

## SECTION 502

### ASPHALT PAVEMENT CONSTRUCTION

#### (END PRODUCT SPECIFICATION - EPS)

##### PART A - GENERAL

**502.01 Preliminary and General** – This Section describes the materials, equipment, professional standards, and end product requirements for the construction of hot mix asphalt pavement and related shouldering operations.

End Product Specifications contain the acceptance and payment criteria based on the results of specified sampling and testing. Payment of the Contract Unit Prices for the asphalt pavement product is contingent on the product meeting the QC Plan, professional standards and quality requirements of this Section and is subject to payment adjustments upward and downward in accordance to the provisions provided in End Product Specifications (EPS).

When used in this Section and subject to the General Conditions:

- “acceptance” means agreement with past actions or decisions made, within the scope of the Contract.
- “authorization” means formal approval for future actions, frequently changing the Contract requirements.

##### **502.02 General Description of the Work** –

Generally, the work associated with the construction of asphalt pavement and shouldering by EPS consists of the following:

- Preparing a Quality Control Plan for review before commencing the Work and providing at the production site a testing facility to provide the data needed to implement that plan;
- Supplying, screening, crushing, processing and improving aggregate to produce asphalt mix aggregate;
- Supplying and delivering asphalt cement and spray primer meeting the requirements of SS 952;
- Preparing mix designs which, once reviewed and

accepted by the Ministry Representative, become the basis for the accepted Job Mix Formula;

- Heating the asphalt mix aggregate and mixing it with asphalt cement to produce asphalt mix that meets the Job Mix Formula;
- Hauling, placing, compacting and finishing the asphalt mix;
- Supplying, hauling, placing and compact shouldering gravels.

The Contractor shall provide an end product conforming in professional standard, quality and accuracy of detail to the QC Plan and the dimensional and tolerance requirements of the contract. Where no tolerances are specified, the standard of workmanship shall be in accordance with normally accepted good practice and the provisions of this Section. Payment is subject to adjustments based on quality acceptance tests performed by the Ministry Representative and calculations performed by the Contractor with respect to application rate.

##### **502.03 Definitions**

**Actual Asphalt Content** – Actual asphalt content is the amount of asphalt cement in the mix as determined by the Ministry’s Quality Assurance Program.

**Additives** – solid or liquid materials to enhance the properties of the liquid asphalt cement or mix.

**Aggregate** – the crushed or screened gravel.

**Asphalt Cement (AC)** – a bitumen-based liquid binder used in asphalt pavement.

**Asphalt Content** – Asphalt Content means the quantity of asphalt cement in the mix expressed as a percentage by weight of the total dry aggregate in the mix.

**Levelling Course (LC)** – asphalt mix used to improve crossfall, level, and strengthen existing pavements.

## SECTION 502

**Asphalt Mix (AM)** – hot plant mixture of asphalt cement and aggregate.

**Asphalt Mix Aggregate (AMA)** – the processed crushed aggregate just prior to the addition of asphalt cement.

**Asphalt Pavement (AP)** – compacted asphalt mix.

**Cutback Asphalt** – asphalt cement which has been blended with light petroleum distillates.

**Design Asphalt Content** – The asphalt content upon which the Job Mix Formula is initially established.

**Driving Lane** – A driving lane shall mean a single lane in any area of the pavement other than a shoulder or a barrier flare.

**Emulsified Asphalt** – asphalt cement that has been blended with water and emulsifying agents to form aqueous emulsions, including anionic type, cationic type and high float type.

**End Product Specification (EPS)** – A specification whereby the Contractor is responsible for quality control of the construction processes, and whereby the Ministry reviews the workmanship and performs the specified quality assurance sampling and testing of the end product for the purpose of determining acceptance/rejection and payment.

**Job Mix Formula (JMF)** – The asphalt mix “recipe”, proposed by the Contractor in accordance with SS 502.08.04 or an accepted variation in accordance with SS 502.08.12 and accepted by the Ministry, establishing the aggregate proportions, gradation, and the asphalt content to be used for production of asphalt mix.

**Lift** – A layer of asphalt mix laid in a single application then compacted.

**Top Lift** – The uppermost Lift, forming the final running surface.

**Lower Lift** – Any Lift below Top Lift.

**Bottom Lift** – The lowest Lift (excluding Level Course),

**Lot and Sub-Lot** – A Lot is a portion of the work being considered for acceptance and for the determination of payment adjustments. For

## ASPHALT PAVEMENT CONSTRUCTION (EPS)

density, AC content, gradation and smoothness, each Lot is comprised of a number of Sub-Lots, each of which is sampled, and then aggregated to determine the acceptability of the Lot. Lot and Sub-Lot sizes are defined in the appropriate payment adjustment provisions of this Section.

**Reclaimed Asphalt Pavement (RAP)** – Asphalt Pavement that has been removed and processed, for the purpose of recycling.

**Recycled Asphalt Mix (RAM)** – a carefully controlled hot plant mix of asphalt cement, graded high quality aggregate, and reclaimed asphalt pavement.

**Reject Mix** – asphalt mix that is deemed unacceptable for use in the project.

**Sample Mean** – the arithmetic mean of a set of test results constituting the sample.

**Smoothness** – a measure of the longitudinal profile of the pavement surface, measured as International Roughness Index (IRI).

**Sub-Lot** – See Lot.

**Surplus Aggregate** – aggregate surplus to the works, in split or un-split stockpiles which singly or combined will meet the asphalt mix aggregate gradation.

**Random Sample** – a set of test measurements taken, one each from a number of separate areas or Sub-Lots within a Lot, in an unbiased way.

### 502.04 Quality Control

**502.04.01 General** – Quality Control shall be performed by the Contractor in accordance with SS 101 and the requirements of this Section.

**502.04.02 Quality Control Plan** – The paving component of the Contractor’s Quality Control Plan shall fulfill or exceed the requirements of Appendix 1 and function integrally with any other Quality Management provisions of the Contract.

The QC Plan shall be submitted in accordance with the timelines established in SS 101.02.03(iii).

The Quality Control Plan must include a detailed description of the means by which the Contractor shall use the quality control test results to ensure that the workmanship, asphalt materials, aggregate, mix production, paving and pavement compaction

## SECTION 502

processes will be controlled to keep the product within the specified limits. The Quality Control Plan must clearly show the flow of information from the quality control laboratory to the individuals who shall make the actual adjustments to the processes and equipment to affect this control. The plan will show time allowance for each step, the names and positions of all the people involved, and a clear description of the responsibilities of each.

### **502.04.03 Quality Control Testing and Inspection –**

The Contractor shall provide and maintain equipment and qualified personnel to perform all laboratory testing, field testing and inspection necessary to determine and monitor the characteristics and properties of all the materials produced and incorporated into the work. They shall also monitor the workmanship of the final product in accordance with the Quality Control Plan as most recently submitted.

The Contractor shall provide a testing facility(s) that meets the requirements necessary to carry out all the test procedures listed within this Section. The facility(s) must have the equipment specified under the appropriate test designation to perform the tests. The Ministry shall have access at all times to the quality control facility(s).

**502.04.04 Quality Control Records –** Quality Control inspections shall be recorded on checksheets and/or diaries at the time of inspection.

The results from Quality Control testing shall be reported on test logs and plotted on charts immediately after each test is completed. The Contractor shall report all test results on Ministry-supplied forms (available from the Ministry Representative) or Contractor-supplied forms acceptable to the Ministry Representative.

For the purposes of confirming delivery of asphalt mix and shouldering aggregate to the road and the calculation of material application rates, the Contractor shall provide to the Ministry Representative a copy of the Road Checker's Summary and the weigh tickets for each load received at the placement operation at the end of each shift. The Road Checker's Summary shall

## ASPHALT PAVEMENT CONSTRUCTION (EPS)

include, but not be limited to, the following information:

- Truck Number.
- Weigh Ticket Number and Net Weight of load.
- Date, time and location by station of delivery.
- Material Application Rate Dimensions and Calculations. Calculation frequency minimally shall be for every 10 loads.
- Notes pertaining to the paving of any appurtenances (letdowns, intersections, tapers, etc.)

In addition to the equipment calibration requirements of SS 101, for the purpose of obtaining accurate and consistent results between the Contractor's Quality Control testing and the Ministry's Quality Acceptance testing, correlation of the Marshall hammer and ignition ovens to be used on the project shall be performed prior to mix production.

### **502.04.05 Final Quality Control Testing Reports –**

Prior to the issuance of a Completion Certificate, the Contractor shall provide the Ministry Representative with:

- a summary of all aggregate quality control test results;
- copies of all quality control test results for asphalt mix properties and compaction; and
- copies of all quality control charts.

## PART B – MATERIALS

### **502.05 Materials Testing**

**502.05.01 Test Procedures –** Where a test is specified to conform to an ASTM procedure, the correspondingly listed AASHTO test may be used, or vice versa. See Table 502-A Standard Sampling and Testing Procedures.

TABLE 502-A – STANDARD SAMPLING AND TESTING PROCEDURES

TEST REF. No.		STANDARD TEST METHOD / PRACTICE
AASHTO	ASTM	
<b>AGGREGATES:</b>		
T 11	C 117	Materials Finer than 75 µm (No. 200) Sieve in Mineral Aggregates by Washing
T 85	C 127	Density, Relative Density (Specific Gravity), and Absorption of Coarse Aggregate
T 84	C 128	Density, Relative Density (Specific Gravity), and Absorption of Fine Aggregate
T 27	C 136	Sieve Analysis of Fine and Coarse Aggregates
T 112	C 142	Clay Lumps and Friable Particles in Aggregates
T 255	C 566	Total Evaporable Moisture Content of Aggregate by Drying
T 2	D 75	Standard Practice for Sampling Aggregates
	D 421	Standard Practice for Dry Preparation of Soil Samples for Particle-Size Analysis and Determination of Soil Constants [aka Atterberg Limit]
T 304	D 1252	Method "A", - Uncompacted Void Content of Fine Aggregate when determining Fine Aggregate Angularity
T 176	D 2419	Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate
	D 4318	Liquid Limit, Plastic Limit, and Plasticity Index of Soils
	D 5821	Density, Relative Density (Specific Gravity), and Absorption of Fine Aggregate
T 327	D 6928	Resistance of Coarse Aggregate to Degradation by Abrasion in the Micro-Deval Apparatus
<b>ASPHALT CEMENT:</b>		
T 49	D 5	Penetration of Bituminous Materials
T 202	D 2171	Standard Test Method for Viscosity of Asphalts by Vacuum Capillary Viscometer
<b>ASPHALT MIX AND PAVEMENT:</b>		
T 245		Standard Method of Test for Resistance to Plastic Flow of Bituminous Mixtures Using Marshall Apparatus
	D 979	Standard Practice for Sampling Bituminous Paving Mixtures
T 165	D 1075	Standard Test Method for Effect of Water on Compressive Strength of Compacted Bituminous Mixtures
	D 1188	Standard Test Method for Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Paraffin Coated Specimens
	D 2041	Standard Test Method for Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures
	D 2726	Standard Test Method for Bulk Specific Gravity and Density of Non-Absorptive Compacted Bituminous Mixtures
T 269	D 3203	Standard Test Method for Percent Air Voids in Compacted Dense and Open Bituminous Paving Mixtures
	D 4469	Standard Test Method for Calculating Percent Asphalt Absorption by the Aggregate in an Asphalt Pavement Mixture
	D 6307	Standard Test Method for Asphalt Content of Hot-Mix Asphalt by Ignition Method
<b>SHOULDERING:</b>		
	D 698	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft <sup>3</sup> (600 kN-m/m <sup>3</sup> )) [aka Standard Proctor]
T 310	D 2922	Standard Test Methods for Density of Soil and Soil Aggregate in Place by Nuclear Methods (Shallow Depth)
	D 3017	Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)

**502.05.02 Sieve Sizes** – All aggregate gradation tests shall use the following sieve sizes: 37.5 mm, 25 mm, 19 mm, 16 mm, 12.5 mm, 9.5 mm, 4.75 mm, 2.36 mm, 1.18 mm, 0.600 mm, 0.300 mm, 0.150 mm, and 0.075 mm.

### 502.06 Aggregates

**502.06.01 Aggregates** – The Contractor shall supply all aggregates for the Work from sources acceptable to the Ministry Representative.

**502.06.02 Work in Ministry Pits or Quarries** – Ministry of Transportation pits offered in the Special Provisions as available sources may be used without charge provided they are developed and worked in accordance with SS 145.26, SS 202 Part C, and the pit development plan. Deviation from the pit development plan will require the authorization of the Ministry Representative. No guarantee is given or implied that aggregate from Ministry pits will meet the Specification requirements or provide requisite quantities.

