SECTION 105
CONTRACTOR QUALITY CONTROL GENERAL REQUIREMENTS

105-1 General.

Certain operations require personnel with specific qualifications. Certain materials require production under an approved QC Plan to ensure that these materials, whether manufactured or processed, or procured from suppliers or subcontractors, meet the requirements of the Contract. Applicable materials are identified in 6-8. For all applicable materials included in the Contract, submit a QC Plan prepared in accordance with the requirements of this Section to the Engineer. Do not incorporate any of these materials into the project prior to the Engineer's approval of the QC Plan.

105-2 Certification of Compliance.

Provide the Engineer with a notarized monthly certification of compliance with the requirements of this Section, to accompany each progress estimate, on a form provided by the Engineer. The Department may not authorize payment of any progress estimate not accompanied by an executed certification document.

This notarized certification will also be required as a final certification summarizing all QC exceptions before final payment will be made in accordance with 9-9.

105-3 Guidelines for Development of the Q C Plan.

105-3.1 General: Use the following guidelines for developing the QC Plan. Provide detailed policies, methods and procedures to ensure the specified quality of all applicable materials and related production and field operations. Include other items in addition to these guidelines as necessary.

105-3.2 Personnel:

105-3.2.1 Qualifications: Submit the Training Identification Numbers (TIN) for all technicians performing sampling, testing and inspection for both field and laboratory tests. Include employed and subcontracted technicians.

105-3.2.2 Level of Responsibility: Identify the primary contact for the Department. Identify roles and responsibilities of various personnel involved in the QC process.

105-3.3 Raw Materials:

105-3.3.1 Source: Identify the sources of raw materials. Provide locations and plant or mine numbers when applicable.

105-3.3.2 Certification: Describe methods of verifying compliance of certification with the specifications.

105-3.3.3 Disposition of Failing Materials: Describe the system for controlling non-conforming materials, including procedures for identification, isolation and disposition.

105-3.4 Storage Facilities for Raw Materials: Describe measures and methods, including bedding details, for preventing segregation, contamination and degradation.

Describe methods of identifying individual materials. Where applicable, submit a site plan showing the locations of various materials.

105-3.5 Production Equipment: Describe calibration frequencies, maintenance schedule and procedures for production equipment.

105-3.6 Plant Requirements:

105-3.6.1 Plant Identification: Provide the mailing address, physical address including county and X-Y (Latitude and Longitude) coordinates of the plant, telephone and fax numbers, E-mail address, primary contact at the plant, responsible person in charge, approved facility number provided by the Department, Owner information and Vendor Number and other information as required.

105-3.6.2 Process Control System: Describe the methods and measures established to ensure Contract compliance for the produced materials that are supplemental to the QC sampling and testing program described in the Contract. These methods and measures will include, but are not limited to, inspection schedule, additional sampling and testing, maintenance schedule, etc.

105-3.6.3 Loading and Shipping Control: Describe the methods and measures for preventing segregation, contamination and degradation during loading and shipping operations. Describe the methods established for materials to be in compliance with the specifications at the point of use.

105-3.6.4 Types of Products Generated: Describe the products the plant is approved to produce under Department guidelines.

105-3.7 Other Requirements:

105-3.7.1 Copy of Certification: Attach examples of certifications issued by the plant/Contractor for the products approved by the Department.

105-3.7.2 Statement of Compliance: Include a statement of compliance with all quality requirements set forth by the Department including Contract Documents and other Department manuals.

105-3.7.3 Information on Approved Producers: Identify the Producers. All producers must have accepted QC Programs and be listed on the Department's Approved Producer List.

105-3.7.4 Describing Documentation Procedure: Identify location of document storage to enable Department review. Include QC charts, qualification/accreditation records, inspection reports, and other pertinent/supporting documents for an approved QC Plan.

105-3.8 Final Manufactured Product - Plant Operations: Describe inspection schedule and methods for identifying defects and non-compliance with the specifications. Describe corrective actions and methods to resolve them.

105-3.8.1 Storage: When storage of the produced materials is required and it is not defined in the Contract Documents, describe the methods and duration for storage. Include measures and methods for preventing segregation, contamination and degradation during storage.

105-3.8.2 Disposition of Failing Materials: When not described in the specifications, describe the methods and measures for identifying and controlling the failing materials. Include preventive and corrective measures. Describe disposition of failing materials.

105-3.9 Final Manufactured Product - Field Operations:

105-3.9.1 Transportation: Describe the method of delivery from the point of production/storage to the point of placement.

105-3.9.2 Storage: When storage of the produced materials is required and it is not defined in the Contract Documents, describe the methods and duration for storage. Include measures and methods for preventing segregation, contamination and degradation during storage.

