

**MANDATORY
SUPPLEMENTAL SPECIFICATIONS
FOR
CONTRACTOR QUALITY CONTROL**

EFFECTIVE DATE: OCTOBER 14, 2011

200.07 – Contractor Quality Control - is replaced with the following:

- (a) **Scope:** These requirements pertain to all Contractor Quality Control testing, inspections, and submittals.
- (b) **Purpose:** This is to assign to the Contractor responsibility for Quality Control of the project from the time of Notice to Proceed until final acceptance of the work by the Owner.
- (c) **Testing:** The Contractor shall retain a VDOT approved testing laboratory to perform inspections, tests, and retesting in the event of failure of all items of work, including that of his subcontractors, to assure compliance with the contract provisions. The test results shall be signed by a Virginia Registered Professional Engineer. The Contractor Quality Control system will specifically include, but not limited to, the tests and inspections listed and/or required in the technical provisions of the contract specifications and shall cover all construction operations, including both on-site and off-site fabrication.

The minimum rate and location of sampling for the respective tests shall be determined by the VDOT Virginia Test Methods Manual (VTM) and the attached Minimum Job Acceptance Sampling Requirements.

Note: The Quality Assurance (QA) and Independent Assurance (IA) requirements shown in the Minimum Job Acceptance Sampling Requirements section of this specification are shown for informational purposes only and will be completed by the Owner independent of the Contractor Quality Control requirements.

- (d) **Method of Measurement:** This item is considered incidental to the cost of furnishing and placing materials and will not be measured for payment.
- (e) **Basis of Payment:** The cost of implementing Contractor Quality Control will not be measured separately and shall be considered incidental to other items.

Minimum Job Acceptance Sampling Requirements

<i>Contractor Quality Control (QC) Frequency – Soil & Aggregate</i>					
Material Type	Specification Section	Test Reference	QC Frequency/Acceptance Testing (By Contractor)	QA Frequency, if Contractor Performed QC (By Owner)	IA Frequency, if Recommended (NHS required) (By Owner)
Backfill	Contract Special Provisions				
Moisture Density Relations – Standard Proctor, Atterberg Limits & Grain Size Analysis (All Backfill Types)		VTM-1, VTM-7 & VTM-25	Once weekly during production and with change in material.	Once every 5 weeks during production	One test per year during production; minimally perform one in first 5 tests taken for QA
One Point Proctor Check with Sand Cone Density-Compare to Nuclear Gauge		VTM 012	Once Daily during production and with change in material.	Once weekly during production	One test per year during production; minimally perform one in first 5 tests taken for QA
In Place Density Tests:					
Box Culverts & Pipes		VTM-10	One (1) per 100 LF length, each lift, minimum one (1) test per 150 CY; minimum one (1) test per work shift at each location and whenever there is a change in material or compaction equipment/method.	One test per 1,500 CY with a minimum one test 10 ten days of production	One per 15,000 CY, minimally perform one test in first 5 tests taken for QA
Abutments, Retaining Walls and MSE Walls		VTM-10	One (1) per 100 LF length, each lift, minimum one (1) test per 150 CY; minimum one (1) test per work shift at each location and whenever there is a change in material or compaction equipment/method.	One test per 1,500 CY with a minimum one test every 10 days of production	One per 15,000 CY, minimally perform one test in first 5 tests taken for QA