Without limitation and unless otherwise specified in the Special Provisions, the following items shall not be left in a Ministry pit:

- surplus milled or rubblized asphalt pavements,
- reject mix,
- fuel contaminated materials, or
- other waste products.

**502.06.03 Supply of Aggregates, Aggregate Production and Characteristics** – The Contractor shall not produce aggregate until the Contractor has received written notification that their Quality Control Plan is in accordance with SS 502.04.02, and has in place testing facilities for aggregate production that are in accordance with the Quality Control Plan.

For the production of aggregate within Ministry pits, the Contractor shall follow the Ministry's pit development plan, and provide crushing equipment such that all aggregate which will pass through 375 mm x 450 mm slotted openings shall be used for the production of crushed aggregate. Rocks which will not pass through these openings shall be stockpiled as directed by the Ministry Representative. Crushing and screening equipment shall be provided with adequate facilities and capacity to be able to bleed off reject aggregate and remove any excess fine aggregate, dust

or objectionable aggregate coatings, to make it generally acceptable for use. No portion of the products from crushing or screening plants that can be used shall be wasted, but shall be stockpiled or used as directed by the Ministry Representative.

Where the Ministry has available any test result information on the properties shown in Table 502-B, for a Ministry pit or other source, the Ministry Representative will upon request, provide that information to the Contractor. Otherwise, sampling and testing to determine and demonstrate the compliance of aggregate with the requirements of this Section shall be the responsibility of the Contractor.

**502.06.04 Shouldering Aggregate** – Shouldering Aggregate shall meet the following:

- All requirements of SS 202.04 and SS 202.05,
- Aggregate Properties and Gradation for 25 mm WGB, per Table 202-B and Table 202-C, or as otherwise specified in the Contract or with the agreement of the Ministry Representative

**502.06.05 Paving Aggregates** – Paving aggregates shall meet the following requirements:

- a) Coarse Aggregates
  - i) shall be all mineral matter retained on the sieve designated in the test procedures for each individual test.
  - ii) shall consist of crushed stone, crushed gravel, or combination thereof, or materials naturally occurring in a fractured condition, or materials naturally occurring of highly angular nature or rough texture.
  - iii) shall be free from coating of clay, silt or other deleterious material.
  - iv) shall meet the requirements listed in Table 502-B.

**SECTION 502**

**ASPHALT PAVEMENT CONSTRUCTION (EPS)**

**TABLE 502-B – REQUIREMENTS FOR COARSE AGGREGATES**

TEST REF. #		PROCEDURES	Superpave	Class 1	Class 2
AASHTO	ASTM				
T 85	C 127	Maximum Water Absorption, % by mass	2	2	2
T 112	C 142	Maximum % by mass of clay balls and friable particles	1.0	1.0	1.5
	D 5821	2 Fractured Faces, Minimum % by Mass retained on the 4.75 mm sieve	90	85	70
	D 6928	Maximum Micro-Deval abrasion loss factor, %	18	15	20

**b) Fine Aggregate**

- i)** shall be all mineral matter passing the sieve designated in the test procedure for each individual test.
- ii)** shall be clean, tough, durable, moderately sharp, and free from coatings of clay, silt, or other deleterious material, and shall contain no clay balls or other aggregations of fine material.
- iii)** shall have a sand equivalent of not less than 40 (not less than 45 for Superpave mixes) when tested in accordance with ASTM Test D 2419.

**iv)** for Class 1 and Superpave mixes, shall have a minimum value of 45 when tested according to the AASHTO Test T 304, Method “A”, - Uncompacted Void Content of Fine Aggregate when determining Fine Aggregate Angularity.

**c) Mineral Filler and Mineral Dust**

- i)** Mineral filler shall consist of all matter passing the 0.600 mm sieve and mineral dust shall consist of all mineral matter passing the 0.075 mm sieve.
- ii)** Mineral filler and mineral dust shall be free from organic matter.
- iii)** Mineral filler shall be non-plastic when tested in accordance with ASTM Test D 4318.

**d) Additional requirements for Superpave Aggregates** – Aggregates for Superpave mixes shall have properties and the gradation limits as specified below and in accordance with the latest version of the Asphalt Institute’s *Superpave Series Publication – Superpave Mix Design (SP-2)*. Changes and/or variations from these limits shall be outlined within the Contract Special Provisions.

- i)** 90% fractured aggregate with a 12.5 mm nominal maximum size, including sufficient manufactured fines to provide fine aggregate angularity.
- ii)** The aggregates must meet all the requirements for angularity, toughness deleterious materials, clay content, and flat and elongated particles.
- iii)** Design ESALs will be 10 – 30 million.

TABLE 502-C-1 – ASPHALT MIX AGGREGATE GRADATION LIMITS

SIEVE SIZE (mm)	PERCENTAGE PASSING BY MASS				
	Coarse Mix	Medium Mix		Fine Mix	Superpave
	37.5 mm	19 mm	16 mm	12.5 mm	Nominal 12.5 mm
37.5	100				(see appendix B SP-2)
25.0	80 – 100				
19.0	60 – 92	100			100
16.0	---	---	100		---
12.5	50 – 85	84 – 95	90 – 100	100	90 – 100
9.50	40 – 80	73 – 90	73 – 90	90 – 100	
4.75	30 – 65	50 – 75	50 – 75	55 – 80	---
2.36	20 – 50	35 – 57	35 – 57	32 – 64	28 – 58
1.18	15 – 35	26 – 45	26 – 45	24 – 51	
0.600	8 – 30	18 – 34	18 – 34	17 – 40	
0.300	6 – 22	10 – 26	10 – 26	13 – 29	
0.150	3 – 15	6 – 17	6 – 17	8 – 18	---
0.075	1 – 7	3 – 7	3 – 7	4 – 10	2 – 10

TABLE 502-C-2 – MARSHALL DESIGN CRITERIA

PROPERTY OF LABORATORY COMPACTED PAVING MIXTURE	PAVEMENT CLASS	
	1	2
Number of blows each face of test specimens	75	75
Minimum % Voids in Asphalt Mix Aggregate for 19 mm Medium Asphalt Mix	14	14
Minimum % Voids in Asphalt Mix Aggregate for 16 mm Medium Asphalt Mix	14.5	14
Minimum % Voids in Asphalt Mix Aggregate for 12.5 mm Fine Asphalt Mix	15	15
% air voids in laboratory compacted mixture for 19 mm Medium Asphalt Mix	2.5 to 4.5	2.5 to 4.5
% air voids in laboratory compacted mixture for 16 mm Asphalt Mix	2.5 to 4.5	2.5 to 4.5
% air voids in laboratory compacted mixture for 12.5 mm Fine Asphalt Mix	4 to 6	4 to 6
Minimum Marshall Load, N @ 60°C for 80 – 100 Pen. and 120 – 150 Pen.	9000	7000
Minimum Marshall Load, N @ 60°C for 150 – 200 and 200 – 300 Pen.	7000	6000
Flow index, units of 0.25 mm	8 to 14	8 to 16
Minimum Asphalt Film Thickness, $\mu\text{m}$ (microns)	8.0	8.0
Minimum Index of Retained Stability after immersion in water at 60°C for 24 hours	85%	75%

TABLE 502-C-3 – SUPERPAVE DESIGN CRITERIA

PROPERTY OF LABORATORY COMPACTED PAVING MIXTURE For Design ESALs = 10 - 30 million, at $N_{\text{Design}} = 100$ gyrations	SUPERPAVE
% voids in the Mineral Aggregate, minimum	14
Required density: % of Theoretical Maximum Specific Gravity in a laboratory compacted mix at $N_{\text{Design}} = 100$ gyrations at $N_{\text{Initial}} = 8$ gyrations	95 – 97 <89
% voids filled with Asphalt Cement	65 – 75
Dust to Binder ratio <sup>2</sup>	0.6 – 1.2

<sup>2</sup> Consideration shall be given to increasing the dust to binder ratio to 0.8 – 1.6

**502.07 Supply of Asphalt Cement and Primer** – The Contractor shall supply the types and grades of asphalt cement and primers as specified in the Special Provisions and in accordance with SS 952. The supply of these materials includes, but is not limited to, ordering, scheduling delivery of, receiving, handling, storing, sampling, and testing of the materials and other related work.

The Contractor shall supply the Ministry Representative with copies of the asphalt supplier's weigh-bill and records of all asphalt materials received on a daily basis.

### 502.08 Asphalt Mix

**502.08.01 Responsibility for Asphalt Mix Design** – Preparation and submission of the project asphalt mix designs for Ministry review is the responsibility of the Contractor. All costs incurred in mix design formulation are the responsibility of the Contractor.

The Contractor shall utilise a qualified registered member of the Association of Professional Engineers and Geoscientists of British Columbia or a qualified, registered member of the Applied Science Technologists and Technicians of British Columbia who shall sign off the asphalt mix design. The Contractor shall also utilise a testing laboratory meeting the requirements of SS 101 and acceptable to the Ministry, to assess the aggregate material proposed for use and to carry out the asphalt mix designs.

### 502.08.02 Requirements for Asphalt Mix Design

**a) ALL MIXES** – Asphalt mix designs shall be performed using asphalt cement grade specified in the Special Provisions and which is from the same refinery contracted to supply the asphalt cement for the duration of the project.

Any subsequent change in the asphalt cement supplied by the Contractor will require a new asphalt mix design unless permitted otherwise by the Ministry Representative.

Asphalt mix designs, Job Mix Formulas, and field adjustments made in accordance with SS 502.08.10 must all be based on an aggregate gradation meeting the requirements of Table 502-C-1 and the criteria specified in Table 502-C-2 or Table 502-C-3, as applicable.

**b) MARSHALL MIXES** – The asphalt mix design for Class 1 and Class 2 pavements shall be carried out

under Marshall design criteria using the designated equipment and procedures as contained in the Asphalt Institute's *Mix Design Methods for Asphalt Concrete MS-2*, latest edition.

**c) SUPERPAVE MIXES** – The Superpave asphalt mix design shall be carried out in accordance with the latest edition of the Asphalt Institute's *Superpave Mix Design, Superpave Series No. 2 (SP-2)* and these Standard Specifications.

The JMF aggregate gradation shall fall under the maximum density gradation line for the 0.300 mm to 2.36 mm sieves inclusive.

**502.08.03 Asphalt Mix Antistrip Additives** – For Marshall, the Contractor shall determine the Index of Retained Marshall Stability (IRMS) of each asphalt mix in accordance with ASTM D 1075 "Standard Test Method for Effect of Water on Compressive Strength of Compacted Bituminous Mixtures". For Superpave mix designs, the Contractor shall determine the Tensile Strength Ratio (TSR) of each asphalt mix in accordance with AASHTO T 283-7 "Resistance of Compacted Bituminous Mixture to Moisture Induced Damage".

An antistrip additive shall be added to the asphalt mix when:

- the Special Provisions so direct;
- the IRMS is less than 85;
- the TSR is less than 80; or
- the Ministry Representative specifically requests it.

The Contractor shall select the antistrip additive from the Ministry's "Recognized Products List" and add it to all asphalt mix used in the Work, at an application rate of 0.3% additive by weight of asphalt cement. The Recognized Products list is available on-line at: [http://www.th.gov.bc.ca/publications/eng\\_publications/geotech/Recognized\\_Products\\_Book.pdf](http://www.th.gov.bc.ca/publications/eng_publications/geotech/Recognized_Products_Book.pdf)

**502.08.04 Asphalt Mix Design Submittals** - The Contractor shall submit each asphalt mix design to the Ministry Representative for review that it complies with the requirements of the Contract, and shall not proceed until the review is received in writing from the Ministry Representative. The Contractor's submissions shall include the following information:

## SECTION 502

- The gradation of each aggregate to be used in each mixture.
- The percentage by mass of each aggregate to be used in each mixture.
- The design gradation of the combined aggregate for each mixture for each of the sieve sizes applicable to the mix, per the first column of Table 502-C-1.
- The estimated dry sieve gradation corresponding to the JMF gradation.
- All asphalt mix design data used in arriving at the final mix designs.
- The Design Asphalt Content expressed as a percentage of the dry weight of the aggregate.
- The Design Mix Temperature, which shall be the temperature at which the kinematic viscosity of the asphalt cement is 0.17 Pa•s (170 centistokes) or as per the Asphalt Cement supplier's recommendations.
- The recommended compaction temperature.

