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**DATE:** December 2, 2020  
**TO:** Paul Zachary, Engineering Services Department Director  
**FROM:** Henry Som de Cerff, Design Manager  
**SUBJECT:** New Section 335 – City of Tulsa Acceptance Sampling/Testing Requirements

The Specification Review Committee recommends and asks the Engineering Services Department Director to approve the following:

1. New Section 335 – City of Tulsa Acceptance Sampling/Testing Requirements

Please call me at (918) 596-7355 if you have any questions.

Thank you.

APPROVED:

  
\_\_\_\_\_  
Paul Zachary, Director

12.23.20  
\_\_\_\_\_  
Date

Cc: Engineering Services Department Specification Review Committee

## **PART 335 – ACCEPTANCE SAMPLING/TESTING REQUIREMENTS**

### **335.1 DESCRIPTION**

Furnish Quality Control of materials and construction in accordance with the Standard Specifications, Plans and Special Provisions. This includes but is not limited to preparing and following a Quality Control Plan (See Part 335 Tables 1–7). Obtain samples and perform tests for Quality Control, provide inspection, and exercise management control to produce materials and workmanship that conforms to contract requirements. Unless otherwise noted in the plans, all pavements and bridges will be subject to requirements of any or all the Provisions which are included in this specification. City of Tulsa will provide Quality Assurance testing at their discretion.

### **335.2 MATERIALS**

Meet materials quality requirements.

### **335.3 EQUIPMENT**

Provide equipment at own expense, unless otherwise specified. All equipment and supplies shall conform with Standards and applicable Specifications. Certify the calibration of all equipment.

### **335.4 CONSTRUCTION**

- A) General: Provide quality of all construction covered in the project.
- B) Quality Control Personnel Qualifications: All personnel directly involved in sampling and/or testing materials for either control or acceptance purposes shall be certified in the appropriate area(s) by the Oklahoma Highway Construction Materials Technician Certification Board. Manager certification for material sampling and testing is not required unless he or she is directly involved in sampling and/or testing materials.
- C) Contractor's Quality Control Plan: Submit a written Quality Control Plan at least one week prior to the pre-work conference. Include the following in the plan:
  - 1) Sources of principal materials including names of suppliers and locations.
  - 2) Names and resumes of key Quality Control personnel.
  - 3) Duties, responsibilities, and authorities (to suspend production, alter mixtures, etc.) granted to key Quality Control personnel.
  - 4) Description of testing laboratories, including qualifications, key equipment, and locations.
  - 5) Description of start-up operations, including but not limited to:

- a) Review of submittal requirements and all other Contract requirements with the performance of the work.
  - b) Examine the work area to ascertain that all preliminary work has been completed.
  - c) Verify all field dimensions and advise the Engineer of any discrepancies.
- 6) Detailed testing schedule based on production.
- 7) Control, verification, and acceptance testing procedures for each specific test to include the test name, specification requiring the test, feature of work to be tested, and person responsible for each test.
- 8) Procedures for tracking construction deficiencies from identification through acceptable corrective action. These procedures will establish verification that identified deficiencies have been corrected.
- a) Sampling and Testing: Perform sampling and testing according to the accepted Quality Control plan using personnel certified in appropriate areas and laboratories approved by the Engineer. Keep laboratory facilities clean and maintain all equipment in proper working condition.
  - b) Inspection: Provide inspection necessary to ensure compliance with applicable standards and specifications.
  - c) Records: Maintain complete testing and inspection records and make them accessible to the Engineer.
    - 1. Test Results: Maintain control charts that identify the project number, contract item, test number, each test parameter, the upper and/or lower specification limit applicable to each test parameter, and the test results. Use the control charts as part of the Quality Control system to document process variability, to identify production and equipment problems, to make necessary corrections, and to identify potential pay factor adjustments.
      - i. Post control charts in an accessible location, keep them up to date, and make them available to the Engineer upon request. Make corrections to the process when problems are evident, including ceasing production if necessary.
    - 2. Inspection Results: For each day of work, prepare an "Inspector's Daily Record of Construction Operations" on an approved form. Include the following certification signed by the person with overall responsibility for the inspection system:

