

## SECTION 336

### ASPHALT CONCRETE PAVEMENT

336.1 GENERAL: Asphalt concrete pavement shall consist of a mixture of mineral aggregate and asphalt binder, placed and compacted on either a prepared subgrade, or base, or asphalt concrete pavement, in conformity with the lines, grades, and dimensions shown on the plans or as specified in the supplementary Specifications, and this specification. The asphalt concrete including materials, mixing, and hauling shall comply with the requirements of SECTION 116, SECTION 328, and SECTION 329, as applicable, and the supplementary technical specifications. The CONTRACTOR shall be solely responsible for the asphalt concrete pavement supplied under this specification, materials, proportioning, placement, and compaction. The terms field density and compaction are interchangeable.

#### 336.1.1 REFERENCES:

ASTM D2726 Standard Test Method for Bulk Specific Gravity and Density of Non-absorptive Compacted Bituminous Mixtures

ASTM D2950 Density of Bituminous Concrete in Place by Nuclear Methods

ASTM D3549 Thickness or Height of Compacted Bituminous Paving

ASTM D979 Sampling Bituminous Paving Mixtures

336.1.1 This Publication:

SECTION 13 WARRANTY AND GUARANTEE;  
TESTS AND INSPECTIONS;  
CORRECTIONS, REMOVAL, OR  
ACCEPTANCE OF DEFECTIVE  
WORK.

SECTION 112 ASPHALT BINDER

SECTION 116 ASPHALT CONCRETE

SECTION 304 LIME TREATED SUBGRADE

SECTION 305 CEMENT TREATED BASE  
CONSTRUCTION

SECTION 307 PLANT MIXED BITUMINOUS  
TREATED BASE CONSTRUCTION

SECTION 328 QUIET ASPHALT CONCRETE  
PAVEMENT

SECTION 329 PLANT MIXED SEAL COAT  
CONSTRUCTION

SECTION 333 FOG SEAL COATS

#### 336.2 PAVING PLANNING

336.2.1 For construction and reconstruction street projects requiring asphalt concrete pavement placement equal or greater than either 500 tons of asphalt concrete per day, the CONTRACTOR shall have a full time asphalt pavement construction supervisor on site to direct the asphalt concrete pavement construction during test sections and pavement construction operations. The supervisor shall be certified under the New Mexico State Highway and Transportation Department/Associated CONTRACTORS of New Mexico Technical Training and Certification Program for ASPHALT and SUPERPAVE.™ The supervisor shall be identified by the CONTRACTOR at the prepaving conference and shall be the contact person for the ENGINEER during asphalt concrete pavement construction. Supervisor certification shall be made available to the ENGINEER upon request.

336.2.2 At the direction of the ENGINEER, a prepaving Conference shall be held no later than seven calendar days prior to the start of asphalt concrete pavement construction. The meeting agenda/assigned responsibilities shall be accomplished at the conference.

#### I. ENGINEER/OWNER

- A. Scope of the project.
- B. Identify construction management team and contact telephone numbers.
- C. Review CONTRACT requirements for asphalt pavement construction.
- D. Review Quality Assurance Program.

#### II. CONTRACTOR

- A. Review pavement construction schedules.
  1. Test strip location and placement schedules.
  2. Proposed pavement construction schedule for duration of the project.
- B. Identify construction personnel and contact telephone numbers.
  1. CONTRACTOR Staff
  2. Sub-CONTRACTOR(s)
  3. Supplier(s)
  4. Safety Manger
- C. Present construction placement procedure plans.
  1. Equipment Schedule
  2. Asphalt Concrete Job Mix Formula
  3. Paving methodology
  4. Traffic Control Plan
  5. Quality Control Plan

## SECTION 336

### ASPHALT CONCRETE PAVEMENT

#### III. DISCUSSION AND COMMENT

##### 336.3 MATERIALS

##### 336.3.1 ASPHALT CONCRETE

Asphalt concrete shall be placed at the design proportions specified in the authorized job mix formula, within the specified production tolerances for combined aggregate gradation and asphalt binder content. Asphalt concrete placed at a project, sampled and tested in accordance with this specification, shall have a gradation that complies with the authorized design gradation  $\pm$  the production tolerance(s) specified in the authorized job mix formula. Asphalt concrete placed at a project, sampled and tested in accordance with this specification, shall have an asphalt content that complies with the design asphalt content  $\pm$  0.5% (laboratory analysis).

##### 336.3.2 PRIME COAT

336.3.2.1 Prime coat shall comply with the requirements of Section 113. It shall be applied to subgrade, aggregate base course, and concrete treated base course a minimum of 12 hours prior to placing the asphalt concrete pavement, as directed by the ENGINEER. Traffic shall not be permitted on the prime coat prior to construction of the asphalt concrete pavement.

