

NEW MEXICO DEPARTMENT OF TRANSPORTATION



INDEPENDENT ASSURANCE PROGRAM

Evaluation of Sampling and Testing Procedures

5/29/2013

ISSUED BY:

A handwritten signature in blue ink, appearing to read "Jimmy Camp", is written over a horizontal line.

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1. SCOPE

The NMDOT Independent Assurance Program has been established in accordance with requirements of the *Code of Federal Regulations 23, Part 637, Subpart B – Quality Assurance Procedures for Construction*. Its definition of an independent assurance program is as follows:

“Activities that are an unbiased and independent evaluation of all the sampling and testing procedures used in the acceptance program.”

The Federal Highway Administration (FHWA) requires each state to have an approved Independent Assurance Program for materials and construction sampling and testing. Independent Assurance test results are not used for determining the quality and acceptability of the materials and workmanship on a project, but serves as checks on the reliability of the results obtained in project acceptance sampling and testing.

The Independent Assurance Program evaluates the sampling/testing personnel and testing equipment used in verification and quality acceptance and quality control in accordance with Section 901.3 "Independent Assurance Testing" of the Standard Specifications. The Code of Federal Regulations allows observations, split sample results, and proficiency sample results as a means of evaluating testing personnel within a State's independent assurance program. Calibration checks and split sample results are permissible inclusions to the Independent Assurance Program for evaluating acceptance testing equipment.

NMDOT evaluates laboratories' testing equipment and personnel by inspections and Independent Assurance split samples, and compliance with AASHTO Materials Reference Laboratory (AMRL). The Independent Assurance Program cannot be used to determine the acceptability of materials.

Each District will be responsible for making sure the Independent Assurance Program objectives are met. The Assistant District Engineer (Construction) and the District Lab Supervisor (DLS) will be responsible for administering the Independent Assurance Program; they provide personnel and equipment to obtain the independent assurance split samples and provide the testing and observation. Communication shall be maintained between project and district lab personnel to assure timely independent assurance sampling and testing and evaluations are accomplished commensurate with project progress or specified time intervals.

Materials requiring independent assurance sampling, testing, and frequency are identified within the New Mexico Department of Transportation Minimum Testing Requirements (NMDOT MTR's), see attached MTR's.

1.1 INDEPENDENT ASSURANCE EVALUATION AND TESTING

Independent Assurance evaluates sampling and testing procedures and equipment for acceptance and verification testing. Independent Assurance testing is performed concurrently with the acceptance sampling and testing but is not used directly for acceptance of materials.

Independent Assurance is not required on the contractor's quality control tests unless the quality control test results are used for acceptance (QLA) and as indicated on the NMDOT MTR's. Independent Assurance may be performed, when requested, for the contractor's quality control as time and resources permit. The results of the Independent Assurance Tests shall not be used in place of the Contractors test results.

Every NMDOT Civil Engineer Technician (CET)/Materials Tester Sorter (Record Tester) engaged in material sampling and testing for use in Independent Assurance evaluations on NMDOT and Federal funded highway projects, including other projects deemed necessary by FHWA, must hold the appropriate required training/certification from the New Mexico Technician Training and Certification Program (TTCP).

Independent Assurance evaluations and testing are used to assure that sampling and testing procedures, including testing equipment, are within allowable tolerances. A comparison of the project test results with Independent Assurance test results, when in close conformity, gives assurance that project sampling and testing is valid. If the results are not within the allowable tolerances in accordance with the MTR's, then an out of tolerance review must be done by the Assistant District Engineer (Construction), Project Manager (PM) and DLS, such as checking for damaged equipment, reviewing sampling and testing procedures, or other corrective action as necessary.

The PM, as well as the CET Supervisor and CET Field Lab Technician, will notify the District Lab Supervisor (DLS) as soon as possible prior to production startup and throughout the project so the required Independent Assurance evaluations can be scheduled.

1.2 DISTRICT LAB SUPERVISOR (DLS) / DISTRICT LAB

The DLS is responsible for supervising the District Lab and District Lab staff. One of the major responsibilities of the District lab is to perform Independent Assurance testing and evaluation at the project construction level. This involves comparing test results on split samples with state and contractor personnel. The DLS may have three (3) to five (5) testers within the lab under his/her direction and will provide the appropriate sampling, testing and observation in order to conform to the Independent Assurance program. All testers that perform any testing will be certified in accordance with the New Mexico TTCP.

The following will provide typical duties of the DLS and the District Lab as it is related to the Independent Assurance program:

1. Independent Assurance evaluations and testing in accordance to the Independent Assurance Program and frequencies identified in the NMDOT MTR's.
2. Spot check during normal Independent Assurance evaluations that project testing laboratories have the appropriate qualifications.
3. Spot check during normal Independent Assurance evaluations that Civil Engineer Technicians (CET's) and contractors are TTCP certified and have the appropriate certifications.
4. Conduct intermediate and final field lab record reviews.
5. Spot check during normal Independent Assurance evaluations and during intermediate and final field lab record reviews that the acceptance sampling and testing is done in accordance with the contract specifications.
6. Perform Final Closeout Audits of construction projects verifying testing credits were performed and materials are certified in accordance with the contract.
7. Provide and approve the project Final Materials Certification Letter for the Assistant District Engineer (Construction) approval.
8. Oversee the purchase of lab equipment used on roadway projects and administer the validation and verification program for the equipment in accordance with AASHTO R-18.
9. Administer the District Radiation Program and Radioactive Materials License procedures for use of the Nuclear Moisture/Density Meter.
10. Make sure that the District Lab and Field Laboratories comply with the requirement of AASHTO R-18 and AMRL proficiency testing accreditation.

1.3 SELECTION AND FREQUENCY OF INDEPENDENT ASSURANCE EVALUATIONS AND TESTING

Independent Assurance evaluations and testing for each roadway or bridge item (material) should commence in accordance with the frequencies identified in NMDOT MTR's. The District Lab will use either a Project Approach or System Approach to measure whether Independent Assurance requirements have been met which means each project must have evidence that the required Independent Assurance evaluations and testing have been performed.