Minimum Job Acceptance Sampling Requirements

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Material Type	Specification Section	Test Reference	QC Frequency/Acceptance Testing (By Contractor)	QA Frequency, if Contractor Performed QC (By Owner)	IA Frequency, if Recommended (NHS required) (By Owner)
Soils/Embankment					
Moisture Density Relations-Standard Proctor, Atterberg Limits & Grain Size Analysis (Soils/Embankment)		VTM-1, VTM-7 & VTM-25	Once weekly during production and with change in material (Proctor for backfill will suffice if same source).	Once every 5 weeks during production	One test per year during production; minimally perform one in first 5 tests taken for QA
One Point Proctor Check with Sand Cone Density-Compare to Nuclear Gauge (Soil/Embankment)		VTM-012	Once daily during production and with change in material (Proctor for backfill with suffice if same source).	Once weekly during production	One test per year during production; minimally perform one in first 5 tests taken for QA
Embankment in Place Density (Soils/Embankment)		VTM-10	One (1) per 500 LF interval each lift; minimum one (1) test per 500 CY; minimum one (1) test per work shift at each location and whenever there is a change in material or compaction equipment/method.	One test per 5,000 CY with a minimum one test every 10 days of production	One per 100,000 CY, or fraction thereof, with minimum of one test per project
Subgrade	Section 305	VTM-10	One (1) test per 750 SY	One test per 7,500 SY	One test per 75,000 SY, minimally perform one (1) in first 5 taken for QA

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Material Type	Specification Section	Test Reference	QC Frequency/Acceptance Testing (By Contractor)	QA Frequency, if Contractor Performed QC (By Owner)	IA Frequency, if Recommended (NHS required) (By Owner)
Treated Subgrade/Subbase, Aggregate Base Material, and Cement Treated Aggregate Base Material	VDOT Sections 306, 307 & 309				
Depth Checks		VTM-38B	One (1) test per every half mile per lane width, minimum one (1) test per roadway.	One test for every 5 miles per lane width	One test per ten (1) roadway miles, or fraction thereof. Minimum of one per project, unless quantity of individual material (base, sub-base, etc.) is less than 500 tons per project, in which case no IA test required for that material
In Place Density		VTM-10	One (1) test per every half mile of stabilization per lane width, average of 5 readings for each nuclear test minimum one (1) test per roadway.	One test for every 5 miles per lane width	One test per 10 roadway miles, or fraction thereof, consisting of the average of five readings. Minimum of five readings per project, unless total quantity of individual material (base, sub-base, etc.) is less than 500 tons per project, in which case no IA test
Clearing and Grubbing	VDOT Section 301				
Ensure activities are confined to limits and seeded within 30 days of disturbance		N/A	Daily		

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Erosion and Siltation Control	VDOT Section 303.03 & current Virginia DCR Specifications				
Monitor for correct installation and Maintenance		N/A	Daily	Weekly	
Undercut	VDOT Section 303.04				
Review area to determine need for Undercut		N/A	Prior to start of work at each location	All reports reviewed by Locality Project Manger to verify qualified inspector and correct equipment	One QA report reviewed per month during production to verify qualified inspector and qualified personnel
Measure Undercut Area		N/A	Prior to backfill at each location	All calculations/reports checked/reviewed by Locality Project Manager to verify qualified inspector and correct equipment	One QC calculation/report checked/reviewed to verify qualified inspector and correct equipment
Overlay Sands					
Grade D Silica Sand	Special Provision		One bag per project	N/A	N/A

Minimum Job Acceptance Sampling Requirements

<i>Contractor Quality Control (QC) Frequency – Hydraulic Cement Concrete</i>					
Material Type	Specification Section	Test Reference	QC Frequency/Acceptance Testing (By Contractor)	QA Frequency, if Contractor Performed QC (By Owner)	IA Frequency, if Recommended (NHS required) (By Owner)
Cast-In-Place (CIP) Structures and Bridge Concrete	VDOT Section 217				
Concrete Entrained Air Content (CIP Concrete)		ASTM C231 or C173	Test every load	One per 100 CY	One test shall be made on the same batches of concrete from which cylinders taken
Slump of Hydraulic Cement Concrete (CIP Concrete)		ASTM 143	Test every load	One per 100 CY	One test shall be made on the same batches of concrete from which cylinders taken
Temperature of Concrete (CIP Concrete)		ASTM C1064	Test every load	One per 100 CY	One per 500 CY, minimally one in first 5 tests taken for QA
Concrete Unit Weight		ASTM C138	Test every load	One per 100 CY	One per 500 CY, minimally one in first 5 tests taken for QA
Compressive Strength of Concrete Cylinders (CIP Concrete)		ASTM C31 & C39	One (1) set of 3 cylinders per every 100 CY and at least one (1) set per day with minimum of two (2) sets of cylinders per structure per class of concrete.	One set of 3 cylinders per every 1,000 CY. Minimum of one sample per project	Minimum one set per 1,000 C.Y. of structural concrete, except that IA sample will not be required for projects having less than 300 C.Y. If more than one set is needed per project, the samples should be taken from different classes.