336.3.2.2 Immediately prior to prime coat application, an inspection of the surface shall be made by the ENGINEER. The surface to be primed shall be in a uniform and well compacted condition, true to grade and cross section. All loose and foreign material shall be removed by light sweeping prior to application. Loose material shall not be mixed with asphalt concrete.

336.3.2.3 Prime coat shall be applied uniformly at the rate of 0.10 to 0.30 gallon per square yard. It shall be applied when the air temperature is 40°F and rising, as authorized by the ENGINEER.

336.3.2.4 In order to prevent lapping at the joint of two applications, the distributor shall promptly shut off. A hand spray shall be used to touch up all spots missed by the distributor.

336.3.2.5 The pressure distributor used for applying prime coat material shall be equipped with pneumatic tires and shall be so designed and operated as to distribute the prime material in a uniform spray without

atomization, in the amount and between the limits of temperature specified. It shall be equipped with a speed tachometer registering feet per minute and so located as to be visible to the truck driver to enable him to maintain the constant speed required for application at the specified rate.

336.3.2.6 The pressure distributor shall be equipped with a tachometer registering the pump speed pressure gauge, and a volume gauge. The rates of application shall not vary from the rates specified by more than 10 percent. Suitable means for accuracy indicating at all times the temperature of the prime material shall be provided. The thermometer well shall be so placed as not to be in contact with a heating tube.

336.3.2.7 The distributor shall be so designed that the normal width of application shall be not less than 6 feet, with provisions for the application "of lesser width" when necessary. If the distributor is equipped with heating attachments, the prime coat material shall be circulated or agitated to provide the application temperature specified by the manufacturer.

336.3.2.8 If the prime coat has not been completely absorbed prior to the start of placing the asphalt concrete pavement, sufficient sand shall be spread over the surface to blot the excess and prevent tracking under traffic. Sand shall be applied as directed by the ENGINEER. Prior to placing the asphalt concrete pavement, loose or excess sand shall be swept from the base. If a sand cover is specified in the Supplementary Specifications or noted on the drawings to cover a prime coat, it shall be applied within 4 hours after the application of prime coat, as authorized by the ENGINEER.

336.3.2.9 A prime coat shall be prevented from spraying upon adjacent pavements, structures, guard rails, guide posts, culvert markers, trees, and shrubbery that are not to be removed; adjacent property and improvements; and other facilities or that portion of the traveled way being used by traffic.

336.3.2.10 The CONTRACTOR shall protect a prime coat against all damage and markings, both from foot and other traffic. Barricades shall be placed where necessary to protect a prime coat. Damaged prime coat shall be repaired by the CONTRACTOR, at his expense. Asphalt concrete pavement shall not be placed until a prime coat has been accepted by the ENGINEER.

##### 336.4 TACK COAT:

## SECTION 336

### ASPHALT CONCRETE PAVEMENT

336.4.1 If the asphalt concrete pavement is being constructed directly upon an existing hard surfaced pavement, a tack coat shall be evenly and uniformly applied to existing pavement preceding the placing of the asphalt concrete, as directed by the ENGINEER. The surface shall be free of water, all foreign material, or dust when the tack coat is applied. No greater area shall be treated in any one day than will be covered by the asphalt concrete during the same day. Traffic will not be permitted over tack coat.

336.4.2 Tack coat shall consist of cationic emulsified asphalt as specified in Section 113. Application rate shall be 0.03 to 0.12 gallon per square yard.

336.4.3 A tack coat shall be applied to the surface of any course if, in the opinion of the ENGINEER, the surface is such that a satisfactory bond cannot be obtained between it and the succeeding course.

336.4.4 The contact surfaces of all cold pavement joints, curbs, gutters, manholes, and the like shall be painted with a tack coat immediately before the adjoining asphalt concrete is placed. Surfaces where a tack coat is required shall be cleaned of all loose material before the tack coat is applied.

#### 336.5 PLACEMENT

336.5.1 Asphalt concrete may be placed when the ground temperature is 40°F and rising and the weather is favorable, as authorized by the ENGINEER. Quiet asphalt concrete and plant mixed seal coat may be placed when the pavement temperature is 60 °F and rising, and the weather is favorable to construction, as authorized by the ENGINEER. Materials may not be placed in either wet weather, or on a wet or damp surface, or on frozen supporting material. The area where the asphalt is to be placed is to be free of foreign material.

