

Superpave Asphaltic Concrete Mixtures For use by Local Governments

Special Provisions Page:

- 1) Please list here if MTV is required. Remember the MTV needs special height and weight requirements. The MTV is not recommended for use on parking lots or subdivision streets.
- 2) Please list here if Profilograph requirements are needed.
- 3) Please list here if any special requirements are needed with the liquid Asphalt Cement such as the addition of Polymer or other grades other than specified in this specification.
- 4) Please list here intended nominal aggregate size for your job.
- 5) Please list here if your project will require high friction aggregates for the final Wearing Course. Remember these aggregates are usually more expensive and are intended to improve skid ratings on highways. We do not recommend requiring their use on roads or parking areas with low speed limits because of the economic factors.
- 6) Please list here if you choose to use the nuclear density gauge to determine density in lieu of cutting cores.

Superpave Asphaltic Concrete Mixtures For use by Local Governments

DESCRIPTION. These specifications are applicable to Superpave Asphaltic Concrete wearing, binder and base course mixtures of the plant mix type. The intended use of these mixtures is for City and Parish local roads, parking lots, local airports, etc.

It should be noted here that with each level of mix, the degree of compactive effort on the roadway increases also. Therefore, a higher level mixture may not be better if the underlying Base Course is not sufficient enough to withstand the compactive effort without damage.

This specification will make reference to different tables and sections of the latest version of the Louisiana Department of Transportation and Development Standard Specifications unless modified herein.

This work consists of furnishing and constructing one or more courses of asphaltic concrete mixture applied hot in conformance with these specifications and in conformity with the lines, grades, thicknesses and typical sections shown on the plans or established. The mixture shall consist of aggregates and asphalt with additives combined in proportions, which meet the requirements of this section including Tables 502-3, 502-4, and 502-5. Equipment and processes shall conform to Section 503.

Changes in design level will not be allowed. Substitutions will be allowed for mixes within the same design level without requiring a plan change as follows:

Substitutions will be allowed for mixes within the same design level without requiring a plan change as follows:

1. Wearing course for binder course or base course.

2. Binder course base course.
3. Higher level Base course for lower level base course.
4. One nominal maximum size aggregate reduction for a larger nominal maximum size aggregate with a new mix

When any substitution is made, all specification requirements for the mixture used shall apply with the following exception. When wearing course is substituted for binder course, RAP will be allowed in accordance with Table 502-4. If wearing course is substituted for binder, the percent allowable RAP for binder may be used. The lift thickness placed shall be as specified in Subsection 502.07 and Table 502-4 for the mix type used.

Quality assurance requirements and design procedures shall be as specified herein elsewhere or in the latest edition of the Owner and / or his representative's publication entitled "Application of Quality Assurance Specifications for Asphaltic Concrete Mixtures" which is hereby made a part of this contract by reference.

502.02 MATERIALS. The contractor shall keep accurate records, including proof of deliveries of materials for use in asphaltic concrete mixtures. Copies of these records shall be furnished to the engineer upon request. Materials shall conform to the following Subsections:

Asphalt	1002.01
Silicone and Anti-Strip Additives	1002.02
Aggregates.....	1003.01 & 1003.06
Hydrated Lime	1018.03(a)
Mix Release Agent.....	1018.26

(a) Asphalt: The asphalt cement grades used shall be as specified in Table 502-1 using the design traffic load levels shown on the plans.

**TABLE 502-1
SUPERPAVE ASPHALT CEMENT USAGE**

CURRENT TRAFFIC LOAD LEVEL	MIXTURE TYPE	GRADE OF ASPHALT CEMENT[†]
Level 1	Wearing Course	PG64-22
	Binder Course	PG 64-22
	Base Course	PG 64-22
Level 2 and 3	Wearing Course	PG 64-22
	Binder Course	PG 64-22
	Base Course	PG 64-22

(b) Additives:

(1) Silicone: Silicone additives, when needed, shall be dispersed into the asphalt by methods and in concentrations given in QPL 22.

(2) Anti-Strip (AS): An anti-strip additive shall be added at the minimum rate of 0.5 percent by weight (mass) of asphalt and thoroughly mixed in-line with the asphalt cement at the plant. Additional anti-strip additive shall be added up to 1.2 percent by weight (mass) of asphalt in accordance with Subsection 502.03(b).

(3) Hydrated Lime: Hydrated lime additive may be incorporated into all asphaltic concrete mixtures at the rate specified in the approved job mix formula. The minimum rate shall not be less than 1.5 percent by weight (mass) of the total mixture. Hydrated lime additive shall be added to and thoroughly mixed with aggregates in conformance with Subsection 503.02(e). Hydrated lime may be added as a mineral filler in accordance with Heading (c)(3).

(c) Aggregates: Aggregates shall meet the requirements of Tables 502-3 and 502-4 and Subsection 1003.

(1) Reclaimed Asphaltic Pavement (RAP): Reclaimed asphaltic pavement shall be stockpiled separate from other materials at the plant and will be subject to approval prior to use. Such stockpiles shall be uniform and free of soil, debris, foreign matter and other contaminants. Reclaimed materials that cannot be broken down during mixing or that adversely affect paving operations shall be screened or crushed to pass a 2-inch (50-mm) sieve prior to use.

(2) Mineral Filler: Mineral filler conforming to the requirements of Subsection 1003.06(a)(11) may be used in all mixtures.

(3) Crushed Aggregates: Crushed aggregates are crusher generated materials manufactured by crushing materials which have a maximum of 10 percent passing the No. 4 (4.75 mm) sieve.

Friction Ratings for coarse aggregates shall be determined in accordance with Subsection 1003.06. The allowable usage of coarse aggregates shall be as follows.

**TABLE 502-2
AGGREGATE FRICTION RATING**

Friction Rating *	Allowable Usage
I	All mixtures
II	All mixtures
III	All mixtures except wearing courses with plan ADT greater than 7000 ¹
IV	All mixtures except wearing courses ²

* When not available, the engineer to assign friction level

¹At least 50 percent by weight (mass) of total aggregates retained on the No. 8 (2.36 mm) sieve for wearing course with plan ADT greater than 7000 shall have a Friction Rating of I, or at least 75 percent by weight (mass) of the total aggregate retained on the No. 8 (2.36 mm) sieve shall have a Friction Rating of II. The remaining course aggregate shall have a Friction Rating of III or better.

²Level 1 wearing course mixes may use this aggregate provided a minimum of 50 percent by weight (mass) of the coarse aggregates in the mixture has a Friction Rating of I or II. This aggregate may also be used in mixtures for shoulders, drives, curbs, detours, etc.

