PRACTICE FOR MIX CHECK

1. SCOPE

1.1 This document outlines the procedure for conducting a one-point check of a Superpave mix design.

1.2 A one-point check of the mix design serves to confirm that the job mix formula (JMF) selected by the mix design laboratory will yield a mix that meets specified criteria. It is typically carried out by a lab other than the one that prepared the mix design and, when stipulated by the owner, the laboratory shall not be owned or corporately affiliated with the laboratory that prepared the mix design or associated with the Contractor.

2. REFERENCES

2.1 MTO Lab Test Methods

- LS-282, Quantitative Extraction of Asphalt Cement and Analysis of Extracted Aggregate from Bituminous Paving Mixtures
- LS-291 Quantitative Extraction of Asphalt Cement and Mechanical Analysis of Extracted Aggregate from Bituminous Paving Mixtures – Ontario Procedure
- LS-312 Fractionation of Unextracted Reclaimed Asphalt Pavement (Rap) for Testing and for Incorporating in Other Test Samples
- LS-313 Density of Hot Mix Asphalt (HMA) Specimens by Means of the Superpave Gyratory Compactor
- LS-602 Sieve Analysis of Aggregates

2.2 AASHTO Standards

- T 209 Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures
- T 283 Resistance of Compacted Bituminous Mixtures to Moisture Induced Damage

3. MIX CHECK PROCEDURE

3.1 When specified by the owner, sieve analysis shall be carried out on each aggregate used in the mix design in accordance with LS-602.

3.2 Using the mix design information prepare, at the design asphalt cement (AC) content, a minimum of 4 specimens compacted to the design number of gyrations (N_{des}), and a minimum of 2 specimens compacted to the maximum number of gyrations (N_{max}), in accordance with LS-313.

3.2.1 For samples prepared from the constituent aggregates, the following procedure shall be used:

Each constituent aggregate shall be fractioned on all sieves down to the 2.36 mm sieve, with the passing 2.36 mm sieve collected as a single fraction. Prepare the one-point check samples by reconstituting to the JMF gradation up to and including the 2.36 mm sieve using the proportions indicated in the mix design. The total fraction passing the 2.36 mm shall be obtained by drawing from the passing 2.36 mm of each constituent in the proportion of its source material as per the mix design.

For recycled mixes, include the amount of RAP or RST or both calculated on the basis of the mix design to the aggregate blend. The RAP or RST or both shall be prepared in accordance with LS-312.

If RAP or RST or both are constituents of the mix, the design asphalt content includes AC from this RAP or RST or both. Allowance shall be made for this quantity of AC already in the aggregate blend by determining the AC content of the RAP or RST or both through solvent extraction (Methods LS-282 or LS-291).

Note: The AC content of RAP or RST or both used in the mix design are typically based on process control testing. Its value can be assumed to be representative of the sample supplied for the purpose of the one point mix check.

3.2.2 When permitted by specifications, a one-point mix check can be carried out on plant produced mix. For specimens produced from plant mix, the minimum number of specimens compacted to N_{des} shall be two per sample.

3.3 Prepare 2 samples for the determination of maximum theoretical density. The minimum mass of these samples shall be in accordance with AASHTO T 209.

3.4 Determine the density of each aggregates used in the mix design. Alternately, when specified by the owner, densities shall be determined for the blended coarse and blended fine aggregate.

3.5 Determine volumetric properties of the mix using the results of the tests carried out under steps 3.1, 3.2, 3.3, and 3.4.

3.6 Moisture sensitivity shall be determined as part of the one-point mix check procedure using AASHTO T 283. Sample preparation method shall be according to LS-313. The test shall be conducted using the type and amount of anti-stripping additive determined in the mix design.

4. REPORTING

4.1 Information shall be provided in a legible manner. The documents shall include, but are not limited to the following information:

Project information, aggregate gradations, JMF, compaction temperature, re-compaction temperature, design gyrations, AASHTO T 283’s completed Moisture Damage Laboratory Data Sheet, and the results of all testing carried out on the mix and the aggregates. When the owner has a Certificate of Independent Check of Mix Design form (see Figure 1 for an example), that form shall be submitted along with other supporting documents.

Figure 1: Example of a Certificate of Independent Check of Mix Design Form

CERTIFICATE OF INDEPENDENT CHECK OF MIX DESIGN

PART A - PROJECT INFORMATION			
Independent Laboratory		Independent Lab. Project #	
Mix Design Laboratory		Mix Design Lab Project #	
MTO Contract #		Mix Type/Design Category	
Contractor		Paving Sub-contractor	
Contract Location			

PART B - AGGREGATE GRADATIONS - PERCENT PASSING SIEVES

Aggregate	50.0	25.0	19.0	16.0	12.5	9.5	4.75	2.36	1.18	0.600	0.300	0.150	0.075
CA #1													
CA #2													
FA #1													
FA #2													
FA #3													
RAP #1													
RAP #2													

PART C - JOB MIX FORMULA

Gradation (percent passing sieves) and AC Content

% AC	37.5	25.0	19.0	16.0	12.5	9.5	4.75	2.36	1.18	0.600	0.300	0.150	0.075
Compaction Temperature (°C):				Re-compaction Temperature (°C):						Design Gyrations (N_{des}):			

PART D - INDEPENDENT CHECK RESULTS - AGGREGATE PROPERTIES AND SUPERPAVE VOLUMETRICS

Independent Check Parameter	Mix Check Requirements (Note 1)	Design Req't (1)	Test Results
G_{sb} - Blended Coarse Aggregate	For information only	N/A	
G_{sb} - Blended Fine Aggregate	For information only	N/A	
G_{sb} - Combined Aggregate	For information only	N/A	
Bulk Relative Density (BRD) of Mix	For information only	N/A	
Max. Relative Density (MRD) of Mix	For information only	N/A	
Air Voids at N_{design}	+/- 0.7% from Contractor Mix	4.0	
VMA (%)	+/- 1.0% from Contractor Mix and not more than 0.3% below design minimum		
VFA (%)	Within specified mix design range		
% G_{mm} @ $N_{initial}$	Not more than design minimum (Note 2)		
% G_{mm} @ N_{max}	Not more than design maximum		
Dust Proportion	Within specified mix design range		
Tensile Strength Ratio	Not less than 0.80	Min. 0.80	

Note 1: Design requirements specified elsewhere in the contract

Note 2: For mix check on plant produced mix, this shall not exceed the design requirements by more than 0.5%

ENGINEER'S CERTIFICATION

I,________________________________P.Eng (print name), a professional engineer licensed to practice professional engineering in the Province of Ontario and the supervising Engineer of ________________________________(print independent laboratory name), certify that, in accordance with Contract requirements:

a) This laboratory prepared all samples and conducted all testing required by the laboratory procedure for the mix check to determine the values of mix and aggregate properties listed in the Contract for Mix Check Requirements;

b) the mix meets the Owner's Mix Check requirements and tolerances; and

c) our laboratory holds a current CCIL Type A Certification, including Superpave capability.

Seal and Signature:

Date:

PH-CC-822 IMC 06-02