336.5.2 An asphalt concrete pavement lift shall be placed uniformly, at a temperature within the compaction range specified in the authorized job mix formula, without segregation, to such a depth that after compaction it will comply with the specified cross section and grade, specified in the plans and specifications.

336.5.3 The temperature of the mat shall be in a uniform range of 15°F transverse the mat after placement behind the paver.

336.5.4 Asphalt concrete shall be placed and compacted in uniform layers/lifts, +/- 3/16 inch in 10 feet of the lift finish grade. See COA STD Drawing for 2400 for acceptable lift thicknesses. Lift thickness(s) and asphalt concrete type, designating the maximum nominal size aggregate, shall be either specified in the CONTRACT documents, or as directed by the ENGINEER. SP-II gradation mixes shall not be used for the surface course.

336.5.5 Placement shall be continuous, without interruption. No greater amount of the mixture shall be delivered in any one day than can be placed, compacted and finished that same day.

336.5.6 No asphalt concrete surface course shall be placed which cannot be finished within daylight hours of the same day it is laid unless authorized by the ENGINEER.

336.5.7 In narrow, deep, irregular sections, intersections, turning radiuses, turnouts, cul de sacs, or driveways, where it is impractical to spread and finish the base and level the surface mixtures by machine methods, the CONTRACTOR may use placement equipment or acceptable hand methods, as authorized by the ENGINEER. The CONTRACTOR shall place material in lifts specified and not exceed the limits of depth of the compaction equipment. Hand placed and compacted material shall be placed in lifts not greater than 2 inches maximum compacted depth. The finish surface shall be checked with a 10 feet straight edge, true and level, within 3/16 inch to the adjacent asphalt concrete pavement. Humps shall be milled true and level and depressions shall be filled and finished to comply with this specification.

336.5.8 Pavement cuts of 8 feet or more in width and 50 feet or more in length must be paved with an approved bituminous paving machine. Asphalt concrete should be placed with a paving machine for all sections.

336.5.9 Depositing and spreading of the asphaltic concrete shall be accomplished by means of a bituminous paver except as specified in 336.5.7. Bituminous pavers shall be self contained, self propelled units, provided with an automated leveling activated screed or a strike off assembly, with heating capabilities, and capable of spreading and finishing courses of bituminous plant mix material in lane widths applicable to the lifts and thickness specified in the plans and specifications. Pavers shall be free of fluid leaks. Pavers detected to have leaks shall not be allowed on the project.

## SECTION 336

### ASPHALT CONCRETE PAVEMENT

336.5.8 The paver shall be equipped with a receiving hopper having sufficient capacity for uniform spreading operation. The hopper shall be equipped with a distribution system to place the mixture uniformly in front of the screed. The hopper shall be operated at 50% or greater capacity during paving operations. Paving shall not be allowed when the hopper is at less than 50% capacity.

336.5.9 The screed or strike off assembly shall effectively produce a uniform surface and texture without tearing, shoving or gouging the mixture. The paver shall be operated at a forward speed consistent with satisfactory laying of the mixture.

336.5.10 The paver shall be operated with an automatic leveling device controlled from an external guide. The screed shall be zeroed by the CONTRACTOR on a template or blocks set to the same depth as the loose mat behind the paver, prior to start of placement of each lift of a material. Verification of the target loose lift thickness shall be made at regular intervals during the placement. The loose lift thickness, lift thickness behind the paver shall be defined by the CONTRACTOR and reported to the ENGINEER for reference prior to startup of a lift placement. Broadcasting of excess edge material over the surface of a precompacted lift shall not be permitted.

#### 336.6 COMPACTION:

336.6.1 Asphalt concrete compaction shall begin when the asphalt concrete temperature is in the compaction temperature range specified in the authorized job mix formula. Compaction shall be completed before the temperature of the material cools to less than 200°F. Compaction may be allowed on material with a temperature less than 200°F and greater than 185°F, as authorized by the ENGINEER. Compaction on a lift shall not be allowed when the temperature of the lift is less than 185°F.

336.6.2 The material shall be compacted to a density of at least 93% and not greater than 97% of the theoretical maximum density as determined by ASTM D2726/D3549 and/or ASTM 2950. The CONTRACTOR shall be responsible for the development and implementation of the compaction program. A reference compaction program shall be defined by the CONTRACTOR and reported in writing to the ENGINEER for each job mix formula/lift thickness to be used on a project. Changes in the compaction program shall be reported to the ENGINEER as they may occur.

336.6.3 Repair and replacement of damaged adjacent property and structures, resulting from the use of vibratory rolling equipment, shall be the responsibility of the CONTRACTOR, at no cost to the OWNER.

