

**** USE ON ALL PROJECTS INVOLVING ASPHALT ****

**** USE IN CONJUNCTION WITH STORED SPECIFICATION 1001MATL ****

**** WHEN SPECIFIED IN THE MATERIALS REPORT, USE IN CONJUNCTION WITH ****
**** STORED SPECIFICATION 1005PG ****

**** FILL IN INFORMATION FROM THE MATERIALS REPORT IN THE FOLLOWING SUBSECTIONS (SHOWN IN RED TEXT): ****

*	404-2.02(C)	CLASS OF COVER MATERIAL	(1 place)
*	404-4	PRIME COAT BITUMINOUS MATERIAL TYPE	(1 place)
*		APPLICATION RATE	(1 place)
*	404-6	FOG COAT BITUMINOUS MATERIAL TYPE	(1 place)
*	404-7.01	CHIP SEAL COAT BITUMINOUS MATERIAL TYPE	(1 place)
*		APPLICATION RATE	(1 place)

****CHANGE TO BLACK TEXT IF IT APPLIES, DELETE RED TEXT THAT DOES NOT APPLY****

(404BITUM, 12/16/19)

SECTION 404 BITUMINOUS TREATMENTS: of the Standard Specifications is revised to read:

404-1 Description:

The work under this section shall consist of furnishing all materials and constructing or applying a single or multiple course bituminous treatment in accordance with the requirements of the specifications and in reasonably close conformity to the lines shown on the project plans or established by the Engineer.

The kind of bituminous treatment may consist of one or a combination of the following:

- Prime Coat
- Tack Coat
- Fog Coat
- Emulsified Asphalt Chip Seal with Fog Coat
- Hot Applied Chip Seal with Fog Coat

404-2 Materials:

404-2.01 Bituminous Materials:

The bituminous material shall be of the type and grade specified in the Special Provisions and shall conform to the requirements of the following subsections:

Asphalt Cement	1005-3.01
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Liquid Asphalt	1005-3.02
Emulsified Asphalt	1005-3.03
Emulsified Asphalt (Special Type)	1005-3.04
Recycling Agents	1005-3.05
Emulsified Recycling Agents	1005-3.06
Crumb Rubber Asphalt	1009-2

Application temperatures of bituminous materials shall conform to the requirements of Table 1005-6. Polymer modified bituminous materials shall not exceed 390 degrees F, or less as specified by the supplier.

If emulsified asphalt of any type is held overnight, it shall be reheated and agitated prior to further application.

404-2.02 Aggregate Materials:

(A) General:

The contractor shall provide a source of aggregate material in accordance with the requirements of Section 1001.

Aggregate material will be sampled for gradation acceptance in the final stockpile before incorporation into the work. For precoated aggregate, sampling will occur prior to precoating.

The aggregate material will be acceptable when the test values for each specified aggregate characteristic are within the specified limits.

(B) Blotter Material:

Blotter material shall be natural sand, crushed sand, volcanic cinders, or other approved material and shall be free of deleterious materials or foreign substances.

The grading shall meet the following requirements when tested in accordance with the requirements of Arizona Test Method 201:

Sieve Size	Percent Passing
3/8 inch	100
No. 4	80 - 100
No. 16	45 - 80
No. 200	0 - 5.0

(C) Cover Material:

Aggregate for cover material shall be of clean sand, gravel or crushed rock and shall be free from lumps or balls of clay and shall not contain calcareous or clay coatings, caliche, synthetic materials, organic matter or foreign substances.

The gradation shall meet the following requirements for the Class specified in the Special Provisions when tested in accordance with the requirements of Arizona Test Method 201.

The gradation shall meet the following requirements for Class **XXXXX**, when tested in accordance with the requirements of Arizona Test Method 201.