The Independent Assurance evaluation will include all test methods performed, including sampling and splitting during performance of the actual project tests (acceptance and process control tests) whenever possible.

The Independent Assurance evaluation must accurately follow the specified test methods and procedures. The most current TTCP Manual shall be used as a guide for evaluation of each test method. Even small deviations should be pointed out to the CET to ensure accurate and consistent test results, as well as accurate field equipment evaluations.

The DLS may be called upon by the PM/Assistant District Engineer (Construction) to evaluate test methods and field testing equipment due to test results or during a QC/QA project when there is a verification evaluation test failure prior to referee testing. Additional duplicate samples and observations may be necessary for resolution.

1.3.1 Independent Assurance Evaluation by Project Approach

The minimum frequency evaluation and testing for the Project Approach using split samples is summarized in the NMDOT MTR's under Independent Assurance for each standard specification item (See Attached MTR's). Test methods evaluated by split samples are those where the Record Tester has dedicated equipment to perform an independent test at the District Lab.

Dependent on the number of ongoing projects within each district, the District Tester may not have enough time to observe or take samples being split in the field on every project. If the District Tester and the DLS cannot coordinate this effort due to timing and coordination efforts, the CET will collect and split the samples appropriately and provide the District Tester and DLS with the Independent Assurance sample to be tested at the District Lab. Alternatively, for tests evaluated on the project site such as concrete field tests (slump, and unit weight) the District Tester collects and tests samples either independently or in conjunction with the CET. In addition, if the DLS and his/her staff cannot keep up with all the testing required for Independent Assurance for each project due to the magnitude of their construction program on any given year, no more than 20% of the testing can be done by observation. A Daily Diary and/or Test Report will be used by the DLS or his/her designee to document the date, test method and CET performing the test. An Independent Assurance test report must be completed by the DLS for each project and list each item to which the observation evaluation applies.

The following procedures are an example of Independent Assurance split samples for aggregate:

- a. The CET/Materials Tester Sorter (Record Tester) will take a single sample large enough to provide not less than two (2) samples after splitting. If time permits, sampling is to be observed by the Record Tester in accordance with AASHTO T2, Sampling of Aggregates as often as scheduling permits.

- b. The sample will be mixed and quartered or split into two or three approximate equal size duplicate samples. Three (3) split samples can be taken when comparison with the contractors testing. The District Tester is to observe this procedure in accordance with AASHTO T-248-11 Method A.
- c. One of the split samples is to be tested by the CET for complete gradation, sand equivalent or other specifications field tests as applicable. The Record Tester is to carefully observe the techniques employed by the CET during the testing as often as scheduling permits. The second portion of the sample is to be taken to the District Lab by the Record Tester and tested for the same series of tests.
- d. The CET's results are submitted to the District Lab as soon as the tests are complete, giving identification of the sample, date sampled, CET's name, Record Tester's name, and identifying the test results as one of the split samples taken in the presence of the Record Tester.
- e. The DLS will log the CET's results on the "Project Acceptance and Assurance Test Results" form (See Attachment) in order to make appropriate comparisons.

1.3.2 Independent Assurance Evaluation by the System Approach

It may be desirable to evaluate test methods by the System Approach, to allow the DLS more management flexibility to allocate staff and resources to provide more efficient materials oversight. In addition, the System Approach may be advantageous due to the magnitude and quantity of project running concurrently in a single lab and smaller geographic area. Independent Assurance frequencies for the program are based on a frequency unit of time in lieu of a unit of production for each item as summarized in the NMDOT MTR's under Independent Assurance, System Approach, for each specific item (See Attached MTR's).

Independent Assurance using the System Approach is typically valid for three (3) months in accordance with the NMDOT MTR's. The DLS will be responsible for the observation, testing, and documentation of the System Approach for each CET and each test method. One Independent Assurance split sample may apply to multiple items and projects by the same CET using the same test methods and equipment. It is intended that a single observation and test may apply to multiple items and projects provided the items are being tested by the same tester using the same test methods regardless of quantity of material up to three (3) months. The DLS and/or the District Tester will split a sample of material with the CET or the contractor on QLA projects. The DLS will observe the CET/tester's test procedures and have the other split sample tested by the District Lab. The results from both tests are documented and compared. An Independent Test Report must be completed by the DLS for each CET and list each item to which the independent observations and test evaluation applies.

The DLS must use judgment in applying the System Approach and the frequency of three (3) months and to thoroughly evaluate each CET performing each test method involved. An annual report will be compiled by the DLS and approved by the Assistant District Engineer (Construction) that includes a list of certified CET's, indicating test methods and deviations in the sampling and testing procedures observed. The annual report will be forwarded to FHWA.

1.4 REVIEW OF INDEPENDENT ASSURANCE RESULTS

The Independent Assurance results and observations are evaluated to assure the dependability and accuracy of the project sampling and testing, and to evaluate the testing equipment.

1.4.1 Comparison and Reporting of Independent Assurance Tests and Evaluation Results

Each Independent Assurance sample will have an Independent test run by the District Tester located at the District lab, except for tests such as concrete slump and air tests that are performed in the field immediately after the sample is taken. Independent Assurance samples must be tested with equipment other than that used for project acceptance testing. This equipment will be located in the District Lab or in a previously approved and certified Satellite Lab. In no case will Quality Control or Quality Assurance samples be run at the District Lab or by District Lab personnel.

The Independent Assurance sample test results and the field test results from the other half of the split sample are reported on the "Project Acceptance and Assurance Test Results" form (see attachment) and compared. The comparison is made to determine whether the results are within the allowable variations indicated on the NMDOT MTR's "Tolerance for Comparison of Independent Assurance Samples Tests" (see attached MTR's).

Independent Assurance by the System Approach is documented on the District Independent Assurance Inspector's Report Field Evaluation. The evaluation report will be completed by the DLS. Any deviations in the sampling and testing procedures observed by the DLS will be documented and indicated on the report.