502.03 DESIGN AND QUALITY CONTROL OF MIXTURES.

(a) General: It is the intent of these specifications that the mixtures produced and placed meet the requirements for 100 percent payment. The contractor shall be responsible for design, production, transportation and laydown of mixtures. Work shall meet the requirements of this section and be subject to acceptance by the Owner and / or his representative.

The contractor shall exercise quality control over materials and their assembly, design, processing, production, hauling, laydown and associated equipment. Quality control is defined as the constant monitoring of equipment, materials and processes to ensure that mixtures produced and laid are uniform, are within control limits, and meet specification requirements. When these specifications are not being met and satisfactory control adjustments are not being made, operations shall be discontinued until proper adjustments and uniform operations are established. Control shall be accomplished by a program independent of the Owner and / or his representative's testing and shall ensure that the requirements of the job mix are being achieved and that necessary adjustments provide specification results.

The contractor shall conduct such tests as necessary, in addition to the required tests, to design, control and place mixtures within specifications.

The quality of mixtures will be evaluated during two phases, mixture produced at the plant, and mixture hauled, laid and compacted. Quality of both phases will be evaluated continuously as stated herein elsewhere. A lot is a segment of continuous production of asphaltic concrete mixture from the same job mix formula produced for the Owner and / or his representative at an individual plant. Plant quality control testing shall be conducted continuously throughout production independent of delivery points. Project site quality control testing shall be conducted on each project for the mix placed on that project.

When the plant is in operation, the contractor shall have a Superpave Qualified Asphaltic Concrete Plant Technician at the plant or jobsite who is capable of designing asphaltic concrete mixes, conducting any test or analysis necessary to put the plant into operation and producing a mixture meeting specifications. Daily plant operations shall not begin unless the Certified Asphaltic Concrete Plant Technician is at the plant.

The Contractor will be responsible for aggregate gradation, percent crushed, asphalt content testing on a daily basis. When testing indicates that the mix is outside the specification tolerances listed herein for two, consecutive tests, the contractor must cease operations for that mix until satisfactory adjustments have been made.

(b) Job Mix Formula: The contractor shall design the mixtures for optimum asphalt content and comply with requirements of the Superpave Mix Design for the level of mixture in Table 502-4 in accordance with AASHTO PP 28. The job mix formula shall include the recommended formula, extracted gradation, and supporting design data. The recommended formula shall be submitted for approval to the Owner and / or his representative with all supporting design data. No mixture shall be produced until the proposed job mix formula has been approved.

The proposed job mix formula shall indicate a single anti-strip additive rate which is 0.1 percent greater than the percentage which will yield a minimum Tensile Strength Ratio (TSR) of 75 percent up to a maximum of 1.2 percent when tested in accordance with AASHTO T 283 with one freeze-thaw cycle.

The job mix formula shall indicate a single rate of hydrated lime additive when used. The job mix formula rate of hydrated lime additive shall not be less than 1.5 percent by weight (mass) of total mixture.

The job mix formula shall indicate the optimum mixing temperature which is the midpoint of the range shown on the Optimum Mixing and Compaction Temperatures Chart for the asphalt cement used. This chart shall be furnished by the Materials and Testing Section. The job mix

formula limits for mix temperature will be $\pm 25^{\circ}\text{F}$ ($\pm 14^{\circ}\text{C}$) from the optimum mixing temperature.

The job mix formula is to be inside the control points and outside the restricted zone as detailed in Table 502-5. The full range of gradation mix tolerances will be allowed regardless of whether they fall outside the control points or within the restricted zone. Blending of aggregates, i.e., gravel and stone, will be allowed provided the final composite mixture and final product meets or exceeds all specifications requirements. Level 1 mixes will be allowed to be designed within the restricted zone.

The plant shall be operated to produce, on a continuing basis, a mixture uniformly conforming to the approved job mix formula. When this is not the case, the contractor shall make satisfactory adjustments or cease operations. The District Laboratory Engineer may permit the contractor to submit a new Asphaltic Concrete Job Mix Formula form for approval. The contractor shall submit a new job mix formula whenever a plant begins initial operations for the Owner and / or his representative in a specific location or whenever a plant experiences a change in materials or source of materials.

When the contractor changes a source of RAP, the new mix design shall be submitted, validated and approved if the type of aggregate changes (e.g. gravel to limestone) or the source change causes a change in acceptance tolerances. If the contractor determines that the source change will not cause a change in acceptance tolerances, the contractor may elect to integrate the new RAP source into the existing approved mix design provided the contractor submits a revised job mix formula cover sheet which shows the new source of RAP and other changes. A new validation will not be required. If subsequent acceptance tests indicate that the mix is out of tolerance, a new design will be required and appropriate payment adjustments will apply.

A new job mix formula will also be required whenever there are significant changes in equipment, such as the introduction of a new crusher, drum mixer, burner, etc.

(c) Job Mix Formula (JMF) Validation: The first day's production or a maximum of 1500 tons (1650 Mg) of mix shall be used to validate a new JMF and to establish parameters for quality control. The producer and the Owner's representative shall jointly, using the stratified random sampling approach, take three (3) samples during the first day's production. Minimum testing shall include one maximum specific gravity (G_{mm}), one gyratory specimen compacted to N_{design} , one gyratory specimen compacted to N_{max} , and one oven extraction. As approved by the Owner, the contractor and the Owner's representative shall jointly analyze the results including:

- (1) Percent extracted asphalt cement.
- (2) Extracted gradation.
- (3) Percent crushed aggregate
- (4) Maximum specific gravity (G_{mm}).
- (5) Bulk specific gravity (G_{mb}) at N_{design} measured and N_{max} . on samples aged for one hour in an oven at gyratory compaction temperature.
- (6) Percent G_{mm} at $N_{initial}$, N_{design} , and N_{max} .
- (7) Percent voids at N_{design} on samples aged for one hour in an oven at gyratory compaction temperature.
- (8) Percents VMA and VFA at N_{design} on samples aged for one hour in an oven at gyratory compaction temperature.

A JMF is considered validated if the average results of the following parameters are within the specification limits.

- (1) Extracted gradations for the No. 8 and No. 200 (2.36 mm and 75 μm) sieves.

- (2) Maximum specific gravity (G_{mm}).
- (3) Percents G_{mm} at $N_{initial}$ and N_{max} .
- (4) Percent voids N_{design} .
- (5) Percent VMA at N_{design} .

