

## YEAR 2010 CCIL CORRELATION

### PART A: MIX DESIGN

One bag of coarse and one bag of fine aggregate for each of two mix designs (four bags total) along with asphalt cement have been provided.

**Note 1.** To ensure that all laboratories receive identical samples, the fine aggregate samples have been recombined from individual sieve sizes. Before commencing any testing, these samples should be **carefully but thoroughly mixed** (each fine aggregate separately) by running through a mini-splitter several times.

**Note 2.** Pay attention to the notes included with each weigh card

### PREPARATION OF THE MATERIALS BY THE PARTICIPATING LABORATORIES

On receipt of the bulk samples of coarse and fine aggregate, dry the samples to constant mass and size the **coarse** aggregate (down to 2.36 mm size).

### TESTING

#### AGGREGATES

Coarse aggregates shall be tested according to LS-604, Rev. No. 23 "Method of test for Relative Density and Absorption of Coarse Aggregate" and fine aggregates shall be tested according to LS-605, Rev. No. 23 "Method of test for Relative Density and Absorption of Fine Aggregate". Two determinations for each aggregate (**A-MDCA-#; B-MDCA-#, A-MDFA-#; B-MDFA-#**) are required.

All test results shall be reported in the designated spaces in the (MS Excel) Mix Design Report form which shall be returned by e-mail. An example of a completed mix design form is shown on page **1- 4** of this instruction package.

#### MIXES

Combine the dried aggregate and asphalt cement (**A-MDAC-# or B-MDAC-#**) in the proportions given on the attached mix "WEIGH CARDS", for Material I and Material II on page **1-3**. MTO laboratory test method LS-261, Rev. No. 19 "Method of Test for Preparation of Marshall Specimens" shall then be followed to prepare the Marshall specimens.

Note 3. In accordance with current MTO practice, samples for each Marshall briquette specimen and Maximum Relative Density Test are to be batched individually. A total of six (6) briquettes and two (2) Maximum Relative Density samples shall be prepared for each mix.

Note 4. With the manual hammer, the following should be noted: (a) compaction pedestal must be secured; (b) the timing of blows should be  $60 \pm 5$  blows per minute; (c) the hammer should be allowed to rebound between successive blows.

**The mixing temperature and compaction temperature** shall be as indicated on the mix design weigh card forms. **Trough, moulds and hammers** shall be preheated to **135±5°C**.

Thereafter the specimens, produced in two groups of three for each mix, shall be tested for:

1. Bulk relative density, LS-262, Rev. No. 18, "Bulk Relative Density of Compacted Bituminous Mixes"

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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"

Note 5. To allow a proper comparison, the Maximum Relative Density test shall be carried out on uncompacted freshly mixed material as described in Section 5 including the heat treatment (Item 5.10).

4. Air voids, LS-265, Rev. No. 16, "Determination of Percent Air Voids in Compacted Dense Bituminous Pavement Mixtures"
5. VMA, LS266, Rev. No. 16, "Determination of VMA in Compacted Bituminous Mixtures"

All test results shall be reported by e-mail in the designated spaces on the (MS-Excel) Mix Design Report form.

The completed Mix Design 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 1-4.

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)

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

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**Mix Design – Material I**  
Weigh Card (mass in grams)

Mass Type	Coarse Aggregate A-MDCA						Fine Aggregate	Dust	Asphalt Cement
	13.2mm *	9.5mm	6.7mm	4.75mm	2.36mm	Pass ** 2.36mm	A-MDFA		A-MDAC
Individual	19.1	186.7	n/a	325.8	26.5	9.1	567.2	37.4	68.2
Cumulative	19.1	205.8	n/a	531.6	558.1	567.2	1,134.4	1,171.8	<b>1,240</b>

**Mixing Temperature = 150°C      Compaction Temperature = 135°C**

Notes:

1. \* Is material retained on the 13.2mm sieve to be discarded? **No**
2. \*\* Is material passing the 2.36mm sieve material from coarse aggregate to be discarded? **No**  
**OR**  
has the pass 2.36mm sieve material been included in the component package? **No**
3. \*\*\* Has dust been supplied separately? **Yes. In a separate bag with the coarse aggregate.**  
Aggregates may exhibit stripping. Do NOT use antistripping additive.
4. Masses provided for Mix Design Specimens are to be adjusted proportionally to provide for Maximum Theoretical Relative Density (MRD) test samples.

**Mix Design – Material II**  
Weigh Card  
(mass in grams)

Mass Type	Coarse Aggregate B-MDCA						Fine Aggregate	Dust	Asphalt Cement
	13.2mm *	9.5mm	6.7mm	4.75mm	2.36mm	Pass ** 2.36mm	B-MDFA		B-MDAC
Individual	4.7	136	n/a	385.1	48.4	9.3	583.5	11.8	71.2
Cumulative	4.7	140.7	n/a	525.8	574.2	583.5	1,167	1,178.8	<b>1,250</b>

**Mixing Temperature = 150°C      Compaction Temperature = 138°C**

Notes:

1. \* Is material retained on the 13.2mm sieve to be discarded? **No**
2. \*\* Is material passing the 2.36mm sieve material from coarse aggregate to be discarded? **No**  
**OR**  
has the pass 2.36mm sieve material been included in the component package? **No**
3. \*\*\* Has dust been supplied separately? **Yes. In separate bags**
4. Aggregates may exhibit stripping. Do NOT use antistripping additive.
5. Masses provided for Superpave Gyratory Specimens are to be adjusted proportionally to provide for Maximum Theoretical Relative Density (MRD) test samples.

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<b>2010 CCIL CORRELATION – EXAMPLE MIX DESIGN REPORT</b>						
<b>Testing Admin Information</b>				Enter your assigned Lab No.:		<b>175</b>
• Lab Name (include Branch or Mobile #)	<b>Apex Construction</b>					
• E-mail Address	enstein@apex.xom					
• Reported by (Contact Name)	Frank Enstein					
• Phone Number (Contact)	<b>(999) 999-9999</b>					
• Tested by (Name(s))	Joe Blow					
• Results Reporting Date	<b>January 8, 2010</b>					
* For Type A Laboratories.						
<b>MIX DESIGN - MARSHALL</b>						
<b>MIX DESIGN MARSHALL TESTS</b>						
Results for:	A-MD			B-MD		
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>M RD</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>
<b>Aggregate Properties</b>						
• <i>BRD - CA</i>	<b>2.705</b>	<b>2.702</b>	<b>2.704</b>	<b>2.694</b>	<b>2.689</b>	<b>2.692</b>
• <i>BRD - FA</i>	<b>2.671</b>	<b>2.675</b>	<b>2.673</b>	<b>2.671</b>	<b>2.666</b>	<b>2.669</b>
•						
• <i>Absorption - CA</i>	<b>1.358</b>	<b>1.385</b>	<b>1.372</b>	<b>1.403</b>	<b>1.391</b>	<b>1.397</b>
• <i>Absorption - FA</i>	<b>1.741</b>	<b>1.728</b>	<b>1.735</b>	<b>1.766</b>	<b>1.744</b>	<b>1.755</b>

Save as **Mix Design – Marshall – Report – Lab ###** (where ### is your code number)