If the evaluation/report indicated the results are not within the allowable variation or deviation, the DLS will notify the PM within ten (10) working days of receiving the sample in the District Lab. An out of tolerance review amongst the PM, DLS, CET, District Tester and contractor (when required) will be held in order to resolve the issue. A report with the out of tolerance comparisons must be accompanied by documentation of an investigation and findings determining reasons for the unfavorable comparison of test results. A resolution signed by the

PM to the DLS with a copy to the Assistant District Engineer (Construction) will indicate the corrective action that will take place or the corrective action that has already been enacted to prevent the deviation on subsequent sampling and testing. The action may include replacing faulty equipment, additional supervision of the CET and/or suspension of testing until necessary qualifications are met.

1.4.2 Evaluation of Testing Equipment Using Calibration Checks

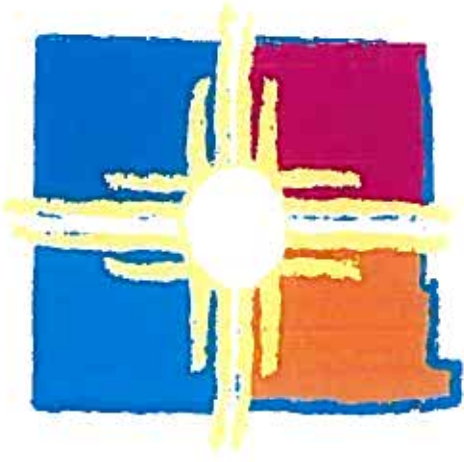
Each District within NMDOT will maintain a record of all testing equipment assigned to the field lab and district lab that requires periodic calibration. Calibration of all testing equipment will be done in accordance with AASHTO R-18 requirements. These records includes the following; description of each equipment showing manufacture, model or serial number with Fixed Asset (FA) number if required; the date placed in service; required frequency of calibration, date of last calibration and scheduled date of next calibration. It is the responsibility of the PM or his/her designee for each project office/field lab to assure current calibration/verification of all equipment assigned to his/her project office/field lab. The DLS will work with the PM or his/her designee to review documentation of calibration/verification and insure that it is maintained in an orderly manner. The State Material Bureau will work with the DLS to review and assure district lab testing equipment is current on calibration/verification. All records of testing equipment within each district will be maintained by the DLS, with the exception of field checks i.e. sieve inspections, field calibration of mechanical hammer to manual hammer etc.

Calibration/verification may be accomplished by any of the following procedures: Performed in-house using standard and equipment maintained by the District Lab or State Materials Bureau; by a commercial calibration "service" through an annual price agreement; or under a service contract with the manufacture of the equipment.

In-house verification is generally limited to equipment such as slump cones, unit weight measures, air meters, and steel molds that require only the measurement of the critical dimensions or less complex calibration procedures.

Equipment such as compression testing machines, mechanical apparatus, flukes or more complex procedures are generally calibrated by a commercial calibration service.

NEW MEXICO DEPARTMENT OF TRANSPORTATION



NMDOT

MINIMUM TESTING REQUIREMENTS

ISSUED BY:

NMDOT STATE MATERIALS BUREAU

Revised:

May 2, 2013

ATTACHMENT "A"

New Mexico Department of Transportation Minimum Testing Requirements (incorporate minimum sample size chart)

EARTHWORK

Item	Test Required	Sampling/Testing Location	Agency Testing	Contractor Testing	Independent Assurance		State Materials Bureau
					Project Approach	System Approach	
Embankment, Unclassified Excavation and Borrow (Section 203)	Moisture/Density Tests (Proctor), Soils Classification	Roadway	1 per material type	N/A	1/20,000 cy or minimum 2 per project	Once every 3 months with each sampling/testing technician	N/A
	In-Place Density and Moisture		1/2,000 cy				
Natural Ground (Section 203.3.5.1)	Moisture/Density Tests (Proctor), Soils Classification	Roadway	1 per material type	N/A	Minimum 2 per project	Once every 3 months with each sampling/testing technician	N/A
	In-Place Density and Moisture		1/1,000 If per 2 lane Roadway				
Surfacing Required (Section 203)	Estimated "R" Value	Top 2 feet of Roadway	1/1,000 If per 2 lane Roadway	N/A	1/10,000 If or minimum 2 per project	Once every 3 months with each sampling/testing technician	R-Value (as needed)
	In-Place Density and Moisture	Structure	Sec Table A				
Foundations / Backfill for Culverts and Minor Structures (Section 206)	Moisture/Density Tests (Proctor), Soils Classification	Stockpile	1 per material type	N/A	Minimum 2 per project	Once every 3 months with each sampling/testing technician	N/A
	Gradation		1 per 300 cy				
Subgrade Preparation (Section 207)	Moisture/Density Tests (Proctor), Soils Classification	Roadway	1 per material type	N/A	1/10,000 If or minimum 2 per project	Once every 3 months with each sampling/testing technician	N/A
	In-Place Density and Moisture		1/1,000 If/lane				
Linear Grading and Blading and Re-shaping (Sections 208, 209)	Moisture/Density Tests (Proctor), Soils Classification	Roadway	1 per material type	N/A	1/10,000 If or minimum 2 per project	Once every 3 months with each sampling/testing technician	N/A
	In-Place Density and Moisture		1/1,500 If				

New Mexico Department of Transportation Minimum Testing Requirements

EARTHWORK

Item	Test Required	Sampling/Testing Location	Agency Testing	Contractor Testing	Independent Assurance		State Materials Bureau
					Project Approach	System Approach	
Backfill for Major Structures (Section 210)	In-Place Density and Moisture	Structure	See Table A	N/A	Minimum 2 per project		N/A
	Moisture/Density Tests (Proctor), Soils Classification	Stockpile	1 per material type	N/A			
	Gradation		1 per 300 cy				
Treated Sub grade (Section 306)	In-Place Density and Moisture	Roadway	1/1,000 If		N/A	1/10,000 If or minimum 2 per project	
	Gradation		1 per material type				
	Moisture/Density Tests (Proctor), Soils Classification						
Backfill for Mechanical Stabilized Earth (MSE) Retaining Structures (Section 506)	In-Place Density and Moisture	Structure	See Table A	N/A	Minimum 2 per project		N/A
	Moisture/Density Tests (Proctor), Soils Classification	Stockpile	1 per material type				
	Gradation, PI		1 per 300 cy				
	Direct Shear, Electro Chemical		N/A				
Flowable Fill (Section 516)	In-Place Penetration Test	Structure	1/100 If	N/A	N/A		N/A
Foundations for Slope and Erosion Protection Structures (Section 602)	In-Place Density and Moisture	Structure	1 per 25 sy	N/A	Minimum 2 per project		N/A
	Moisture/Density Tests (Proctor), Soils Classification	Foundation material location	1 per material type				