- i. "It is hereby certified that the information contained in this record is accurate, and that all work documented herein complies with the requirements of the contract. Any exceptions to this certification are documented as a part of this record."
  - 3. Submit the record and certification to the Engineer within two working days of the work being performed. If the record is incomplete, in error, or otherwise misleading, a copy of the record will be returned with corrections noted. When chronic errors or omissions occur, correct the procedures by which the records are produced.
- D) Use of Contractor Test Results for Acceptance Purposes: Abbreviated test procedures are allowed for Contractor use. The Quality Control Plan shall list all abbreviated test procedures, describe all deviations from standard procedures for each, and note their intended purpose. Test results from abbreviated procedures will not be used for any purpose by the City of Tulsa. It is the Engineer's discretion to use or not use any of the Contractor's test results for acceptance purposes.
- E) Changes: Submit, in writing, all proposed changes in key Quality Control personnel, equipment or procedures from those previously approved by the Engineer. Submit written changes at least one week prior to the proposed action.

335.5 METHOD OF MEASUREMENT

Payment for Contractor's Quality Control will be measured on a lump sum basis.

335.6 BASIS OF PAYMENT

Accepted Contractor's Quality Control measured for payment as prescribed above will be paid for at the Contract unit price for:

CONTRACTOR'S QUALITY CONTROL.....LUMP SUM

This payment will be full compensation for furnishing all materials, facilities, equipment, labor, and incidentals to complete the work.

Subject to acceptable performance, payment for Contractor's Quality Control will be made in accordance with the following schedule:

- A) 25% on the next estimate after the Engineer's approval of the Contractor's Quality Control Plan and other required initial documentation.
- B) 25% when 50% of the contract work is completed.
- C) 25% when 75% of the contract work is completed.
- D) 25% when all test results and records related to Quality Control work have been furnished to and accepted in writing by the Engineer.

As stated above, this payment is based upon acceptable performance. Payment will be reduced for unacceptable portions of the Quality Control work. Serious deficiencies in Quality Control work may result in the project being shut down.

PART 335 TABLE 1 BITUMINOUS MIXTURES				
ODOT/COT SUPPLEMENTS	MATERIAL	TYPE OF TEST(S) REQUIRED	SAMPLING POINT	MINIMUM SAMPLING/TESTING FREQUENCY
411, 708	Asphalt Concrete Pavement	Volumetric, Marshall, Rice, & Air Voids	Hot Plant or Roadway	One Per Day's Production.
		Oil Content (Nuclear/Ignition)	Hot Plant or Roadway	One Per 350 Tons or Fraction Thereof. Minimum One Sample Per Day.
	Cold Feed	Compaction (Core)	Roadway	One Per 300 Linear Feet for Each Lift and Lane Pass or Fraction Thereof.
		Gradation	Hot Plant	When Days Production Exceeds 300 Tons: One Prior to First Day of Production and One Per 500 Tons Thereafter.
<b>Remarks:</b> Asphalt deficient in oil content and/or density shall be cored 50' maximum on both sides of failed section when deemed necessary by the City of Tulsa. The results of the two cores shall be averaged with the previous test results. Minimum sampling and testing are required for each mix and supplier. City of Tulsa reserves the right to modify sampling and testing requirements as needed to ensure quality of materials.				