After validating the JMF for mix properties, the owner and / or his representative may elect to sample the next day's production and perform verification testing at the plant for AASHTO T 283 using one freeze-thaw cycle and AASHTO TP 4 specimens. When the verification results do not meet specifications, no further production for that job mix formula or any proposed job mix formula substituted for that mix type will be accepted on any DOTD project having AASHTO T 283 requirements until a passing plant-produced TSR value is verified by the Owner and / or his representative. A previously validated and approved job mix formula may be produced in lieu of the disapproved job mix formula.

(e) Reclaimed Asphaltic Pavement (RAP): The quantity of reclaimed asphaltic pavement to be used shall be designated in the job mix formula and meet the requirements of Table 502-4 . With the exception of roadway and airport final wearing courses, mixtures may contain a maximum of 30 percent reclaimed asphaltic pavement with no testing required for absolute viscosity. The mixture produced shall comply with the requirements for the type mixture specified. The engineer may require the contractor to reduce the percentage of reclaimed asphaltic pavement to meet acceptance criteria.

502.04 WEATHER LIMITATIONS. Asphaltic concrete mixtures shall not be applied on a wet surface or when the ambient temperature is below 50°F (10°C) for wearing courses and 40°F (5°C) for base and binder courses, except that material in transit, or a maximum of 50 tons (45 Mg) in a surge bin or silo used as a surge bin at the time plant operation is discontinued may be laid; however, mixture laid shall perform satisfactorily and meet specification requirements. Inclement weather will be sufficient reason to terminate or not begin production.

When base course materials are placed in plan thickness of 2 3/4 inches (70 mm) or greater, these temperature limitations shall not apply provided all other specification requirements are met. When a wearing course is substituted for a binder or base course mixture the temperature limitation for binder and base course shall apply.

502.05 SURFACE PREPARATION. The surface to be covered shall be approved prior to placing mixtures. The contractor shall maintain the surface until it is covered.

(a) Cleaning: The surface to be covered shall be swept clean of dust, dirt, caked clay, caked material and loose material by revolving brooms or other mechanical sweepers supplemented with hand equipment as directed. When mixtures are to be placed on portland cement concrete pavement or overlaid Portland cement concrete, the contractor shall remove excess joint filler from the surface by an approved burning method. The contractor shall remove any existing raised pavement markers prior to asphaltic concrete overlay operations.

When liquid asphalt is exposed to traffic for more than 2 calendar days, becomes contaminated, or degrades due to inclement weather, the liquid asphalt shall be reapplied at the initial recommended rate at no direct pay.

(b) Applying Liquid Asphaltic Materials:

(1) Existing Pavement Surfaces: Before constructing each course, an approved asphalt tack coat shall be applied in accordance with Section 504. The contractor shall protect the tack coat and spot patch as required.

(2) Raw Aggregate Base Course and Raw Embankment Surfaces: The contractor shall apply an approved asphalt prime coat to unprimed surfaces, or protect in-place prime coat and spot patch as required with asphalt prime coat, in accordance with Section 505.

(3) Cement and Lime Stabilized or Treated Embankment and Base Course Surfaces: The contractor shall apply an approved asphalt curing membrane when none is in place, or protect the in-place curing membrane and spot patch, as required, with asphaltic material in accordance with Section 506.

(4) Other Surfaces: Contact surfaces of curbs, gutters, manholes, edges of longitudinal and transverse joints, and other structures shall be covered with a uniform coating of an approved asphalt tack coat conforming to Section 504 before placing asphaltic mixtures.

502.06 JOINT CONSTRUCTION.

(a) Longitudinal Joints: Longitudinal joints shall be constructed by setting the screed to allow approximately 25 percent fluff and also overlapping the paver approximately 2 inches (50 mm) onto the adjacent pass. Prior to rolling, the overlapped mix shall be pushed back to the uncompacted side, without scattering loose material over the uncompacted mat, to form a vertical edge above the joint. The vertical edge shall then be compacted by rolling to form a smooth, sealed joint. Longitudinal joints in one layer shall offset those in the layer below by a minimum of 3 inches (75 mm); however, the joint in the top layer shall be offset 3 inches (75 mm) to 6 inches (150 mm) from the centerline of pavement when the roadway comprises two lanes of width, or offset 3 inches (75 mm) to 6 inches (150 mm) from lane lines when the roadway is more than two lanes. The narrow strip shall be constructed first.

Where adjacent paving strips are to be placed, the longitudinal edge joint of the existing strip shall be tacked.

(b) Transverse Joints: Transverse joints shall be butt joints formed by cutting back on the previously placed mixture to expose the full depth of the lift. An approved 10-foot (3.0 m) static straightedge shall be used to identify the location at which the previously placed mixture is to be cut back to maintain no greater than a 1/8-inch (3 mm) deviation in grade. The cut face of the previously placed mat shall be lightly tacked before fresh material is placed. The screed shall rest on shims that are approximately 25 percent of plan thickness placed on the compacted mat. Transverse joints shall be formed by an adequate crew. Transverse joints shall be checked by the engineer for surface tolerance using a stringline extended from a point 10 feet (3 m) before the joint to a point approximately 40 feet (12 m) beyond the joint. Any deviation in grade from the stringline in excess of 3/16 inch (5 mm) for roadway wearing courses and 1/4 inch (6 mm) for other courses shall be immediately corrected prior to the paving operation continuing beyond 100 feet (30 m) of the transverse joint. Additionally, the transverse joint shall meet the surface tolerance requirements of Table 502-3. The contractor shall make necessary corrections to the joint before continuing placement operations.

Transverse joints in succeeding lifts shall be offset at least 3 feet (1.0 m).

502.07 HAULING, PAVING AND FINISHING. Mixtures shall be transported from the plant and delivered to the paver at a temperature no cooler than 25°F (14°C) below the lower limit of the approved job mix formula. The temperature of the mix going through the paver shall not be cooler than 250°F (120°C).

No loads shall be sent out so late in the day that completion of spreading and compaction of the mixture cannot be completed during daylight, unless artificial lighting has been approved.

When segregation occurs, haul trucks shall be loaded with a minimum of three drops of mix, the last of which shall be in the middle.

Each course of asphaltic mixture shall be placed in accordance with the specified lift thickness. When no lift thickness is specified, or when substitute mixtures are utilized as specified in Subsection 502.01, mixtures shall be placed in accordance with Table 502-4.

With the engineer's approval, motor patrols may be used to fill isolated depressions in the initial layer, provided this construction does not result in unsatisfactory subsequent lifts.