336.6.4 A CONTRACTOR may construct a test strip, a minimum of 10 feet wide and 250 feet long, to establish the rolling pattern for an asphalt mix and lift thickness to be placed on the project, as directed by the ENGINEER. The test strip shall be paid for in accordance with the requirements of the CONTRACT, as authorized by The ENGINEER.

#### 336.7 JOINTS

336.7.1 Care shall be exercised in connection with the construction of joints to insure that the surface of the pavement is true to grade and cross section across the joint. Periodically, joints shall be tested with a 10 feet straight edge to verify the smoothness of the surfaces of adjacent material(s). A 10 feet long straight edge shall be placed perpendicular to the joint extending equally on both sides of the joint. The smoothness of the surfaces across the joint shall comply with the requirements of this specification.

336.7.2 After construction of a joint along any adjoining edge such as a curb, gutter, or an adjoining pavement lift free edge, and after the hot mixture is placed by the finishing machine, sufficient hot material shall be carried back to fill any space left open. This joint shall be properly "SET UP" with the back of a rake at proper height and level to receive the maximum compaction. The work of "setting up" this joint shall be performed by competent workmen who are capable of making a correct, clean, and neat joint. Excess material shall be removed. Broadcasting excess material onto the adjacent asphalt concrete pavement surface will not be allowed. Excess material at an edge joint shall be removed and discarded if not required for compaction.

336.7.3 Longitudinal and transverse joints shall be made in a careful manner. Well bonded and sealed joints are required. Joints between old and new pavements or between successive day's work shall be carefully made in such a manner as to insure a thorough and continuous bond between the old and new surfaces. In the case of surface course, the edge of the old surface course shall be cut back for its full depth so as to expose a fresh surface and, if necessary to obtain a well bonded joint, shall be painted with a tack coat after which the hot surface mixture shall be placed in contact with it and raked to a proper depth and grade. Before placing mixture against

SECTION 336

ASPHALT CONCRETE PAVEMENT

contact surfaces of curbs, gutters, headers, manholes, etc., they shall be painted with a tack coat. Joints shall be tested with a 10 feet straight edge to verify the smoothness of the surfaces transition of adjacent material(s). A 10 feet long straight edge shall be placed perpendicular to the joint extending equally on both sides of the joint. The smoothness of the surfaces across the joint shall comply with the requirements of this specification. Longitudinal and transverse joints shall be compacted parallel to the joint. Transverse and longitudinal joints shall be staggered a minimum of 1 foot offset from the joint of a lift either below or above, and completely bonded.

336.8 PAVEMENT PENETRATIONS, MANHOLES AND VALVE COVERS: Manhole frames and valve covers shall be adjusted as per the Standard Drawings, or as directed by the ENGINEER. The finish surface at the top of all asphalt concrete pavement penetrations, to include but not be limited to manhole frames and valve covers, shall be constructed to and be parallel in all directions the finish surface of the surrounding asphalt concrete pavement prior to placing the surface course.

336.9 SMOOTHNESS: Upon completion, the pavement shall be true to grade and cross section. Except any changes of grade, when a 10 foot straight edge is laid on the finished surface of the roadway, the surface shall not vary from the edge of the straightedge more than 3/16 inch. After the completion of final rolling, the smoothness of the course shall be checked, and the irregularities that exceed the specified tolerances and or retain water on the surface shall be corrected by the CONTRACTOR at the no cost to the OWNER, as directed by the ENGINEER.

336.10 SEGREGATION  
The surface of the asphalt shall be visually inspected for segregation. Segregation is the non-uniform distribution of coarse and fine aggregate components in the asphalt mat. A segregated asphalt mat will have large voids in the surface of the mat and will not be smooth.

336.11 SAMPLING

336.11.1 Density of Support Material

A reference density test of the support material for the asphalt concrete roadway lift to be constructed, shall be taken prior to the placement of the fresh asphalt concrete lift, or defined from previous test results. The density of the support material shall be used as reference in performing the density test of a fresh asphalt concrete lift

in accordance with the requirements ASTM D2950, placed over the support material. A density test of the support material shall be taken at the rate of one (1) test for each 500 sy of surface or less to be paved over in a day, as directed by the ENGINEER. The density of the support material shall be reported as "reference support material density" in the compaction test report of the constructed asphalt concrete pavement over the area represented by the support material compaction test.

