

SECTION 320: ASPHALT TREATED BASE

320.1 DESCRIPTION

This work shall consist of furnishing base course aggregate and bituminous material mixed in a central plant and spread and compacted on a prepared surface.

320.2 MATERIALS

320.2.1 Composition of Mixtures

The Asphalt Treated Base (ATB) shall be composed of a mixture of aggregate, hydrated lime, blending sand if required, and asphalt binder. The several aggregate fractions shall be sized, uniformly graded, and combined in such proportions that the resulting composite blend meets gradation requirements as designated.

320.2.2 Asphalt Binder

The Contractor shall provide performance-graded asphalt binder in accordance with AASHTO M 320. The asphalt binder type shall be PG 64-22 unless otherwise specified in the contract or by the City Engineer or designee.

The Contractor shall provide certified test reports from the supplier of the asphalt binder incorporated into the mix and shall provide a certificate of compliance identifying the grade and source (plant location), temperature viscosity relationship reported in accordance with AASHTO M 320, and the minimum mixing and compaction temperature ranges. The certification shall state the asphalt binder to be furnished to the project, and/or used in the asphalt treated base delivered to the project complies with this specification.

The Contractor shall submit the Material Supplier's name and address to the City Engineer or designee. If required by the City Engineer or designee, the Contractor shall submit representative samples of each grade or classification of asphalt binder for testing. The Contractor shall mix and apply asphalt binder within the approved temperature range. Changes shall not be made in the crude stock source, manufacture method, or the Supplier without written approval from the City Engineer or designee.

320.2.3 Aggregate

Aggregate shall conform to the requirements of Section 310, "Base Course" of these Standard Specifications and City Standard Details. RAP shall not be used.

320.2.4 Hydrated Lime

Hydrated Lime shall be provided in accordance with Section 405, "Hot-Mix Asphalt Material" of these Standard Specifications and City Standard Details.

Hydrated lime or anhydrite based material shall be furnished in the amounts shown on the approved job mix formula. The hydrated lime or anhydrite based material shall be added to the asphalt treated base before the addition of the Asphalt material.

320.2.5 Mix Design

The Contractor shall provide a laboratory mix design developed by an AMRL or NMDOT certified testing laboratory. The laboratory mix design shall be certified by a Licensed Registered Professional Engineer in the State of New Mexico. A list of the NMDOT approved testing laboratories is available from the NMDOT State Materials Bureau. All costs associated with the development of the mix design shall be at the contractor expense. Approved mix designs will be valid for one year and shall be updated when a material source change occurs.

The issuance of a mix design developed by a certified testing laboratory and accepted by the City shall not relieve the Contractor of full responsibility for producing an acceptable mixture through the central mixing plant. The laboratory mix design shall be considered as a starting point only and may be adjusted as needed to provide a satisfactory mix.

The lime or anhydrite based material will be included in the gradation for establishing the job mix formula. The job mix formula for each mixture shall establish a single percentage of aggregate passing each required sieve size and a single percentage of Asphalt binder and lime to be added to the aggregate. The resultant job mix formula gradation shall be within the master range gradation in accordance with Section 310, "Base Course" of these Standard Specifications. The job mix formula shall indicate the required mixing and placement temperatures.

The asphalt binder content shall be selected, based on laboratory testing such that the job mix formula physical properties do not exceed the tabulated limits for a variation in asphalt content of 0.5% plus or minus.

The job mix design shall provide a minimum 50-blow Marshall Stability of 1200 lbs. and a Marshall Flow of eight (8) to Sixteen (16) in accordance with ASTM D1559. During the Mix design process, the Contractor shall consider other factors, in addition to air voids and Marshall Stability, such as durability, water resistance, and asphalt film thickness when developing the mix design. The judgment as to the significance of these factors with regard to acceptance of the mix design will rest with the City Engineer or designee.

A job mix formula submittal shall include but not be limited to that defined in Table 320.2.5:1, as directed by the City Engineer or designee. A submittal shall be rejected if it does not include the information specified.

**Table 320.2.5:1
Submittal Requirements**

A.	Name of Supplier
B.	Date of submittal
C.	Job mix formula identification number
D.	Date of sampling of aggregates
E.	Project Name, Project Number, and Control Number (when applicable)
F.	Certification of compliance of materials
G.	Temperature viscosity curve with recommended mixing and compaction temperatures for proposed asphalt binder

- H. Proposed job mix formula target proportions of materials
 - I. Certification of compliance of proposed job mix formula by the NM Registered Professional Engineer
 - J. Job mix formula performance target characteristics and specification limits
 - K. Tabulation of laboratory design development test results
 - L. Graphical representation of Unconfined compressive strength vs. Asphalt Content
 - ii. Marshal Density (pcf) vs. Asphalt Content (%)
 - iii. Voids in Mineral Aggregate (%VMA) vs. Asphalt Content (%)
 - M. Specific gravity of asphalt cement
 - N. Bulk Specific Gravity of aggregate
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320.3 CONSTRUCTION REQUIREMENTS

320.3.1 Preparation of Subgrade

The subgrade upon which the Asphalt Treated Base is to be placed shall be prepared in accordance with Section 207, "Subgrade Preparation" of the NMDOT Standard Specifications for Highway and Bridge Construction, current edition and shall conform to the line, grade and cross section requirements in the plans, contract or City Standard Details. The subgrade upon which this base is to be placed shall be clean and free from frozen, saturated, or Deleterious Material.