(a) Coordination of Production: The contractor shall coordinate and manage plant production, transportation of mix and placement operations to achieve a high quality pavement and shall have sufficient hauling vehicles to ensure continuous plant and roadway operations. The engineer will order a halt to operations when sufficient hauling vehicles are not available.

On final wearing course construction under traffic with pavement layers of 2 inches (50 mm) compacted thickness or less, the contractor will be permitted to pave one travel lane for a full day. The contractor shall pave the adjacent travel lane the next workday. When the adjacent travel lane is not paved the next calendar day and the longitudinal joint is exposed to traffic for more than 3 calendar days, the entire length of exposed longitudinal joint shall be cut back to plan thickness to a vertical edge and heavily tacked. When pavement layers are greater than 2 inches (50 mm) compacted thickness, the contractor shall place approximately 1/2 of each day's production in one lane and the remainder in the adjacent lane.

Pavement shall be protected from traffic until it has sufficiently hardened to the extent the surface is not damaged.

(b) Paving Operations: All mixtures shall flow through the paver hopper. Mixtures dropped in front of the paver shall be either lifted into the hopper or rejected and cast aside. Delivery of material to the paver shall be at a uniform rate and in an amount within the capacity of paving and compacting equipment. The paver speed and number of trucks shall be adjusted to have one truck waiting in addition to the one at the paver in order to maintain continuous paving operations. The height of material in front of the screed shall remain uniform.

Transfer of mixture from haul truck to paver, unless otherwise specified, may be made by direct unloading into the paver hopper or by use of approved mechanical transfer devices to transfer mix from a haul truck or windrow. During mixture transfer, the paver shall not be jarred or moved out of alignment. The level of mix in the paver hopper shall not drop so low as to expose the hopper feed slats.

Pavers shall be designed and operated to place mixtures to required line, grade and surface tolerance without resorting to hand finishing.

Longitudinal joints and edges shall be constructed along lines established. Stringlines or other forms of longitudinal control shall be placed by the contractor for the paver to follow. The paver shall be positioned and operated to closely follow the established line. Irregularities in alignment shall be corrected by trimming or filling directly behind the paver.

After each load of material has been placed, the texture of the unrolled surface shall be checked to determine its uniformity. The adjustment of screed, tamping bars, feed screws, hopper feed, etc., shall be checked frequently and adjusted as required to assure uniform spreading of the mix to proper line and grade and adequate compaction. When segregation of materials or other deficiencies occur, paving operations shall be suspended until the cause is determined and corrected.

Surface irregularities shall be corrected directly behind the paver. Excess material forming high spots shall be removed. Indented areas shall be filled and finished smooth. Hand

placement in accordance with Heading (c) for surface repair will be permitted. Material shall not be cast over the surface.

When paving and finishing operations are interrupted so that the mixture remaining in trucks, paver, paver hopper or on the pavement cools to such extent that it cannot be placed, finished or compacted to the same degree of smoothness and with the same texture and density as the uncooled mixture, the cooled mixture shall be removed and replaced at no direct pay.

When additional mix is required to increase super-elevation in curves, the use of automatic slope control will be optional with the contractor.

The traveling reference method of construction will be required for airport runways unless designated otherwise on the plans.

Pavers for roadway travel lanes shall be equipped with automatic screed and slope control devices used with an erected stringline, unless the contractor elects to use an approved automated base course grading machine. If the automated base course grading machine is used with an erected stringline, an approved traveling reference plane shall be used with the paver.

The following requirements shall apply for mechanical pavers:

(1) Traveling Reference Plane: An approved traveling reference plane shall be used. After the initial paving strip of each lift is finished and compacted, adjacent paving strips shall be placed to the grade of the initial paving strip using a the traveling reference plane or shoe device to control grade and a slope control device to control cross slope.

On multilane pavements, the initial paving strip and the sequence of lane construction will be subject to approval.

When both outside edges of the paving strip being placed are flush with previously placed material, the slope control device shall not be used. A grade sensor is required for each side of the paver.

In super-elevated curves, the cross slope shall be changed from that specified for tangents to that specified for super-elevation in gradual increments while the paver is in motion so a smooth transition in grade is obtained. This change in cross slope shall be accomplished within the transition distance specified.

This is the minimum acceptable method and the contractor must meet or exceed current specifications for surface tolerance.

(2) Erected Stringline: An erected stringline shall consist of a piano wire or approved equal stretched between stakes set at no greater than 25-foot (7.0-m) intervals tensioned between supports so that there is less than 0.1-inch (3 mm) variance between supports when the sensor is in place. The stringline elevation will be verified by the Owner's representative using standard surveying practices.

The initial paving strip of the first lift shall be constructed using an erected stringline referenced to established grade. When permitted, mixtures required to level isolated depressions may be placed without automatic screed control. Subsequent lifts may be constructed by use of the traveling reference plane, provided surface and grade tolerances are met on the previous lift.

Only one grade sensor and the slope control device are necessary for roadways with a normal crown on tangent alignment. Super-elevated curves will require the use of two grade sensors and two erected stringlines to obtain proper grade and slope; however, when the automatic screed control device is equipped with a dial or other device which can be conveniently used to change the cross slope in small increments, super-elevated curves may be constructed using this device and one erected stringline.

After the initial paving strip of the first lift is finished and compacted, adjacent paving strips shall be laid using an approved traveling reference plane.

(3) Without Automatic Screed Control: When permitted, pavers without automatic screed control may be used for pavement patching, pavement widening, paved drives and turnouts.

(c) Hand Placement: When the use of mechanical finishing equipment is not practical, the mix may be placed and finished by hand to the satisfaction of the engineer. No casting will be allowed including casting the mixture from the truck to the grade. During paving operations material shall be thoroughly loosened and uniformly distributed. Material that has formed into lumps and does not break down readily will be rejected. The surface shall be checked before rolling and irregularities corrected.

(a) General: After placement, mixtures shall be uniformly compacted, by rolling while still hot, to at least the density specified in Table 502-3. If continuous roller operation is discontinued, rollers shall be removed to cooler areas of the mat, where they will not leave surface indentations. The use of steel wheel rollers which result in excessive crushing of aggregate will not be permitted.

502.08 COMPACTION.

The rolling pattern established by the contractor shall be conducted by experienced operators in consistent sequences and by uniform methods that will obtain specified density and smoothness. Individual roller passes shall uniformly overlap preceding passes to ensure complete coverage of the paving area. The speed and operation of rollers shall not displace, tear or crack the mat. Non-vibrating steel wheel rollers shall be operated with drive wheels toward the paver. Any operations causing displacement, tearing or cracking of the mat shall be immediately corrected.