Sieve Size	Percent Passing	
	Class 1	Class 2
1/2 inch	100	
3/8 inch	70 – 90	100
1/4 inch	0 – 10	70 – 90
No. 4	---	0 – 10
No. 8	0 – 5	0 – 5
No. 200	0 - 1.0	0 - 1.0

Cover material shall meet the following requirements:

Aggregate Characteristics	Test Method	Requirement
Abrasion	AASHTO T 96	100 Rev., Max 9% 500 Rev., Max 40%
Carbonates	Arizona Test Method 238	Maximum 20%
Fractured Coarse Aggregate Particles	Arizona Test Method 212	Minimum 85% (at least two fractured faces) and minimum 92% (at least one fractured face) determined on plus No. 4 material
Flakiness Index	Arizona Test Method 233	Maximum 20%
Bulk Oven Dry Specific Gravity	Arizona Test Method 210	2.350 – 2.850
Water Absorption	Arizona Test Method 210	0 – 2.5%

(D) Precoated Cover Material:

The aggregate for cover material shall meet the requirements given above for aggregate characteristics prior to precoating with bituminous material.

Prior to placing, the cover material shall be precoated with a grade of PG asphalt cement which meets the requirements of Section 1005 of the specifications. The precoating shall be accomplished by mixing at a central plant until the aggregate is evenly coated. The cover material shall have a minimum temperature of 250 degrees F at the time of precoating with asphalt cement. The cover material shall be precoated with approximately 0.40 to 0.60 percent asphalt cement, by weight of the aggregate. The final percentage of asphalt cement used for precoating will be as directed by the Engineer. The end result shall be a dust free material.

For hot applied chip seal coats, no more than the quantity of precoated cover material needed for one day of chip seal production shall be stockpiled, unless otherwise approved by the Engineer.

404-3 Construction Requirements:

404-3.01 Seasonal and Weather Limitations:

The contractor's bid submittal and initial construction schedule shall adhere to the beginning and ending dates shown in Subsection 404-7 for placement of bituminous material used in chip seal coats. Bituminous material used in chip seal coats shall only be placed when the existing bituminous surface is dry, the pavement surface temperature is at least 85 degrees F, and the ambient temperature at the beginning of the application of bituminous material is at least 65 degrees F and rising. The application of bituminous material shall be stopped when the ambient temperature is 70 degrees F or less and falling.

No placement of bituminous material for chip seals shall occur if ambient temperatures are forecasted to be at or below 40 degrees F at any time during the day or night after placement.

For hot applied chip seals, no placement shall occur if ambient temperatures exceed, or are forecasted to exceed, 110 degrees F the day before, the day of, or the two days after paving.

Placement shall cease for the day if sustained wind velocities in excess of 15 MPH occur at the project.

Placement of chip seals may be stopped by the Engineer at any time, and all other contract requirements, including stoppage due to weather, shall remain in place.

Bituminous material used in prime coats shall normally be applied to an existing aggregate surface only when the ambient air temperature in the shade is at least 70 degrees F and when the existing aggregate surface is slightly damp.

At any time, the Engineer may require that the work cease or that the work day be reduced in the event that weather conditions, either existing or expected, are anticipated to have an adverse effect upon the bituminous treatment.

404-3.02 Equipment:

(A) Distributor Truck:

Distributor trucks shall be so designed, equipped, maintained and operated that bituminous material at even heat may be applied uniformly on variable widths of surface at readily determined and controlled rates from 0.03 to 1.00 gallons per square yard, with uniform pressure, and with an allowable transverse variation from any specified rate not to exceed 10 percent or 0.02 gallons per square yard, whichever is less. Distributor equipment shall include a tachometer, pressure gauges, accurate volume measuring devices or a calibrated tank, and a thermometer for measuring temperatures of the tank contents. Distributors shall be equipped with a power unit for the pump and a spray bar which is adjustable laterally and vertically. The distributor shall provide for continuous circulation of the bituminous material through the tank and spray bar.

Prior to the spreading of bituminous material, all distributor trucks proposed for use shall have been tested for rate of transverse spread, in accordance with the requirements of Arizona Test Method 411, and certified within 12 months prior to the date of spreading. Upon certification, an ADOT Bituminous Distribution Truck Certification sticker shall be applied in a clearly visible location inside the driver's side door of the truck. A valid copy of the Certificate of Test (Arizona Test Method 411) shall be carried in the distributor truck. The Engineer may at any time require that each distributor truck be tested to determine the rate of the transverse spread.

All testing and sampling, including the preparation of test pads and test plates, shall be performed by an independent testing laboratory which has been approved by the Engineer to perform Arizona Test Method 411. A professional engineer, registered in the State of Arizona and employed by the independent testing laboratory, shall be responsible for all testing and test results. Testing shall be performed at no cost to the Department.