320.3.2 Equipment

Equipment used for mixing, hauling, placing and compacting asphalt treated base shall conform to the requirements of Sub-Section 435.3.4, "Equipment" of Section 435, "Hot-Mix Asphalt (Superpave)" of these Standard Specifications.

320.3.3 Placement of Asphalt Treated Base

Asphalt treated base shall be placed on an approved surface, spread, and compacted to the specified grade and elevation. The asphalt treated base shall be placed in layers utilizing a self propelled paver to the thickness shown in the Plans, City Standard Details, or as directed by the City Engineer or designee and shall conform to the placement requirements of Section 435, "Hot-Mix Asphalt (Superpave)" of these Standard Specifications.

320.3.4 Surface Tolerance

There shall be no deviation of the surface greater than plus three sixteenth (+3/16) of an inch or minus three eighth (-3/8) of an inch when tested with a ten (10) foot straightedge in any direction. All deviations from this tolerance shall be corrected at no additional cost to the City.

320.3.5 Plan Depths

The depth of asphalt treated base shall be in accordance with City Standard Details for Base Course, the Plans, or as directed by the City Engineer or designee. The Contractor shall monitor and record compacted asphalt treated base depths during the placement and compaction operation.

Measurements of the uncompacted mix depth shall be taken behind the paving machine and correlated with measurements of the mix depth after compaction to achieve the required placement depth. Depth check records shall be maintained by the Contractor and submitted to the City Engineer or designee upon request. There shall be no deviation in depth greater than plus or minus three eighths (+/- 3/8) of an inch from the required depth.

If the placement depth does not meet requirements, the Contractor shall remove and replace the deficient areas at no additional cost to the City.

320.3.3 Compaction

Compaction shall begin immediately after placement of the asphalt treated base and shall be continuous and uniform over the entire surface. Asphalt treated base shall be compacted to not less than 95% of maximum density or as otherwise specified in the Plans, City Standard Details or as directed by the City Engineer or designee. Density requirements shall be determined in accordance with AASHTO T 166.

Field density tests shall be taken by the contractor to control operations and shall be taken at random locations as per the Contractor's quality control plan. Densities shall be determined using nuclear testing methods in accordance with ASTM D2950. Calibration of the portable nuclear device shall be established from cut pavement samples (six (6) inch cores). The density readings of the cut pavement samples shall be determined by the Contractor in accordance with AASHTO T 166 (weight, volume method). A minimum of three (3) cut pavement samples shall be used to determine the correction factor to be applied to the nuclear density readings to match the unit weight of the cut pavement samples.

320.3.4 Weather Limitations

Placement of Asphalt Treated Base shall be in accordance with Section 435.3.5.5, "Temperature and Weather Limitations" of these Standard Specifications.

320.3.5 Maintenance of Asphalt Treated Base Material

The Contractor shall maintain the surface of the asphalt treated base free from contamination with dirt, debris or other deleterious material until such time as the surface treatment is placed on the base or as approved by the City Engineer or designee.

320.3.6 Sampling and Testing

320.3.6.1 Contractor Quality Control

The Contractor is responsible for the quality of materials and construction. The Contractor shall provide a quality control plan to control the quality of the product. The quality control plan shall be submitted to the City Engineer or designee for review and acceptance at least two weeks before starting work. The quality control plan should itemize inspections, testing procedures, sampling and testing frequencies, and corrective action strategies that the Contractor will use to control the work. The quality control plan may be developed using the NMDOT Contractor Process Quality Control Plan Guidelines available from the NMDOT Construction Bureau, the City Engineer or designee. The Contractor shall provide written certification that testing equipment is calibrated and meets the

applicable specification. The Contractor shall provide a qualified and experienced individual to administer the plan. The individual will have full authority to take actions necessary for the successful operation of the plan.

The Contractor shall develop and administer a quality control plan that addresses, at a minimum, the following elements:

1. Sampling and Testing Personnel - Ensure that sampling and testing personnel performing sampling and testing of the material are qualified and certified by ACNM’s Technician Training and Certification Program (TTCP) or other certification program acceptable to the City Engineer or designee.
2. Testing Laboratory - Perform quality control testing using a private testing Laboratory or a Contractor provided Laboratory. The Laboratory used shall be AMRL or NMDOT certified. The Laboratory used shall perform the testing and development of a mix design and job mix formula. The testing and mix design shall be certified to have been performed in compliance with the specifications by a NM Registered Professional Engineer in direct charge of the testing program and mix design process.
3. Testing Equipment and Lab Facilities – Calibrate or check testing equipment in accordance with AASHTO R 18 and any time the equipment is moved. Maintain calibration documentation at the Laboratory and provide this to the City Engineer or designee upon request. Allow the City Engineer or designee unrestricted access to the Laboratory to verify equipment, test procedures and lab facilities.
4. Compaction - Perform density testing using nuclear device methods and cut pavement cores at a frequency sufficient to control operations. Determine asphalt content and gradation of material samples at a frequency sufficient to control operations.
5. Line and Grade Control - Establish a plan for line and grade control.