**502.08.05 Review of Asphalt Mix Design** - The Ministry Representative will require up to five (5) calendar days from the time of receipt of the asphalt mix design for review. The mix design must be reviewed prior to commencement of pavement construction.

When the Ministry Representative has confirmed in writing that the Contractor's asphalt mix design has been accepted, that asphalt mix design becomes the tentative Job Mix Formula for ignition oven correlation and the start of mix verification.

Upon acceptance of the tentative JMF, the Contractor shall prepare the laboratory equipment calibration samples, submit them to the Ministry Representative, and participate in the calibration and correlation process described in Appendix 3 Blank Aggregate sample Preparation and Appendix 4 Ignition Oven Correlation Procedure.

**502.08.06 Ignition Oven Correlation** – After receiving acceptance of the tentative JMF, the Contractor shall prepare blank aggregate samples (aggregate-only samples prepared to match the tentative JMF) for correlation of the Contractor, Ministry and appeal laboratory ignition ovens. Blanks shall be prepared in accordance with SS 502 Appendix 3 Blank Aggregate Samples.

## ASPHALT PAVEMENT CONSTRUCTION (EPS)

The Ministry Representative shall randomly select which of the individual blanks will be used by each party.

Within 3 working days, and prior to any mix production, the Contractor and the Ministry shall prepare and test asphalt mix samples in accordance with SS 502 Appendix 4 Ignition Oven Correlation.

**502.08.07 Use of Calibration Factors in Reporting Asphalt Cement Content** – Results from testing of any asphalt mix shall report the measured AC Content and the corrected AC Content after applying the applicable laboratory calibration factor.

**502.08.08 Verification of Job Mix Formula** - Verification of the tentative Job Mix formula will be carried out by the Contractor during the course of production of the first 1,000 tonnes of mix. The Contractor will provide a tentative Job Mix Formula a minimum of five (5) days prior to production of any mix with supporting verification data, which shall include all the information, but not limited to, the requirements of SS 502.08.02, through SS 502.08.04 inclusive.

During the first 1,000 tonnes of plant production, the Contractor may make any adjustments it chooses to the tentative JMF, testing the mix, and refining the tentative JMF to a state that fully complies with Table 502-C-1 and 502-C-2 (or 502-C-3 as applicable).

All mix laid must be tracked by the Contractor, and reported to the Ministry Representative, as to lay-down location and the tentative JMF values in effect at the time that mix was produced, to ensure appropriate values are used in comparing design to sampled properties.

After production of the first 1,000 tonnes, the Contractor shall declare their production JMF to the Ministry Representative, and provide volumetric properties on the final mix produced. Any adjustments to the production JMF shall comply with all requirements of SS 502.

Where the production JMF varies from the tentative JMF by an amount greater than any tolerance specified in Table 502-G, the Contractor shall do a confirmatory mix design and report the results to the Ministry Representative.

## SECTION 502

**502.08.09 AC Content Bump** – Upon receipt of a production Job Mix Formula meeting all Contract requirements, the Ministry may direct the Contractor to increase the asphalt cement content by a “bump” of up to 0.3% by weight of dry aggregate in the mix.

**502.08.10 Field Adjustment of Job Mix Formula** - A field adjustment to the production Job Mix Formula is defined as a change in the asphalt cement content of the mix, aggregate gradation and/or proportioning of various aggregate sizes, within the specified limits as shown in Table 502-D without review and acceptance of a new asphalt mix design.

**TABLE 502-D – FIELD ADJUSTMENT OF JOB MIX FORMULA**

Job Mix Formula Property	Maximum Field Adjustment
Percentage Passing by Sieve Size:	
• 37.5, 25.0, 19.0, and 16.0 mm	±2.0%
• 12.5 and 9.5 mm	±2.0%
• 4.75 and 2.36 mm	±1.5%
• 1.18 and 0.600 mm	±1.5%
• 0.300 and 0.150 mm	±1.5%
• 0.075 mm	±0.5%
Asphalt Cement content	±0.2%

The proposed field adjustment shall be submitted in writing together with supporting documentation to the Ministry Representative. Within four hours of receipt of the proposed field adjustments, the Ministry Representative will review the field adjustment for conformance with the contract requirements and notify the Contractor whether or not it is acceptable.

The Contractor’s field adjustment to the production Job Mix Formula must comply with the Asphalt Mix Design requirements of SS 502.08.02 through SS 502.08.04 inclusive. The Contractor shall provide all supporting verification data.

After the production Job Mix Formula has been established in accordance with SS 502.08.10, no field adjustment to that Job Mix Formula will be permitted without prior written authorization by the Ministry Representative. The Ministry Representative will limit the number of field adjustments to the Job Mix Formula originally derived from the laboratory mix design, to two.

No field adjustment will be acceptable if it results in a change from the Job Mix Formula, for any property, in

## ASPHALT PAVEMENT CONSTRUCTION (EPS)

excess of the maximum adjustment for that property permitted in Table 502-G. All production Mix shall meet either Table 502-C-2 or Table 502-C-3.

### PART C – EQUIPMENT AND PLANT

All equipment and plant shall be in good mechanical condition and be capable of performing the Work in accordance with this section.

### PART D - CONSTRUCTION

**502.20 Minimum Acceptable Construction Practices** – Professional standards in accordance with the Contractor’s QC Plan and construction industry best practices are a core requirement of the Work. Any construction practice or activity that results in an obvious defect must be corrected by the Contractor. Construction practices shall include but are not be limited to the following:

#### 502.21 Prime Coat and Tack Coat

Applications of Prime and Tack is required and shall be applied unless otherwise directed by the Ministry Representative.

**502.21.01 Surface and Weather Conditions** – The liquid asphalt for prime coat or tack coat shall be applied when surface and weather conditions are favourable. The application of prime and tack shall meet manufacturer’s requirements.

**502.21.02 Spray Temperature** – The liquid asphalt shall be sprayed within the temperature range specified by the supplier.

**502.21.03 Prepared Granular Bases and Old Pavements** – All prepared granular bases or old pavements which are to be paved shall be prime coated or tack coated at specified rates.

**502.21.04 Application** – The spray bars shall produce double coverage at one pass, with uniform spray and even pressure with application rates controlled to within ±25% of the specified application rate.

Spray bar nozzles shall be of the same type and size, set to produce uniformly fan-shaped sprays without atomization.

**502.21.05 Spraying Faults** – Any spraying faults shall be corrected by the Contractor.

**502.21.06 Excess Liquid Asphalt** – Excess liquid asphalt remaining unabsorbed shall be blinded with sand or fine aggregate at no expense to the Ministry.

## SECTION 502

**502.21.07 Surface Condition** – The surface to be tack coated shall be cleaned of dirt or other foreign material.

**502.21.08 Application** – Tack coat shall not be applied on sections of roadway longer than will be covered by one day of asphalt plant production.

**502.21.09 Traffic** – Traffic shall not be permitted on tack coat until it has cured and on prime coat until the primer has been absorbed into the granular surfacing.

Where it is not possible to keep the traffic off the treated surface, the surface shall be blinded with sand or fine aggregate, at no expense to the Ministry, prior to allowing traffic on same.

**502.21.10 Curing** – Normally prime coats shall be allowed to cure for a minimum of 24 hours prior to the placing of asphalt mix and tack coats shall be allowed to cure to a state that minimizes tracking prior to the placing of asphalt mix.

**502.21.11 Maintenance** - The Contractor shall, at the Contractor's expense, maintain the prime coat and/or tack coat.

### **502.22 Adjacent Mats, Joints, Edges, and Let-downs**

**502.22.01 Longitudinal Joints** – Longitudinal joints in the Top Lift of asphalt pavement will only be permitted where lane dividing lines are to be painted. Longitudinal joints in a Lift shall be offset within 150 to 300 mm from joints in the underlying Lift. Joints shall be pinched as soon as practicable, using best compaction practices.

**502.22.02 Longitudinal Edge** – Any longitudinal edge that has been damaged by traffic or equipment shall be trimmed to provide a vertical abutting face. Vertical surfaces of roadway appurtenances shall be tack coated to the top of the new pavement only.

**502.22.03 Contact Edge** – The contact edge of abutting cooled asphalt pavement shall be thoroughly painted with a uniform coat of emulsified asphalt.

**502.22.04 Paving Adjoining Mats** – When paving an adjoining parallel mat there shall be at least a 50 mm overlap onto the previously paved surface. This overlap shall be properly constructed to form a homogeneous bond between the two mats.

**502.22.05 Disposal of Raking Material** – Any raked material from the joint shall not be placed on the new mat or placed in or in front of the paver. The

## ASPHALT PAVEMENT CONSTRUCTION (EPS)

Contractor shall dispose of the material in a manner acceptable to the environmental agencies and the Ministry Representative.

**502.22.06 Discontinued Paving** – When paving is discontinued in any lane on a traffic bearing roadway, the asphalt pavement shall be tapered down at a minimum slope of 25:1. When paving resumes this letdown shall be cut back so as to form a vertical face that matches the required depth being paved. Material removed from the taper shall be disposed of in a manner acceptable to the environmental agencies and the Ministry Representative.

### **502.23 Stockpiling Aggregates**

**502.23.01 Stockpile Construction** – Stockpiles shall be constructed as specified in SS 202.21.

**502.23.02 Stockpiles for Different Materials** – Stockpiles of different types of material shall be located and constructed in such a manner as to prevent intermingling of the types and to prevent segregation.

**502.23.03 Stockpile Requirements Prior to Mix Production** – Before plant mixing commences, the Contractor shall have in stockpile a minimum of 20,000 tonnes of asphalt mix aggregate or 50% of the total quantity of asphalt aggregate required for the mix, whichever quantity is greater. These quantities shall be maintained throughout the crushing period. These requirements may be waived by the Ministry Representative in circumstances where such stockpiles cannot be accommodated, such as where materials are being barged in or are being hauled to the plant from a remote site.

### **502.24 Mix Production**

**502.24.01 Mixing Temperature** – The temperature of the asphalt mix measured at the plant discharge chute shall be maintained at  $\pm 15^{\circ}\text{C}$  of the Design Mixing Temperature designated in the accepted Mix Design, with adjustments within that range made at the Contractor's discretion. Where the Contractor plans to adjust the actual mix temperature to  $10^{\circ}\text{C}$  or more above the Design Mixing Temperature, the Contractor shall notify the Ministry Representative prior to making the adjustment. To optimize mix properties during inclement weather or to address other specific circumstances, the Ministry Representative may agree, in advance, to a higher mixing temperature.

Any mix produced at a temperature above the upper tolerance limit may be deemed Reject Mix by the Ministry Representative.

## SECTION 502

**502.24.02 Residual Moisture Content** – The residual moisture content of the asphalt mix prior to compaction shall not exceed 1% by mass. Should foaming or bubbling persist, even below the allowed percentage of moisture, the Contractor shall modify operations accordingly.

### 502.25 Placing the Asphalt Mix

**502.25.01 Surface Condition** – Asphalt mix shall only be placed on clean dry surfaces free from all foreign materials, and when weather and conditions are suitable. Normally, asphalt mix is only placed when the ambient air temperature is 5°C and rising and for Top Lift when the average surface temperature is also above 5°C.

**502.25.02 Asphalt Levelling Course Requirements** – Asphalt Levelling Course shall be placed in one or more Lifts, with a maximum thickness of 75 mm per Lift. The amount of Levelling Course placed shall not exceed the quantity listed in Schedule 7 unless otherwise authorized in writing in advance by the Ministry Representative.

All asphalt mix shall be paver laid, unless otherwise authorized by the Ministry Representative.

Any mix laid prior to the establishment of the production Job Mix Formula (per SS 502.08.10) shall normally be placed in a location where performance of the mix is of lower concern, typically as level course, on a low volume side road, and/or in Bottom Lift. The location proposed by the Contractor shall be subject to the authorization of the Ministry Representative.

**502.25.03 Lay-Down Operation** – Asphalt mix should be delivered to the paver at a constant rate sufficient to allow continuous placement.

**502.25.04 Traffic Control Person** – A traffic control person shall be provided at each paver during asphalt mix lay-down operations. This individual's sole duty during asphalt mix lay-down operations shall be to ensure safe conditions.

**502.25.05 Persons in the Vicinity of the Paver** – When in the vicinity of an operating paver and in front of the screed, workers and inspectors shall stand in full view of the paver operator, clear of side arms, wings, and screed, and never directly in front of the machine hopper.

**502.25.06 Vibrating Tampers and Hand Rollers** – Along curbs, manholes, headers and similar structures which are not accessible to rollers, thorough compaction shall be obtained, by use of vibrating

## ASPHALT PAVEMENT CONSTRUCTION (EPS)

tampers and hand rollers or other suitable methods.