Equipment which leaves tracks or indented areas which cannot be corrected in normal operations or fails to produce a satisfactory surface shall not be used. Operation of equipment resulting in accumulation of material and subsequent shedding of accumulated material into the mixture or onto the mat will not be permitted.

To prevent adhesion of mixture, wheels of steel wheel rollers shall be kept properly moistened, but excess water will not be permitted.

Pneumatic tire rollers shall be operated so that the tires will retain adequate heat to prevent mix from adhering to tires. The pneumatic tire roller shall be operated at a contact pressure which will result in a uniform, tightly-knit surface. The pneumatic tire roller shall be kept approximately 6 inches (150 mm) from unsupported edges of the paving strip; however, when an adjacent paving strip is down, the roller shall overlap the adjacent paving strip approximately 6 inches (150 mm).

Vibratory rollers may be used provided they do not impair the stability of the pavement structure or underlying layers. Vibratory rollers shall not be used on the first lift of asphaltic concrete placed over the asphalt treated drainage blanket. When mix is placed on newly constructed cement or lime stabilized or treated layers, vibratory rollers shall not be used for at least 7 days after such stabilization or treatment.

It is the responsibility of the contractor to determine the number, size, and type of rollers to sufficiently compact the mixture to the specified density and surface smoothness. The rolling equipment shall be capable of maintaining the pace of the paver and shall conform to Subsection 503.06.

The surface of mixtures after compaction shall be smooth and true to cross slopes and grade within the tolerances specified. Mixtures that become loose, broken, contaminated or otherwise defective shall be removed and replaced with fresh hot mixture compacted to conform with the surrounding mixture.

Ripples in the mat surface will not be accepted. Areas identified as unacceptable shall be corrected at no direct pay. Damage to the longitudinal joint shall be minimized to conform to Subsection 502.07(a).

(b) Rolling: After rolling, newly finished pavements shall have a uniform, tightly-knit surface free of cracks, tears, roller marks or other deficiencies. Deficiencies shall be corrected at no direct pay and the contractor shall adjust operations to correct the problem. This may require the contractor to adjust the mix or furnish additional or different equipment.

(c) Hand Compaction: Along forms, curbs, headers, walls and at other places inaccessible to rollers, mixture shall be uniformly compacted to the satisfaction of the engineer with approved hand tampers or mechanical tampers, conforming to Subsection 503.07.

502.09 PAVEMENT SAMPLES. Samples shall be cores approximately 4 inches (100 mm) or 6 inches (150 mm) in diameter taken by an approved core drill. The contractor shall furnish samples cut from the completed work. The removed pavement shall be replaced with hot or cold mixture and refinished during the work day coring is performed. No additional compensation will be allowed for furnishing test samples and replacing the areas with new pavement. Samples shall be taken by the contractor in the presence of the engineer's representative from areas selected by the Owner and / or his representative in accordance with Subsection 502.12(b)(2)c. When the design thickness is greater than 1.75 inches (45 mm), cores less than 1 3/8 inches (35 mm) thick shall not be used as pavement samples for payment determination.

Cores shall be transported to the plant in approved styro-foam transport containers or one-gallon friction-top cans. Regardless of transport container used, the container will be sealed, signed, and dated by the inspector using an approved method. The individually wrapped core will also be sealed, signed, and dated by the inspector using an approved method. Any evidence of tampering with the core wrappings, sticker, or opening the container or friction-top can will result in the cores being rejected. Additional pavement samples will be required.

The contractor may elect to use a calibrated Thin Lift Nuclear Gauge to take readings in lieu of core samples. For each core location 2- nuclear density gauge readings will be taken and averaged. Then the five average readings will be averaged to determine acceptance. The nuclear Gauge will be operated in accordance with ASTM D2950 or other recognized procedure.

502.10 SURFACE TOLERANCE REQUIREMENTS.

Acceptance testing for surface tolerance as outlined herein and in Table 502-3 of this section will be the responsibility of the contractor. The contractor shall provide an approved 10-foot (3 m) rolling straightedge for the testing. The rolling straightedge shall be calibrated to the satisfaction of the owner and / or his representative. Procedures shall be in accordance with DOTD designations: TR-603 and TR 618.

a) Longitudinal Surface Tolerance: The finished surface will be tested in the longitudinal direction for conformance to the surface tolerance requirements listed in this section. When testing for roadway travel lanes and airport wearing and binder courses using the straightedge, one path in each paving strip in a lot will be selected for Quality Control and Acceptance Testing. The entire lot will be tested and shall meet the following requirements of table 502-3.

(b) Transverse Surface Tolerance: The transverse surface finish shall be controlled so that the values shown in Table 502-3 will not be exceeded. The surface for binder and wearing courses will be tested at selected locations by the owner in the transverse direction for conformance to surface tolerance requirements of Table 502-3. Corrections shall be made as directed in accordance with Heading (e).

(c) Cross Slope: When the plans require the section to be constructed to a specified cross slope, tests shall be run at selected locations, using a stringline, slope board or other comparable method. The cross slope shall be so controlled that the values shown in Table 502-3 will not be exceeded. Cross slope variations allowed in Table 502-3 shall apply to each lane constructed.

(d) Grade: When the plans require the pavement to be constructed to a grade, tests for conformance shall be run at selected locations, using a stringline or other comparable method. Grade variations shall be controlled so that the tolerance shown in Table 502-3 will not be exceeded. Grade tolerances shall apply to only one longitudinal line, such as the centerline or outside edge of pavement. Corrections shall be made in accordance with Heading (e) of this subsection.

(e) Correction of Deficient Areas: Deficiencies to be corrected in the final wearing course shall be corrected by diamond grinding and applying a light tack coat, or removing and replacing, or furnishing and placing a supplemental layer of wearing course mixture at least 1 1/2 inches (30 mm) compacted thickness for the full width of the roadway meeting specification requirements at no direct pay. If the supplemental layer does not meet specification requirements, it shall be removed and replaced.

Deficiencies to be corrected in binder and shoulder courses shall be corrected in a manner meeting specification requirements at no direct pay. Corrections shall be made before subsequent courses are constructed.

502.11 DIMENSIONAL REQUIREMENTS. Mixtures that are specified for payment on a cubic yard (cu m) or square yard (sq m) basis shall conform to the following dimensional requirements. Overthickness and overwidth will be waived at no direct pay.

(a) Thickness: Thickness of mixtures will be determined in accordance with DOTD TR 602. Underthickness shall not exceed 1/4 inch (6 mm).

