete mixers at speeds per the manufacturer's design. Do not exceed the manufacturer's rated capacity for the volume of mixed concrete in the mixer, mixing drum, or container.

347-3.3 Delivery: The maximum allowable mixing, ~~and~~ agitation, and placement time of concrete is 120 minutes.

347-3.4 Small Quantities of Concrete: With approval of the District Materials Engineer, small quantities of concrete, less than 3 cubic yards placed in one day and less than 0.5 cubic yards placed in a single placement may be accepted using a pre-bagged mixture. The Engineer will verify that the pre-bagged mixture is prepared in accordance with the manufacturer's recommendations and will meet the requirements of this Specification.

347-4 Control of Quality.

347-4.1 Concrete Mix Design: Before producing any concrete, submit the proposed mix design with compressive strength test results, tested in accordance with ASTM C39 and demonstrating the mix meets the minimum 28 day compressive strength requirement, to the Engineer on a form provided by the Department. ~~A similar form containing the same information may be used. Also submit three compressive strength test results tested in accordance with ASTM C 39 demonstrating the mix meets the minimum 28 day compressive strength requirement. The test results must be within twelve months of the submittal of the mix design.~~ The strength test is defined as the average of the compressive strengths tests of three cylinders. Use only concrete mix designs having prior approval of the Engineer.

Materials may be adjusted provided that the theoretical yield requirement of the approved mix design is met. Show all required original approved design mix data and batch adjustments and substituted material on the Department concrete delivery ticket. The Engineer may disqualify any concrete production facility for non-compliance with Specification requirements.

347-4.2 Sampling and Testing: The Engineer may sample and test the concrete at their discretion to verify its quality. The minimum 28-day compressive strength requirement for this concrete is 2,500 psi.

347-4.3 Records: Maintain the following records for review, at the concrete production facility, for at least three years after ~~final acceptance of the project~~receipt:

~~1. Approved concrete mix designs.~~

~~2. Materials source (delivery tickets, certifications, certified mill test reports).~~

~~3~~1. A copy of the scale company or testing agency report showing the observed deviations from quantities checked during calibration of the scales and meters.

~~4~~2. A copy of the documentation certifying the admixture weighing/measuring devices.

~~5~~3. Recent NRMCA, VMMB or Department inspection records certifying the plant or truck can produce concrete and documentation showing that action has been taken to correct deficiencies noted during the inspections.

347-5 Certification and Acceptance.

347-5.1 General: Furnish a Delivery Ticket with each batch of concrete before ~~unloading~~ discharging concrete at the placement site. The Department will provide an example of the Delivery Ticket Form. The concrete producer may use an alternate form provided that it contains the required information. Record material quantities incorporated into the mix on the Delivery Ticket. Ensure that the Batcher responsible for producing the concrete~~,~~ certifies that the batch was produced in accordance with ~~Specification~~ the Contract Documents ~~requirements,~~ signs the Delivery Ticket. Sign the Delivery Ticket certifying that the concrete was ~~batched, delivered and~~ placed in accordance with the Contract Documents~~se Specifications~~.

Acceptance by the Department will be by Certification on the Delivery Ticket, as described herein, by the Batcher and the Contractor.

The Engineer will hold the Contractor responsible for rejecting loads of concrete that do not meet the minimum compressive strength requirements. Delineate and replace, at no cost to the Department, all concrete that does not meet the 28-day compressive strength requirements or has any cracking greater than 1/4 inch in width or 1/4 inch in vertical displacement. Any spalling or flaking off of the surface layer that exposes the rough, pitted aggregate surface in excess of 10 square inches is to be removed and replaced in accordance with 347-5.2. Sidewalk, ditch pavement, slope pavement, Traffic Separator, or curb and gutter having any intersecting cracks visible in the dry concrete (regardless of size) will be removed and replaced in accordance with 347-5.2.

~~At the sole option of the Department, the Engineer may accept concrete at a reduced pay when it is determined that the concrete will serve its intended function.~~

If any uncontrolled cracks appear during the life of the Contract unacceptable to the Engineer, remove and replace the concrete in accordance with 347-5.2 at no expense to the Department.

347-5.2 Remedial Action: Remedial action will be the removal and replacement of all concrete to the full depth and width.

Sidewalk, Curb and Gutter, Ditch Pavement and Traffic Separator: Begin saw cutting 2 1/2 feet either side or above and below the crack or at the nearest joint, remove and replace the 5 foot section encompassing the crack.

Slope Pavement: Saw cut each scored joint above and below the crack and replace the entire section between the saw cuts, ensuring the section removed and replaced encompasses the crack.