Distributor trucks shall be equipped with the appropriate size nozzles adjusted to the proper angle with the associated adjustment wrench to achieve maximum overlap of spray and an even application.

Distributor trucks shall have a calibrated thermometer and volume gauge or other device with which the volume of material in the tank may be measured to within 50 gallons. The pump shall be shown to have been verified by a mass flow meter or other acceptable means within the last 12 months. The spray bar shall be adequately flushed of prior materials, solvents, or other contaminants.

Equipment which fails to provide an acceptable application of bituminous material shall be removed from the project.

(B) Power Brooms:

Power brooms shall be of the rotary or pickup type, capable of completely removing all excess chips, and cleaning without gouging or tearing the surface.

(C) Rollers:

Rollers shall be of the oscillating type having a width of not less than 4 feet with pneumatic tires of equal size and diameter. Wobble-wheel rollers will not be permitted. The tires shall be spaced so that the gaps between adjacent tires will be covered by the following tires. Unless

foam filled, the tires shall be inflated per the manufacturer's specifications and maintained so that the air pressure will not vary more than 5 pounds per square inch from the designated pressure. Pneumatic-tired rollers shall be properly ballasted and constructed so that the total weight of the compactor can be varied to produce an operating weight per tire of not less than 2,000 pounds.

(D) Aggregate Spreaders:

The application of cover material shall be accomplished by means of a calibrated spreader. The spreader shall be a self-propelled, computerized rate-controlled unit capable of an application width of 14 feet or greater. The spreader shall be in good mechanical condition and capable of applying aggregate uniformly across the spread width.

Chip spreader boxes shall be calibrated to ensure consistent discharge across all of the chutes except where the discharge is intentionally adjusted to compensate for site conditions and construction operations.

The application of blotter material shall be accomplished by means of a sand slinger or other equipment approved by the Engineer.

Aggregate application rates are expected to vary from 4 to 32 pounds per square yard, depending on the type of construction.

404-3.03 Traffic Control:

In the construction or application of a bituminous treatment, the treated roadway surface shall not be used by the contractor, its agents, or others until it has been established to the satisfaction of the Engineer that the treated roadway surface will not be damaged or marred under the action of traffic. No traffic of any description shall be allowed on any bituminous application until approved by the Engineer. The contractor shall erect and maintain approved barricades, signs and other traffic control devices and shall use every possible means to protect the work and to exclude traffic from the roadway surface for as long a time as may be required. Traffic shall be handled in the manner most convenient to the traveling public. When traffic is handled on a one-way basis, the contractor shall provide such flaggers and pilot trucks as deemed necessary to insure adequate protection for the roadway surface. Traffic may be detoured around the work, provided that detours are constructed and maintained in a satisfactory manner and properly signed. When it is necessary to provide for traffic across a bituminous treated surface, the crossing shall be blotted with material, as directed, before the crossing is opened to traffic.

404-3.04 Preparation of the Surface:

The surface to be treated shall be thoroughly cleaned to the satisfaction of the Engineer prior to applying the bituminous material.

When the work consists of a chip seal coat or when blotter material is applied, self-propelled rotary power brooms and/or pickup brooms, along with hand brooms, if necessary, shall be used immediately in advance of applying the bituminous material.

When a bituminous treatment is to be applied to an existing aggregate surface, the surface shall be uniformly smooth, firm and reasonably true to grades and cross sections as shown on the project plans, and shall be so maintained throughout the placing of the bituminous treatment. In no event shall a bituminous treatment be placed on a soft, uneven base. Any holes, depressions or irregularities shall be repaired. All loose and unsuitable material shall be removed and replaced by suitable material, which shall be compacted to produce a dense surface conforming to the adjacent area. Uniformity of surface texture is of the utmost importance.

When required, the existing aggregate surface on which the bituminous treatment is to be placed shall be lightly bladed, watered and compacted immediately prior to the application of bituminous material. In extremely dry areas, additional light applications of water may be required prior to the application of the bituminous material to facilitate penetration of the bituminous material.

404-3.05 Application of Bituminous Material:

The types, grades, and approximate rates of application of bituminous material for fog coat, prime coat, and tack coat will be as specified in the Special Provisions. The application rates for chip seal coats shall be determined by the contractor in accordance with the requirements herein, subject to approval by the Engineer.