New Mexico Department of Transportation Minimum Testing Requirements

EARTHWORK

Item	Test Required	Sampling/Testing Location	Agency Testing	Contractor Testing	Independent Assurance		State Materials Bureau
					Project Approach	System Approach	
Backfill for Soil and Drainage Geotextiles (Section 604)	In-Place Density and Moisture	Roadway	1 per lift	N/A	Minimum 2 per project		N/A
	Moisture/Density Tests (Proctor), Soils Classification	Stockpile	1 per material type	N/A			
Backfill for Drains (section 605)	In-Place Density and Moisture	Roadway	1/1,000 lf for impermeable material	N/A	Minimum 2 per project		N/A
	Moisture/Density Tests (Proctor), Soils Classification	Stockpile	1 per material type				
Foundations for Sidewalks, Drive Pads and Concrete Median Paving (Section 608)	In-Place Density and Moisture	Roadway	1/1,000 sq. ft.	N/A	Minimum 2 per project	Once every 3 months with each sampling/testing technician	N/A
	Moisture/Density Tests (Proctor), Soils Classification	Foundation material location	1 per material type				
Bed Course Material for Sidewalks, Drive Pads and Concrete Median Paving (Section 608)	In-Place Density and Moisture	Roadway	1/1,000 sq. ft.	N/A	Minimum 2 per project		N/A
	Moisture/Density Tests (Proctor), Soils Classification	Stockpile	1 per material type				
Foundations for Curb and Gutter (Section 609)	In-Place Density and Moisture	Roadway	1/500 lf or as site locations require	N/A	Minimum 2 per project		N/A
	Moisture/Density Tests (Proctor), Soils Classification	Foundation material location	1 per material type				

New Mexico Department of Transportation Minimum Testing Requirements

EARTHWORK

Item	Test Required	Sampling/Testing Location	Agency Testing	Contractor Testing	Independent Assurance		State Materials Bureau
					Project Approach	System Approach	
Bed Course Material for Curb and Gutter (Section 609)	In-Place Density and Moisture	Roadway	1/500 If or as site locations require	N/A	Minimum 2 per project	Once every 3 months with each sampling/testing technician	N/A
	Moisture/Density Tests (Proctor), Soils Classification	Stockpile	1 per material type	N/A	Minimum 2 per project		
Foundations / Backfill for Cattle Guards (Section 610)	In-Place Density and Moisture	Structure	Sec Table A	N/A	Minimum 2 per project	Once every 3 months with each sampling/testing technician	N/A
	Moisture/Density Tests (Proctor), Soils Classification	Stockpile	1 per material type	N/A	Minimum 2 per project		
Bedding Material for Cattle Guards (Section 610)	In-Place Density and Moisture	Structure	1 per structure	N/A	Minimum 2 per project	Once every 3 months with each sampling/testing technician	N/A
	Moisture/Density Tests (Proctor), Soils Classification	Stockpile	1 per material type	N/A	Minimum 2 per project		
Foundations / Backfill for Drop Inlets and Junction Boxes (Section 623)	In-Place Density and Moisture	Structure	Sec Table A	N/A	Minimum 2 per project	Once every 3 months with each sampling/testing technician	N/A
	Moisture/Density Tests (Proctor), Soils Classification	Foundation material location	1 per material type	N/A	Minimum 2 per project		
Foundations / Backfill for Utilities (Section 660)	In-Place Density and Moisture	Structure	Sec Table A	N/A	Minimum 2 per project	Once every 3 months with each sampling/testing technician	N/A
	Moisture/Density Tests (Proctor), Soils Classification	Foundation material location	1 per material type	N/A	Minimum 2 per project		

New Mexico Department of Transportation Minimum Testing Requirements

TABLE A

STRUCTURE DEFINITIONS, FOUNDATION AND BACKFILL REQUIREMENTS

- 1) Transverse or skewed culvert or concrete box culvert (CBC), not connected to and underground drainage network, including end sections, wing walls if backfilled simultaneously, structural plate pipe, storm drains and sewer lines (Note 1):

Foundation: One density per 100 linear feet. For pipe in a battery, up to 4 pipe may be considered as a unit for purposes of foundation density.

Backfill Density: 1 per 2 foot of fill per side* and to top of trench per 100 linear feet (Note 2).

* For a battery of pipes, the number of backfill densities required will be as follows:

One-Half (1/2) of the required densities for up to 4 pipes.

One-Third (1/3) of the required densities for more than 4 pipes.

- 2) End section or CBC wing wall if backfilled separately from culvert pipe or CBC (Note 2):

Backfill Density: 1 per 2 foot of fill per side.

- 3) Drop inlet (D.I.), junction box, cattle guard, light and signal base, manhole, etc.:

Foundation: 1 per structure.

Backfill Density: 1 per 2 foot of fill.

- 4) Underground drainage network including interruptions such as D.I., manhole, junction box, plug service connection, slotted drain, etc., if backfilled simultaneously:

Foundation: One per 100 linear feet.

Backfill Density: 1 per 2 foot of fill per side and to top of trench per 100 linear feet (Note 2).

- 5) Retaining wall / MSE wall:

Foundation: One foundations density per 100 linear feet.

Backfill Density: 1 per 2 foot of fill per 100 linear feet.