336.11.2 Asphalt concrete tests shall be performed in accordance with the requirements of this specification, the Supplemental Technical Specifications, or as directed by the ENGINEER. Asphalt concrete analysis shall be performed in a laboratory accredited in accordance with the requirements of the New Mexico Department of Transportation "Procedure for Approval of Testing Laboratories to Perform Inspection, Testing, and Mix Design Services", latest revision. Testing equipment used in the performance of specified testing shall be calibrated annually with calibration standards traceable to the National Bureau of Standards. Certification records shall be maintained at the Laboratory for review by the ENGINEER. A copy of the certifications shall be submitted to The ENGINEER upon request. The sampling and testing shall be performed by a technician certified under the New Mexico State Highway and Transportation Department/Associated CONTRACTORS of New Mexico Technical Training and Certification Program for ASPHALT and SUPERPAVE.™

336.11.3 Material Sampling: A quality assurance asphalt concrete material field sample shall be taken in accordance with the requirements of ASTM D979 for each job mix delivered. The materials shall be sampled at the greater rate of either one sample for each 250 tons or when converted to square yards (sy) per the table below:

<u>Lift Thickness</u>	<u>SY</u>
1.5"	3,065
2.0"	2,300
2.5"	1,840
3.0"	1,533

If a lift thickness is used that is not specified in the table above, the conversion from 250 tons to sy is:  $sy = 127.7 / \text{lift thickness in yds}$  or one sample per day, for each type of material placed on a project, as directed by the ENGINEER. If the area of asphalt is less than 500 sq ft, a material test is not required. The sample shall be of such size to provide material for all tests specified and a split

## SECTION 336

### ASPHALT CONCRETE PAVEMENT

sample to perform verification/referee tests for gradation and binder content, if required.

#### 336.12 MATERIAL TESTING

336.12.1 Asphalt concrete quality assurance sampling and testing shall be performed in accordance with the requirements of this Specification, the Supplemental Technical Specifications, or as directed by the ENGINEER.

336.12.2 A quality assurance asphalt concrete sample shall be sampled, tested, and reported in accordance with this specification.

336.12.3 A CONTRACTOR may challenge production material test results, binder content and aggregate gradation, and request that the retained split asphalt concrete sample of record be released to his assigned laboratory and tested for compliance, as authorized by the ENGINEER. A challenge notification shall be made in writing to the ENGINEER by the CONTRACTOR within 28 calendar days from date of sampling. Challenge test results shall be submitted to the ENGINEER for evaluation no later than 42 calendar days from date of sampling. Challenge test results will be evaluated in accordance with the "multi laboratory" precision tolerances specified, T53 for binder content, ASTM C117 and C136 for aggregate gradation. Challenge and record test results that comply with precision tolerances will be averaged with the companion test results of record and the material pay factor, recalculated as directed by the ENGINEER. Challenge and record test results that do not comply with the precision tolerances will direct the disqualification of the challenged and record samples, as directed by the ENGINEER. Cut/core sample(s) will be taken from the area(s) represented by the disqualified challenge sample(s) and evaluated by the lab of record under the observation of the CONTRACTOR, in accordance with the requirements of these specifications and replace the disqualified sample test results. Analysis of the replacement cut/core sample(s) may not be challenged. The CONTRACTOR will submit challenge test results in writing to the ENGINEER for each split sample released to his assigned laboratory of record. Challenges filed after the time limitations will not be considered. The OWNER shall pay for all complying tests.

#### 336.12.4 COMPACTION TESTING

336.12.4.1 Asphalt concrete pavement compaction sampling and testing shall be performed in accordance

with the requirements of this specification, the Supplemental Technical Specifications, as directed by the ENGINEER. Each lift, for each type of asphalt concrete pavement placed each day, shall be tested for compaction per ASTM D2726/D3549 and ASTM D2950. The laboratory test for field density ASTM D2726/D3549 is required if the quantity of asphalt placed meets the threshold to require a full depth asphalt core as mentioned later in this specification.

336.12.4.2 An asphalt concrete pavement compaction test shall be performed in accordance with the requirements of this specification, as directed by the ENGINEER. A test shall determine the compaction at a location of a fresh constructed asphalt concrete roadway lift at the rate of 1 test per 1000 sy. Compaction shall be calculated as the field density at a location of a test area divided by the average of the maximum theoretical density ( $G_{mm}$ ) of the acceptance sample(s) taken for that day's placement, reported to the nearest one tenth of a percent, xxx.x%. A maximum theoretical density ( $G_{mm}$ ) shall be determined in accordance with ASTM D2726/D3549.

336.12.4.3 The field density at a location for a lift of SP-II material shall be determined from a core sample. One core sample shall be taken for each lift of 250 tons, or fraction thereof, placed each day, but not less than 3 cores per day, as directed by the ENGINEER. The density of a core shall be determined in accordance with the requirements of ASTM D2726 and reported to the nearest one-tenth pound per cubic foot.