The rates to be applied may vary substantially because of different surface conditions within the project limits. The actual bituminous material application shall not vary more than 10 percent from the application rate specified by the Engineer.

The bituminous material shall be uniformly applied to the prepared surface at the rate specified by the Engineer and in one application.

The various types or grades of bituminous materials shall be applied at temperatures within the limits given in Table 1005-6, and at no time shall the contractor increase the temperature of the bituminous material above the higher limit specified.

In order to obtain uniform distribution, the distribution shall be promptly started or stopped at the junction of two applications in a manner that will not result in overlaps or gaps in the applications.

The distribution shall be promptly cut off prior to the decrease in uniform flow caused by the distributor tank becoming empty, when there is a decrease in uniform flow due to any reason, or when the forward movement of the distributor slows down or stops.

In the event that any spots are missed in the application, or any areas develop that do not have a uniform spread or penetration, such areas shall be remedied without unnecessary delay.

Care shall be taken to prevent the spraying or splattering of bituminous material on adjacent pavements, structures, curb, guardrail, trees and shrubbery or any other object outside of the area designated for spraying.

Unused bituminous material shall be the responsibility of the contractor.

404-3.06 Application of Blotter Material:

The approximate amount of blotter material, when required as a part of a bituminous treatment, will be specified in the Special Provisions; however, the Engineer will specify the exact rate to be applied based on the characteristics of the bituminous treated surface.

Blotter material, at the time of spreading, shall be wet but free from running water.

Blotter material shall be uniformly spread. Any oversize aggregate or foreign material picked up during stockpiling or loading operations shall be eliminated before entering the spreader. Supplemental spreading or smoothing shall be done by hand methods where necessary.

For chip seals with an emulsified asphalt binder coat, the application rate shall be 8 pounds per square yard or as specified by the Engineer.

If blotter material is required for a hot applied chip seal, the blotter material shall be applied in one or more applications for a total application of 2 pounds per square yard. The Engineer may reduce or eliminate blotter material if deemed to be unnecessary.

Prior to final acceptance and when ordered by the Engineer, the contractor shall remove and dispose of any excess blotter material. The method of removal and the disposal of any excess blotter material shall be the contractor's responsibility.

404-3.07 Joints:

Transverse joints with the preceding work, at intersections, and at all existing pavements and structures shall be made by a method approved by the Engineer prior to the start of the work.

Unless otherwise directed by the Engineer, transverse joints with the preceding work shall be made by placing building paper over the end of the previous application, and the joining application shall start on the building paper. Once the application process has progressed beyond the paper, the paper shall be disposed of as directed by the Engineer. Transverse joints at other locations shall be made by a method approved by the Engineer prior to the start of the work.

Longitudinal joints shall be overlapped between 2 to 6 inches.

Joints shall be cleaned as deemed necessary by the Engineer prior to the application of bituminous material in the adjacent strip.

Regardless of the width of the roadway to be sealed, the number of longitudinal joints shall be kept to a minimum and shall be located to the greatest degree possible so that they will coincide with painted lines between traffic lanes.

404-4 Prime Coat:

The type of bituminous material and the approximate application rate shall be as specified in the Special Provisions.

The type of bituminous material shall be **XXXXX** and shall be applied at the approximate rate of **XXXX** gallons per square yard.

When it is deemed necessary, areas having excess bituminous material shall be blotted with material as directed.

When so directed, the surface of the completed prime coat shall be rolled with a pneumatic-tired roller.

The integrity of the prime coat shall be maintained at all times until the next course is placed or until final acceptance. In the event traffic has caused holes or breaks in the surface, such holes or breaks shall be satisfactorily repaired by the contractor.

404-5 Tack Coat:

Tack coat shall be applied prior to placing a bituminous mixture on a primed surface, an existing bituminous surface, or an existing Portland cement concrete pavement surface. Tack coat shall also be applied between layers of bituminous mixtures. A light coat of bituminous material shall also be applied to edges or vertical surfaces against which a bituminous mixture is to be placed.

The contractor shall choose the bituminous material to be used for tack coat. The Engineer must approve the contractor's choice of bituminous material prior to its use.