**502.25.07 Traffic** – Traffic will not be permitted on the finished pavement until it has cooled to such a temperature as to ensure that no deformation or flushing of the surface will occur.

**502.25.08 Release Agents** – Lubrication of the truck boxes, pavers, rollers or other equipment in contact with asphalt mix with diesel fuel will not be permitted. A list of potential alternative products evaluated by industry is available on the BC Safety network web page, "Resources"- "Diesel Alternative Committee": <http://www.safetynetwork.bc.ca/resources/dieselalt.pdf>

### 502.25.09 Ponding

Areas of ponding will be noted as an obvious defect and remedial works will be required.

**502.26 Shoulder Build-up** – Shoulder build-up is typically required where an existing roadway is being overlaid with wider shoulders. It involves construction of base course aggregate (adjacent to a Lift of pavement) which will be overlaid by one or more Lifts of asphalt. Shoulder build-up shall be constructed:

- a) in accordance with the SS 202.26;
- b) to the lines and grades indicated in the Contract, generally to a finished compacted level that matches level and grade of the adjacent asphalt level, and
- c) with cross-fall that matches that of the finished asphalt surface above the shoulder build-up area.

### 502.27 Shouldering

**502.27.01 Shouldering Aggregate** – Shouldering aggregate shall be 25 mm Well Graded Base (WGB), in accordance with SS 202, unless otherwise specified in the Special Provisions or authorized by the Ministry Representative.

**502.27.03 Lines and Grades** – The finished surface of the granular shoulder shall be true to grade and cross section, and be free from ruts, segregation or other irregularities.

**502.27.04 Aggregate Segregation** – All granular shoulder materials shall be handled in such a manner that segregation does not occur.

**502.27.05 Moisture Adjustment** – If necessary for compacting, the moisture content of the shoulder aggregate shall be adjusted either through drying or

## SECTION 502

applying water.

**502.27.06 Compaction** – Shoulders shall be thoroughly compacted to a state that will not rut more than 5 mm under a pick-up truck steering axle wheel load.

Where the base under the shoulder has been constructed as part of the Work, the degree of compaction of the granular shoulder measured in accordance with ASTM D 2922 shall be greater than 98% of the maximum dry density determined in accordance with ASTM D 698.

**502.27.07 Adjacent Pavement Damage** – If the adjacent asphalt pavement is damaged during the shouldering operation, the damage shall be repaired to the satisfaction of the Ministry Representative, at no expense to the Ministry.

**502.27.08 Interim Shouldering** – For safety reasons, when a roadway with gravel shoulders is used by the travelling public, an intermediate layer of shouldering aggregate shall be placed following final rolling of levelling course or multiple Lifts of asphalt pavement thicker than 50 mm, in advance of the main shouldering operation.

Should the Work extend past the Completion Date and be carried over to the next paving season suitable interim drainage control measures shall be put in place, all at no cost to the Ministry.

### PART E – PAYMENT

**502.30 General** – Payment at the Unit Prices for the supply of primer/tack coat materials, the application of the spray primer/tack coat, the supply of paving aggregates into stockpile, the construction of asphalt pavement including the supply of asphalt cement, and for shouldering shall be full compensation for completing the supply and installation of asphalt pavement and shouldering on prepared surfaces in accordance with the contract requirements. Applicable payment adjustments (Additions or subtractions as applicable) shall be applied in accordance with Part F of this Section.

Compensation for Quality Control shall be at the price bid for Quality Control or, in the absence of such a bid Item in Schedule 7 – Approximate Quantities and Unit Prices, incidental to the Work.

**502.31 Acceptance at Adjusted Payment** – Acceptance of any Lot at adjusted payment will occur if it complies with the requirements of the QC Plan and Parts C and D of this Section, contains no obvious

## ASPHALT PAVEMENT CONSTRUCTION (EPS)

defects as per SS 502.32, and if:

- the test results for EPS acceptance parameters (density, gradation, asphalt content, smoothness, segregation, and application rate) are such that the Lot meets the requirements for acceptance at a reduced payment;
- the Lot is acceptable in respect of all other requirements; and
- the Contractor has not notified the Ministry Representative in writing that it will exercise its option to either repair or remove and replace the work, at its own cost, with work meeting the requirements for acceptance at full or increased payment.

**502.32 Rejection For Workmanship Defects** – Work may be rejected if it does not comply with the requirements of the QC Plan and Part D of this Section.

Additionally, the finished surface of any Asphalt Pavement Lift shall have a uniform texture and be free of visible signs of poor workmanship. Any obvious defects as determined by the Ministry Representative such as, but not limited to the following, may be cause for automatic rejection of asphalt pavement regardless of the values of any other acceptance parameter:

- individual bumps and dips that exceed 12 mm over 3 m;
- areas of excess or insufficient asphalt;
- improper matching of longitudinal and transverse joints;
- roller marks or roller pick-ups;
- excess tracking of prime or tack coat;
- areas contaminated by fuel oil or other deleterious materials;
- tire marks; or
- cracking or tearing.

When asphalt pavement is rejected by reason of obvious defects, the minimum area of rejection will be the actual length of the defect for the full width of the driving lane in which the defect exists.

Rejected work shall be promptly repaired, remedied, overlaid, or removed and replaced in a manner acceptable to the Ministry Representative. The Contractor shall be responsible for all costs including materials.

No payment will be made for work in any Lot or Sub-

## SECTION 502

Lot, which has been rejected, until the defects have been remedied.

**502.33 Partial Payment for Rejected Work** – In the Ministry Representative’s sole discretion and without setting precedence, where any Work is reject but the Ministry Representative determines that it may be left in place, the Ministry Representative may authorize partial payment to the Contractor as full compensation for any residual value the Work may have. Notwithstanding the foregoing, the Ministry is under no obligation to make any payment for such Work.

### 502.34 Primer and Tack Coat

**502.34.01 Supply of Primer and Tack Coat** – Payment to Supply Primer and Tack Coat shall be at the Unit Price per litre for the quantity of material actually sprayed onto the roadway measured prior to any additional diluting by the Contractor where applicable. The measured quantity shall not be greater than the total of the bills of lading.

Such payment shall be full compensation for supplying, handling, storing, sampling and testing of the material and all other related work.

**502.34.02 Application of Primer and Tack Coat** – Payment for the application of Primer and Tack Coat will be at the Unit Price per litre of primer actually sprayed onto the roadway. In the case of an emulsion the payment quantity shall include any water added by the Contractor with the authorization of the Ministry Representative.

Such payment shall be full compensation for diluting the material when required and spraying it on the surfaces to be paved, and for all incidental costs arising from priming and tack coating.

**502.35 Paving Aggregate into Stockpile** – Payment for Paving Aggregate into Stockpile shall be at the Unit Price per tonne for the quantity of paving aggregate placed into stockpile accordance with the following.

As the aggregate is crushed into stockpile, progress payments will be made against the bid item, up to the quantity shown in the “Approximate Quantity” column of the Schedule of Approximate Quantities and Unit Prices.

The final payment quantity for paving aggregate quantity will be equal to the corresponding asphalt mix quantity actually laid, without any adjustment for AC

## ASPHALT PAVEMENT CONSTRUCTION (EPS)

or moisture content. As a result, the final quantities and payments may vary from those used in prior progress payments; down if the mix quantity underruns and up if it overruns.

Such payment shall be full compensation for all work including but not limited to the production, supply and stockpiling of all paving aggregates.

**502.36 Asphalt Pavement** – Payment for Asphalt Pavement constructed in place shall be at the Unit Price per tonne for the quantity of mix placed in accordance with the Contract requirements.

Subject to the exception noted below, only acceptable asphalt pavement will be included in the payment quantity.

Where overlays are used as a corrective measure, in accordance with SS 502.58:

- the overlay quantity will not be included in the payment quantity, but
- the quantity of asphalt pavement covered by the overlay will be included in the payment quantity, whether or not it was acceptable.

Such payment shall be compensation in full for all work including but not limited to: loading the aggregate into the feeders; drying the aggregate; supplying, metering, and adding the asphalt cement; mixing, loading, weighing, hauling, dumping, spreading, compacting and finishing the asphalt pavement.

### 502.37 Asphalt Mix Antistrip Additives

**502.37.01 Where Specified in the Special Provisions** – Where the Special Provisions direct the addition of an antistrip additive, all costs associated with supplying, storing, and blending the additive into the asphalt mixes shall be incidental to the prices bid for the varying classes of asphalt mix.

**502.37.02 Where Not Specified in the Special Provisions** – Where the Special Provisions do not direct the addition of an antistrip additive but the need was identified in accordance with SS 502.08.03, compensation for supplying, storing and blending the additive into the asphalt mixes shall be made at a negotiated price or on a Force Account Basis and any authorized payments will be made from the Provisional Sum for Site Modifications.

## SECTION 502

**502.38 Asphalt Cement “Bump”** – The Contractor will be compensated for additional oil ordered by the Ministry Representative in accordance with SS 502.08.09 at the AC cost FOB the asphalt plant, demonstrated by the AC supplier’s invoice, with mark-up on a Force Account Basis for the material only.

Payment will be calculated in accordance with the formula below, on a Lot-by-Lot basis based on the difference in asphalt cement content determined from Ministry Quality Assurance (QA) samples and that in the Contractor’s production Job Mix Formula, to a maximum of the bump and a minimum of the Contractor’s proposed Job Mix Formula AC content. No compensation will be made for additional AC in any rejected mix.

$$\$_{\text{Lot } n} = 110\% \times \text{Cost}_{\text{AC}} \times t_{\text{Lot } n} \times \left[ \left( \frac{\text{AC}_{\text{Burn}}}{100 + \text{AC}_{\text{Burn}}} \right) - \left( \frac{\text{AC}_{\text{JMF}}}{100 + \text{AC}_{\text{JMF}}} \right) \right]$$

Where:

$\$_{\text{Lot } n}$  = Compensation due for additional AC in Lot “n”

$\text{Cost}_{\text{AC}}$  = Supplier’s invoiced cost for AC, dollars per tonne

$t_{\text{Lot } n}$  = tonnes of asphalt mix laid and accepted in Lot “n”, including AC

$\text{AC}_{\text{Burn}}$  = asphalt cement content (% dry mix) of Lot determined from Ministry QA samples, to a maximum of the bumped AC content and a minimum of  $\text{AC}_{\text{JMF}}$

$\text{AC}_{\text{JMF}}$  = asphalt cement content (% dry mix) of Contractor’s production Job Mix Formula before the bump

### **502.39 Payment for Rejected Work Made**

**Acceptable** – When defects have been remedied in Lots or Sub-Lots which had been rejected, payment for the original quantity of material in those Lots or Sub-Lots will be made subject to payment adjustments and penalty assessments and subject to SS 502.58.

No payment will be made for any material used to replace, repair or overlay rejected work and all corrective work shall be performed entirely at the Contractor’s expense.

**502.40 Shouldering** – Payment for Shouldering will be at the Unit Price bid per tonne or cubic metre (to the neat lines), whichever is specified in the Schedule of Approximate Quantities and Unit Prices. The price bid

## ASPHALT PAVEMENT CONSTRUCTION (EPS)

shall be full compensation for supplying, hauling, placing, moisture adjustment, and compaction of the aggregate to the required grades and crossfall.

### **502.41 Surplus Aggregate**

**502.41.01 Surplus Aggregate in Private Pits** – At the discretion of the Ministry Representative, the Ministry may or may not purchase surplus aggregate in stockpile in a private pit. Generally the Ministry will provide payment for the processing costs of surplus aggregate in stockpile in Ministry Pits only, and only to a limited quantity. However, should the Contractor produce surplus aggregate in a private pit, and the Ministry intends to purchase these surplus aggregates, the Contractor shall be required to provide a written agreement with the owner of the property. This document shall indicate that the Ministry will have free access to and use of the surplus aggregate in stockpile for a period of 12 months after the completion of the contract work. If the Contractor undertakes private work from within the private pit, measurements for surplus aggregate in stockpile will not be taken until the completion of the private work, ensuring that the Ministry does not pay for aggregate used on private works. All surplus aggregate shall be properly stockpiled.

### **502.41.02 Ministry Purchase of Surplus Aggregate**

- Should the Ministry proceed with the purchase of surplus aggregate, upon completion of the contract, the Ministry will purchase surplus paving mix aggregate as indicated herein. Surplus shouldering, surfacing, base and sub-base aggregates will be paid in accordance with SS 202.