- 6) Bridge abutment back wall, wing wall or approach slab:
Backfill Density: 1 per 6 inches of fill.
- 7) Pier footing:
Foundation: 1 per footing.
Backfill Density: 1 per 6 inches of fill.
- 8) Water lines, electrical conduit, telephone cable or gas line, etc., within roadway prism (traveled area and shoulder)
if trench width sufficient for density testing.
Foundation: One per 100 linear feet.
Backfill Density: 1 per 2 foot of fill per 100 linear feet.
- 9) Water line, electrical conduit, telephone cable or gas line, etc., outside the roadway prism
(traveled area and shoulders) if trench width sufficient for density testing.
Foundation: 1 per 300 linear feet.
Backfill Density: 1 per 2 foot of fill per 300 linear feet.

Notes:

- 1. All extensions will be considered increments and as such structure units.
- 2. Determination of Backfill Depths Governing Minimum Testing Criteria Requirements:
 - A. When backfill construction is performed in trench conditions, the depth of compacted backfill to be tested shall be measured from the foundation to the top of the trench.
 - B. When backfill construction is performed in non-trench conditions, the depth of compacted backfill to be tested shall be determined through the use of the appropriate NMDOT standard drawings.

New Mexico Department of Transportation Minimum Testing Requirements

QLA BASE COURSE

Item	Test Required	Sampling/Testing Location	Agency Testing	Contractor Testing	Independent Assurance		Static Materials Bureau
					Project Approach	System Approach	
Base Course (Section 303)	In-Place Density and Moisture	Roadway after compaction	1/2,000 tons	1/1,000 tons	1/10,000 tons with Contractor 1/20,000 tons with Agency	Once every 3 months with each sampling/testing technician	Referee Testing
	Moisture/Density Tests (Proctor)	Stockpile	1 per material type	N/A	1/10,000 tons with Contractor 1/20,000 tons with Agency		
	Gradations	Processed material	1/2,000 tons	1/1,000 tons			
	FF, LL, PI	Processed material	1/2,000 tons	1/1,000 tons			
	Thickness	Roadway after compaction	1/2,000 tons	1/1,000 tons			

*For Projects whose total is less than 300 tons, IA testing is not required.

New Mexico Department of Transportation Minimum Testing Requirements

BASE COURSE

ITEM	Test Required	Sampling/Testing Location	Agency Testing	Contractor Testing	Independent Assurance		State Materials Bureau
					Project Approach	System Approach	
Base Course (Section 304)	In-Place Density and Moisture	Roadway after compaction	1/1,500 tons (Minimum 1 per project)	N/A	1/15,000 tons, minimum 1 per Project*	Once every 3 months with each sampling/testing technician	N/A
	Moisture/Density Tests (Proctor)	Stockpile	1 per material type	N/A			
	Gradations	After placement but before compaction	1/1,000 tons (Minimum 1 per project)	N/A			
	FF, LL, PI	After placement but before compaction	1/1,000 tons (Minimum 1 per project)	N/A	1/10,000 tons, minimum 1 per project*		
	Thickness	Roadway after compaction	3/1,000 If per lane (Minimum 3 per project)	N/A			

Stockpiled Base Course

See Aggregates;
Stockpiled Aggregates

*For Projects whose total is less than 300 tons, 1A testing is not required.

New Mexico Department of Transportation Minimum Testing Requirements

AGGREGATES

ITEM	Test Required	Sampling/Testing Location	Agency Testing	Contractor Testing	Independent Assurance		State Materials Bureau
					Project Approach	System Approach	
Processing, Placing and Compacting Existing Pavement (Section 302)	In-Place Density	Roadway	1/1000 sq yards	N/A	1/40,000 sq. yd. with minimum 2 per project	N/A	N/A
	Gradation	Roadway	1/2000 tons	N/A	1/20,000 tons with minimum 2 per project		
Stockpiled Aggregate	Gradation, FF, F&E	Stockpile	If contractor testing not specified in contract 1/500 tons with a minimum 1 per day. If contractor testing is specified in contract 1/1500 tons	If contractor testing specified in contract 1/500 tons with a minimum 1 per day	Minimum 2 per project	N/A	Once every 3 months will each sampling/testing technician
Rip Rap Material	Aggregate Index	Source	N/A	N/A	N/A	N/A	N/A

New Mexico Department of Transportation Minimum Testing Requirements

Non QLA HOT MIX ASPHALT (HMA)/Warm Mix Asphalt (WMA)

ITEM	Test Required	Sampling/Testing Location	Agency Testing	Contractor Testing	Independent Assurance		State Materials Bureau
					Project Approach	System Approach	
HMA/WMA Superpave (Section 423/424)	Asphalt Content, Gradation	Roadway	1/1,500 tons	N/A	Minimum of 2 per project	Once every 3 months with each sampling/testing technician	N/A
	Bulk Specific Gravity, Gmm, Air Voids, VMA, VFA, DP			N/A			
	Roadway Compaction (Cores)		3/1,500 tons	Contractor to obtain cores for Compaction Testing	Minimum 3 per project from cores retained at project		
Open Graded Friction Course (Section 403/404)	Roadway Compaction (Portable Densometer)	Roadway	N/A	1/300 tons	N/A	Minimum 2 per project	N/A
	Gradation, FF, PI, SE, F&E, FAA, Moisture	Cold Feed before addition of lime or Anhydrite material	1/day	N/A			
	Gradation, FF	Cold Feed	1/3000 tons with a minimum of 1 per day	1/500 tons 1st 2,000 tons then 1/1000 tons after 2,000 tons			
		Crusling	N/A	1/500 tons 1st 2,000 tons then 1/1000 tons after 2,000 tons			
	Performance Graded Asphalt Binder	From storage tank or Delivery Truck	1 sample consisting of three separate 1 quart increments per Project	Samples will be obtained by contractor personnel and observed by Department personnel	N/A		Material will be accepted in accordance with contract documents. A min. of one sample per project will be tested.