The rate of application for the specific usage will be specified by the Engineer. The following table shows approximate tack coat application rates:

Type of Bituminous Material	Approximate Tack Coat Application Rates: Gallons / Square Yard		Payment Factor
	Prior to Placing ACFC or AR-ACFC	All Other Tack Coats	
Emulsified Asphalt (Special Type) – See Note Below.	Not Allowed	0.12	0.7
Emulsified Asphalt (Other than Special Type)	0.08	0.08	1.0

Asphalt Cement	0.06 to 0.08	0.06 to 0.08	1.0
Note: Emulsified Asphalt (Special Type) shall consist of Type SS-1 or CSS-1 emulsified asphalt diluted with water to provide an asphalt content of not less than 26 percent.			

The Engineer may adjust the application rate.

If emulsified asphalt of any type is used, it shall have broken before the bituminous mixture is placed.

Tack coat shall be applied only as far in advance of the placement of the bituminous mixture as is necessary to obtain the proper condition of tackiness. In no event shall more tack coat be applied in one day than will be covered by the bituminous mixture during that same day.

404-6 Fog Coat:

The type of bituminous material and the approximate application rate shall be as specified in the Special Provisions. The material shall be diluted with one part water to one part bituminous material.

Blotter material shall be applied to the treated surface in one or more applications for a total application as specified in the Special Provisions at a time specified by the Engineer and before opening to traffic.

The type of bituminous material shall be **XXXXX**. The material shall be diluted with one part water to one part bituminous material. The bituminous material shall be applied at the approximate rate of 0.08 gallons per square yard.

Blotter material shall be applied to the treated surface in one or more applications for a total application of approximately 2 pounds per square yard at a time specified by the Engineer and before opening to traffic.

The Engineer may adjust the actual application rate based on specific trials and visual observations performed on test areas for different pavement types.

404-7 Chip Seal Coat:

404-7.01 General:

The contractor shall prepare their bid submittal and initial construction schedule, submitted at the Preconstruction Conference as described in Subsection 108.03, based on the following beginning and ending dates for asphaltic concrete production.

Average Elevation of Project, Feet	Beginning and Ending Dates
0 – 3499	March 15 – May 31
0 – 3499	September 1 – October 31
3500 – 4999	May 1 – September 30
5000 and over	June 1 – August 31

Any proposed placement deviating from the beginning and ending days shall be detailed in the written schedule of construction submitted at the weekly meeting described in Subsection 108.04. No contract time extension will be granted for placement outside of the beginning and ending dates. Any placement deviating from the beginning and ending dates shall be at the sole risk of the contractor.

For hot applied chip seals, the type and grade of asphalt binder shall be as specified in the Special Provisions.

The contractor shall determine the application rates and corresponding quantities of bituminous material and cover material for chip seal coat in accordance with Arizona Test Method 819. Application rates are subject to approval by the Engineer. Areas and locations anticipated to require adjustment to the rate(s) shall also be identified.

The application rates and performance of emulsified asphalt chip seals shall be verified using the Sweep Test in accordance with ASTM D7000. The performance of bituminous material shall be verified using the Vialit Retention Test in accordance with EN 1272-3, modified as necessary to accommodate the specific characteristics of the proposed chip seal. However, the occurrence of failure of polymer modified asphalt during the Vialit Retention Test does not constitute an unacceptable performance of bituminous material.

The type of bituminous material shall be **XXXX** and, for bidding purposes, shall be applied at the approximate rate of **XXXX** gallons per square yard.

The actual application rate shall be such that the aggregate is embedded approximately 70 percent (80 percent above 4,000 feet elevation) and tracking of bituminous material does not occur under construction equipment or when opened to traffic.

The actual rate of cover material to be applied shall be such that no more than 5 percent of the chips applied are removed during sweeping and approximately 20 percent void space exists between the aggregate particles once realigned after opening to traffic.

The proposed rate(s), locations requiring adjustment, rate adjustments and the associated basis for each adjustment, shall be submitted to the Engineer for approval no later than five days following completion of the Pre-Activity Walkthrough as described in Subsection 404-7.02 and at least five days prior to placement of the test strip.