105-3.9.3 Placement: Describe the methods and identify the type of equipment used in incorporation of the materials into the project.

105-3.9.4 Disposition of Failing Materials: When not described in the specifications, describe the methods and measures for identifying and controlling the failing materials. Include preventive and corrective measures. Describe disposition of failing materials.

105-3.10 Testing Laboratories: Identify the laboratories performing testing. Ensure that the testing laboratories comply with the Laboratory Qualification Program requirements of 6-9.

105-4 Quality Control Plan Submittal.

Submit the QC Plan to the Engineer for approval within 21 calendar days after the Contract Award. The Engineer will review the QC Plan and respond to the Contractor within 21 calendar days of receipt.

If at any time the Contractor is not in compliance with the approved QC Plan, or a part thereof, affected portions of the plan will be disapproved. Cease work in the affected operation(s) and submit a revision to the Engineer. If the QC Plan, or a part thereof, must be revised, submit the revision to the Engineer. The Engineer will review the revision and respond within seven calendar days of receipt.

Continue to work on operations that are still in compliance with the approved sections of the QC Plan.

105-5 Personnel Qualifications.

105-5.1 General: Provide qualified personnel for sampling, testing and inspection of materials and construction activities. Ensure that qualifications are maintained during the course of sampling, testing and inspection.

Construction operations that require a qualified technician must not begin until the Department verifies that the technician is on the CTQP list of qualified technicians. The CTQP lists are subject to satisfactory results from periodic Independent Assurance evaluations.

105-5.2 QC Manager: Designate a QC Manager who has full authority to act as the Contractor's agent to institute any and all actions necessary for the successful implementation of the QC Plan. The QC Manager must speak and understand English. The QC Manager must be on-site at the project on a daily basis or always available upon four hours notice to administer the QC Plan. This includes administering, implementing, monitoring, and as necessary, adjusting the processes to ensure compliance with the Contract Documents. Ensure that the QC Manager is qualified as such through the Construction Training/Qualification Program.

Under the direction of the QC Manager, and using Department's standard forms provided by the Engineer, summarize the daily QC activities including testing and material sampling. Since erasures are strictly prohibited on all reports and forms, use blue or colored ink, not black ink. If manual corrections to original data are necessary, strike through, correct, and date the entry, including the initials of the person making the correction. Make copies of the completed forms available for the Department to review daily unless otherwise required in the respective Sections of the Specifications. Ensure that the QC test data is entered into the Department's database on a daily basis. Maintain all Quality Control related reports and documentation for a period of three years from final acceptance of the project. Make copies available for review by the Department upon request.

105-5.3 Worksite Traffic Supervisor: Provide a Worksite Traffic Supervisor who is responsible for initiating, installing, and maintaining all traffic control devices as described in Section 102 and in the Contract Documents. Ensure that the Worksite Traffic Supervisor is certified in the advanced training category by a Department approved training Provider. Approved Providers will be posted on the Department's website at the following URL address:

www.dot.state.fl.us/rddesign/MOT/MOT.htm . Use approved alternate Worksite Traffic Supervisors when necessary.

105-5.4 Flagger: Provide trained flaggers to direct traffic where one-way operation in a single lane is in effect and in other situations as required. The Worksite Traffic Supervisor or others as approved by the Department will provide training for flaggers.

105-5.5 Earthwork QC Technicians:

105-5.5.1 Earthwork Level I: Ensure the inspector who samples soil and earthwork materials from the roadway project, takes earthwork moisture and density readings, and records those data in the Density Log Book holds a Construction Training and Qualification Program (CTQP) Earthwork Construction Inspection Level I qualification.

105-5.5.2 Earthwork Level II: Ensure the inspector responsible for determining the disposition of soil and earthwork materials on the roadway, and for interpreting and meeting Contract Document requirements holds a CTQP Earthwork Construction Inspection Level II qualification.

105-5.6 Asphalt QC Technicians:

105-5.6.1 Plant Technicians: For asphalt plant operations, provide a QC technician, qualified as a CTQP Asphalt Plant Level II technician, available at the asphalt plant at all times when producing mix for the Department. Perform all asphalt plant related testing with a CTQP Asphalt Plant Level I technician.

105-5.6.2 Paving Technicians: For paving operations, keep a qualified CTQP Asphalt Paving Level II technician on the roadway at all times when placing asphalt mix for the Department, and perform all testing with a CTQP Asphalt Paving Level I technician. As an exception, measurements of cross-slope, temperature and yield (spread rate) can be performed by someone under the supervision of a CTQP Paving Level II technician.

