

## YEAR 2010 CCIL CORRELATION

### SUPERPAVE GYRATORY COMPACTION (Province of Alberta)

#### Samples

One bag of coarse aggregate (**A-GYCA-#** or **B-GYCAI-#**) and one bag of fine aggregate (**A-GYFA-#** or **B-GYFA-#**) along with asphalt cement (**A-GYAC-#** or **B-GYACI-#**) have been provided.

#### Aggregate Preparation

On receipt of the bulk samples of coarse and fine aggregate, dry the samples to constant mass and size the **coarse** aggregate (down to 2.5 mm size) and pass 2.5 mm portion.

**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 the weigh cards for each mix

#### Mix Preparation

- 1) For Gyratory samples (**two samples for each mix**) combine the dried aggregate and asphalt cement in the proportions indicated in the Weigh Card tables for Material I and Material II. Mass of the sample to be consistent with those included in the appropriate weigh card  $\pm 10g$ .
- 2) An additional sample using the same proportions of dried aggregate and asphalt cement shall be produced for Maximum Theoretical Relative Density (MRD); minimum mass of 1500g.
- 3) The mixing temperature and compaction temperature shall be as indicated on the appropriate mix design weigh card form.
- 4) Mixture conditioning for both Gyratory and MRD samples shall be carried out at the mixture compaction temperature indicated on the weighcard  $\pm 3^{\circ}C$  for  $2h \pm 5$  minutes (as indicated in AASHTO R30). Proceed immediately with compaction.

#### Compaction Procedure

- 5) Verify all Gyratory Compactor operating parameters prior to testing:
  - a) Compaction pressure =  $600 \pm 18$  kPa
  - b) Gyration speed =  $30 \pm 0.5$  gyrations per minute
  - c) Compaction angle =  $1.25^{\circ} \pm 0.02^{\circ}$
  - d) Specimens to be compacted to:  
 $N_{ini} = 8$   
 $N_{des} = 100$   
The same Superpave Gyratory Compactor shall be used to compact both materials.
- 6) Preheat compaction mold and base plate to compaction temperature for 30 to 60 minutes prior to the estimated beginning of compaction.
- 7) Remove from oven and place base plate and paper disc in the bottom of the mold.
- 8) Place the mixture, preheated to compaction temperature (normally at the completion of the mixture conditioning period) into the mold in one lift being careful to avoid segregation.
- 9) Level the mix and place another paper disc on top of the mixture
- 10) Load the charged mold into the compactor and centre the loading ram.
- 11) Allow the compaction to proceed until the desired number of gyrations specified is reached and the gyratory mechanism shuts off.
- 12) Remove the angle from the mold assembly; retract the loading ram; remove the mold from the assembly; extrude the specimen from the mold.

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13) Remove paper discs from the top and bottom of the specimen.

### Sample Testing

1. Bulk relative density, T166, "Bulk Specific Density and Gravity of Compacted Bituminous Mixes"
2. Maximum Specific Gravity, T209 "Theoretical Maximum Specific Gravity and Density of Hot Mix Asphalt (HMA)"

### Report

- 1) Laboratory name
- 2) Laboratory code number
- 3) e-Mail address
- 4) Reported by (name and telephone number)
- 5) Date reported
- 6) Specimen height for  $N_{\text{initial}}$  and  $N_{\text{design}}$
- 7) Maximum Theoretical Relative Density (MRD) for gyratory mix
- 8) Bulk Relative Density for gyratory compacted samples
- 9) Mass of specimen
- 10) Height of specimen after each gyration to nearest 0.1mm
- 11) The calculated percent air voids of the compacted specimen ( $N_{\text{design}}$ ) to nearest 0.1%
- 12) Manufacturer, Model, and Serial number of the Superpave Gyratory Compactor used to compact the samples.

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

The completed Gyratory 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 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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**SuperPave Gyratory Specimens – Material I**

Weigh Card (mass in grams)									
Mass Type	Coarse Aggregate A-GYCA						Fine Aggregate	Dust	Asphalt Cement
	12.5mm *	10.0mm	6.7mm	5.0mm	2.5mm	Pass ** 2.5mm	A-GYFA		A-GYAC
Individual	75.5	737.7	n/a	1,287.3	104.8	36	2,241.3	147.9	269.5
Cumulative	75.5	813.2	n/a	2,100.5	2,205.3	2,241.3	4,482.6	4,630.5	<b>4,900</b>

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

Notes:

- \* Is material retained on the 12.5mm sieve to be discarded? **No**
- \*\* Is material passing the 2.5mm sieve material from coarse aggregate to be discarded? **No**  
**OR**  
has the pass 2.5mm sieve material been included in the component package? **No**
- \*\*\* Has dust been supplied separately? **Yes. In a separate bag with the coarse aggregate.**
- Aggregates may exhibit stripping. Do NOT use antistripping additive.
- Masses provided for SuperPave Gyratory Specimens are to be adjusted proportionally to provide for Maximum Theoretical Relative Density (MRD) test samples.

**SuperPave Gyratory Specimens – Material II**

Weigh Card (mass in grams)									
Type Mass	Coarse Aggregate B-GYCA						Fine Aggregate	Dust***	Asphalt Cement
	12.5mm *	10.0mm	6.7mm	5.0mm	2.5mm	Pass ** 2.5mm	B-GYFA		B-GYAC
Individual	22.6	452.8	n/a	1485.3	255.8	47.5	2263.9	45.7	276.4
Cumulative	22.6	475.4	n/a	1960.7	2216.5	2264.0	4527.9	4573.6	<b>4850</b>

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

Notes:

- \* Is material retained on the 12.5mm sieve to be discarded? **No**
- \*\* Is material passing the 2.5mm sieve material from coarse aggregate to be discarded? **No**  
**OR**  
has the pass 2.5mm sieve material been included in the component package? **No**
- \*\*\* Has dust been supplied separately? **Yes. In a separate bag.**
- Aggregates may exhibit stripping. Do NOT use antistripping additive.
- 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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2010 CCIL CORRELATION – EXAMPLE REPORT FORM GYRATORY COMPACTOR - ALBERTA						
<b>Testing Admin Information</b>			Enter your assigned Lab No.: <b>AB 09</b>			
<ul style="list-style-type: none"> <li>• Lab Name (include Branch or Mobile #)</li> <li>• E-mail Address</li> <li>• Reported by (Contact Name)</li> <li>• Phone Number (Contact)</li> <li>• Tested by (Name(s))</li> <li>• Results Reporting Date</li> </ul>	<b>Apex Construction</b>					
				<a href="mailto:enstein@apex.com">enstein@apex.com</a>		
				<b>Frank Enstein</b>		
				<b>(999) 999-9999</b>		
				<b>Jim Dandy</b>		
			<b>January 8, 2010</b>			
<b>Gyratory Compaction – Laboratory Mix</b>						
Manufacturer:	Troxler		Model:		S/N:	123456
Results for Sample Number	A-GY			B-GY		
	X	Y	Average	X	Y	Average
• BRD ( $N_{des}$ )	2.425	2.416	2.421	2.431	2.431	2.431
• MRD	2.510	2.508	2.509	2.515	2.519	2.517
• Height $N(ini)$	127.42	128.15	127.79	126.20	128.14	127.17
• Height $N(des)$	115.20	116.40	115.80	115.70	116.74	116.22
• % Air Voids ( $N_{des}$ )	3.5	3.7	3.6	3.3	3.5	3.4
• Specimen Mass, g	4,694.0	4,699.0	N/R	4,704.0	4,708.0	N/R

Save as **Gyratory Report - Lab ###** where ### is your code number.