The basis for any anticipated adjustments shall include use of one or more of the following:

- (A) Sand Patch tests performed in accordance with *STP762 Pavement Surface Characteristics and Materials*; Haydon, C.E. (ASTM, 1982),

- (B) Appendix B of Chip Seal Guide for Application and Construction; Pavement Preservation Committee of the Arizona Chapter of The Associated General Contractors (AGC-Arizona Chapter, 2013),
- (C) Arizona Test Method 742 for mean macrotexture.

The approved application rate(s) and adjustments shall be clearly marked at the corresponding locations and remain visible to equipment operators prior to placement.

The contractor shall submit a minimum 75-pound sample of the cover material to the Engineer at least 10 calendar days prior to beginning application of the cover material for testing. In addition to the submitted cover material, the contractor shall also submit 3 gallons of emulsion (5 to 8 gallons for hot applied) in 1-gallon cans, and 40 pounds of granulated rubber if included in the bituminous material.

404-7.02 Pre-Activity Walkthrough:

Prior to placement, the contractor shall conduct a Pre-Activity Walkthrough with all parties expected to work on the chip seal.

Locations where adjustments in application rate may be appropriate shall be documented.

A location for a test strip, approximately 1000 feet in length shall be identified. If additional test strip locations are desired due to varying surface conditions, these shall also be identified.

Other factors or site conditions such as turn or deceleration lanes, changes in surface characteristics, crack fill, and recent patchwork which may affect placement of the chip seal coat shall also be identified. A description of any affecting conditions and the corresponding locations and action to be taken to minimize their impact shall be documented.

In addition to the requirements herein, the items contained on the checklists provided in AGC-Arizona Chapter's Chip Seal Guide for Application and Construction (pages 11 and 12) shall be considered.

404-7.03 Application of Cover Material:

Cover material shall be immediately and uniformly spread over the freshly applied bituminous material such that aggregate particles are securely adhered and will not roll, tumble, or be picked up during the rolling process. Any oversize aggregate or foreign material picked up during stockpiling or loading operations shall be eliminated before entering the aggregate spreader hopper. Supplemental spreading and smoothing shall be done by hand methods where necessary.

When emulsified asphalt is used, the cover material shall be at a saturated surface-dry condition at the time of spreading. When bituminous material other than emulsified asphalt is used, the cover material shall be precoated as described in Subsection 404-2.02(D).

The class, aggregate requirements, and for bidding purposes, the approximate rates of application of cover material will be as specified herein.

404-7.04 Rolling Cover Material:

Following the spreading of cover material, the surface shall be promptly rolled with self-propelled pneumatic-tired compactors. A sufficient number of compactors shall be provided to cover the width of the material spread in one pass of the compactors and this rolling shall continue until a minimum of three passes has been completed. For chip seals with a hot applied binder coat, the third pass shall be completed within 15 minutes after the initial rolling commences.

404-7.05 Minimum Traffic-Free Period:

The minimum traffic-free period for a newly applied emulsion chip seal coat shall be three hours; however, the contractor's hauling equipment may use the new seal coat during the traffic free period at a speed not to exceed 15 miles per hour. After the traffic free period, but prior to removing the loose cover material, all traffic allowed by the Engineer shall be limited to a speed not to exceed 25 miles per hour.

404-7.06 Removal of Loose Cover Material:

Prior to opening to traffic and at least 2 hours after placement of the cover material, all loose cover material shall be removed from the paved surface by brooming within 36 hours after application.

For chip seals with a hot applied binder coat, the removal of loose cover material shall commence approximately 30 minutes after the final rolling is completed.

If the Engineer determines that conditions are not conducive to obtaining the best results, brooming shall be discontinued until the Engineer has considered all conditions and has determined the best time for the removal of the cover material. The cover material shall be removed by means of a power broom which shall be in good condition and of a design suitable for the work. The action of the broom shall be such that particles which are stuck to the bituminous material will not be dislodged.

404-7.07 Fog Coat on New Chip Seals:

Unless otherwise specified in the Special Provisions, following the curing period of new chip seal coats, a fog coat shall be placed on the final chip seal coat surface, in accordance with the application rates described in 404-6.

404-7.08 Chip Seal Test Strip:

Prior to the start of placement, all equipment used in the placement of the chip seal coat shall be verified to be in satisfactory operating condition and in accordance with the requirements herein.

