

## YEAR 2010 CCIL CORRELATION

### PART B: MIX COMPLIANCE

#### RECOMPACTED MARSHALL TESTS

Four (4) bulk samples, two (2) identified as Materials (A-C-E)-MC-# and two identified as Materials (B-D-F)-MC-#, have been provided.

#### TESTING

On receipt of the Materials (A-C-E)-MC-# and (B-D-F)-MC-#, (2 x approximately 7500 g samples for each material), the samples shall be warmed and a representative portion obtained by quartering. The representative portion shall then be tested as per Item 6 in LS-264, Rev. No. 19, "Method of Test for Theoretical Maximum Relative Density of Bituminous Paving Mixtures"

The remaining material from each sample shall then be heated to the appropriate temperature. Indicate on Test Report Form 2-4 what type of oven was used (Microwave ovens shall not be used for this purpose). Three briquette specimens shall be prepared for each sample as per LS-261, Rev. No. 19, "Method of Test for Preparation of Marshall Specimens". The **compaction temperature** shall be **140°C. Trough, moulds and hammers** shall be preheated to **135 ± 5°C**.

**Note 1.** With the manual hammer, the following should be noted: (a) the compaction pedestal must be secured; (b) the timing of blows should be 60 blows per minute (plus or minus 5 blows); (c) the hammer should be allowed to rebound between successive blows.

Thereafter the specimens shall be tested for:

1. Bulk relative density, LS-262, Rev. No. 18, "Bulk Relative Density of compacted Bituminous Mixes"
2. Marshall stability and flow, LS-263, Rev. No. 18, "Resistance to Plastic Flow of Bituminous Mixtures using the Marshall Apparatus"
3. Maximum relative density, LS-264, Rev. No. 25, "Theoretical Maximum Relative Density of Bituminous Paving Mixtures".
4. Air voids, LS-265, Rev. No. 16, "Determination of Percent Air Voids in Compacted Dense Bituminous Pavement Mixtures"
5. Voids in mineral aggregate, LS-266, Rev. No. 16, "Determination of V.M.A. in Compacted Bituminous Mixtures"

Note 1. For calculation of the V.M.A. use the values for aggregate bulk relative densities and asphalt cement provided on page **2 - 2 to 2 - 5**.

All test results shall be reported by e-mail in the designated spaces on the (MS-Excel) Mix Compliance Report form. Please use the appropriate form for the samples that were shipped to your laboratory.

The completed Mix Compliance Report form shall be e-mailed to [ibullen@ccil.com](mailto:ibullen@ccil.com) by **January 8, 2010** (listed separately on CCIL Web Site). An example of a completed report form is shown on page 2 - 6.

Hard copies of the report forms and work sheets must be submitted by **January 8, 2010** by mail or courier to:

Nabil Kamel, M.A.Sc., P.Eng.  
CCIL Program Manager  
3166 Lakeshore Road  
Burlington, Ontario, L7n 1A4  
Tel: 905-632-6456; Fax: 905-632-1990; e-mail: [nkamel@ccil.com](mailto:nkamel@ccil.com)

**YEAR 2010 CCIL CORRELATION**

**DO NOT** send reports and worksheets by fax.

**MIX COMPLIANCE - % VOIDS IN MINERAL AGGREGATE WORK SHEET**

LABORATORY No. : \_\_\_\_\_ LABORATORY NAME \_\_\_\_\_

**MATERIAL A-MC**

Coarse Aggregate	(CA)	42.0%	
Fine Aggregate	(FA)	58.0%	
BRD Coarse Aggregate	(CA)	BRD	2.647
BRD Fine Aggregate	(FA)	BRD	2.666
Compacted Mix BRD (Db)	SAMPLE # _____	SAMPLE # _____	
	(1) _____	(4) _____	
	(2) _____	(5) _____	
	(3) _____	(6) _____	
	% AC	<u>4.95</u>	<u>5.00</u>

Aggregate BRD (Gb): \_\_\_\_\_

% VMA = (1) \_\_\_\_\_ (2) \_\_\_\_\_ (3) \_\_\_\_\_ (4) \_\_\_\_\_ (5) \_\_\_\_\_ (6) \_\_\_\_\_

**MATERIAL B-MC**

Coarse Aggregate	(CA)	%	44.0
Fine Aggregate	(FA)	%	56.0
Coarse Aggregate	(CA)	BRD	2.682
Fine Aggregate	(FA)	BRD	2.670
Compacted Mix BRD (Db)	SAMPLE # _____	SAMPLE # _____	
	(1) _____	(4) _____	
	(2) _____	(5) _____	
	(3) _____	(6) _____	
	% AC	<u>5.05</u>	<u>5.10</u>