**PART 335 TABLE 2  
CEMENTITIOUS MIXTURES**

<b>ODOT/COT SUPPLEMENTS</b>	<b>MATERIAL</b>	<b>TYPE OF TEST(S) REQUIRED</b>	<b>SAMPLING POINT</b>	<b>MINIMUM SAMPLING/TESTING FREQUENCY</b>
414, 701	<b>Portland Cement Concrete (Flatwork)</b>	Compressive Strength	At Discharge	One Set of Six Cylinders Per 50 Cubic Yards or Fraction Thereof.
		Slump, Time, & Temperature	At Discharge	One Per Set of Cylinders.
509, 701	<b>Portland Cement Concrete (Structures)</b>	Compressive Strength	At Discharge	One Set of Six Cylinders Per Type of Structure, Per 50 Cubic Yards, or Days Production.
		Slump, Time, & Temperature	At Discharge	One Per Set of Cylinders.
501, 701, 703	<b>Controlled Low Strength Material</b>	Compressive Strength	At Discharge	One Set of Two Cylinders Per Shift.
425, 623, 701, 733	<b>Grout</b>	Compressive Strength	At Discharge	One Set of Four Prisms When Required by Engineer or Their Representative.
		Slump, Time, & Temperature	At Discharge	One Per Set of Prisms.
521, 701 733, 737	<b>Mortar</b>	Compressive Strength	At Batch Site	One Set of Four Cylinders When Required by Engineer or Their Representative.
Project Plans & Specifications	<b>Shotcrete</b>	Compressive Strength	At Discharge	One Panel Per 50 Cubic Yards or One Per Mixture, Nozzleman and Shift (Whichever is Greater).

**Remarks:**

Concrete specifications: Time is **90 minutes max** from time concrete is batched; Concrete is from **50 °F to 90 °F** [10 °C to 32 °C] during mixing, delivery, and placement.

If, in the opinion of the Engineer or his/her representative, there is sufficient cause to question the quality of the mortar or grout being utilized, random field sampling and testing may be required.

Shotcrete test panel forms should be wood or steel and a minimum of 24" x 24" x 4", generally shot in a vertical position.

Minimum sampling and testing are required for each mix design and supplier.

City of Tulsa reserves the right to modify sampling and testing requirements as needed to ensure quality of materials.

**PART 335 TABLE 3  
SOIL**

<b>ODOT/COT SUPPLEMENTS</b>	<b>MATERIAL</b>	<b>TYPE OF TEST(S) REQUIRED</b>	<b>SAMPLING POINT</b>	<b>MINIMUM SAMPLING FREQUENCY</b>
202, 613	<b>Trench Backfill (including lateral trenches)</b>	Proctor Density, Gradation & P.I.	In-Place	One Per Soil Type.
		Compaction & Moisture Content	In-Place	One Per 8" Lift for Every 100 Linear Feet, Per Pipe Run, or Day's Production.
310	<b>Subgrade</b>	Proctor Density, Gradation & P.I.	In-Place	One Per Soil Type.
		Compaction & Moisture Content	In-Place	Every 100 Linear Feet or Day's Production.
202, 501	<b>Structure Backfill</b>	Proctor Density, Gradation & P.I.	In-Place	One Per Soil Type.
		Compaction & Moisture Content	In-Place	One Per 8" Lift Per Structure
202	<b>Roadway Fill &amp; Embankments</b>	Proctor Density, Gradation & P.I.	In-Place	One Per Soil Type.
		Compaction & Moisture Content	In-Place	One Per 8" Lift for Every 100 Linear Feet or Day's Production.
202	<b>Import</b>	Proctor Density, Gradation & P.I.	Import Site or On-Site Stockpile	One Per Soil Type.
		Compaction & Moisture Content	In-Place	One Per 8" Lift for Every 100 Linear Feet or Day's Production.

**Remarks:**

**For Infrastructure Development Projects (IDP) only. Testing Frequencies as follows:**

Sewer & Water Services (30%) Driveways, Aprons, and ADA ramps (50%) Valley Gutters (100%)

Dry Utility, Fire Hydrant, Fire Line, and Storm Drain (100%)

Import material shall be Select Borrow in accordance with Section 202 and 705. All fill materials shall be placed at  $\pm 2\%$  of the optimum moisture content.

**The nuclear density gauge is to be correlated with a sand cone for every ten tests taken, or one per day, whichever is greater.**

City of Tulsa reserves the right to modify sampling and testing requirements as needed to ensure quality of materials.