Cover material shall be verified to be in a condition consistent with that in which it existed at the time initial acceptance samples were obtained with adequate moisture. Bituminous material certifications shall be verified to indicate that the required type of material is on hand and at the proper temperature.

The existing pavement surface to receive the test strip shall be verified to have been adequately swept and cleaned and meeting the requirements herein. Anticipated application rates shall have been marked and clearly visible to equipment operators.

During placement of the test strip, all equipment shall be observed to confirm proper operation. The application rate of the both bituminous material and cover material shall be measured and verified using a catch-and-weigh "tarp" method. The application rate of the bituminous material shall also be measured and verified by means of a volume per area calculation using the distributor trucks calibrated thermometer and volume measuring gauge or device.

Rolling shall immediately follow placement of the cover material and be verified to be in conformance with the requirements herein.

For emulsion chip seals, the contractor shall broom the surface to remove excess cover material only after the emulsion has fully broken.

Prior to any subsequent placement, the test strip shall be observed to have adequate embedment of the cover material without excessive void space between the chips, stacking of chips, or accumulation of chips on the shoulders. If the condition of the test strip is not acceptable, adjustments shall be made as appropriate, and an additional test strip shall be performed.

404-7.09 Contractor Quality Control:

The contractor shall be responsible for the chip seal design, performing quality control testing on materials, and designating an individual charged with constant observation and monitoring.

Need for an adjustment to application rates or a correction to process or equipment shall be communicated immediately to the necessary personnel.

The initial condition of equipment, materials, and the project and pavement surface conditions shall be documented. The performance and results of the test strip shall be documented. Observations of monitoring activities and quantification of application rates during the test strip and production shall be documented no less frequently than every other placement run.

The cause for any adjustments, including quantifying tests performed, the adjustments made, and the result of such adjustments with regard to acceptability and performance of the chip seal coat shall be documented.

404-8 Method of Measurement:

Bituminous materials will be measured by the ton.

Bituminous material that is required to be diluted prior to application will be measured by the ton of diluted material.

Cover material will be measured by the square yard.

The contractor shall be responsible to determine the amount of cover material that will be required to complete the work from the source or sources from which the cover material is obtained.

Blotter material, when required, will be measured by the square yard.

Measurement for payment will be made only for the quantity of bituminous material and for the quantity of aggregate material used in accordance with the requirements of these specifications.

Time to apply tack coat, when required, is defined as the hours within a work shift that an approved distributor truck containing the specified bituminous material is required by the Engineer to be at the work site.

The time which is required to apply tack coat, when required, will be measured to the nearest hour for the actual number of hours required in any one work shift; however, when the time required is less than four hours in any workday, the time will be measured as four hours.

404-9 Basis of Payment:

The accepted quantities of bituminous treatments, complete in place, measured as provided above, will be paid for at the contract unit price, except the contract unit price for bituminous material will be adjusted for quantities of material represented by the corresponding test results. Adjustments will be made in accordance with Section 1005.

For chip seal coats, no measurement or direct payment will be made for precoating the cover material, material for precoating, and rolling and removal of loose cover material.

Payment for all measures necessary to direct and escort traffic through the area being bituminous treated will be made as specified under Section 701.

No measurement or direct payment will be made for rolling.

No measurement or direct payment will be made for furnishing, applying and removing blotter material, furnished in conjunction with the application of a prime coat.

No measurement or direct payment will be made for the maintenance or repair of a prime coat surface.

The bidding schedule quantity for tack coat is based on an estimated application rate of 0.06 gallons per square yard for each application shown on the project plans.

The unit price for bituminous tack coat is deemed to be the cost to furnish, transport, and store asphalt cement or emulsified asphalt at the project location. Payment for bituminous tack coat will be made at the unit price multiplied by the respective payment factor listed under Subsection 404-5, and adjusted to the nearest dollar.

Unless otherwise specified, the accepted quantity of bituminous tack coat, measured as provided above, will be paid at the contract unit price per ton adjusted as provided above which price shall be full compensation for furnishing, transporting, and storing the exact type, grade or designation of bituminous tack coat specified by the Engineer.

Unless otherwise specified, the accepted quantity of time to apply bituminous tack coat, measured as provided above, will be paid for at the contract unit price per hour which payment shall be full compensation for applying bituminous tack coat.