Aggregate BRD (Gb): \_\_\_\_\_

% VMA = (1) \_\_\_\_\_ (2) \_\_\_\_\_ (3) \_\_\_\_\_ (4) \_\_\_\_\_ (5) \_\_\_\_\_ (6) \_\_\_\_\_

An example of a completed work sheet is shown on page **2- 6**. A hard copy of this sheet must be submitted with the laboratory work sheets. The VMA values for Material **(A-C-E)MC-#**, and Material **(B-D-F)-MC-#**, shall be reported in the designated spaces on the (MS-Excel) Mix Compliance Report form.

**YEAR 2010 CCIL CORRELATION**

**MIX COMPLIANCE - % VOIDS IN MINERAL AGGREGATE WORK SHEET**

LABORATORY No. : \_\_\_\_\_ LABORATORY NAME \_\_\_\_\_

**MATERIAL C-MC**

Coarse Aggregate (CA) 47.8%  
Fine Aggregate (FA) 52.2%

BRD Coarse Aggregate (CA) 2.998  
BRD Fine Aggregate (FA) 2.724

Compacted Mix BRD (Db) SAMPLE # \_\_\_\_\_ SAMPLE # \_\_\_\_\_  
(1) \_\_\_\_\_ (4) \_\_\_\_\_  
(2) \_\_\_\_\_ (5) \_\_\_\_\_  
(3) \_\_\_\_\_ (6) \_\_\_\_\_

% AC 5.20 5.25

Aggregate BRD (Gb): \_\_\_\_\_

% VMA = (1) \_\_\_\_\_ (2) \_\_\_\_\_ (3) \_\_\_\_\_ (4) \_\_\_\_\_ (5) \_\_\_\_\_ (6) \_\_\_\_\_

**MATERIAL D-MC**

Coarse Aggregate (CA) 50.0%  
Fine Aggregate (FA) 50.0%

Coarse Aggregate (CA) 2.994  
Fine Aggregate (FA) 2.728

Compacted Mix BRD (Db) SAMPLE # \_\_\_\_\_ SAMPLE # \_\_\_\_\_  
(1) \_\_\_\_\_ (4) \_\_\_\_\_  
(2) \_\_\_\_\_ (5) \_\_\_\_\_  
(3) \_\_\_\_\_ (6) \_\_\_\_\_

% AC 5.15 5.25

Aggregate BRD (Gb): \_\_\_\_\_

% VMA = (1) \_\_\_\_\_ (2) \_\_\_\_\_ (3) \_\_\_\_\_ (4) \_\_\_\_\_ (5) \_\_\_\_\_ (6) \_\_\_\_\_

An example of a completed work sheet is shown on page 2- 6. A hard copy of this sheet must be submitted with the laboratory work sheets. The VMA values for Material **(A-C-E)MC-#**, and Material **(B-D-F)-MC-#**, shall be reported in the designated spaces on the (MS-Excel) Mix Compliance Report form.

**YEAR 2010 CCIL CORRELATION**

**MIX COMPLIANCE - % VOIDS IN MINERAL AGGREGATE WORK SHEET**

LABORATORY No. : \_\_\_\_\_ LABORATORY NAME \_\_\_\_\_

**MATERIAL E-MC**

Coarse Aggregate (CA) % 53.0  
Fine Aggregate (FA) % 47.0

BRD Coarse Aggregate (CA) BRD 2.669  
BRD Fine Aggregate (FA) BRD 2.648

Compacted Mix BRD (Db) SAMPLE # \_\_\_\_\_ SAMPLE # \_\_\_\_\_  
(1) \_\_\_\_\_ (4) \_\_\_\_\_  
(2) \_\_\_\_\_ (5) \_\_\_\_\_  
(3) \_\_\_\_\_ (6) \_\_\_\_\_