**PART 335 TABLE 4  
AGGREGATE BASE**

<b>ODOT/COT SUPPLEMENTS</b>	<b>MATERIAL</b>	<b>TYPE OF TEST(S) REQUIRED</b>	<b>SAMPLING POINT</b>	<b>MINIMUM SAMPLING FREQUENCY</b>
303, 703, 708	<b>Aggregate Base (AB)</b>	Proctor Density	Stockpile, Windrow, Roadway	At Start of Production and as Material Changes per Supplier and/or Plant.
		Compaction & Moisture Content	Roadway, Pipe Bedding, Initial Backfill	One per 100' per Lift or One per Lane Pass or Days Production.
		Gradation, PI (Wet Prep)	Stockpile, Windrow, Roadway	One per Project, or One per 1000 Tons or Fraction Thereof.
		Specific Gravity	Stockpile, Windrow, Roadway	At Start of Production and as Material Changes per Supplier and/or Plant.

**Remarks:**

If asphalt millings are used for bedding, they shall meet the requirements of virgin Aggregate Base per ODOT.

Millings must meet all ASTM C33 requirements.

Millings cannot be placed until the material has been certified by ODOT/COT approved testing lab.

City of Tulsa reserves the right to modify sampling and testing requirements as needed to ensure quality of materials.



**PART 335 TABLE 5  
REINFORCEMENT**

<b>ODOT/COT SUPPLEMENTS</b>	<b>MATERIAL</b>	<b>TYPE OF TEST(S) REQUIRED</b>	<b>SAMPLING POINT</b>	<b>MINIMUM SAMPLING FREQUENCY</b>
724	<b>Steel Reinforcement</b>	Certificate and/or Tests	Project	One Sample for Each Size, Grade & Heat Number Per Shipment & Manufacturer. Certificate Required.
517, Project Plans & Specifications	<b>Post-Tensioned Steel</b>	Certificate and/or Tests	Project	One Sample for Each Size, Grade & Heat Number Per Shipment & Manufacturer. Certificate Required.
503, Project Plans & Specifications	<b>Pre-Stressed Steel</b>	Certificate and/or Tests	Project or Fabrication Plant	One Sample for Each Size, Grade & Heat Number Per Shipment & Manufacturer. Certificate Required.

**Remarks:**

All steel and iron incorporated into Federal-Aid projects must conform to requirements of "Buy America" per 23 CFR 635.410. City of Tulsa reserves the right to modify sampling and testing requirements as needed to ensure quality of materials.

**PART 335 TABLE 6  
ELASTOMERIC BEARING PADS**

<b>ODOT/COT SUPPLEMENTS</b>	<b>MATERIAL</b>	<b>TYPE OF TEST(S) REQUIRED</b>	<b>SAMPLING POINT</b>	<b>MINIMUM SAMPLING FREQUENCY</b>
733.06	<b>Elastomeric Bearing Pad (Grade 2)</b>	AASHTO M 251	Project	Two Sample Bearing Pads Selected at Random by Engineer from every 100 Bearing Pads or Portion Thereof. Minimum of One Sample per Lot.

**Remarks:**

Two sample bearing pads may be needed to complete the specified testing for smaller bearing pads.  
Bearing pads will be selected at random by the Engineer at the project site for testing.  
Bearing pads marked or otherwise presented as test bearing pads will not be tested.  
Bearing pads must be made available for testing at least four weeks in advance of intended use.  
Each bearing pad is to be marked in indelible ink or flexible paint. The marking shall consist of the order number, lot number, bearing identification number, and elastomer type and grade number. The marking shall be on the face that is visible after erection of the bridge.  
City of Tulsa reserves the right to modify sampling and testing requirements as needed to ensure quality of materials.