If the quantity of Asphalt Pavement actually incorporated into the works is less than the estimated quantity, as stated in the Schedule of Approximate Quantities and Unit Prices, the Ministry will purchase aggregate up to 100% of the quantity required by the contract, to be paid under the appropriate Unit Price Item for Aggregate in Stockpile. The surplus aggregate must, when singly or combined, meet the gradation requirements set out in the Job Mix Formula.

The portion of material remaining in a stockpile eligible for compensation as surplus aggregate shall the lesser of:

- a) the quantity of mix as stated in the Schedule of Approximate Quantities and Unit Prices minus the quantity of aggregate actually incorporated in the works, and
- b) the volume of the remaining stockpile as determined under SS 502.41.03

## SECTION 502

No payment shall be made for any surplus paving aggregate remaining at contract completion in excess of the contract requirement. Material remaining in a Ministry pit is the property of the Ministry.

**502.41.03 Measurement of Surplus Aggregate** - The Ministry will determine the volume of aggregate by surveying the stockpile(s) using string-line techniques, and determine volume using prismatic volumes between surfaces. Alternatively, the Ministry Representative may elect to survey using cross-section techniques and/or determine volumes using end-area volumes.

The base of the pile will be determined from a pre-stockpile survey or, where such a survey is not available, from a surface determined by the Ministry Representative as being a reasonable interpolation from the intersection of the pile sides with the adjacent ground level. Where there are two or more stockpiles of aggregate meeting the same gradation classification, the compensation will be based on the cumulative quantity of those stockpiles.

Where necessary, stockpile volume shall be converted to mass using the conversion factor of 2.0 tonnes per cubic metre.

### PART F – PAYMENT ADJUSTMENTS

**502.50 Payment Adjustment** – Payment adjustments resulting from the application of this Section will be effected on each progress payment as follows.

**502.50.01 Density, Asphalt Content, and Gradation** – For each Lot paid for by the tonne (t), the applicable payment adjustment derived from Tables 502-E-1 or Table 502-E-2 (Density), 502-F (Asphalt Content), and 502-G (Gradation), in dollars per tonne, will be expressed as positive in the case of increases and negative in the case of decreases.

The algebraic sum of these unit adjustments will then be applied to the payment quantity for the Lot. The resulting amount, in dollars, will be the net payment adjustment, positive or negative, for that Lot.

**502.50.02 Application Rate** – Payment Adjustments from Table 502-H (Application Rate) shall be computed for the Lot.

The algebraic sum of the net payment adjustments for all such Lots for which payment is authorized on the current progress payment, computed in dollars, shall be the total payment adjustment for density, asphalt content, aggregate gradation, and material application rate for the current progress payment.

## ASPHALT PAVEMENT CONSTRUCTION (EPS)

**502.50.03 Segregation and Smoothness** – For each Lot with payment adjustments based on kilometer (km), the applicable unit adjustment derived from Table 502-I-2 (Segregation) and Table 502-J (Smoothness), in dollars per Lot (\$/lane km), will be expressed as positive in the case of increases and negative in the case of decreases, and will be the payment adjustment, positive or negative, for that Lot.

The algebraic sum of the payment adjustments for all such Lots for which payment is authorized on the current progress payment, computed in dollars, shall be the total payment adjustment for segregation for the current progress payment.

**502.50.04 Total Payment Adjustment** – The algebraic sum of the total payment adjustments for density, asphalt content, aggregate gradation, material application rate, segregation and smoothness, derived in accordance with SS 502.50.01 through SS 502.50.03 above, shall be the total payment adjustment, positive or negative, in dollars, for all attributes for the current progress payment.

The total payment adjustment will be made by a single entry in computing the current progress payment.

**502.50.05 Progress Payments** – The process set out in SS 502.50.01 through SS 502.50.04 above will be used in computing each progress payment to which it is applicable.

### 502.51 Initial 1,000 tonnes of Mix

For the first 1,000 tonnes of asphalt mix produced under a Contract, the following provisions take precedence over all other payment and payment adjustment provisions of SS 502.52 through SS 502.57 inclusive, but do not take precedence over the rejection criteria.

**502.51.01 Payment Adjustments** – Unless requested otherwise by the Contractor in writing in advance of mix production, the first 1,000 tonnes of asphalt mix production and placement shall not be subject to the bonus/penalty payment adjustments for AC content, density and gradation. Payment adjustments will apply to smoothness, segregation and application rate if the mix is applied in a Top Lift location.

**502.51.02 Acceptance Limits** – Contrary to any other provision of SS 502, any mix produced during the initial 1,000 tonnes will only be considered acceptable if:

## SECTION 502

- a) the tentative JMF has been accepted by the Ministry Representative in accordance with SS 502.08.05;
- b) aggregate gradation per SS 502.08.02 is within the gradation limits specified in Table 502-C-1 or the banana formed by applying the Table 502-G column 3 variation limits to the JMF gradation;
- c) all other properties fall inside the allowable limits specified, in SS 502 and the Special Provisions, for the mix, including
  - o For Marshall mixes, Table 502-C-2,
  - o For Superpave mixes, Table 502-C-3; and
- d) AC content of the sample is within  $\pm 0.5\%$  of the design value design value for top lift and is within  $\pm 0.55\%$  of the design value for the bottom lift.

All values are measured against the tentative JMF value at the time the sampled mix was produced.

Any mix with any characteristic outside the above limits is Reject Mix.

Additionally, rejection limits for smoothness, segregation, density and application rate shall apply in accordance with SS 502 and the Special Provisions.

**TABLE 502-A-4 – TEST SAMPLE SOURCE LOCATIONS**

Test	Sample Source:
Density	100 mm dia. road cores; 150 mm dia. road cores for Superpave
AC Content	Loose Mix Samples
Smoothness	Centre of the Lane
Aggregate Gradation	Loose Mix Samples
Segregation	Roadway Pavement

### 502.52 Density

**502.52.01 Lot** – A Lot for density shall be one day’s scheduled production of at least 7 hours plant production where no changes have occurred to criteria such as but not limited to:

- accepted Job Mix Formula,
- the specific Lift that is being placed,
- the required material application rate.

## ASPHALT PAVEMENT CONSTRUCTION (EPS)

A change in any above criteria may require a new Lot designation.

Where one day’s production is less than 7 hours, the material will be added to the next Lot that has the same criteria, as described above, except that if a test indicates that this production is subject to a payment adjustment or to rejection, or if no further material will be produced with the same criteria, this production will be designated as a separate Lot.

A Lot shall be no more than two days total production even if the above criteria have not changed or been met.

**502.52.02 Sub-Lot** – For density, a Lot shall be divided into three equal Sub-Lots, defined by lineal metres of production

**502.52.03 Coring** – The Contractor shall be responsible for providing all core samples for quality assurance and payment adjustment purposes. The randomly selected locations for the cores shall be supplied by the Ministry Representative to the Contractor. The Contractor shall provide 100 mm diameter cores for these purposes. For projects utilizing a Superpave product, 150 mm diameter cores shall be required. The Contractor shall prepare the cores prior to the submission by removing all material not representative of the pavement Lift to be tested. The Contractor shall deliver these cores to the Ministry Representative on site, within 24 hours of being provided the locations for the coring.

The Contractor shall fill all core holes before the roadway is re-opened to traffic. Core holes shall be filled by the following method:

- (a) Empty the hole of water and loose material.
- (b) Remove any excess moisture by wiping the inside with a dry towel.
- (c) Tack coat the inside surfaces and the outside perimeter with an emulsified asphalt.
- (d) Place asphalt mix in loosely, so that the compacted Lifts do not exceed 75 mm.
- (e) With a minimum of 20 blows per Lift, compact the loose material using a minimum 2 kg sledge hammer and tamper.
- (f) For additional Lifts repeat Steps (a) to (e).
- (g) The final Lift shall be a minimum thickness of 25 mm, and finished to a level higher but not

## SECTION 502

exceeding 6 mm, than the elevation of the surrounding pavement.

The Contractor may use an alternative method if acceptable to the Ministry Representative.

All costs associated with the obtaining the cores, including the filling and compaction of the core holes are considered incidental to the contract and are the responsibility of the Contractor.

**502.52.04 Percent Density** – The average in-place density will be determined from core samples of the completed Lift of pavement.

One random core sample will be obtained from each Sub-Lot and the test results for the three Sub-Lots will be averaged to determine the percent density for the Lot.

a) Marshall Mixes – For the determination of Marshall Briquette Density, the Contractor shall obtain the samples as outlined in SS 502 Appendix 2 for each Sub-lot. All costs associated with sampling, shall be the Contractor's responsibility.

From each Sub-lot sample, the Contractor will form three briquettes as per the procedure identified in Table 502-A and tested, and the ASTM D 2726 test results will be averaged to obtain the test value for that sample.

The Marshall Briquette Density for a Lot is the average of the test results from the three Sub-lots. The Marshall Briquette Density value for the Lot shall be provided to the Ministry Representative prior to the provision of the coring locations to the Contractor.

$$\text{Marshall Percent Density} = \left( \frac{\text{In-place Density of Sample}}{\text{Marshall Briquette Density}} \right) \times 100$$

At the discretion of the Ministry Representative, the Ministry may at any time, perform and use the Ministry results in accordance with procedures as outlined above, to obtain the value for Marshall Briquette Density which will replace the values achieved under the Quality Control Testing.

Should the initial test results in any Sub-Lot be lower than 97.0%, one additional core will be taken and tested, and that result shall replace and be averaged with the initial result to determine the percent density for the Sub-Lot.

In addition, the Contractor shall determine the individual Maximum Theoretical Densities (MTD) per

## ASPHALT PAVEMENT CONSTRUCTION (EPS)

ASTM D 2041 for each of the Sub-Lot samples and average the results of them to obtain the Lot MTD. The Contractor shall report the Lot MTD to the Ministry Representative prior to the provision of the coring locations to the Contractor.

b) Superpave Mixes – The Contractor shall determine the individual Maximum Theoretical Densities (MTD) per ASTM D 2041 for each of the Sub-Lot samples and average the results of them to obtain the Lot MTD. The Contractor shall report the Lot MTD to the Ministry Representative prior to the provision of the coring locations to the Contractor.

At the discretion of the Ministry Representative, the Ministry may at any time use the same procedures to obtain the values for Maximum Theoretical Density which will replace the values determined by the Contractor.

The average in-place density will be determined from 150 mm diameter core samples of the completed Lift of pavement.

$$\text{Superpave Percent Density} = \left( \frac{\text{In-place Density of Sample}}{\text{Lot MTD (ASTM D 2041)}} \right) \times 100$$

The Maximum Theoretical Density for a Lot is the value calculated defined as the average of the test results from the three Sub-Lots. The Maximum Theoretical Density value for the Lot shall be provided to the Ministry Representative prior to the provision of the coring locations to the Contractor.

Should the initial test results in any Sub-Lot be lower than 92.0%, one additional core will be taken and tested, and that result shall replace and be averaged with the initial result to determine the percent density for the Sub-Lot.

**502.52.05 Payment Adjustments** – The payment adjustment for percent density will be the amount shown in Table 502-E-1 and 502-E-2 for the Sample Mean of the test results for the Lot.

**502.52.06 Rejection Limit** – The rejection limit for percent density is the limiting value of the Sample Mean as shown in Table 502-E-1 and 502-E-2. If any Sub-Lot has a value within the reject zone, the Sub-Lot is rejected and not paid for.

Acceptance or rejection will be determined for each Sub-Lot. One opportunity will be provided to the Contractor, using non-destructive test methods, to isolate the area of low density and conduct additional

**SECTION 502**

**ASPHALT PAVEMENT CONSTRUCTION (EPS)**

compaction providing no damage is incurred to the new pavement. The Contractor shall mark out the extents of the area identified using chalk or other temporary marking acceptable to the Ministry Representative. One additional core will be taken randomly in the area of low density and will replace the core with previous low density and a new value will be calculated. The Ministry Representative shall be advised as to the scheduling of the re-compaction effort prior to the work taking place.

Where any Marshall mix core density is less than 96% (91% for Superpave mixes), the Contractor shall either overlay or remove and replace the previously placed area of reject mix. If the test result for density of a Sub-Lot is outside the acceptance limits, the Sub-Lot is rejected automatically regardless of the values of other acceptance parameters. To minimize the cost of rejection to the Contractor, the Contractor will be provided the opportunity to isolate the area of low density within the Sub-lot. The limits of the low density area must be verified and accepted by the Ministry Representative before remedial work proceeds.