105-5.6.3 Mix Designer: Ensure all mix designs are developed by individuals who are CTQP qualified as an Asphalt Hot Mix Designer.

105-5.6.4 Documentation: Document all QC procedures, inspection, and all test results and make them available for review by the Engineer throughout the life of the Contract.

105-5.7 Concrete QC Technicians:

105-5.7.1 Concrete Field Technician - Level I: Ensure technicians performing plastic property testing on concrete for materials acceptance are qualified CTQP Concrete Field Technicians Level I. Plastic property testing will include but not be limited to slump, temperature, air content, water-to-cementitious materials ratio calculation, and making and curing concrete cylinders. Duties will include initial sampling and testing to confirm specification compliance prior to beginning concrete placements, ensuring timely placement of initial cure and providing for the transport of compressive strength samples to the designated laboratories. Technicians who test concrete properties or perform Verification testing for the Department must posses this qualification.

105-5.7.2 Concrete Field Technician - Level II: Ensure field technicians responsible for the quality of concrete being placed on major bridge projects are qualified CTQP Concrete Field Technicians Level II. A Level II Technician must be present on the jobsite during all concrete placements. Prior to the placement of concrete, the technician will inspect the element to be cast to ensure compliance with Contract Documents. A Level II Technician’s duties may include ensuring that concrete testing, inspection, and curing in the field is performed in accordance with applicable Contract Documents. The QC Technician will inform the Verification Technician of anticipated concrete placements and LOT sizes.

105-5.7.3 Concrete Laboratory Technician - Level I: Ensure technicians testing cylinders and recording concrete strength for material acceptance are qualified CTQP Concrete Laboratory Technicians Level I. Duties include final curing, compressive strength testing, and the recording/reporting of all test data.

105-5.7.4 Concrete Production Facility Manager of Quality Control: Ensure each concrete production facility has a Facility Manager for QC with the following qualifications:

1. CTQP Concrete Laboratory Technician Level I, Concrete Field Technician-Level I, and Batch Plant Operator. As alternatives to these qualifications, the Department will accept:

Prestressed Concrete Institute (PCI) Level III or

National Ready Mixed Concrete Association (NRMCA) Concrete Technologist Level II, as equivalent qualifications.

2. Three years of QC experience directly related to cement concrete production.

3. Demonstrated proficiency in implementing, supervising, and maintaining surveillance over a QC Program.

4. Experience and certification in performance of required QC tests and statistical evaluation of quality control test results.

105-5.8 Supervisory Personnel - Bridge Structures:

105-5.8.1 General: Provide supervisory personnel meeting the qualification requirements detailed in this Article. Submit qualifications to the Engineer at the pre-construction conference. Do not begin Construction until the qualifications of supervisory personnel have been approved by the Engineer.

105-5.8.2 Proof of License or Certification: Submit a copy of the Professional Engineer license current and in force issued by the state in which registration is held. The license must be for the field of engineering that the construction work involves such as Civil, Electrical or Mechanical. Under certain circumstances Florida registration may be required.

Submit a copy of the license issued by the State of Florida for tradesmen that require a license indicating that the license is in force and is current. Submit a copy of the certification issued by the Instrumentation, Systems and Automation Society of America for each Certified Control Systems Technician.

105-5.8.3 Experience Record: Submit the following information for supervisory personnel to substantiate their experience record. The supervisor (project engineer, superintendent/manager or foreman) seeking approval must provide a notarized certification statement attesting to the completeness and accuracy of the information submitted. Provide the following experience information for each individual seeking approval as a supervisor:

Project owner’s name and telephone number of an owner’s representative, project identification number, state, city, county, highway number and feature intersected.

Provide a detailed description of each bridge construction experience, and the level of supervisory authority during that experience. Report the duration in weeks, as well as begin and end dates, for each experience period.

Provide the name, address and telephone number of an individual that can verify that the experience being reported is accurate. This individual should have been an immediate supervisor unless the supervisor cannot be contacted in which case another individual with direct knowledge of the experience is acceptable.

105-5.8.4 Concrete Post-Tensioned Segmental Box Girder Construction: Ensure the individuals filling the following positions meet the minimum requirements as follows:

105-5.8.4.1 Project Engineer: Ensure the Project Engineer is a registered professional engineer with five years of bridge construction experience. Ensure a minimum of three years of experience is in Segmental Box Girder Construction Engineering and includes a minimum of one year in segmental casting yard operations and related surveying, one year in segment erection and related surveying, including post-tensioning and grouting of longitudinal tendons and a minimum of one year as the Project Engineer in responsible charge of Segmental Box Girder Construction Engineering.