**PART 335 TABLE 7A  
MINIMUM TEST SCHEDULE & FINAL REPORT**

**Minimum Testing Schedule:**

A Minimum Testing Schedule is to be created and submitted to the City of Tulsa Field Engineering within ten business days of project assignment. Testing frequencies are to be calculated using an approved set of plans in conjunction with the bid tab items to create an accurate representation of the minimum testing needed for the project. Any notes, comments, special circumstances, and/or assumptions made for quantity calculations should be listed at the bottom of the page.

**Final Report Should Include the Following:**

All laboratories must submit a Final Report after the completion of each project. Laboratories will be notified by the City of Tulsa Field Engineering, via email, that the project is complete and all lab results for soils, concrete and asphalt will be attached. A CD and a hard copy of the Final Report must be delivered to the City of Tulsa Field Engineering within five business days from the date of this email.

Final Reports are to include all field and lab tests/results, daily reports, and samples taken for the entire project.

**All Final Reports must be stamped and signed by a registered professional engineer** and shall verify that all materials, sampled and tested, were found to be in compliance with the latest City of Tulsa Standards and Specifications. Construction materials that fail to meet specification requirements, but were incorporated in the project, must be summarized in the final report with a detailed explanation listing corrective actions or justification for acceptance.

**PART 335 TABLE 7B  
INFRASTRUCTURE DEVELOPMENT PROJECTS (IDP) ONLY  
MINIMUM TEST SCHEDULE & FINAL REPORT**

**Minimum Testing Schedule:**

A Minimum Testing Schedule shall be created and submitted to the City of Tulsa IPD Inspector, during the pre-construction meeting. Testing frequencies are to be calculated using an approved set of plans, in conjunction with the bid tab items, to create an accurate representation of the minimum testing needed for the project. Any notes, comments, special circumstances, and/or assumptions made for quantity calculations, should be listed at the bottom of the page.

**Final Report:**

All laboratories must submit a Final Report at the completion of each project. A spiral bound copy of the Final Report must be delivered to the City of Tulsa IDP Inspector along with final record drawings of the project.

Final Reports shall include all field and lab tests/results (including any acceptance/deficiency test results), daily reports, and samples taken for the entire project.

All Final Reports must be stamped and signed by a registered professional engineer and shall verify that all materials, sampled and tested, were found to be in compliance with the latest City of Tulsa Standards and Specifications. Construction materials that fail to meet specification requirements, but were incorporated in the project, must be summarized in the final report with a detailed explanation listing corrective actions or justification for acceptance.

### INSPECTION/TESTING SCHEDULE

SERVICE	MINIMUM NOTICE (HOURS)	NOTES
Aggregate Base:	48	Density testing must be complete prior to string line. Obtain samples for proctor/acceptance testing prior to scheduling density.
Aggregate Base Thickness:	48	Per Plans and Specifications.
Aggregate Base Sampling:	48	Material must be from a City of Tulsa approved plant.
Asphalt:	48	Contractor/Inspector must call the City of Tulsa Field Engineering for scheduling. Material must be from an ODOT approved plant.
Backfill:	48	Obtain samples for proctor/acceptance prior to scheduling density testing.
Concrete:	48	Material must be from an ODOT approved plant.
Coring:	48	Allow time to schedule and set up traffic control if required.
Crack Seal:	48	
Footing Inspection:	24	
Grout:	24	
Import:	24	Material must be approved by the City of Field Engineering prior to placement.
Mortar:	24	
Post Tension Pre-Pour Inspection:	48	
Post Tension Stressing Inspection:	48	
Post Tension Sampling:	48	
Reinforcing Steel (Inspection):	48	
Reinforcing Steel (Sampling):	48	
Shotcrete:	48	Contractor shall provide 16" x 16" x 4" sampling panel.
Sidewalk Slope Inspection:	24	
Slurry (CLSM):	24	
Slurry Seal:	48	
Soil Sampling:	24	
String Line:	24	
Subgrade:	24	Density testing must be complete prior to string line. Obtain samples for proctor/acceptance testing prior to scheduling density.
Weld Inspection:	48	

Inspection/Testing schedule time listed above has been considered in contract time. No additional time will be given.

### SECTION END