New Mexico Department of Transportation Minimum Testing Requirements

Non QLA HOT MIX ASPHALT (HMA)/Warm Mix Asphalt (WMA)

ITEM	Test Required	Sampling/Testing Location	Agency Testing	Contractor Testing	Independent Assurance		State Materials Bureau
					Project Approach	System Approach	
Hot In-Place Recycling (Remixing Method) (Section 412)	Roadway Density (Portable Densometer)	Roadway	1/300 tons	N/A	Minimum 2 per project	Once every 3 months with each sampling/testing technician	N/A
	Roadway Density (Portable Densometer)	Roadway	1/300 tons	N/A	Minimum 2 per project		N/A
	HMA/WMA	Windrow/Hopper	See HMA/WMA Requirements above	N/A	Minimum 2 per project		N/A
Pavement Surface Restoration (In-Situ) (Section 415)	Roadway Density	Roadway	1/300 tons	N/A	Minimum 2 per project		N/A
	Bulk Specific Gravity		2 sets/day				
Performance Graded Asphalt Binder (Section 402)	As required in the Contract Documents	From storage tank or delivery truck	Minimum 2 samples consisting of three separate 1 quart increments per Project. One from the Test Strip and one randomly selected from the project	Samples will be obtained by contractor personnel and observed by Department personnel. One sample will be obtained from the Test Strip, and one sample will be obtained for each 5000 tons asphalt mix	Random samples will be selected by District Laboratory Personnel and submitted to the SMB.	N/A	Material will be accepted in accordance with the Contract Requirements. A minimum of two samples per project will be tested.

New Mexico Department of Transportation Minimum Testing Requirements

Non QLA HOT MIX ASPHALT (HMA)/Warm Mix Asphalt (WMA)							
ITEM	Test Required	Sampling/Testing Location	Agency Testing	Contractor Testing	Independent Assurance		State Materials Bureau
					Project Approach	System Approach	
Asphalt Emulsion (Section 402)	The manufacturers certificate of compliance will suffice for testing credits	N/A	N/A	N/A	N/A	N/A	Material shall be provided by approved suppliers, in accordance with SMB procedures for Certification of Asphalt Suppliers.
Hydrated Lime or Anhydrite Base Material (Section 402)	The manufacturers certificate of compliance will suffice for testing credits	N/A	N/A	N/A	N/A	N/A	N/A

New Mexico Department of Transportation Minimum Testing Requirements

QLA (Sections 423/424 / 901) HOT MIX ASPHALT (HMA), WARM MIX ASPHALT (WMA)

ITEM	Test Required	Sampling/Testing Location	Agency Testing	Contractor Testing	Independent Assurance		State Materials Bureau
					Project Approach	System Approach	
HMA/WMA Superpave (Section 423/424)	Asphalt Content, Gradation, Gmm, Gmb, Air Voids, VMA, VFA, DP	Roadway	1/3000 tons. Gmm will be determined at least once per day.	1/1000 tons. Gmm will be determined at least twice per day.	1/10,000 tons with Contractor. 1/30,000 tons with Agency	Once every 3 months with each sampling/testing technician	Referee Testing
	Roadway Compaction (Cores)				1 per sub-lot with Agency and 3 per sub-lot with Contractor from cores retained at project		
	Roadway Compaction (nuclear)	Roadway	N/A	As needed	N/A		
Performance Graded Asphalt Binder (Section 402)	Fr, Pl, SE, F&E, FAA, Moisture	Cold Feed before addition of lime or Anhydrite material	1/week	1/day	1/10,000 tons with Contractor. 1/30,000 tons with Agency	N/A	Material will be accepted in accordance with contract requirements. A minimum of two samples per project will be tested.
	As required in the Contract Documents	From storage tank or delivery truck	Minimum 2 samples consisting of three separate 1 quart increments per sample per Project. One from the Test Strip and one randomly selected from the project	Samples will be obtained by contractor personnel and observed by Department personnel. One sample will be obtained from the Test Strip, and one sample will be obtained for each 5000 tons asphalt mix	Random samples will be selected by District Laboratory Personnel and submitted to the SMB.		
Asphalt Emulsion (Section 402)	The manufactures certificate of compliance will suffice for testing credits	N/A	N/A	N/A	N/A		
Hydrated Lime or Anhydrite Base Material (Section 402)	The manufactures certificate of compliance will suffice for testing credits	N/A	N/A	N/A	N/A		N/A

New Mexico Department of Transportation Minimum Testing Requirements

Non QLA PORTLAND CEMENT CONCRETE

Structures, Curb & Gutter, Side Walks, etc. (509, 510, 511, 521)

Item	Test Required	Sampling/Testing Location	Agency Testing	Contractor Testing	Independent Assurance		State Materials Bureau
					Project Approach	System Approach	
Fine Aggregates	Gradation	Stockpile	1/2000 cy of concrete batched or one per two weeks during production (Minimum of 2 per project)	If approved for Combined Gradation 1/week or 500 cy (which ever is less)	Minimum 2 per project		N/A
	SE., F.M.		1 per two weeks during production. Minimum 2 per project	N/A			
Coarse Aggregates	Gradation	Stockpile	1/2000 cy of concrete batched or one per two weeks during production (Minimum of 2 per project)	If approved for Combined Gradation 1/day or 500 cy (which ever is less)	Minimum 2 per project		N/A
	FF, F&E		1 per two weeks during production. Minimum 2 per project	N/A			
Non-Shrink Mortar Aggregate	The manufacture certificate of compliance will suffice for testing credits	N/A	N/A		N/A		N/A
Project Acceptance Test	Compressive Strength Cylinders	Sec tabic B	One random set of cylinders for the first three trucks. One random set for each subsequent six truck sub-lot (with corresponding slump, unit weight and calculated air content).	N/A	1 set per 1000cy or minimum 2 per project		N/A
	Slump, Unit Weight, Calculated Air Content, Temperature		Test each of the first three trucks. After first three trucks randomly select a truck to be tested in six truck sub-lots	N/A			

New Mexico Department of Transportation Minimum Testing Requirements

Non QLA PORTLAND CEMENT CONCRETE PAVEMENT (509, 451)