Minimum Job Acceptance Sampling Requirements

<i>Contractor Quality Control (QC) Frequency – Hydraulic Cement Concrete</i>					
Material Type	Specification Section	Test Reference	QC Frequency/Acceptance Testing (By Contractor)	QA Frequency, if Contractor Performed QC (By Owner)	IA Frequency, if Recommended (NHS required) (By Owner)
Chloride Permeability Concrete Cylinders (CIP Concrete)		VTM-112	One (1) set of two (2) cylinders per every 100 CY and at least one set per day.	One set of 2 cylinders per every 1,000 CY. Minimum of one sample per project	Minimum one set per 1,000 C.Y. of structural concrete, except that IA sample will not be required for projects having less than 300 C.Y. If more than one set is needed per project, the samples should be taken from different classes. One set of two.
Concrete Reinforcing Steel (CIP Concrete) elongation, yield strength and ultimate strength		ASTM A615	Verify manufacturers' certificates for every shipment for acceptance prior to placement.	One sample per manufacturer per most common size per structure	One sample per project
Pavement	VDOT Section 217				
Concrete Entrained Air Content (Pavement)		ASTM C231 or C173	One (1) test per hour and when casting Flexural Beams.	One test per day	One test shall be made on the same batches of concrete from which cylinders taken
Slump of Hydraulic Cement Concrete (Pavement)		ASTM 143	One (1) test per hour and when casting Flexural Beams.	One test per day	One test shall be made on the same batches of concrete from which cylinders taken
Temperature of Concrete (Pavement)		ASTM C1064	Test every load	One per 100 CY	One per 500 CY, minimally one in first 5 tests taken for QA
Concrete Unit Weight		ASTM C138	One (1) test per hour and when casting Flexural Beams.	One test per day	One per 500 CY, minimally one in first 5 tests taken for QA

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Material Type	Specification Section	Test Reference	QC Frequency/Acceptance Testing (By Contractor)	QA Frequency, if Contractor Performed QC (By Owner)	IA Frequency, if Recommended (NHS required) (By Owner)
Compressive Strength of Concrete Cylinders (Pavement)		ASTM C31 & C39	One (1) set of 3 cylinders cast for every 100 CY and at least one for each days concreting operation.	One set of 3 cylinders per every 1,000 CY minimum of one set per project	Minimum one set per 1,000 C.Y. of structural concrete, except that IA sample will not be required for projects having less than 300 C.Y. If more than one set is needed per project, the samples should be taken from different classes. One set of three
Flexural Strength Beams		ASTM C31 & C39	At least one (1) beam cast for each days concreting operation.	Minimum of one beam per week	Minimum of one beam per month
Chloride Permeability Concrete Cylinders (CIP Concrete)		VTM-112	One (1) set of 2 cylinders per every 100 CY and at least one (1) set per day.	One set of 2 cylinders per every 1,000 CY minimum of one set per project	Minimum one set per 1,000 C.Y. of structural concrete, except that IA sample will not be required for projects having less than 300 C.Y. If more than one set is needed per project, the samples should be taken from different classes. One set of two.
Concrete Reinforcing Steel (Pavement) elongation, yield strength and ultimate strength		ASTM A615	Verify manufacturers' certificates for every shipment for acceptance prior to placement.	One sample per manufacture per most common size for every 2 lane miles	