336.12.4.4 The field density for Types B, C, D, E, SP-III, SP-IV and SP-V materials, shall be measured in accordance with the requirements of ASTM D2950 Density of Bituminous Concrete in Place by Nuclear Methods, at the minimum rate of three tests per lift of 500 sy, or fraction thereof, for each type of asphalt material placed in a day, as directed by the ENGINEER. The lab density for Types B, C, D, E, SP-III, SP-IV and SP-V materials, shall be measured in accordance with the requirements of ASTM D2726/D3549 for each core taken per paragraph 336.13. If the area of asphalt is less than 500 sq ft, a density test per ASTM D2726/D3549 is not required.

336.12.4.5 Field compaction (density) tests shall be taken at random locations on an asphalt concrete pavement lift, as directed by the ENGINEER. Three (3) general areas at which a test should be taken are either adjacent to the free edge of the mat, or the mat interior, or adjacent to a joint. The number of tests taken will vary but the total number of tests taken on any project shall be in the approximate

## SECTION 336

### ASPHALT CONCRETE PAVEMENT

proportions as specified below:

<u>Location</u>	<u>% of total tests</u>
Edge of Mat	20 to 33
Mat Interior	33 to 60
Joints	20 to 33

The edge of mat test shall be taken between 1 and 2 feet from the edge of the mat. Joints shall include the longitudinal and transverse butt joints between adjacent lifts of asphalt having the same finish elevation

336.12.4.6 Sampling and testing of quiet asphalt concrete, and measurement and payment shall conform to the requirements of SECTION 328. Acceptance and/or Pay Factor is defined later in this specification

#### 336.13 FULL DEPTH CORES TO DETERMINE ASPHALT THICKNESS

Full depth cores of asphalt concrete shall be taken to determine the depth of structure and the depth pay factor, DF per ASTM D3549, defined in TABLE 336.B, as directed by the ENGINEER. A minimum of one core, having an outside diameter equal or greater than four (4) inches, shall be taken at random for each 1000 sy, or fraction thereof, placed divided by the number of lifts for a pavement section. Cores shall be evaluated in accordance with the requirements of 336.17.4. The core length, depth of the pavement, shall be determined based on the average of three measurements of the length of the core, measured from circular ends of a sample. If only one core sample is taken, averaging is not required. All measurements shall be reported to the nearest 0.125" (1/8 inch). Plant mixed seal coat shall not be included in the depth of structure.

#### 336.14. SEGREGATION

If segregation is visually detected, the area of visually segregated asphalt shall be tested for field density in a minimum of two places per ASTM D2950 as directed by the ENGINEER. In addition, a field density test per ASTM D2950 shall be tested 2 feet from the edge of the segregated asphalt at approximately the same Station.

#### 336.15 TEST RESULTS AND CERTIFICATION

336.15.1 Test results shall be reported to the ENGINEER, CONTRACTOR, Supplier and OWNER, in writing, within 7 working days of completion of the sampling of the asphalt and/or the field testing. Non-complying tests

shall be reported to The ENGINEER, CONTRACTOR, supplier and OWNER, within 1 working day of completion of the test.

336.15.2 The New Mexico Registered Professional ENGINEER in direct charge of the laboratory shall certify on a quality assurance test report that the test procedures used to generate the report complied with the specifications.

#### 336.16 MEASUREMENT AND PAYMENT:

336.16.1 Measurement: Asphalt concrete pavement shall be measured by the square yard of full depth pavement including each type and lift of material delivered, placed, compacted, and finished at the project, as specified in the CONTRACT DOCUMENTS.

#### 336.16.2 PAYMENT

336.16.3 Asphalt concrete pavement placed shall be paid at the CONTRACT unit price specified in the CONTRACT documents, adjusted in accordance with the requirements of this section, as authorized by the ENGINEER. Asphalt concrete pavement may be paid at a rate lower than the CONTRACT price if the material and workmanship do not meet this specification. The asphalt may also not be accepted as directed by the ENGINEER.

336.16.4 The asphalt concrete pavement may not be accepted by the Engineer if the Pay Factor, as calculated/shown later in this section is 0.7. If it is determined by the ENGINEER to be more practical to accept the asphalt concrete pavement in the testing area, it may be accepted under written agreement between the OWNER and the CONTRACTOR and a Pay Factor assigned as discussed below and as shown in tables later in this section.

336.16.5 If the area being accepted by the ENGINEER is a private residential subdivision, the written agreement stated in paragraph 336.16.4 shall be provided to the homeowner's association who in turn will provide their agreement with the acceptance to the ENGINEER. In addition, any Pay Factor monies will be given to the homeowner's association and the homeowners association will provide notification to the ENGINEER they have received payment.