Item	Test Required	Sampling/Testing Location	Agency Testing	Contractor Testing	Independent Assurance		State Materials Bureau
					Project Approach	System Approach	
Fine Aggregates	Gradation	Stockpile	If Conventional Stockpile Approval, 1 per two weeks during production	"Combined Gradation" 1/week or 500 cy (which ever is less)	Minimum 2 per project		N/A
	S.E., F.M.		1 per two weeks during production. Minimum 2 per project	N/A			
Coarse Aggregates	Gradation	Stockpile	If Conventional Stockpile Approval, 1 per two weeks during production	"Combined Gradation" 1/week or 500 cy (which ever is less)	Minimum 2 per project		N/A
	F.F, F&E		1 per two weeks during production. Minimum 2 per project	N/A			
Project Acceptance Test	Compressive Strength Cylinders	See table B	One random set of cylinders from the first three trucks. After the first three trucks randomly select a truck to be tested in 6 truck sub-lots	N/A	1 set / 2,000 cy or minimum 2 per project	Once every 3 months with each sampling/testing technician	N/A
	Slump, Unit Weight, Calculated Air Content, Temperature		Test each of the first three trucks. After the first three trucks randomly select a truck to be tested in 6 truck sub-lots	N/A			
	Thickness		1 per 300 cy	N/A			
Environmental Conditions	Evaporation Rate	Placement Site	N/A	Evaporation Potential determined at intervals not greater than 5 minutes until final curing system in place	N/A		N/A

New Mexico Department of Transportation Minimum Testing Requirements

Non QLA Superstructure Concrete (509, 510, 512)

Item	Test Required	Sampling/Testing Location	Agency Testing	Contractor Testing	Independent Assurance		State Materials Bureau
					Project Approach	System Approach	
Fine Aggregates	Gradation	Stockpile	1/2000 cy of concrete batched or one per two weeks during production	If approved for Combined Gradation 1/day or 500 cy (which ever is less)	Minimum 2 per project per source		N/A
	S.E., F.M.		1 per two weeks during production. Minimum 2 per project	N/A			
Coarse Aggregates	Gradation	Stockpile	1/2000 cy of concrete batched or one per two weeks during production	If approved for Combined Gradation 1/day or 500 cy (which ever is less)	Minimum 2 per project per source		N/A
	F.F., F&E		1 per two weeks during production. Minimum 2 per project	N/A			
Project Acceptance Test	Compressive Strength Cylinders	See table B	One random set of cylinders for one of the first three trucks tested. One random set for each subsequent three truck sub-lot.	N/A	1 set per 300 cy or minimum 2 per project		N/A
	Slump, Unit Weight, Air Content - calculated and measured		Test each of the first three trucks. After 1st three trucks randomly select a truck to be tested in three truck sub-lots.	N/A			
Environmental Conditions	Evaporation Rate	Placement Site	N/A	Evaporation Potential determined at intervals not greater than 5 minutes until final curing system in place	N/A		N/A

New Mexico Department of Transportation Minimum Testing Requirements
Table B

<u>Method of Placement</u>	<u>Sample Location</u>
Pumped	Point of discharge from pump into structure
Direct Discharge from Truck	At end of discharge chute of truck
Crane and Bucket	From discharge chute of bucket
Conveyor belt	From material on roadway after being discharged from conveyor
Slip Form (Curb and Gutter/Barrier Walls)	Point of discharge into extrusion machine
Slip Form Paver (PCCP)	From grade in front of paving machine

**New Mexico Department of Transportation Minimum Testing Requirements
QLA PORTLAND CEMENT CONCRETE PAVEMENT (450)**

Item	Test Required	Sampling/Testing Location	Agency Testing	Contractor Testing	Independent Assurance		State Materials Bureau
					Project Approach	System Approach	
Fine Aggregates	Gradation, S.E., F.M.	Stockpile	1 per two weeks during production. Minimum 2 per project	"Combined Gradation" 1/day or 500 cy (which ever is less)	Minimum 2 per project	Once every 3 months with each project sampling/testing technician	Referee Testing
Coarse Aggregates	Gradation, F.F., F&E	Stockpile	1 per two weeks during production. Minimum 2 per project	One set of cylinders from one of the first three trucks. 1 set per 125 cy thereafter	Minimum 2 per project		
Project Acceptance Test	Compressive Strength Cylinders	See table B	1 set of cylinders per 500 cy	For each of the first three trucks. 1 set per 125 cy from the trucks selected for compressive strength testing thereafter.	1 set of cylinders per 2,000 cy or minimum 2 per project	N/A	N/A
	Slump, Unit Weight, Calculated Air Content, Temperature		1 per 500 cy	2 per 2,500 sq. yd.			
Environmental Conditions	Thickness	Roadway	2 per 10,000 sq. yd.	Evaporation Potential determined at intervals not greater than 5 minutes until final curing system in place	N/A	N/A	N/A
	Evaporation Rate	Placement Site	N/A				

Table B

<u>Method of Placement</u>	<u>Sample Location</u>
Pumped	Point of discharge from pump into structure
Direct Discharge from Truck	At end of discharge chute of truck
Crane and Bucket	From discharge chute of bucket
Conveyor belt	From material on roadway after being discharged from conveyor
Slip Form (Curb and Gutter/Barrier Walls)	Point of discharge into extrusion machine
Slip Form Paver (PCCP)	From grade in front of paving machine