When grade adjustments are permitted for all mixtures except the final wearing course, areas with underthickness in excess of 1/4 inch (6 mm) shall be corrected to plan thickness at no direct pay by furnishing and placing additional mixture in accordance with Subsection 502.10(e). For the final wearing course, areas with underthickness in excess of the 1/4 inch (6 mm) shall be corrected to plan thickness at no direct pay by furnishing and placing a supplemental layer of wearing course mixture meeting specification requirements in accordance with Subsection 502.10(e) over the entire area for the full width of the roadway when grade adjustments are permitted.

When grade adjustments do not permit, the deficient overthickness area shall be removed and replaced at no direct pay.

(b) Width: The width of completed courses will be determined in accordance with DOTD TR 602. Underwidths shall be corrected by furnishing and placing additional mixture a minimum of 1-foot (0.3 m) wide and plan thickness at no direct pay.

502.12 ACCEPTANCE REQUIREMENTS. All inspection procedures, including sampling and testing included within these specifications, form the basis for acceptance of the asphaltic concrete. Any section of pavement that is obviously deficient shall be satisfactorily corrected or replaced. Sampling and testing shall be accomplished following a stratified sampling plan in accordance with the Materials Sampling Manual and specified test procedures.

A standard lot is 1,500 tons (1650 Mg), of consecutive production of asphaltic concrete mix from the same job mix formula produced for the Owner and / or his representative at an individual plant. A sub-lot is 500 tons (550 Mg). The Owner and / or his representative reserve the right to assign lot size to a day's run. Additional adjustments may be made to the standard

lot size as specified in this subsection. Minor adjustments will be made to the lot size to accommodate hauling unit capacity.

Acceptance testing for VMA, voids, maximum theoretical gravity, N_{initial} , N_{design} , N_{max} , percent anti-strip additive, percent hydrated lime (when used), quality of asphalt cement, extracted aggregate gradation, percent crushed aggregate, percent asphalt cement, and percent moisture in loose mix will be conducted on the total lot quantity. Acceptance testing for pavement density, surface tolerance and dimensional tolerances will be conducted on that portion of the lot placed on each contract.

When historical records indicate acceptable and uniform mix, the standard lot size may be increased when agreed upon by the engineer and contractor. The Owner and / or his representative or contractor may decrease the size of an individual lot for any of the following conditions:

- (1) The interval between continuous production exceeds 2 days.
- (2) A new job mix formula is accepted.
- (3) The final lot is less than 1,500 tons (1 650 Mg).
- (4) A payment adjustment will be applied to the portion of the lot already produced, provided plant or pavement adjustments have been made to bring the asphaltic concrete into conformance with the specifications requirements.

In case of a smaller individual lot size, the plant mix will be accepted based on the average values of those tests run. A minimum of two samples shall be taken for each lot.

Pavement density and surface tolerance requirements will not be applied for short irregular sections, such as drives, aprons and turnouts; however, mix shall be placed to provide a neat, uniform appearance and shall be compacted by satisfactory methods.

For projects, or separate locations within a project, requiring between 250 and 1 000 tons (250 and 1000 Mg) of mixture, one sample will be taken for VMA, and voids testing for each 250 tons (250 Mg) or portion thereof produced. Sampling and testing for aggregate gradation, asphalt content and percent crushed shall be in accordance with Heading (b)(2)b. Five samples shall be taken for determination of pavement density, with the sampling distribution to be determined by the engineer.

For projects, or separate locations within a project, requiring less than 250 tons (250 Mg), the job mix formula, materials, and plant and paving operations shall be satisfactory to the engineer. Payment adjustments for VMA and voids will be based on Table 502-6 4. Sampling and testing requirements for surface tolerance and pavement density may be modified by the Owner and / or his representative and the payment adjustment for deviations waived.

(a) Inspection: Mix exhibiting deficiencies before placement such as segregation, contamination, lumps, non-uniform coating, excessive temperature variations or other deficiencies, apparent on visual inspection, shall not be placed.

Mix exhibiting deficiencies during placement, such as segregation, contamination, alignment deviations, variations in surface texture and appearance or other deficiencies, apparent on visual inspection, will not be accepted. Poor construction practices such as handwork, improper truck exchanges, improper joint construction, or other deficiencies, apparent on visual inspection, will not be accepted.

Deficiencies revealed by visual inspection after placement and before final acceptance shall be corrected at no direct pay.

When requested by the contractor, the acceptability of mixtures or work rejected by visual inspection will be evaluated by tests and measurements.

(1) Sampling and Testing for Acceptance:

The Owner and / or his representative will take samples or perform tests as outlined in these specifications, to ensure that the asphaltic concrete conforms to LDOTD standards, which include job mix limits, typical sections, material properties, surface deviations and verification of control testing. The Owner and / or his representative will perform plant and roadway acceptance tests with and without payment adjustments. Plant acceptance tests will be performed for, asphalt cement properties, percent anti-strip, voids in the specimen compacted to N_{design} , VMA at N_{design} , and percent of maximum theoretical gravity at $N_{initial}$ and N_{max} to determine the acceptability of the asphaltic concrete at the plant. The plant acceptance tests for, VMA, voids, asphalt cement properties and percent anti-strip shall be subject to payment adjustments and sampling and testing in accordance with the requirements of Heading (b)(2).

The contractor will perform roadway acceptance tests for pavement density and surface tolerance which will be subject to payment adjustments and sampling and testing in accordance with Heading (b)(2). Asphalt cement properties shall be subject to payment adjustments in accordance with Table 502-6. The asphalt cement producer shall provide the test results when requested by the Owner and / or his representative.

(1) Acceptance with Payment Adjustments: When the mix does not meet requirements in the areas listed in this section, the Payment Adjustment Schedules shown in Table 502-6 or 502-7 will be applied. Production of mix that is not eligible for 100 percent payment will not be allowed on a continuous basis. When test results demonstrate that payment adjustments are necessary, satisfactory control adjustments shall be made, or production shall be discontinued.