Minimum Job Acceptance Sampling Requirements

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Material Type	Specification Section	Test Reference	QC Frequency/Acceptance Testing (By Contractor)	QA Frequency, if Contractor Performed QC (By Owner)	IA Frequency, if Recommended (NHS required) (By Owner)
Miscellaneous Concrete	VDOT Section 217				
Concrete Entrained Air Content (Miscellaneous Concrete)		ASTM C231 & C173	One (1) test per hour and when cylinders are cast.	One test per day	One per 10,000 CY minimally one in first 5 tests taken for QA
Slump of Hydraulic Cement Concrete (Miscellaneous Concrete)		ASTM C143	One (1) test per hour and when cylinders are cast.	One test per day	One per 10,000 CY, minimally one in first 5 tests taken for QA
Temperature of Concrete (Miscellaneous Concrete)		ASTM C1064	One (1) test per hour and when cylinders are cast.	One test per day	One per 10,000 CY, minimally one in first 5 tests taken for QA
Concrete Unit Weight		ASTM C138	One (1) test per hour and when cylinders are cast.	One test per day	One per 10,000 CY, minimally one in first 5 tests taken for QA
Compressive Strength of Concrete Cylinders (Miscellaneous Concrete)		ASTM C31 & C39	One (1) set of 3 cylinders per every 250 CY and at least one (1) set per day.	One set of 3 cylinders per every 2,500 CY (cumulative)	One set of 3 cylinders per every 25,000 CY (cumulative)
Concrete Reinforcing Steel (Miscellaneous Concrete)		ASTM A615	Verify manufacturers' certificates for every shipment for acceptance prior to placement.	One sample per manufacture per most common size per structure	One sample per project

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Material Type	Specification Section	Test Reference	QC Frequency/Acceptance Testing (By Contractor)	QA Frequency, if Contractor Performed QC (By Owner)	IA Frequency, if Recommended (NHS required) (By Owner)
Concrete Curing Materials					
	VDOT Section 220				
Burlap		AASHTO M182, Class 3	Verification of LM number and lot numbers if from QA Supplier Approved list 44, if not one sample per lot number.	N/A	N/A
White Liquid Membrane Curing Compound		VTM-2	Verification of LM number and batch numbers if from QA Supplier Approved list 44, if not one sample per batch number.	N/A	N/A
Fugitive Dye Liquid Membrane Curing Compound		VTM-2	Verification of LM number and batch numbers if from QA Supplier Approved list 44, if not one sample per batch number.	N/A	N/A
Polyethylene Film		AASHTO M171	Verification of LM number and batch numbers if from QA Supplier Approved list 44, if not one sample per lot number.	N/A	N/A

Minimum Job Acceptance Sampling Requirements

<i>Contractor Quality Control (QC) Frequency – Asphalt</i>					
Material Type	Specification Section	Test Reference	QC Frequency/Acceptance Testing (By Contractor)	QA Frequency, if Contractor Performed QC (By Owner)	IA Frequency, if Recommended (NHS required) (By Owner)
Asphalt Concrete Pavement	VDOT Section 315				
Pavement Density by Nuclear Method with In Place Pavement Density (Asphalt Pavement)		VTM-76, VTM-6	Establish Roller pattern, control strips and test sections, ten (10) stratified random density test sites per test section (5,000 ft.).	QA=20%*QC Lots Acceptance Options: 1) e.g. 25,000 ft. (7,500 m) per lane width. Ten stratified random samples per QA lot. Limits of QA lot should match limits of one QC lot. OR 2) Coring/Saw plugs method use AASHTO T-166/5 cores/plugs	IA=10%*QC Readings Locality representative observe and witness QC testing to assure gauge is calibrated and accurate. Observe and verify test sites are random and match selected sites. Verify that QC tests are done using proper procedure.
In Place Pavement Density (for all asphalt except Stone Matrix Asphalt (SMA))		VTM-006, VTM-32	Density – minimum one (1) core per location not long enough to establish roller pattern/control strip.	Density – One random core per ten QC locations	One test per two roadway miles, or fraction thereof. Minimum of one per project, unless combined total quantity of all asphalt concrete material is less than 500 tons per project, in which case no IA test required