**502.52.06 Payment Adjustment for Density**

**Rejected Work Made Acceptable** – The payment adjustment for density will be based on testing of the replacement or overlay material where applicable. Where replacement or overlay material does not cover the entire Lot or Sub-Lot, prior tests of the uncovered area will be averaged with new tests on the corrective work.

**TABLE 502-E-1 – PAYMENT ADJUSTMENTS FOR DENSITY – MARSHALL**

Marshall % Density Lot Average	Payment Adjustment (\$ per tonne)
≥ 98.5	+\$1.00
≥ 98.0 to < 98.5	+\$0.75
≥ 97.5 to < 98.0	+\$0.50
≥ 97.0 to < 97.5	+\$0.25
≥ 96.5 to < 97.0	-\$0.50
≥ 96.0 to < 96.5	-\$1.00
< 96.0	<b>REJECT</b>

**TABLE 502-E-2 – PAYMENT ADJUSTMENTS FOR DENSITY - SUPERPAVE**

SUPERPAVE % Density Lot Average	Payment Adjustment (\$ per tonne)
≥ 95.0	+\$1.00
≥ 94.0 to < 95.0	+\$0.75
≥ 93.0 to < 94.0	+\$0.50
≥ 92.0 to < 93.0	+\$0.25
≥ 91.6 to < 92.0	-\$0.50
≥ 91.0 to < 91.6	-\$1.00
< 91.0	<b>REJECT</b>

**502.53 Asphalt Content**

**502.53.01 Lot** – A Lot for AC content shall be one day’s scheduled production of at least 7 hours plant production where no changes have occurred to criteria such as but not limited to:

- accepted Job Mix Formula,
- the specific Lift that is being placed,
- the required material application rate.

A change in any above criteria may require a new Lot designation.

Where one day’s production is less than 7 hours the material will be added to the next Lot that has the same criteria, as described above, except that if a test indicates that this production is subject to a payment adjustment or to rejection, or if no further material will be produced with the same criteria, this production will be designated as a separate Lot.

A Lot shall be no more than two days total production even if the above criteria have not changed or been met.

**502.53.02 Sub-Lot** – For AC content, a Lot shall be divided into three equal Sub-Lots, defined by lineal metres of production.

**502.53.03 Determination of Asphalt Content** – The asphalt content of the asphalt mix will be determined from loose mix samples obtained from each Sub-Lot (3 per Lot) and tested in accordance with ASTM D 6307 test procedures listed in Table 502-A.

One random sample will be obtained from each Sub-lot as per SS 502 Appendix 2. The asphalt content of the asphalt mix will be determined using the average of the results obtained from all of the Sub-lot samples. The Actual Asphalt Content of the Lot will be compared to the Job Mix Formula Asphalt Content and the

## SECTION 502

deviation will be used for payment adjustment purposes.

The ignition oven calibration factor will be applied to the AC Content measured by the ignition oven, and the corrected AC Content used to determine acceptability of the mix and any payment adjustments.

**502.53.04 Payment Adjustments** – The payment adjustment for asphalt content will be the amount shown in Table 502-F, where deviation in AC Content is determined by the percent difference, based on kg of AC per 100 kg of dry aggregate, between the JMF AC content and the actual AC Content.

**502.53.05 Rejection Limit** – Rejection limits for asphalt content are the limiting values of the Sample Mean as shown in Table 502-F, beyond which the Lot is rejected and not paid for.

If the asphalt content of a Lot is within the reject zone, the Lot is rejected automatically regardless of the values of other acceptance parameters.

For Top Lift deviations of more than 0.50% the Contractor shall either overlay or remove and replace the Lot.

**TABLE 502-F – PAYMENT ADJUSTMENTS FOR DEVIATION OF ASPHALT CONTENT (AC)**

Differences of Actual AC Content From Designed AC Content Specified in JMF (AC in %)		
Actual AC Content	Payment Adjustment \$ per tonne	
	Top Lift	Lower Lifts
(%) Greater than Specified in JMF		
≥ 0.00 to ≤ 0.15	\$1.00	\$1.00
> 0.15 to ≤ 0.30	\$0.50	\$0.50
> 0.30 to ≤ 0.35	\$0.00	\$0.00
> 0.35 to ≤ 0.40	-\$2.00	-\$2.00
> 0.40 to ≤ 0.45	-\$3.50	-\$3.50
> 0.45 to ≤ 0.50	-\$5.00	-\$5.00
> 0.50 to ≤ 0.55	REJECT	-\$6.50
> 0.55	REJECT	REJECT
(%) Less than Specified in JMF		
> 0.00 to ≤ 0.15	+\$0.50	+\$0.50
> 0.15 to ≤ 0.30	\$0.00	\$0.00
> 0.30 to ≤ 0.35	-\$2.00	-\$2.00
> 0.35 to ≤ 0.40	-\$3.50	-\$3.50
> 0.40 to ≤ 0.45	-\$5.00	-\$5.00
> 0.45 to ≤ 0.50	-\$6.50	-\$6.50
> 0.50 to ≤ 0.55	REJECT	-\$8.00
> 0.55	REJECT	REJECT

## ASPHALT PAVEMENT CONSTRUCTION (EPS)

For lower Lift deviations of more than 0.55%, no payment will be made and the Ministry Representative will determine whether removal and replacement is necessary.

**502.53.06 Payment Adjustment for Asphalt Cement Content Rejected Work Made Acceptable** – The payment adjustment for Asphalt Content will be based on testing of the replacement or overlay material where applicable. Where replacement or overlay material does not cover the entire Lot or Sub-Lot, prior tests of the uncovered area will be averaged with new tests on the corrective work.

### 502.54 Aggregate Gradation

**502.54.01 Lot** – A Lot for aggregate gradation shall be one day's scheduled production of at least 7 hours plant production where no changes have occurred to criteria such as but not limited to:

- accepted Job Mix Formula,
- the specific Lift that is being placed,
- the required material application rate.

A change in any above criteria may require a new Lot designation.

Where one day's production is less than 7 hours the material will be added to the next Lot that has the same criteria, as described above, except that if a test indicates that this production is subject to a payment adjustment or to rejection, or if no further material will be produced with the same criteria, this production will be designated as a separate Lot.

A Lot shall be no more than two days total production even if the above criteria have not changed or been met.

**502.54.02 Sub-Lot** – For aggregate gradation, a Lot shall be divided into three equal Sub-Lots, defined by lineal metres of production.

**502.54.03 Determination of Aggregate Gradation** – Table 502-C-1, Aggregate Gradation Limits, specifies the aggregate gradation limits which asphalt mix design, Job Mix Formulas, and field adjustments made in accordance with SS 502.08.10 must be based.

Table 502-G shows the limiting values for acceptance and for the determination of payment adjustments. These limits are expressed as departures, on each specified sieve size, from the percentage of material passing that sieve according to the Job Mix Formula. Aggregate gradation will be determined for each Lot

## SECTION 502

from loose mix samples of the completed Lift of pavement. One random sample will be obtained from each Sub-lot, and the aggregate gradation for the Lot will be determined by using the average of the 3 Sub-Lot tests to determine the Sample Mean.

Although the JMF design gradation must at all times be maintained within the limits specified in the Aggregate Table 502-C-1, the gradation of the mix may vary outside those limits, subject to SS 502.54.05.

**502.54.04 Payment Adjustments** – Where the Sample Mean for every specified sieve size falls within the limiting values prescribed in a particular column of Table 502-G, the Lot will be accepted with a payment adjustment as indicated at the bottom of that column.

**TABLE 502-G –PAYMENT ADJUSTMENTS FOR AGGREGATE GRADATION**

Sieve Size mm	Divergence from JMF grading curve Percentage passing by mass (ASTM C 117 and C 136)		
	Column 1	Column 2	Column 3
12.5	±3.5	±4.5	±7.0
4.75	±3.0	±4.5	±6.0
0.600	±2.0	±3.5	±4.0
0.075	±0.75	±1.0	±1.5
<b>Payment Adjustment</b>	<b>+\$0.75</b>	<b>\$0.00</b>	<b>-\$1.50</b>

**502.54.05 Rejection Limit** – Where one or more values of the Sample Mean for the specified sieves falls outside the limiting value specified in Table 502, Column 3, the Lot is reject and the Contractor shall either overlay or, remove and replace the previously placed mix. The Lot will be assessed to determine whether it may remain in place, with payment made in accordance with SS 502.33.

### 502.55 Material Application Rate

**502.55.01 Lot** – A Lot for material application rate shall be one day’s scheduled production of at least 7 hours plant production where no changes have occurred to criteria such as but not limited to:

- the specific Lift that is being placed,
- the required material application rate.

A change in any above criteria may require a new Lot designation.

## ASPHALT PAVEMENT CONSTRUCTION (EPS)

One day’s production of less than 7 hours will be dealt with as follows:

- the material will be added to the next Lot that has the same criteria, as described above, except that if a test indicates that this production is subject to a payment adjustment or to rejection, or if no further material will be produced with the same criteria, this production will be designated as a separate Lot,

A Lot shall be no more than two days total production even if the above criteria have not changed or been met.

**502.55.02 Sub-Lot** – Sub-Lots are not used for material application rate.

**502.55.03 Determination of Material Application Rate** – Asphalt mix shall be applied to the roadway at the rate or rates specified in the Special Provisions, on the Drawings or as otherwise directed by the Ministry Representative. Material Application Rates will be determined by the tonnage delivered to the paver as recorded by weigh tickets generated by automated scales, divided by the area covered by the Lot after allowance has been made for entrance letdowns and/or intersections. The Contractor shall provide the material application rate calculations to the Ministry Representative at the end of each shift.

**502.55.04 Payment Adjustments** – The payment adjustment for material application rate will be applied as shown in Table 502-H, based on the actual material application rate, expressed as a percentage of the specified material application rate.

**502.55.05 Rejection Limits** – Where actual application rate for the Lot is within the reject zone as shown in Table 502-H, the Lot is reject.

A Lot rejected for application rate may be corrected by mill-and-fill or rejected with no remedial work required, either subject to the authorization of the Ministry Representative.

**SECTION 502**

**ASPHALT PAVEMENT CONSTRUCTION (EPS)**

**TABLE 502-H – PAYMENT ADJUSTMENTS FOR MATERIAL APPLICATION RATE**

Actual Application Rate (Percent of specified rate)	Payment Adjustment \$ per tonne of material in the Lot (unless otherwise noted)	
	Bottom Lift or Single Lift	Top Lift of Multiple Lifts
≥ 110	-\$6.00 for all material in the Lot up to 110% and no payment for product in excess of 110.0%	-\$6.00 for all material in the Lot up to 106% and no payment for product in excess of 106.0%
≥ 106.0 to <110.0	-\$4.00	-\$4.00
≥ 105.0 to <106.0		
≥ 104.0 to <105.0	\$0.00	-\$2.00
≥ 96.0 to <104.0	+\$0.50	+\$0.50
≥ 94.0 to <96.0	-\$1.00	-\$1.00
≥ 92.0 to <94.0	-\$2.00	-\$2.00
≥ 90.0 to <92.0	-\$3.00	-\$3.00
≥ 85.0 to <90.0	-\$5.00	-\$5.00
<85.0	<b>REJECT</b>	<b>REJECT</b>

**502.56 Surface Segregation**

**502.56.01 Lot** – A Lot shall be one kilometre length of Top Lift pavement for each driving lane.

**502.56.02 Sub-Lot** – Sub-Lots are not used for segregation.

**502.56.03 Determination of Surface Segregation** – The finished pavement shall be homogeneous, free from segregation and shall be uniform with respect to surface texture. A segregated area is defined as an area within the driving lanes of the pavement wherein the texture differs visually from the texture of the surrounding pavement.

Due to the nature of variation in asphalt mixes and their compactive characteristics, the definition of degrees of segregation will be established on a project by project basis. The Contractor and the Ministry Representative shall establish through the use of photographs or other mutually agreed tools, the definition of slight, moderate and severe segregation. The Ministry Representative and the Contractor shall evaluate the first two Lots upon completion of the second Lot, after opening to traffic, to confirm the

“agreed to” guidelines. Segregation will then be evaluated only when all paving is complete.

The Ministry Representative, with the Contractor’s Representative, will observe the finished pavement to evaluate the existence, severity and extent of segregation and other surface defects. The evaluation will be completed prior to the issuance of the Completion Certificate

The rating system for categorizing the severity of Top Lift surface segregation, and repair methodology is shown in Table 502-I-1.