The Owner and / or his representative will pay the contractor at an adjusted rate as specified in Table 502-6 or 502-7 for tests conducted by the Owner and / or his representative on samples obtained from each lot of material, in accordance with the following Headings. In addition a payment adjustment will be applied for the use of asphalt cement which does not meet specifications.

a. Volumetric Properties: Testing for volumetric properties, percent voids and percent VMA, will be conducted by the Owner and / or his representative. Compacted specimens of mixture shall conform to the properties in Table 502-4 when tested in accordance with AASHTO TP 4, PP 19, and T 166 and an average of three (3) samples taken from each lot after the mixture is placed in trucks. One sample will be taken from each of three (3) sublots. The test results shall be averaged. The data will be used to determine if the lot is outside acceptance limits shown in Table 502-4. If the lot is outside the acceptance limits, an adjustment in unit price for the lot will be made in accordance with Table 502-6.

b. Anti-Strip Additive: Testing for addition of anti-strip additive will be conducted by the Owner and / or his representative at a frequency of twice per lot. When anti-strip additive is not added in accordance with the approved job mix formula, an adjustment in unit price will be made in accordance with Table 502-7. The payment adjustment required will be on the averaged whole percent payment for the lot. The lot will be divided into two approximately equal sub-lots. The percent pay will be adjusted for each sub-lot, then averaged to determine the payment adjustment for the lot.

c. Pavement Density: Acceptance testing for pavement density will be conducted by the contractor. Upon completion of compaction, five pavement samples shall be obtained in accordance with Subsection 502.09 for each mix use from each lot within 24 hours after placement of the lot using the stratified random method. When this falls on a day the contractor's crews are not working, sampling shall be done within 3 calendar days. The lot will

be divided into five sublots of approximately equal length. One sample shall be obtained from each sublot. The number of samples representing a lot will not be less than five. The density requirement per lot will be as shown in Table 502-3 determined in accordance with AASHTO T 166 and PP 19. Payment will be made in accordance with Table 502-6 4.

When the sampling location determined by random sampling falls within areas that are to be replaced or within 1-foot (0.3 m) of the unsupported pavement edge, another random sampling location will be used.

d. Longitudinal Surface Tolerance: Testing for surface tolerance will be required for each lot on the final roadway wearing course lift and airport wearing course lift. The requirements for longitudinal surface tolerance on the final roadway and airport wearing course lift shall be in accordance with table 502-3.

502.13 MEASUREMENT. Asphalt tack coat, prime coat or curing membrane will not be measured for payment.

(a) Weight Measurement: Asphaltic concrete will be measured by the ton of 2,000 pounds (Mg (1 000 kg)) from printed weights as provided in Section 503. Stamped printer tickets will be issued for each truckload of material delivered. Material lost, wasted, rejected or applied contrary to specifications will not be measured for payment.

Estimated quantities of asphaltic concrete shown on the plans are based on 115 lb/sq yd/inch (2.46 kg/sq m/mm) thickness. The measured quantity of asphaltic mixtures will be multiplied by the following adjustment factor to obtain the pay quantity.

<u>Maximum Theoretical Specific Gravity, (Gmm) (AASHTO T 209)</u>	<u>Adjustment Factor</u>
2.340 - 2.360	1.02
2.361 - 2.399	1.01
2.400 - 2.540	1.00
2.541 - 2.570	0.99
2.571 - 2.590	0.98

The adjustment factor for mixtures with maximum theoretical gravities less than 2.340 or more than 2.590 will be determined by the following formulas:

$$F = \frac{2.400}{S}$$

Maximum theoretical gravity less than 2.340:

$$F = \frac{2.540}{S}$$

Theoretical gravity more than 2.590:

where,

F = quantity adjustment factor

S = theoretical gravity of mixture from approved job mix formula

(b) Volume or Area Measurement: The quantities for payment will be the design quantities specified in the plans and adjustments thereto. Design quantities will be adjusted when the engineer makes changes to adjust to field conditions or when design changes are necessary. Design quantities are based on the horizontal dimensions and compacted thickness of the completed course shown on the plans.

502.14 PAYMENT. Payment for asphaltic concrete will be made at the contract unit price on a lot basis. When the mix does not conform to acceptance requirements, payment will be made at an adjusted price per unit of measurement in accordance with Section 1002, and Tables 502-6 4 and 502-7 for both plant and roadway acceptance. The Materials and Testing Section will provide the payment adjustment percentage for properties of asphaltic materials.

(a) General: Payment for asphaltic concrete will include furnishing all required materials, producing the mixtures, preparing the surfaces on which the mixtures are placed, hauling the mixtures to the work site, and placing and compacting the mixtures.

(b) Asphalt Cement: Payment adjustments for asphalt cement properties will be in accordance with Table 502-6 and Section 1002.

(c) Wearing Course Mixes: The average percentage of contract price will be used for adjustment in unit price for plant deficiencies in VMA and voids, and anti-strip additive. The average percentage of contract price will be used for adjustment in unit price for roadway deficiencies in pavement density and surface tolerance (travel lane). Final adjustments in unit price will be as described in Table 502-6 4.

(d) Base, Binder and Shoulder Mixes: The average percentage of contract price will be used for adjustment in unit price for plant deficiencies in VMA and voids, and anti-strip additive. The percentage of contract price will be used for adjustment in unit price for roadway deficiencies in pavement density. Final adjustments in unit price will as described in Table 502-6 4.

(e) Erected Stringline: When the use of an erected stringline is not specified, but directed by the engineer, an additional payment of \$500 per contract plus \$0.25 per linear foot (\$0.75/lin m) will be made for mixtures placed by the erected stringline method. When the use of an erected stringline is specified, no additional payment will be made.

(f) Payment: Payment will be made under:

Item No.	Pay Item	Pay Unit
502-01	Superpave Asphaltic Concrete	Ton (Mg)
502-02	Superpave Asphaltic Concrete	Cubic Yard (Cu m)
502-03	Superpave Asphaltic Concrete, (__ in (__mm) Thick)	Square Yard (Sq m)