336.16.6 If the MATERIAL SUPPLIER and the CONTRACTOR have separate contracts there will be a Pay Factor assigned to the material (e.g. Aggregate Factor and Blend Factor) and a separate Pay Factor assigned to

## SECTION 336

### ASPHALT CONCRETE PAVEMENT

the Workmanship (e.g. Asphalt Compaction and Depth Factor). The lowered rate of the CONTRACT price may have more than one pay factor applied. Example: one Pay Factor for Asphalt Compaction, CONTRACT price times 0.85, and one Pay Factor for Asphalt Depth, CONTRACT price times 0.95.

336.16.7 If the CONTRACT with the CONTRACTOR is for material and workmanship, there will be one Pay Factor assigned per the formula for materials and compaction:

$$PF=(AF + BF +CF)/3$$

An additional Pay Factor for the Full Core Depth As shown in Table 336.B. Both can be assigned per paragraph 336.17.

#### 336.17 PAY FACTORS

Recommended Pay Factor Adjustment for a test area:

Recommended Pay Adjustment Factor for a test area.

AF -Aggregate Factor

BF-Blend Factor

CF - placement/compaction factor, see TABLE 336.A

DF, depth factor, see TABLE 336.B

336.17.1 The material factors, Aggregate Factor (AF) and Blend Factor (BF) are the material acceptance factors.

336.17.1.1 The Blend factor, BF, is to be evaluated on the following blend characteristics :

- a. BF-A Binder content/% asphalt
- b. BF-VMA
- c. BF-VFA
- d. BF-D - Dust proportion
- e. BF-V -% voids

If the test result for any of the blend characteristics are outside of the range of the approved Job Mix Formula, a Pay Factor of 0.7 is assigned to the test area.

336.17.1.2 The Asphalt Aggregate Factor, AF, is to be evaluated for every sieve size in the Job Mix Formula. If the test result for any aggregate size is outside the acceptance range of the Job Mix Formula a Pay Factor of 0.7 is assigned to the test area.

336.17.2 The placement/compaction factor, CF, shall be

defined in accordance with TABLE 336.A, as directed by the ENGINEER. The factor is determined based on the average of the compaction tests taken for a test area. with no single test neither less than 90.0 % nor greater than 97.9 %. Acceptance compaction tests shall be performed in accordance with the requirements of 336.12.4. A test area having a compaction test(s) either less than 90.0 % or greater than 97.9 % shall be removed and replaced.

#### 336.17.3 SEGREGATION

If the asphalt was tested per ASTM D2950, due to segregation being visually observed, the field density results in the segregated area will be used for the test area in the Pay Factor equation for CF. A laboratory field density per ASTM D2726/D3549 test result may be used in the segregated area in lieu of the nuclear test per ASTM D2950.

336.17.4 The depth factor, DF shall be defined in accordance with TABLE 336.B, based on the average depth of a minimum of three full depth cores taken at random for each 1000 sy, or fraction thereof, with no single core less than the specified section depth less 0.5 in, as directed by the ENGINEER. If a core(s) are identified at a depth of the specified depth less 0.5 in, additional cores shall be taken to verify the condition. The condition shall be evaluated and either an appropriate pay factor assigned or the asphalt concrete pavement removed and replaced with complying pavement, as directed by the ENGINEER.

#### 336.18 TEST REPORTS

Test reports shall include by not be limited to the information specified below:

##### 1. Field Data

- a. Date and Time of Sampling/Test
- b. City Project Number
- c. Project Title
- d. Asphalt Concrete Supplier
- e. Delivery Ticket Number
- f. Job Mix formula Number
- g. Job Mix Formula approval letter date from Municipal Development
- h. Location of sample test with street name and stationing or as specified in the Contract documents
- i. Material temperature

SECTION 336

ASPHALT CONCRETE PAVEMENT

- j. Ambient Temperature
  - k. Field test results with reference specification limits
2. Laboratory Test Results
- a. Laboratory results as defined in TABLE 336.C
  - b. Full depth core thickness
  - c. Density per ASTM D2726/D3549
3. Recommended Pay Adjustment Factor for a test area
- a. AF - Aggregate Factor
  - b. BF - Blend Factor
  - c. CF - placement/compaction factor (See Segregation)
  - d. DF- Depth factor

## SECTION 336

## ASPHALT CONCRETE PAVEMENT

TABLE 336.A PLACEMENT/COMPACTION FACTOR, CF

Average Test Results	Factor, CF
98.0 % and greater	[1]
97.1 to 97.9	0.85
93.0 to 97.0	1.00
92.0 to 92.9	0.95
91.0 to 91.9	0.90 [2]
90.0 to 90.9	0.85 [2]
less than 90.0%	[1], [2]