**TABLE 502-I-1 – SEGREGATION – TOP LIFT ONLY – REMEDIATION METHODOLOGY**

Segregation Severity	Visual Appearance	Repair Procedures
None	Completely uniform surface texture.	N/A
Slight	Matrix of asphalt binder, coarse and fine aggregate exists; visually increased presence of stone sizes.	Sand cement slurry.
Moderate	Significantly more stone than surrounding pavement; matrix of asphalt binder and coated sand particles is reduced.	Seal coat or sand cement slurry patch or neat hot mix patch or mill and fill patch.
Severe	Appears as an area of very stony mix - stone against stone - little or no matrix.	Remove and replace or overlay to limits authorized by Ministry Representative.

**502.56.04 Payment Adjustments** – The payment adjustment for Top Lift segregation will be the applicable amount shown in Table 502-I-2.

**TABLE 502-I-2 – SEGREGATION – TOP LIFT ONLY – PAYMENT ADJUSTMENTS**

Payment Adjustment	Number of Segregated Areas, by Category		
	Slight	Moderate	Severe
+\$1,000 per lane km. (Applies only if the criteria in all three adjacent columns are achieved)	0 to 3	0	0
+\$500 per lane km. (Applies only if the criteria in all three adjacent columns are achieved)	4 to 5	0	0
No payment adjustment	6 to 10	0 to 1	0
-\$500 per lane km. (Applies if the criteria in any one or more of the adjacent columns occurs)	11 to 15	2 to 5	0 to 1
-\$1,000 per lane km. (Applies if the criteria in any one or more of the adjacent columns occurs)	16 or more	6 or more	2 or more

**502.56.05 Repair** – On Top Lift all segregation, including any in areas outside the driving lanes assessed for the payment adjustment, shall be repaired according to Table 502-I-1.

Repair shall be to the neat lines and dimensions of the segregated area using a sand cement slurry or other product acceptable to the Ministry Representative.

An acceptable sand cement slurry can be made as follows, with proportions varied as needed for workability:

- 25 litres of SS-1 (or equivalent) emulsion
- 4 – 5 kg (2 shovels) of  $\leq 3$  mm sand
- 2 – 3 kg (1 shovel) Type GU (general use) Portland cement
- Additional water, if needed for workability.

After repairs, the Lot will be re-evaluated for acceptance, but not for segregations payment adjustments.

The Contractor shall be responsible for all costs associated with the repair of segregated areas.

### 502.57 Smoothness

**502.57.01 Lot** – A Lot for smoothness shall be one kilometre length of Top Lift pavement for each driving lane.

**502.57.02 Sub-Lot** – A Sub-Lot for smoothness shall be a 100 metre section of a Lot, or for the last Sub-Lot within a Lot, a section of up to 100 metres.

**502.57.03 Traffic Control for Pavement Smoothness Testing** – The Contractor shall provide traffic control for smoothness testing.

The Ministry Representative will provide sufficient notice to the Contractor regarding when the Ministry will perform smoothness testing. As directed by the Ministry Representative, the Contractor will be responsible to schedule and provide traffic control for the Ministry's smoothness testing, including a shadow vehicle and all signage necessary. The Contractor shall also be responsible for sweeping and any other preparation work required for smoothness testing. No extra payment will be made for sweeping or other preparation work and the provision of traffic control for smoothness testing will also be considered incidental and no extra payment will be made.

The Contractor may also be required to provide an additional Shadow Vehicle or traffic control for smoothness testing as determined by the Ministry Representative. Payment for the provisions of an additional Shadow Vehicle or traffic control, if required, will be made under the Provisional Sum Item for Site Modifications.

**502.57.04 Determination of Pavement Smoothness** – The finished pavement surface shall be tested by the Ministry using a Class I precision rolling profile measuring instrument, to determine the longitudinal profile and compute the International Roughness Index (IRI) in each driving lane. Profiles shall be measured and the IRI calculated in the centre of the lane for each Sub-Lot.

For any Sub-Lot between 50 m and 100 m in length, the IRI value shall be considered representative of a complete Sub-Lot. For any Sub-Lot less than 50 m in length, the IRI value will be combined with the proceeding Sub-Lot IRI value.

The profile shall be measured over the entire length of the pavement exclusive of structures and shoulder areas. Acceleration, deceleration and turning lanes are considered part of the driving lanes and shall be tested in accordance with this provision. For the measuring process, the Contractor shall provide the Ministry

## SECTION 502

Representative a chalk guide line in the centre of the lane immediately prior to measurement.

**502.57.05 Auxiliary Lanes** – For smoothness testing, sections of the driving lanes that do not fall within the continuous through lanes, such as acceleration lanes, deceleration lanes and turning lanes, and lanes which are less than 1 km in length, shall be treated as follows. The ratio of the section length to the standard Lot length of 1 km shall be determined and the payment adjustment shall be pro-rated on this basis as in the following example:

$$\begin{aligned} & \text{For a segment 565 metres long, the payment} \\ & \text{adjustment factor is} \\ & = \text{Length of segment} / \text{Length of standard} \\ & \text{Lot} \\ & = 565 \text{ m} / 1000 \text{ m} \\ & = 0.565 \end{aligned}$$

Hence the applicable payment adjustment is 0.565 times the payment adjustment for a 1 km Lot as determined from Table 502-J.

### 502.57.06 Sub-Lot and Lot Acceptance Limits –

The reject limit and payment adjustments applicable to a road for smoothness are specified in Table 502-J. The default values in the “Standard” column shall apply except where the Special Provisions specify that “Alternate” values apply.

The International Roughness Index (IRI) value, calculated for each Sub-Lot, will be used to determine if the Sub-Lot or Lot will be accepted, and if so whether it will be subject to any payment adjustment.

The Lot IRI is the average of the individual IRI values for the Sub-Lots within the Lot.

A Sub-Lot is rejected if:

- it has an IRI within the applicable reject zone shown in Table 502-J, subject to SS 502.57.08;
- for Top Lift only, there are obvious defects per SS 502.32 or it has unrepaired smoothness deficiencies which require remediation in accordance with SS 502.57.09.

A Lot is rejected for Smoothness if any Sub-Lot is rejected.

**502.57.07 Payment Adjustments** – For Top Lift only, the payment adjustments per the applicable

## ASPHALT PAVEMENT CONSTRUCTION (EPS)

column of Table 502-J shall apply to each Lot.

**TABLE 502-J – PAYMENT ADJUSTMENTS FOR SMOOTHNESS**

Lot IRI (m/km)	Payment Adjustment Per Lot	
	Standard	Alternate
≤ 0.80	+\$2,000	+\$2,000
> 0.80 to ≤ 0.90	+\$1,000	+\$2,000
> 0.90 to ≤ 1.00	+\$500	+\$2,000
> 1.00 to ≤ 1.10	+\$200	+\$1,000
> 1.10 to ≤ 1.20	0	+\$500
> 1.20 to ≤ 1.30	-\$100	+\$250
> 1.30 to ≤ 1.40	-\$250	0
> 1.40 to ≤ 1.50	-\$600	-\$300
> 1.50 to ≤ 1.60	-\$1,400	-\$300
> 1.60 to ≤ 1.70	-\$2,000	-\$750
> 1.70 to ≤ 1.80	-\$3,000	-\$750
> 1.80 to ≤ 1.90	<b>REJECT</b>	-\$1,500
> 1.90 to ≤ 2.00	<b>REJECT</b>	-\$2,500
>2.00	<b>REJECT</b>	<b>REJECT</b>

**502.57.08 Remedial Work** – If the test results on a Sub-Lot of pavement indicate a payment reduction or rejection because of smoothness, the Contractor may propose remedial work to improve the smoothness. Such proposals are subject to the acceptance of the Ministry Representative, but such acceptance does not imply that the proposed remedy will be successful, and does not reduce the Contractor’s responsibility for meeting the acceptance requirements. Grinding may be acceptable, but an overlay may be required. Only one attempt may be made to improve smoothness, and this must be completed within ten (10) calendar days from the time the Contractor receives notification from the Ministry Representative of the original smoothness test results for that Sub-Lot.

Following any attempt to improve the smoothness of a Sub-Lot or Sub-Lots, the Ministry Representative will retest the Sub-Lot or Sub-Lots, and the new results will replace the previous data for the purposes of determining acceptance and payment.

No payment will be made for any material, equipment or manpower used to improve, or attempt to improve, smoothness.

**502.57.09 Smoothness Deficiencies** – Smoothness deficiencies (bumps and dips) less than 12 mm over 3 m will not have remedial work required. Individual deficiencies between 8 mm and 12 mm over 3 m will result in a \$200.00 penalty for each occurrence.

## SECTION 502

Deficiencies exceeding 12 mm over 3 m will require remedial work.

**502.58 Overlays as a Corrective Measure** – If an overlay is used as a corrective measure on a defective Lot or Sub-Lot, the overlay thickness will be subject to the acceptance of the Ministry Representative, but shall not be less than 40 mm. In all other respects, the whole overlay will be subject to the same specifications as the pavement being overlaid. Where an overlay is used as a corrective measure in any lane, adjacent lanes shall also be overlaid whether acceptable or not.

Whether the overlay is applied as a corrective measure or is placed over otherwise acceptable pavement in order to match an adjacent lane, acceptability and payment will be determined as follows:

- acceptability, and eligibility for either positive or negative payment adjustment, will be determined entirely on the results of testing and observations conducted on the overlay, regardless of test results that have been obtained on the underlying, overlaid Lift of pavement; but
- the payment quantity, for application of the Unit Prices for asphalt pavement, and the quantity, to which any payment adjustment is to be applied, will be derived from the tonnage of mix in the underlying, overlaid Lift.

### PART G – APPEAL TESTING

**502.60 Time Limits For Appeal of Test Results** – To appeal any test results, the Contractor shall serve written notice of appeal to the Ministry Representative, within the following time period after receipt of the applicable test results:

- For Density, Gradation and Asphalt Content, within two (2) working days; and
- For Segregation, Smoothness and Application Rate, within three (3) working days.

**502.61 Appeals of Density, Asphalt Content and Gradation** – The Contractor may appeal the results of acceptance testing for density, asphalt content and/or aggregate gradation for any Lot only once. Appeals will only be considered if quality control results support an appeal and can be presented.

Quality control test results for density which are provided to the Ministry Representative subsequent to the Contractor's receipt of the quality assurance test

## ASPHALT PAVEMENT CONSTRUCTION (EPS)

results for that Lot will not be considered (when evaluating evidence) for an appeal. The appeal shall be for all tests within the Lot, and there will be no appeal allowed for single tests within a Lot.

Any attempt to improve density on the appealed Lot after the Ministry Representative has tested the Lot for acceptance shall void the appeal and the original test results will apply.

The Ministry Representative will arrange for an independent testing laboratory to perform the appeal testing. The personnel employed or testing laboratory retained by the Contractor for quality control testing on the project will not be used for appeal testing.

After January 1, 2008 the appeal testing laboratory shall hold current certification from the Canadian Council of Independent Laboratories (CCIL) under both the Asphalt Laboratory and Aggregate Laboratory Certification Programs, and at least one technician in the asphalt laboratory shall hold current certification under the Asphalt Technician Certification Program.

**502.61.01 Density Appeals** – For density appeals:

- the Contractor shall, within two (2) working days of filing the appeal and in the presence of the Ministry Representative, take five (5) cores samples from random locations
- the Contractor shall then deliver new core samples to the Ministry Representative;
- the Ministry Representative shall deliver the core samples and the companion loose mix samples from the appealed Sub-Lots to the appeal testing laboratory.
- the appeal agency shall determine the MTD from the companion sample and the densities of the cores and report the results to the Ministry Representative and the Contractor.
- the original core test results will be discarded and a new sample mean will be obtained from 5 random cores. The appeal agency shall prepare new briquette densities from the previously taken companion samples as per Appendix 2.

**502.61.02 Asphalt Content and Gradation Appeals** – For asphalt content and gradation appeals

- the party who has possession of the companion loose mix samples shall deliver them to the appeal testing laboratory.

## SECTION 502

- the appeal agency shall prepare three new samples from the companion sample and determine the AC contents and gradations, average the results, and report all results to the Ministry Representative and the Contractor.
- the original test results will be discarded. A new sample mean for three new test results will be determined using the companion samples and will be used for acceptance and payment adjustments.

**502.62 Smoothness Appeals** – The Contractor may appeal acceptance test results of a Lot only once.

The Ministry Representative will perform, and the Contractor will be given the opportunity to witness, the appeal testing and the new results will be binding on the Contractor and the Ministry.

**502.63 Segregation Appeals** – Appeals of segregation ratings will first be handled by a joint review with the Contractor. If consensus cannot be reached then the Ministry Representative shall engage the Joint Committee, comprised of representatives

## ASPHALT PAVEMENT CONSTRUCTION (EPS)

from the Ministry and B.C. Road Builders, to assess the area(s) in question.