105-5.8.4.2 Project Superintendent/Manager: Ensure the Project Superintendent/Manager has a minimum of ten years of bridge construction experience or is a registered professional engineer with five years of bridge construction experience. Ensure that a minimum of three years of experience is in Segmental Box Girder construction operations and includes a minimum of one year in the casting yard operations and related surveying, one year in segment erection and related surveying including post-tensioning and grouting of longitudinal tendons and a minimum of one year as the Project Superintendent/Manager in responsible charge of Segmental Box Girder construction operations.

105-5.8.4.3 Foreman: Ensure that the Foreman has a minimum of five years of bridge construction experience with two years of experience in Segmental Box Girder Operations and a minimum of one year as the foreman in responsible charge of a Segmental Box Girder Operations.

105-5.8.4.4 Geometry Control Engineer/Manager: Ensure that the Geometry Control Engineer/Manager for construction of cast-in-place box segments is a Registered Professional Engineer with one year of experience, a non-registered Engineer with three years of experience or a Registered Professional Land Surveyor with three years of experience in geometry control for casting and erection of cast-in-place box segments. Credit for experience in cast-in-place box girder geometry control will be given for experience in precast box girder geometry control but not vice versa.

Ensure that the Geometry Control Engineer/Manager for precast box segments is a Registered Professional Engineer with one year of experience or non-registered with three years of experience in casting yard geometry control of concrete box segments.

The Geometry Control Engineer/Manager must be responsible for and experienced at implementing the method for establishing and maintaining geometry control for segment casting yard operations and segment erection operations and must be experienced with the use of computer programs for monitoring and adjusting theoretical segment casting curves and geometry. This individual must be experienced at establishing procedures for assuring accurate segment form setup, post-tensioning duct and rebar alignment and effective concrete placement and curing operations as well as for verifying that casting and erection field survey data has been properly gathered and recorded.

105-5.8.4.5 Surveyor: Ensure that the Surveyor in charge of geometry control surveying for box segment casting and/or box segment erection has a minimum of one year of bridge construction surveying experience.

105-5.8.5 Movable Bridge Construction: Ensure the individual filling the following positions meet the minimum requirements as follows:

105-5.8.5.1 Electrical Journeyman: Ensure the Electrical Journeyman holds, an active journeyman electrician's license and has at least five years experience in industrial electrical work, or is a Certified Control Systems Technician. A Certified Control Systems Technician will not be permitted to perform electrical power work including, but not limited to, conduit and wire-way installation or power conductor connection. Ensure the electrical journeyman has successfully completed the installation of one similar movable bridge electrical system during the last three years.

105-5.8.5.2 Control Systems Engineer and Mechanical Systems Engineer: Ensure the Control Systems Engineer and Mechanical Systems Engineer are both registered Professional Engineers with a minimum of 10 years supervisory experience each in movable bridge construction. Ensure the Engineers have working knowledge of the movable bridge leaf motion control techniques, mechanical equipment and arrangements specified for this project. Ensure that each Engineer has been in responsible control of the design and implementation of at least three movable bridge electrical control and machinery systems within the past 10 years of which, at least one of the three bridges was within the last three years. Ensure that a minimum of one of the three bridge designs incorporated the same type of leaf motion control and machinery systems specified for this project.

105-5.8.6 Concrete Post-Tensioned Other Than Segmental Box Girder Construction: Ensure the individual filling the following positions meet the minimum requirements as follows:

105-5.8.6.1 Project Engineer: Ensure the Project Engineer is a registered Professional Engineer with five years of bridge construction experience. Ensure that a minimum of three years of experience is in concrete post-tensioned construction. Ensure that the three years of experience includes experience in girder erection, safe use of cranes, stabilization of girders; design of false work for temporary girder support, post-tensioning and grouting operations, and a minimum of one year as the Project Engineer in responsible charge of post-tensioning related engineering responsibilities.

105-5.8.6.2 Project Superintendent/Manager: Ensure the Project Superintendent/Manager has a minimum of ten years of bridge construction experience or is a registered Professional Engineer with five years of bridge construction experience and has a minimum of three years of supervisory experience in girder erection, safe use of cranes, stabilization of girders; design of falsework for temporary girder support post-tensioning, grouting operations and a minimum of one year as the Project Superintendent/Manager in responsible charge of post-tensioning related operations.

105-5.8.6.3 Foreman: Ensure the Foremen has a minimum of five years of bridge construction experience with two years of experience in post-tensioning related operations and a minimum of one year as the foreman in responsible charge of post-tensioning related operations.