- [1] The lift defined for the test area of asphalt shall be removed and replaced by the CONTRACTOR with asphalt concrete pavement complying with this specification at no cost to the OWNER, as directed by the ENGINEER. If it is determined by the ENGINEER to be more practical to accept the asphalt laid in the test area, it may be accepted under written agreement between the OWNER and the CONTRACTOR at an assigned compaction pay factor, CF= 0.50, for the test area if the test area has a material pay factors, AF and BF averaged  $\geq 0.85$ , as authorized by the ENGINEER
- [2] When the lift accepted at this factor is a final surface course of a street having a posted speed limit less than 40 mph, the lift shall have a FOG SEAL applied and sanded by the CONTRACTOR in accordance with SECTION 333, at no cost to the OWNER, as directed by the ENGINEER

## SECTION 336

## ASPHALT CONCRETE PAVEMENT

TABLE 336.B DEPTH FACTOR, DF

Deficient Pavement Depth				DF
0	≤	$D_S - d_A$	≤ 0.25 in (6 mm)	1.00
0.25 in (6 mm)	<	$D_S - d_A$	≤ 0.50 in (12.5 mm)	$(d_A)^2 / (D_S)^2$
		$D_S - d_A$	> 0.50 in (12.5 mm)	[A]
Excessive Pavement Depth, d-D				DF
		$D_S - d_A$	< 0	1.00

## NOTES:

$d_A$  average depth of the pavement structure as determined by field cores.

$D_S$  specified depth of the pavement structure per construction plans or contract documents

[A] Correct deficiencies at no cost to the OWNER, as directed by the ENGINEER, constructing the pavement to the depth, grade, crown, and cross slope drainage, specified in the CONTRACT documents.

TABLE 336.C - FIELD SAMPLE LABORATORY TESTS

- |     |   |
|-----|---|
| I.  | Marshall Design Analysis  |
|     | A. Energy Reference:  |
|     | 1 briquette mass / mold size;   |
|     | 2 hammer size and drop; and   |
|     | 3 number of blow counts per face;   |
|     | B. Volume characteristics of compacted briquettes, with production specifications, average of three:  |
|     | 1 VMA, voids in mineral aggregate;  |
|     | 2 $V_a$ , voids in asphalt concrete;  |
|     | 3 VFA, voids filled with asphalt binder; and,   |
|     | 4 $G_{mb}$ , bulk specific gravity and density, with authorized jmf target, average of three;   |
|     | C. $G_{mm}$ , maximum theoretical specific gravity/density with authorized jmf target, one test;  |
|     | D. Strength Characteristics:  |
|     | 1 stability;  |
|     | 2 flow; and,  |
|     | 3 stability : flow ratio.   |
| II. | SUPERPAVE Analysis (sample aging is not required)   |
|     | Analysis at authorized jmf gyrations, $N_i$ (initial), $N_d$ (design), and $N_m$ (max). (1) Two briquettes required. (2) Report average of test results of two briquette tests. |
|     | A. Compaction analysis with authorized design, and specifications (if applicable)   |
|     | 1 Bulk specific gravity/density, $G_{mb}$ , @ $N_i$ , $N_d$ , and $N_m$   |
|     | 2 Maximum theoretical specific gravity/density, $G_{mm}$  |
|     | 3 Compaction: $G_{mb}$ as % $G_{mm}$ at $N_i$ , $N_d$ , and $N_m$   |
|     | 4 Sample height, mm, at $N_d$   |
|     | B. Volume characteristics of compacted briquettes @ $N_d$ , with design value and specifications  |
|     | 1 VMA, voids in mineral aggregate   |
|     | 2 $V_a$ , voids in asphalt concrete   |
|     | 3 VFA, voids filled with asphalt binder   |

SECTION 336

ASPHALT CONCRETE PAVEMENT

- III. Asphalt binder content, with design value and authorized production range, T53-Quantitative Analysis of Bitumen from Bituminous Paving Mixtures, Ignition Oven Method A (Modified: reference temperature for constant mass,  $149 \pm 3^{\circ} \text{C} / 300 \pm 7^{\circ}\text{F}$ )
- IV. Dust ratio, %P<sub>bc</sub>
- V. Extracted Combined Aggregate, with design value(s) and authorized production range
  - A. Gradation
  - B. Coarse aggregate angularity, material > 4.75 mm, coarse aggregate has two or more fractured faces
  - C. Flat and elongated particles, 3:1 or greater dimension, material > 4.75 mm, %