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<i>Contractor Quality Control (QC) Frequency – Asphalt</i>					
Material Type	Specification Section	Test Reference	QC Frequency/Acceptance Testing (By Contractor)	QA Frequency, if Contractor Performed QC (By Owner)	IA Frequency, if Recommended (NHS required) (By Owner)
Asphalt Concrete Pavement	VDOT Section 315				
Depth Checks		VTM-32	One (1) per ¼ mile per lane width, minimum one (1) test per roadway, maximum lot size one (1) mile (4 tests).		One test for every 50 miles per lane width, minimum one test per roadway. Also, depth tests of intermediate or surface material required only if specific plan depths are called for, not when plans specify rate of application
In Place Pavement Density and Depth Checks by cores for Stone Matrix Asphalt (SMA)		VTM-006	Minimum of one (1) sample per 1,000 feet with a maximum of five (5) samples per day/night's production for density and depth. Three (3) cores for test strip.	Locality Representative Independently weigh and measure one QC core per day/night's production QA will observe the taking of these cores and will maintain control of these cores once obtained	

Minimum Job Acceptance Sampling Requirements

<i>Contractor Quality Control (QC) Frequency – Asphalt</i>					
Material Type	Specification Section	Test Reference	QC Frequency/Acceptance Testing (By Contractor)	QA Frequency, if Contractor Performed QC (By Owner)	IA Frequency, if Recommended (NHS required) (By Owner)
Permanent Pavement Marking	VDOT Section 512				
Permanent Pavement Marking – Preformed Tape		VTM-94	Daily at start up with periodic checks every three (3) hours of operation.	Randomly select ten 20 foot in place sections of markings per day and measure thickness and width. Observe the bead embedment, color (night and day) and brightness/reflectivity. Inspect structure of tape to ensure patterned waffles have not been damaged	Review two C-85 reports per month during production to verify that calculated quantities match application rates and that daily measurements are performed according to VTM 94
Permanent Pavement Marking – Liquid Materials (Paint, thermoplastic and epoxy)		VTM-94	Daily at start up with periodic checks every three (3) hours of operation.	Randomly select ten 20 feet in place sections of markings per day and measure thickness and width. Observe the bead embedment, color (night and day) and brightness/reflectivity. Review application rates to ensure proper thickness has been applied.	Review two C-85 reports per month during production to verify that calculated quantities match application rates and that daily measurements are performed according to VTM 94

Minimum Job Acceptance Sampling Requirements

<i>Contractor Quality Control (QC) Frequency – Miscellaneous Roadway and Structure</i>					
Material Type	Specification Section	Test Reference	QC Frequency/Acceptance Testing (By Contractor)	QA Frequency, if Contractor Performed QC (By Owner)	IA Frequency, if Recommended (NHS required) (By Owner)
Pre-cast Structures	VDOT Section 404				
Verify bedding material is installed properly and that pre-cast materials are not chipped or cracked		N/A	Daily and when shipment arrives on project.	weekly	
Load Bearing Piles	VDOT Section 403				
Monitor Operation and Document Blow Counts		N/A	Continuously	Daily	
Perform Center of Gravity Calculations		N/A	For each Foundation	One out of every 10 foundations	
Structural Steel	VDOT Section 407				
Check of Torque of Bolts		ASTM 325	10% of bolts but not fewer than 2 in any connection.	Minimum one bolt per connection	
Rebar Splicer (Tension Test)		ASTM A615	One sample per manufacturer per most common size per structure (Contractor is to install pieces).	One sample per manufacturer per most common size per project (Contractor is to install pieces)	Verify Machine Calibration annually
Prestressing Strand Splicer (Tension Test)			One sample per manufacturer per most common size per structure.	Two sample per manufacturer per most common size per project	Verify Machine Calibration annually