The term "bituminous material" as used herein shall include asphalt cement, liquid asphalt, and emulsified asphalt.

The contract unit price for each item of bituminous material will be considered to include all costs for furnishing, hauling, handling, spreading, and mixing of the material as required, including the "initial cost" of bituminous material, but excluding any difference in the cost of bituminous material that occurs between the date of bid opening and the date that the material is used on the project.

A cost for bituminous material will be determined monthly by the Department based on the selling prices of asphalt cement published by the Asphalt Weekly Monitor, a publication of Poten & Partners, Inc. The cost will be the arithmetic average of the high and low selling prices for asphalt cement shown in the previous four reports for the Arizona/Utah and Southern California regions.

This cost will be deemed the "initial cost" (IC) for bituminous material for projects on which bids are opened during the following month. This cost will also be deemed the "current price" (CP) for bituminous material for the following month for projects in construction.

This value will be effective as of the last Wednesday of each month, and will be posted on the ADOT Contracts and Specifications Section website, on or shortly after the last Wednesday of month.

For each item of bituminous material for which there is a specific pay item, and for the bituminous material used in Asphaltic Concrete (Miscellaneous Structural), an adjustment will be made as follows for each month that a quantity of bituminous material was used on the project.

The "initial cost" (IC) for the month in which the project was bid will be compared with the "current price" (CP) as specified above for the appropriate current month. The "current price" (CP) will be as posted on the Department's website on the last Wednesday of each month,

and will be used to adjust costs for bituminous material incorporated into the job during the following month (for example; bituminous material used in May will be adjusted, as specified herein, based on the "current price" (CP) for May as posted on the last Wednesday of April). Any difference in price between these two values will be applied to the quantity of eligible bituminous material incorporated into the work.

Determination of the eligible quantities of bituminous material will be based on contractor-furnished invoices, except as modified below.

The tons of emulsified products to which the adjustment will be applicable will be the tons of the emulsified asphalt prior to dilution.

Adjustments in compensation for emulsified asphalts will be made at 60 percent of either the increase or decrease. For emulsified asphalts containing polymer, adjustments in compensation will be made at 66 percent of either the increase or decrease.

The tons of Bituminous Material (Asphalt-Rubber) to which the adjustment will be applicable will be 0.80 multiplied times the total quantity of the item used. The adjustment will not apply to the 20 percent of the material which constitutes the crumb rubber additive.

The tons of bituminous material incorporated in Asphaltic Concrete (Miscellaneous Structural) or Asphaltic Concrete (Miscellaneous Structural-Special Mix) to which an adjustment will be applicable shall be as follows:

- (1) For mixes without reclaimed asphalt pavement (RAP), the adjustment will be equal to five percent of the quantity, measured in tons, of asphaltic concrete placed, regardless of the actual percentage of bituminous material incorporated into the mix.
- (2) For mixes with reclaimed asphalt pavement (RAP), the adjustment will be equal to four percent of the quantity, measured in tons, of asphaltic concrete placed, regardless of the actual percentage of bituminous material incorporated into the mix.
- (3) If the quantity of asphaltic concrete is measured by volume, the supplemental agreement establishing the method of measurement will specify the manner in which the tons of bituminous material eligible for the adjustment is determined.

The tons of bituminous materials which are paid for on the basis of testing by nuclear asphalt content gauge, ignition furnace, or other approved methods to which the adjustment will be applicable, are the tons which have been incorporated into the mixture.

When reclaimed asphalt pavement (RAP) is used in asphaltic concrete, only the virgin asphalt cement will be subject to a bituminous material price adjustment. RAP binder is not subject to a price adjustment.

No additional compensation will be made for any additional or increased charges, costs, expenses, taxes, etc., which the contractor may have incurred since the time of bidding and which may be the result of any increase in the "initial cost" of bituminous material.

Adjustment in unit prices of items governed by this provision will be made in the next regular monthly progress payment following actual use or application of the bituminous material.

Any adjustment in compensation made for bituminous material incorporated into the work after the expiration of the specified completion time set forth in the contract, or as may be extended in accordance with the provisions of Subsection 108.08, will be on the basis of the price of bituminous material shown on the Department's website and applicable for the date of the expiration of the specified completion time as hereinbefore specified.