% AC 5.00 5.05

Aggregate BRD (Gb): \_\_\_\_\_

% VMA = (1) \_\_\_\_\_ (2) \_\_\_\_\_ (3) \_\_\_\_\_ (4) \_\_\_\_\_ (5) \_\_\_\_\_ (6) \_\_\_\_\_

**MATERIAL F-MC**

Coarse Aggregate (CA) % 52.1  
Fine Aggregate (FA) % 47.9

Coarse Aggregate (CA) BRD 2.664  
Fine Aggregate (FA) BRD 2.653

Compacted Mix BRD (Db) SAMPLE # \_\_\_\_\_ SAMPLE # \_\_\_\_\_  
(1) \_\_\_\_\_ (4) \_\_\_\_\_  
(2) \_\_\_\_\_ (5) \_\_\_\_\_  
(3) \_\_\_\_\_ (6) \_\_\_\_\_

% AC 5.10 5.05

Aggregate BRD (Gb): \_\_\_\_\_

% VMA = (1) \_\_\_\_\_ (2) \_\_\_\_\_ (3) \_\_\_\_\_ (4) \_\_\_\_\_ (5) \_\_\_\_\_ (6) \_\_\_\_\_

An example of a completed work sheet is shown on page 2- 6. A hard copy of this sheet must be submitted with the laboratory work sheets. The VMA values for Material **(A-C-E)MC-#**, and Material **(B-D-F)-MC-#**, shall be reported in the designated spaces on the (MS-Excel) Mix Compliance Report form.

**MIX COMPLIANCE - % VOIDS IN MINERAL AGGREGATE WORK SHEET (EXAMPLE)**

**YEAR 2010 CCIL CORRELATION**

LABORATORY No. : 175      LABORATORY NAME Apex Construction

**MATERIAL MC-XYZ**

Coarse Aggregate	(CA)	45.3%		
Fine Aggregate #1	(FA-1)	54.8%		
BRD Coarse Aggregate	(CA)	BRD	2.697	
BRD Fine Aggregate #1	(FA-1)	BRD	2.659	
Compacted Mix BRD (Db)	SAMPLE <u>14</u>	SAMPLE <u>65</u>		
	(1) <u>2.372</u>	(4) <u>2.377</u>		
	(2) <u>2.369</u>	(5) <u>2.371</u>		
	(3) <u>2.374</u>	(6) <u>2.373</u>		
% AC	<u>5.27</u>		<u>5.35</u>	

Aggregate BRD (Gb): 2.673

% VMA = (1) 15.9 (2) 16.1 (3) 15.9 (4) 15.8 (5) 16.1 (6) 16.0

**2010 CCIL CORRELATION – EXAMPLE MIX COMPLIANCE**

YEAR 2010 CCIL CORRELATION

REPORT						
<b>Testing Admin Information</b>			Enter your assigned Lab Code No.:		<b>175</b>	
• Lab Name (include Branch or Mobile #)	<b>Apex Construction</b>					
• E-mail Address	<b>enstein@apex.com</b>					
• Reported by (Contact Name)	<b>Frank Enstein</b>					
• Phone Number (Contact)	<b>(999) 999-9999</b>					
• Tested by (Name(s))	<b>Frank Enstein, Joe Blow</b>					
• Results Reporting Date	<b>Jan 8, 2010</b>					
* For Type B Laboratories.						
<b>MIX COMPLIANCE (A-MC &amp; B-MC)</b>						
<b>RECOMPACTED MARSHALL TESTS</b>						
Results for:	A-MC			B-MC		
Sample Number	x	y	Average	x	y	Average
• <i>BRD</i>	<b>2.376</b>	<b>2.380</b>	<b>2.378</b>	<b>2.421</b>	<b>2.430</b>	<b>2.426</b>
• <i>MRD</i>	<b>2.485</b>	<b>2.484</b>	<b>2.485</b>	<b>2.501</b>	<b>2.504</b>	<b>2.503</b>
• <i>% Voids</i>	<b>4.5</b>	<b>4.4</b>	<b>4.5</b>	<b>3.2</b>	<b>3.0</b>	<b>3.1</b>
• <i>% VMA</i>	<b>15.6</b>	<b>15.8</b>	<b>15.7</b>	<b>14.2</b>	<b>14.4</b>	<b>14.3</b>
• <i>Stability (N)</i>	<b>10864</b>	<b>11625</b>	<b>11245</b>	<b>9424</b>	<b>9821</b>	<b>9623</b>
• <i>Flow (0.25mm units)</i>	<b>10.4</b>	<b>10.2</b>	<b>10.3</b>	<b>9.6</b>	<b>10.2</b>	<b>9.9</b>

Save as **Mix Compliance A&B Report - Lab ###** (where ### is your code number).

Please e-mail the completed form to:  
**ibullen@ccil.com** [ Phone: (905) 688-7497 ]