**502.64 Application Rate Appeals** – Appeals of application rate will be handled by a joint review with the Contractor and Ministry Representative. If the issue cannot be resolved, the issue will be resolved through the dispute resolution provisions of the Contract General Conditions.

**502.65 Application of Appeal Testing Results** – The appeal test values, thus determined, in all cases, will be binding on the Contractor and the Ministry.

**502.66 Payment for Appeal Testing** – If the new results indicate a change in the payment adjustment in the Contractor's favour, then sampling and testing costs incurred during the appeal procedures for that Lot will be borne by the Ministry.

If the new results verify that any payment reduction or rejection remains valid for that Lot, then the costs of testing (plus 10% mark-up) incurred during the appeal procedure will be charged to the Contractor.

## SS 502 APPENDIX 1

## QUALITY CONTROL REQUIREMENTS AND GUIDELINES

## 1.01 GENERAL

The Contract requirements for preparing, submitting and adhering to the paving components of a Quality Control Plan are specified in SS 502.04. This Appendix titled “Quality Control Requirements and Guidelines” sets out the guidelines for the Contractor’s Quality Control Plan, in addition to those set out in SS 502.04 and the Special Provisions.

## 1.02 QUALITY CONTROL PLAN

The Contractor shall prepare and submit a Quality Control Plan for review. The Plan may be operated wholly or in part by a qualified Subcontractor or an independent organization/agency. However, the Quality Control Plan, including compliance with the Plan and its modifications, must remain the responsibility of the Contractor.

The Plan shall address all elements that affect the quality of the hot mix, hot laid asphalt pavement, including but not limited to the following:

- Purchased Materials (asphalt cement characteristics, additives, purchased aggregates, etc.
- Aggregate production (inc. source quality, gradation, fracture, crushing procedures, stockpiling, etc)
- Calibration and Correlation of Testing Equipment (plant sensors, lab equipment, nuclear moisture/density gauges, etc.)
- Mix Design
- Asphalt Plant Mixing procedures (cold feed sampling, AC flow rate, , temperature control, records, weigh scale, etc)
- Product quality (volumetrics, EPS payment elements, etc.)
- Professional standards (joints, placing temperature, rolling procedures, etc.)

The plan shall also include the following:

- The name of the Quality Control testing agency and its proven capability to provide the specific services required for the project.
- The list of dedicated technical staff, if available, (including names, qualifications and relevant experience) and their proposed roles.
- The list of testing equipment available for project work.

The Quality Control Plan shall include the designation of specific personnel to be responsible for specific quality control duties.

- There shall be a Quality Control Manager (QCM) who will be responsible for the development and management of the Quality Control Plan. This person shall be qualified as per the requirements identified in SS 502.04.03. This individual shall also be responsible for the signing off of Quality Control Testing and Inspection records. This individual shall also be responsible for ensuring the qualifications of quality control staff, implementing and documenting any changes or improvements to the Quality Control Plan.
- There should be a designated Process Control Technician (PCT), with 5 years of related experience, who will ensure that laboratory test results and other quality control practices are used to control the quality of aggregates and other mix components, and to adjust and control mix proportions to meet the mix design(s). The PCT is responsible for ensuring that testing equipment, utilized for proportioning and mixing are calibrated and in good working order. The Plan shall describe how the PCT’s duties, including sampling methods and responsibilities are to be accomplished and documented. The Plan should also describe the criteria to be used by the PCT to correct or reject unsatisfactory materials.
- There should also be a Pavement Quality Control

## SECTION 502

Technician (PQT), with 5 years of related experience, who will ensure that delivered materials meet the requirements of the specifications. In addition, the PQT shall be responsible for periodically inspecting all equipment used in placing, finishing, and compacting to assure its proper operating condition and to assure that placing, application rate, finishing, joint construction, and compaction is in conformance with this specification and the contract requirements.

### **1.03 CONTRACTOR'S RECORD OF QUALITY CONTROL TESTING**

Test results should be made on specified forms or charts immediately after completion of each test. These test results are to be made available to the Ministry Representative upon request.

Records of gradation control, both during aggregate production and also during the asphalt mixing operation, should be kept on the form H-295 - Mechanical Analysis of Aggregates.

### **1.04 MATERIAL APPLICATION RATE**

The Contractor shall control the Material Application Rate by monitoring the amount of asphalt mix delivered to the road against the area covered by checking the application rate minimally every ten loads.

## ASPHALT PAVEMENT CONSTRUCTION (EPS)

The Contractor shall advise the Ministry Representative in writing on an ongoing basis of the application rate.

### **1.05 DENSITY**

The Contractor should take core samples to determine actual pavement density. At the start of paving, the Contractor should take a minimum of two pavement cores from each Sub-Lot. The Contractor may employ a nuclear densitometer (or moisture/density gauge) to ensure intermediate density control. Two nuclear densities may be determined for each Sub-Lot, based on job mix densities obtained from the most recent plant briquettes.

### **1.06 OTHER QUALITY CONTROL PROCEDURES**

The Contractor may initiate other Quality Control procedures as necessary for ensuring production of a quality product and include them in the Quality Control Plan. Procedures may also be introduced after the start of work as necessary as amendments to the Quality Control Plan.

### **1.07 QUALITY CONTROL TESTING FREQUENCY**

Minimum test frequencies Guidelines for Quality Control are described in the following table:

TABLE 502 Appendix 1-1 – GUIDELINES FOR MINIMUM TEST FREQUENCIES

	ASTM Test	*Minimum Frequency
Tests During Aggregate Production	C 136, Dry Sieve Analysis of Aggregate or C 117 Sieve Analysis of Aggregates by Washing (Modified for Field Lab with drying done over a hotplate or similar heating element)	- Split Stockpiles: 1 for each stockpile for every 2 hours of production. - One main stockpile: for every 300 tonnes. - Blend Sand: 1 for every 100 tonnes during stockpiling. - Natural filler: 1 for every 50 tonnes during stockpiling.
	D 5821 Determining the Percentage of Fractured Particles in Coarse Aggregate	Every second coarse aggregate sieve test.
	C 117 Sieve Analysis of Aggregates by Washing (Modified for Field Lab)	1/shift on reduced sample obtained from combined samples from the crusher
Asphalt Products Tests	Tack and Prime	Contractor's option.
Tests During Asphalt Plant Mixing	C 136, Dry Sieve Analysis of Aggregate	1 of combined aggregate (off the belt) every 300 tonnes.
	C 566 & D 2216, Moisture Content	Aggregate: 2 tests/Lot Asphalt mix: 1 on first Sub-Lot and every second day.
	C 117 Sieve Analysis of Aggregates by Washing (Modified for Field Lab)	1/shift on reduced sample obtained from combined samples from the plant cold feed
	D 5581 Resistance to Plastic Flow Using Marshall Apparatus.	One set of three briquettes for 1,200 tonnes or Lot, whichever is less.
	D 6307 Asphalt Extraction, Ignition Method	One/Lot.
	D-5 Penetration of Bituminous Materials	One per Manufacturer's Batch. Samples should be taken for every 3000 tonnes of mix production
	D 2171 Viscosity	Contractor's Option
	Maximum Theoretical Density	
Test During Asphalt Paving for Density Testing	AASHTO T 245-97 Resistance to Plastic Flow Using Marshall Apparatus	One 15 kg sample for every Sub-Lot or minimum 1/day for field testing
	Core Samples	At start, two cores for each Sub-Lot. After rolling pattern established, only one core for each Sub-Lot. All Marshall mix cores to be a minimum of 100 mm diameter; Superpave mixes shall require minimum 150 mm diameter cores

\* These are the minimum frequencies and the Contractor is responsible to assess the need to increase testing frequency, where aggregate source is not uniform or any other condition exists that may warrant it. QC frequencies may be reduced below this level, subject to the Ministry Representative's authorization, should the Contractor's QC Plan be proven very effective.

## SS 502 APPENDIX 2

OBTAINING AND PREPARING  
LOOSE MIX SAMPLES

1. Three (3) samples per Sub-Lot shall be obtained by the Contractor (generally from the paver augers), at locations and times chosen by the Ministry Representative. The first sample shall be used by the Contractor for Quality Control, the second sample by the Ministry for Quality Assurance, with the third retained by the Ministry for potential appeal testing.
2. The samples taken shall meet the requirements of ASTM D 979 Sampling of Bituminous Mixtures, Table 1, Size of Sample.
3. The sample size shall be reduced to required laboratory sample size for Marshall and Superpave gyratory briquettes, asphalt content and hot mix gradation determination as outlined below:
  - a) The sample shall either be reduced using a Riffle splitter or shall be quartered into four approximately equal portions. The two diagonally, opposite quarters shall be combined resulting in two samples. Identify and designate one of the samples as the Quality Companion Sample and set aside. Identify and designate the other resulting sample as the Quality Control Sample. Use the Quality Control Sample for testing.
  - b) The Quality Control Sample shall be weighed to ensure that the sample so obtained meets the minimum mass required for the ignition test. If the sample does not meet the minimum mass requirements, then the additional materials will be obtained and added to the Quality Control Sample from the Companion Sample. This will be achieved by quartering the Quality Companion sample and adding one quarter of the Quality Companion Sample to the Quality Control Sample.
  - c) This process is to be repeated for each sample to provide the Quality Acceptance and Appeal Samples.
4. The third sample for appeal purposes shall be set aside and retained in a Contractor-supplied, suitable container labeled with sample location, date sampled, and project information.
5. The Contractor shall deliver the QA and appeal samples to the Ministry Representative for storing.
6. If a sample is taken from the mat, The areas sampled shall be filled with mix immediately after sampling, and shall receive the same compactive effort as the rest of the mat.

SS 502 APPENDIX 3

BLANK AGGREGATE SAMPLE PREPARATION

1. Blank aggregate samples replicate the Job Mix Formula design aggregate gradation, without asphalt cement and are used to correlate the Ministry, Contractor, and appeal lab ignition ovens.
2. Twenty-four (24) blanks are required, each weighing  $1900 \pm 1$  gram. This size approximates the size of the mix samples, less the asphalt cement, that will be used for the project's daily Quality Assurance testing.
3. The blanks shall be prepared from bulk aggregate samples (i.e. coarse aggregates, fine aggregates, blend sand, etc. samples) that were produced from the same sources and are the same materials as the aggregates that will be used for the project and have been designated in the Mix Design. 50 – 60 kg of material will be required.
4. The bulk aggregate samples shall first be dried, and then thoroughly blended at the design cold feed percentages  $\pm 1\%$ .
5. The blended material shall then be sieved into each of the individual sieve sizes designated in the Mix Design.
6. The aggregate blanks will then be made up from the sieved material, adding proportions from each individual sieve to conform to the estimated dry aggregate JMF gradation within the tolerances specified below.
7. Masses of aggregate added shall be within the

following tolerances:

Sieve Size	Cumulative Mass Tolerance (g)
Pan	0.1
0.075	0.1
0.15	0.1
0.3	0.1
0.6	0.1
1.18	0.1
2.36	0.1
4.75	0.1
9.5	0.7
12.5	2
16	3
19	6
25	13
37.5	45

8. Samples shall be sealed in cans or bagged in moisture-proof heavy gauge plastic bags, and labeled with the project number, blank number, the preparation date, and a JMF identification number.

## SS 502 APPENDIX 4

## IGNITION OVEN CORRELATION PROCEDURE

1. Asphalt Mix samples are prepared and burned to determine the effect each oven has on the mix.
2. The Contractor and the Ministry shall each prepare three (3) Asphalt Mix calibration samples by adding AC (provided by the Contractor from the supplier and batch that will be used on the project) to randomly selected aggregate blanks prepared by the Contractor in accordance with SS 502 Appendix 3.
3. AC shall be added to the blanks at the proportion specified in the accepted JMF, within a tolerance of  $\pm 0.1$  g.
4. Each party shall burn their mix calibration samples in their ignition oven in accordance with ASTM D 6307 to determine their calibration factor.
5. The calibration factors determined above shall be compared and the inter-laboratory correlation determined.
6. Correlation between the Contractor's lab and the Ministry lab shall be completed, reviewed and mutually acceptable to the Contractor and the Ministry Representative a minimum of one (1) working day prior to placement of any mix.
7. In the event of an appeal on AC Content, the appeal laboratory shall also prepare and burn calibration samples to determine their oven calibration factor.
8. Results from testing of any asphalt mix shall report the measured AC Content and the corrected AC Content after applying the laboratory calibration factor.