New Mexico Department of Transportation Minimum Testing Requirements

PRE APPROVED ITEMS

Item	Test Required	Project Minimum Frequency of Sampling	Contractor Testing	Independent Assurance		Tested At State Materials Bureau
				Project Approach	System Approach	
Cement (Section 509)	Approved Material List	The manufactures certificate of compliance will suffice for testing credits	N/A	N/A	N/A	Materials will be accepted in accordance with the State Materials Bureau procedures
Fly Ash (Section 509)	Approved Material List	The manufactures certificate of compliance will suffice for testing credits	N/A	N/A	N/A	Materials will be accepted in accordance with the State Materials Bureau procedures
Mixing Water Section 509)	1 per source per year as part of mix design	N/A	N/A	N/A	N/A	Materials will be accepted in accordance with the State Materials Bureau procedures
Air Entraining Agent (Section 509)	Approved Material List	N/A	N/A	N/A	N/A	N/A
Curing Compound (Section 509)	Approved Material List	N/A	N/A	N/A	N/A	N/A
Waterproofing Compound (Section 510)	Approved Material List	N/A	N/A	N/A	N/A	N/A
PCC Admixtures (Section 509)	Approved Material List	N/A	N/A	N/A	N/A	N/A
Wire Fabric	Pre-tested at Fabricating Plant	The manufactures certificate of compliance will suffice for testing credits	N/A	N/A	N/A	N/A
Reinforcing Steel	Pre-tested at Fabricating Plant	The manufactures certificate of compliance will suffice for testing credits	N/A	N/A	N/A	N/A
Expansion Joint Material	Approved Material List	The manufactures certificate of compliance will suffice for testing credits	N/A	N/A	N/A	N/A

New Mexico Department of Transportation Minimum Testing Requirements

PRE APPROVED ITEMS							
	Approved Material List	The manufactures certificate of compliance will suffice for testing credits	N/A	N/A	N/A	N/A	N/A
Hydrated Lime or Anhydrite Base Material	Approved Material List	The manufactures certificate of compliance will suffice for testing credits	N/A	N/A	N/A	N/A	N/A
Asphalt Cement (Section 402)	Approved Material List	The manufactures certificate of compliance will suffice for testing credits	N/A	N/A	N/A	N/A	Materials will be accepted in accordance with the State Materials Bureau procedures
Polymer Modified Asphalt Binder (Section 402)	Approved Material List	The manufactures certificate of compliance will suffice for testing credits	N/A	N/A	N/A	N/A	Materials will be accepted in accordance with the State Materials Bureau procedures
Emulsified Asphalt (Section 402)	Approved Material List	The manufactures certificate of compliance will suffice for testing credits	N/A	N/A	N/A	N/A	Materials will be accepted in accordance with the State Materials Bureau procedures
High Float Emulsions (Section 402)	Approved Material List	The manufactures certificate of compliance will suffice for testing credits	N/A	N/A	N/A	N/A	Materials will be accepted in accordance with the State Materials Bureau procedures
Polymer-Modified Asphalt Emulsions (Section 402)	Approved Material List	The manufactures certificate of compliance will suffice for testing credits	N/A	N/A	N/A	N/A	Materials will be accepted in accordance with the State Materials Bureau procedures
Polymer-Modified Asphalt Emulsions, Rapid Set (Section 402)	Approved Material List	The manufactures certificate of compliance will suffice for testing credits	N/A	N/A	N/A	N/A	Materials will be accepted in accordance with the State Materials Bureau procedures
Asphalt-Emulsified Prime (AE-P) (Section 402)	Approved Material List	The manufactures certificate of compliance will suffice for testing credits	N/A	N/A	N/A	N/A	Materials will be accepted in accordance with the State Materials Bureau procedures
Penetrating Emulsified Prime (Section 402)	Approved Material List	The manufactures certificate of compliance will suffice for testing credits	N/A	N/A	N/A	N/A	Materials will be accepted in accordance with the State Materials Bureau procedures
Cutback Asphalts (Medium-Curing Type) (Section 402)	Approved Material List	The manufactures certificate of compliance will suffice for testing credits	N/A	N/A	N/A	N/A	Materials will be accepted in accordance with the State Materials Bureau procedures

New Mexico Department of Transportation Minimum Testing Requirements

PRE APPROVED ITEMS						
Traffic Paint (Section 704)	Certificate of Compliance and documentation of testing by SMB	The manufactures certificate of compliance will suffice for testing credits	N/A	N/A	N/A	Materials will be accepted in accordance with the State Materials Bureau procedures
ReflectORIZED Glass Beads (Section 704)	Certificate of Compliance and documentation of testing by SMB	The manufactures certificate of compliance will suffice for testing credits	N/A	N/A	N/A	Materials will be accepted in accordance with the State Materials Bureau procedures

**New Mexico Department of Transportation Minimum Testing Requirements
Tolerances for Comparison of Independent Assurance Sample Tests**

to

Acceptance and Process Control Tests

CHARACTERISTICS

Moisture/Density Test (Proctor)
In Place Moisture/Density (Roadway)
Plasticity Index (P.I.)

TOLERANCES

± 3.0 PCF*, ± 2 Units for Moisture
± 3.0 PCF, ± 2 Units for Moisture
± 3 Units

*Only if proctors are run by both District and Project. If proctors are not run by both District and Project ± 5.0 PCF

GRADATION

1 1/2" to 3/4"
1/2" to No. 4
No. 8 through No. 100

± 6 Units
± 5 Units
± 4 Units

No. 200

± 2 Units** **For high volume change soil (Section 207)
± 5 Units the allowable tolerance shall be ± 5 units

Fractured Faces

Flat & Elongated

± 5 Units

Fine Aggregate Angularity

± 3 Units

Sand Equivalent

± 4 Units

Aggregate Specific Gravity

± 0.020

CONCRETE

Slump

± 0.5 Inch

Unit Weight

± 2.0 PCF

Compressive Strength

Within-test coefficient of variation less than 5 %

**New Mexico Department of Transportation Minimum Testing Requirements
Tolerances for Comparison of Independent Assurance Sample Tests**

**to
Acceptance and Process Control Tests**

HOT MIX ASPHALT (HMA)

Roadway Density (Cores from project, retained by Agency and Contractor Personnel)	± 0.025 Units
Density (Nuclear)	± 4 Units
VMA	± 1.0 Units
DP	± 0.3 Units
Asphalt Content (Ignition Burn Oven)	± 0.30 Units (Mixes with Virgin Material and RAP less than equal to 15%), ± 0.40 (With greater than 15% RAP)
Bulk Density at Ndes	± 0.025 Units
Maximum Specific Gravity	± 0.020 Units