**Table 502-3
REQUIREMENTS FOR SUPERPAVE ASPHALTIC CONCRETE MIXTURES**

A. MIXTURE REQUIREMENTS					
U.S. (Metric) Sieve % Passing	1/2 inch (12.5 mm) Nominal	3/4 inch (19 mm) Nominal	1 inch (25 mm) Nominal	1.5 inch (37.5 mm) Nominal	Mix Tolerance ²
2 inch (50 mm)	---	---	---	100	±4
1 1/2 inch (37.5 mm)	---	---	100	90-100	±4
1 inch (25 mm)	---	100	90-100	89 Max.	±4
3/4 inch (19 mm)	100	90-100	89 Max	---	±4
1/2 inch (12.5 mm)	90-100	89 Max	---	---	±4
3/8 inch (9.5 mm)	89 Max.	---	---	---	±4
No. 4 (4.75 mm)	---	---	---	---	±4
No.8 (2.36 mm)	34 -58	29 -49	23 - 45	19-41	±3
No. 16 (1.18 mm)	---	---	---	---	±2
No. 30 (600 µm)	---	---	---	---	±2
No. 50 (300 µm)	---	---	---	---	±2
No. 100 (150 µm)	---	---	---	---	±2
No. 200 (75 µm)	4.0-10.0	3.0-8.0	2.0-7.0	1.0-6.0	±0.7
Extracted Asphalt, %	---	---	---	---	±0.2
Mix Temperature	---	---	---	---	±25°F (±14°C)
Aggregate ¹	A,B,C	A,B,C	A,B,C,D,F	A,B,C,D,E,F	---
B. PAVEMENT REQUIREMENTS					
Density, Min. 92.0 (% of Maximum Theoretical Gravity, AASHTO T 209) Roadway Travel Lane Wearing, Binder and Base Courses					
Density, Min. 91.0 (% of Maximum Theoretical Gravity, AASHTO T 209) Shoulders and parking lots as determined by the engineer.					
Surface Tolerance Variation, inches (mm)			Transverse ³	Cross Slope ³	Grade ⁴
Roadway Travel Lane Wearing Courses			1/8 (3)		1/2 (15)
Binder Courses			1/4 (6)		1/2 (15)
Shoulder Wearing Course			3/16 (5)	(10)	3/4 (20)
				1/2 (15)	
				3/4 (20)	

¹ A - Gravel, B - Slag, C - Stone approved for wearing surface, D - Stone, E - Recycled portland cement concrete, F - Reclaimed asphaltic pavement. See Subsection 502.02(c).

² Job Mix Formula based on validated mix design.

³ Based on 10 feet (3.0 m).

⁴ Applicable only when grade is specified.

MIX LEVEL	INTENDED USE
Level 1 (1/2" Only)	Roadways 35 MPH and under with limited Heavy Truck Traffic, Parking Lots, Pathways, Incidental Paving, etc.
Level 1 (1/2", 3/4", 1")	Roadways 35 MPH and under with limited Heavy Truck Traffic, Parking Lots, Pathways, Incidental Paving, etc.
Level 2 (1/2", 3/4", 1")	Roadways over 35 MPH with limited Heavy Truck Traffic, Roadways with many Intersection stops, Parking Areas with Moderate Heavy Truck Traffic
Level 3 (1/2", 3/4", 1")	Roadways over 35 MPH with Heavy Truck Traffic, Parking Areas with Heavy Truck Traffic, Roadways with many Intersection Stops

- Owner may decide to allow 1/2" Wearing Course mix for better appearance.

MIX NOMINAL SIZE	LIFT THICKNESS
Level 1, 2, 3 - 1/2" Nominal Size	1.5 inches – 2.0 inches
Level 1, 2, 3 - 3/4" Nominal Size	1.5 inches – 3.0 inches
Level 1, 2, 3 - 1" Nominal Size	2.0 inches – 4.0 inches

TABLE 502-4
SUPERPAVE MIXTURES

Nominal Max. Size Agg.	0.5 inch (12.5 mm)	0.75 inch (19 mm)	1.0 inch (25 mm)	1.5 inch (37.5 mm)	
Type of Mix	Wearing Course			Binder or Base Course	Base Course
Level ² (See Chart on Page 19)	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3
Asphalt Binder Table 502-1					
Coarse Agg. Friction Rating ³	I, II, III			I, II, III, IV	I, II, III, IV
Coarse Agg. Angularity (Double Faced) + No.4, (4.75 mm)	75 90 95	75 90 95	75 90 95	60 75 90	
Fine Agg. Angularity (Min. %) -No.8, (2.36 mm)	40 43 45	40 43 45	40 43 45	40 40 45	
Flat and Elongated Particles % Max. (5:1)	10			10	10
Sand Equivalent, Min.% (Fine Agg.) - No.4, (4.74 mm)	35 40 45	35 40 45	35 40 45	35 40 45	
Natural Sand - Max. %	25			20	25
Rap, Max. %	15			30	30
Compacted Mix Design					
VMA, % ⁶	13.0			11.0	10.0
Air Voids, % ⁴	2.5 – 4.5			2.5 – 4.5	2.5 – 4.5
VFA, % ⁴	68-78 68-78 68-78	68-78 68-78 68-78	68-78 68-78 68-78	68-78 68-78 68-78	68-78 68-78 68-78
N _{initial} 89 % max. ⁵ (Gyrations)	7 8 9	7 8 9	7 8 9	7 8 9	7 8 9
N _{design} 96 ± 1 % (Gyrations)	75 100 125	75 100 125	75 100 125	75 100 125	75 100 125
N _{max} 98 % max. (Gyrations)	115 160 205	115 160 205	115 160 205	115 160 205	115 160 205
Moisture Sensitivity, TSR min.	80			80	80
Dust/Effective Asphalt Ratio, %	0.6 - 1.8			0.6 - 1.8	0.6 - 1.8
Lift Thickness, inch (mm)	1.5-2.0 (40-50)	2.0 – 3.0 (50-60)	2.0-4.0 (60-100)	4.0+ (100+)	

¹ May be used for pavement wearing course, airports, joint repair, leveling, driveways, turnouts, crossovers, detour roads, and other incidental items approved by the engineer.

² See Table 502-2 for aggregate friction ratings for mixtures.

³ Air voids, VMA and VFA are determined on samples compacted to N_{design} VFA is for Information only.

⁴ For Level 1 mixtures, N_{initial} will be 90.5 % max. For Level 1- 1/2" mixes, N_{initial} will be 91.5 % max.

⁵ Substitution of 1/2 inch (12.5 mm) wearing course mixes will be allowed only with a minimum VMA of 14.0 percent. All other properties listed in this table shall apply.

⁶ A one – half (1/2) of one percent operating tolerance for %VMA will be allowed for mixtures when tested at the plant.

TABLE 2
PAYMENT ADJUSTMENT SCHEDULES

	100	95	80	50 or Remove ⁽²⁾
Volumetric Properties Percent Voids	2.5 – 4.5	2.0 – 2.4 4.6 – 5.0	1.5 – 1.9 5.1 – 5.4	Less than 1.5 More than 5.5
Pavement Density: (% of Maximum Gravity) 92.0 91.0	92.0 & Above 91.0 & Above	91.0 to 91.9 90.0 to 90.9	90.0 to 90.9 89.0 to 89.9	Below 90.0 Below 89.0
Surface Tolerance (10-Foot Straightedge) Linear % of Pavement exceeding 1/8" Tolerance Wearing Course	0.0 – 1.0	1.1 – 1.5	1.6 – 2.5	Over 2.5

⁽¹⁾ Portion of lot placed on the project.

⁽²⁾ At the option of the engineer.