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<i>Contractor Quality Control (QC) Frequency – Miscellaneous Roadway and Structure</i>					
Material Type	Specification Section	Test Reference	QC Frequency/Acceptance Testing (By Contractor)	QA Frequency, if Contractor Performed QC (By Owner)	IA Frequency, if Recommended (NHS required) (By Owner)
Protective Coating of Metal Structures					
Monitor Surface Preparation	VDOT Section 411	SSPC-PA	Three (3) surface profile measurements per day of blasting.	Two surface profile measurements per week of blasting	Review all reports showing the preparation protocols
Check Coating Thickness according to SSPC-PA		SSPC-PA	Five (5) spot measurements 15 readings per day as defined in PA-2 for coating thickness after each layer of paint at each location.	One spot measurement 3 readings as defined in PA-2 for coating thickness after each layer of paint at each location	Review all reports showing-painting application rates including the tests performed on profiles and thicknesses
Underdrains					
Inspect to ensure no deficiencies	VDOT Section 501	VTM-108	All accessible outlet locations; Additionally a minimum of 10% of longitudinal sections.	Observe 10% of outlet locations; additionally, a minimum of 1% of longitudinal sections	
Guardrail					
Verify that Guardrail is installed per specifications and at proper height	VDOT Section 505		Daily	Spot-check every 50 linear feet for proper height	

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<i>Contractor Quality Control (QC) Frequency – Miscellaneous Roadway and Structure</i>					
Material Type	Specification Section	Test Reference	QC Frequency/Acceptance Testing (By Contractor)	QA Frequency, if Contractor Performed QC (By Owner)	IA Frequency, if Recommended (NHS required) (By Owner)
Fencing					
Verify fencing type, height and location	VDOT Section 507	N/A	Daily	Weekly	
Barbed Wire	VDOT Section 242	ASTM A121	One sample every 50 rolls or spools.	N/A	N/A
Chain link Fence	VDOT Section 242	AASHTO M181	One sample from three (3) rolls for every fifty (50) rolls.	N/A	N/A
ROW Monuments					
Verify monument type and location	VDOT Section 503	N/A	10% of ROW Monuments.	1% of ROW monuments	
Maintenance of Traffic					
Monitor installation and maintenance and use Work Zone Safety Checklist	VDOT Section 512	N/A	Daily (locality Inspector).	Weekly (Locality Project Manager)	

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<i>Contractor Quality Control (QC) Frequency – Miscellaneous Roadway and Structure</i>					
Material Type	Specification Section	Test Reference	QC Frequency/Acceptance Testing (By Contractor)	QA Frequency, if Contractor Performed QC (By Owner)	IA Frequency, if Recommended (NHS required) (By Owner)
Sound Wall Barriers					
Verify location and installation with shop drawings	VDOT Section 519	N/A	Daily	Weekly	
Topsoil and Seeding					
Verify proper material is utilized at application rates from plans	VDOT Section 602/603	N/A	Daily	Weekly	
Traffic Signs					
Verify that signs meeting current standards are utilized in locations per plans	VDOT Section 512	N/A	Daily	Weekly	
Traffic Signals					
Monitor installation for conformance with plans and specifications	VDOT Section 703	N/A	Daily	Weekly	

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Material Type	Specification Section	Test Reference	QC Frequency/Acceptance Testing (By Contractor)	QA Frequency, if Contractor Performed QC (By Owner)	IA Frequency, if Recommended (NHS required) (By Owner)
Water and Sewer Facilities	VDOT Section 520				
Monitor installation for conformance with plans and specifications		N/A	Daily	Weekly	
Electrical and Signal Components	VDOT Section 238				
Tether Wire		ASTM A475	One (1) sample per project.	N/A	N/A
Span Wire		ASTM A475	One (1) sample per project.	N/A	N/A
Masonry	VDOT Section 202				
Wall Units			One (1) sample consisting of ten (10 units per 10,000 units)		