105-5.8.7 Post Tensioning: Perform all post-tensioning field operations under the direct supervision of a Level II Qualified Post-Tensioning and Grouting Technician qualified through the Department's Construction Training Qualification Program (CTQP). In addition, provide a minimum of two crewmembers that are CTQP Level I Qualified Post-Tensioning and Grouting Technicians. All personnel involved in grouting must attend a grouting training session provided by the Department not less then seven days prior to the start of the first stressing or grouting operation of the project.

Perform all vacuum grouting operations under the direct supervision of a crew foreman who has been trained and has experience in the use of vacuum grouting equipment and procedures. Submit the crew foreman's credentials to the Engineer prior to performing any vacuum grouting operations.

Conduct all stressing and grouting operations in the presence of the Engineer. Coordinate and schedule all post-tensioning activities to facilitate inspection by the Engineer.

105-5.8.8 Failure to Comply with Bridge Qualification Requirements: Make an immediate effort to reestablish compliance. If an immediate effort is not put forth as determined by the Engineer, payment for the bridge construction operations requiring supervisors to be qualified under this Specification will be withheld up to 60 days. Cease all bridge construction and related activities (casting yard, etc.) if compliance is not met within 60 days, regardless of how much effort is put forth. Resume bridge construction operations only after written approval from the Engineer stating that compliance is reestablished.

105-5.9 Prestressed Concrete Plant Facility Quality Control Personnel: Ensure each plant has an on site production manager, an on site Facility Manager for Quality Control, a plant engineer, and adequate on site QC inspectors/technicians to provide complete QC inspections and testing.

Ensure the Facility Manager for Quality Control has at least five years of related experience and a current PCI QC personnel Level III certification and a certificate of completion of Section 450 Specification examination. Ensure that the QC inspector/technician has current PCI QC Technician/Inspector Level II certification and a certificate of completion of Section 450 Specification examination. Department certified prestressed concrete inspectors are exempt from PCI Level II certification and from completion of Section 450 Specification examination, until the time of expiration of their certificates. Facility Managers for Quality Control certified by the Department as prestressed concrete inspectors are exempt from PCI Level III certification and from completion of Section 450 Specification examination, until the time of expiration of their certificates.

105-5.10 Signal Installation Inspector: Provide an inspector trained and certified by the International Municipal Signal Association (IMSA) as a Traffic Signal Inspector to perform all signal installation inspections. Use only Department approved signal inspection report forms during the signal inspection activities. Ensure all equipment, materials, and hardware is in compliance with Department Specifications and verify that all equipment requiring certification is listed on the Department's Approved Product List (APL). Provide the completed signal inspection report form(s), certified by the IMSA Traffic Signal Inspector to the Engineer.

The Department's approved inspection report forms are available at the following URL: www.dot.state.fl.us/trafficoperations/ .

105-5.11 Incidental Precast Concrete Manufacturing Facilities: Incidental precast concrete products include, concrete barrier walls, sound barriers, retaining wall panels, and prestressed concrete poles. Ensure there are adequate on site qualified personnel to perform the quality control inspections and testing.

Ensure the quality control manager has at least three years of quality control experience, directly related to cement concrete production and a current CTQP Concrete Field Technician Level I qualification. Ensure the quality control inspectors/technicians are currently certified as CTQP Concrete Field Technician Level I.

105-5.12 Structural Steel and Miscellaneous Metals Fabrication Facility Quality Control Personnel: Ensure each fabrication facility has an on site production manager, an on site facility manager for QC, a plant engineer, and on site QC inspectors/technicians to provide complete QC inspections and testing.

Ensure that the facility manager for quality control and QC inspectors/technicians meet the certification requirements set forth in the latest version of AASHTO/NSBA Steel Bridge Collaboration S 4.1, Steel Bridge Fabrication QC/QA Guide Specification, including the years of experience required in Table 105-5 below. The facility manager for QC must meet the requirements of Table 105-5 for every Structural Steel Member Type produced by a plant with QC being managed by the facility manager of QC. The facility manager of QC will report directly to the plant manager or plant engineer and must not be the plant production manager nor report to or be the subordinate of the plant production manager. QC inspectors/technicians must be the employees of, and must report directly to the facility manager of QC.

TABLE 105-5
Experience Requirements for QC Inspectors/Technicians
And Facility Manager for Quality Control

Structural Steel Member Type	Minimum Years of Experience Required	
	QC Inspector/Technician	Facility Manager for QC
Rolled beam bridges	1 year	3 years
Welded plate girders (I sections, box sections, etc.)	2 years	4 years
Complex structures, such as trusses, arches, cable stayed bridges, and moveable bridges	3 years	5 years
Fracture critical (FC) members	3 years	5 years