320.3.6.2 City Quality Assurance

320.3.6.2.1 Acceptance

The Contractor shall control operations such that the tolerances of Table 320.3.6.2.1:1, “Acceptance Testing Tolerances” are met.

**Table 320.3.6.2.1:1
Acceptance Testing Tolerances**

Characteristic	Lower Specification Limit	Upper Specification Limit
Asphalt Content	TV -0.5%	TV +0.5%
Gradation		
¾ inch Sieve	TV -10%	TV +10%
No. 4 Sieve	TV -15%	TV +15%
No. 10 Sieve	TV -12%	TV +12%
No. 200 Sieve	TV -4%	TV +4%
Mixing Temperature	TV -25 degrees	TV + 25 degrees
Placement Temperature	TV -25 degrees	TV +25 degrees

Density	Not less than 95% of maximum density
Surface Tolerance	As per Section 320.3.4
Depth	As per Section 320.3.5

TV = Target Value

The Target Value shall be obtained from the approved Job Mix Formula. The nominal maximum sieve is one sieve size larger than the first sieve that retains 10% or more. Asphalt Content shall be determined as per AASHTO T 308, Binder Content by Ignition Test.

Acceptance of asphalt treated base shall be based on test results obtained for the properties listed in Table 320.3.6.2.1:2, "Minimum Acceptance Testing Properties and Frequency for Asphalt Treated Base."

**Table 320.3.6.2.1:2
Minimum Acceptance Testing Properties and Frequency for Asphalt Treated Base**

Property	Point of Acceptance	Testing Frequency (minimum of)	Test Method
Asphalt Content	Behind laydown machine before compaction	1 per 300 Ton 1 per 1500 SY 1 per Street or Site 2 per Day	AASHTO T 308
Gradation	Behind laydown machine before compaction	1 per 300 Ton 1 per 1500 SY 1 per Street or Site 2 per Day	AASHTO T 30, 164 or 308
Density*	Roadway After Compaction	1 per 500 Ton 1 per 2400 SY 1 per Street or Site 2 per Day	AASHTO T 166 ASTM D 2950
Surface Tolerance	Roadway After Compaction	Continuous over Surface	Section 320.3.4

* Maximum density shall be determined from the average of three cut pavement samples as per AASHTO T 166 for the job mix formula used. A new maximum density shall be determined for any change in job mix formula.

This testing will be considered acceptance testing and such testing will be conducted by an AMRL or NMDOT certified Testing Laboratory obtained by the Contractor or as designated by the City Engineer or designee. Test results shall be submitted to the City Engineer or designee and Contractor within two working days of sampling.

Acceptance testing for density shall be done with a portable nuclear density device that has been correlated by a minimum of three (3) core samples provided by the Contractor from locations designated by the City. The cost of the cores shall be at the Contractor expense.

Material placed by the Contractor/Developer that does not meet these requirements shall be removed and replaced with suitable material meeting specification requirements at the Contractor's/Developer's expense. Material removed shall be disposed of in an environmentally suitable location at the Contractor's/Developer's expense.

320.4 METHOD OF MEASUREMENT -

Asphalt Treated Base will be measured by the square yard, cubic yard, or ton.

Asphalt material, hydrated lime, and Anhydrite Based Material will be measured according to Section 405, "Hot-Mix Asphalt (HMA) Material" of these Standard Specifications.

Testing required by the Contractor shall be incidental to the Asphalt Treated Base item.

When Asphalt Treated Base is to be measured by the square yard, the average width of the Asphalt Treated Base in place will be used in computing quantities. The length used in computing the area shall be station to station along the centerline of the roadway. All dimensions shall be as shown on the typical section of the plans or City Standard Drawings.

When Asphalt Treated Base is measured by the ton or cubic yard, the Contractor shall provide to the City Engineer or designee with each load delivered to the job site, a copy of the delivery ticket on which is either printed, stamped or written, the information defined in Table 320.4:1 "Delivery Ticket Requirements."

**Table 320.4:1
Delivery Ticket Requirements**

A.	Name of Supplier
B.	Date of Delivery
C.	Delivery Ticket Number
D.	Name of Contractor
E.	Project Name (optional)
F.	Job Mix Formula Identification Number
G.	Weight of Load (Total, Tare, Net)
H.	Time Loaded
I.	Truck Number

310.5 BASIS OF PAYMENT

Pay Item	Pay
Unit	
<i>Asphalt Treated Base</i>	Ton or Cubic Yard
<i>Asphalt Treated Base _____ in Depth</i>	Square Yard