

## YEAR 2020 CCIL CORRELATION

### IGNITION FURNACE GENERAL INSTRUCTIONS AND DATA REPORT FORMS (ON QC)

The following samples have been forwarded to your laboratory:

Material **A-IGCF-X** (Five samples)

Material **A-IGMF-X** and **B-IGMF-X** (Two pre-mixed samples)

Asphalt Cement **A-IGAC-X** (One sample)

#### A) Ignition Furnace: Reference Procedure LS-292 (latest revision)

- 1) While furnace is at room temperature calibrate the furnace balance as described in the furnace manual provided by the manufacturer.
- 2) Set the combustion temperature of 540°C (deemed appropriate for this type of sample) or as indicated for Irradiation type furnace.
- 3) Set the start time (Auto Timer) so that the furnace is at the specified run temperature (see 2) above) for at least 60 minutes before starting the burn of the first sample of the day.
- 4) Set the furnace endpoint to 1.0g (LS-298 Item 4.2)

#### B) Sample Preparation

##### Correction Factor (A-IGCF-X) Samples:

- 1) Five sample bags containing approximately 1500g of mixed aggregates and one sample of asphalt cement are supplied
- 2) Aggregates are to be dried prior to mixing.
- 3) A clean mixing bowl will be buttered by mixing a separate sample of HMA (not supplied). The bowl will be scraped clean of this buttering mix prior to mixing the five samples supplied.
- 4) Mixing temperature for the correction factor samples is 150°C.
- 5) Weigh and record the dried aggregate sample.
- 6) Based on this weight add sufficient asphalt cement (supplied) to produce a mix containing 5.00%, **A-IGCF-X** (based on total mix).
- 7) Mix the sample as indicated in LS-261 (latest revision)
- 8) Transfer the mixed sample to a metal tray, spread it out, cover with metal foil and allow it to cool to ambient temperature.
- 9) Sample is now ready for testing.
- 10) Five samples are provided. Calibration Factor shall be determined from 3 of the 5 samples according to LS-292 Section 4.2.3

##### Premixed A-IGMF-X and B-IGMF-X Samples:

- 1) Sample bags containing approximately 1500g of **A-IGMF-X** and **B-IGMF-X** are supplied and are ready for testing. Determination of moisture content is not required.

#### C) Ignition Furnace Run:

- 1) Weigh the lid, sample tray, catch pan and retaining bracket on the laboratory balance (TABLE 1 – for **A-IGCF-X** (Correction Factor) samples and TABLE 3 – for **A-IGMF-X** and **B-IGMF-X** (HMA) samples)
- 2) Preheat the sample to be tested to 110°C±5°C (i.e. sufficiently warm to handle). Do not heat for more than one hour.
- 3) Place catch pan under sample tray and spread sample evenly on the tray.

## YEAR 2020 CCIL CORRELATION

- 4) Place lid over sample tray and secure lid, tray and catch pan with the retaining bracket.
- 5) Weigh total assembly on the laboratory balance and record the mass to 0.1g (TABLE 1 – for **A-IGCF-X** samples and TABLE 3 – for **A-IGMF-X** and **B-IGMF-X** samples)
- 6) Calculate sample mass (C in both TABLE 1 and TABLE 3)
- 7) Enter the sample mass C in the furnace data system.
- 8) Place the assembly in the preheated furnace and close the door.
- 9) Heat the sample at the specified temperature (540°C) until the difference between consecutive mass loss measurements does not exceed requirements for three one minute intervals.
- 10) Record sample mass after ignition (from data tape) (TABLE 1 – F for **A-IGCF-X** samples and TABLE 3 – F for **A-IGMF-X** and **B-IGMF-X** samples).
- 11) Remove the assembly from the furnace and allow to cool to ambient temperature and weigh to the nearest 0.1g (TABLE 1 – E for **A-IGCF-X** samples and TABLE 3 – F for **A-IGMF-X** and **B-IGMF-X** samples).
- 12) Record required data from tapes in TABLES 1 and 3 for **A-IGCF-X** and **A-IGMF-X** and **B-IGMF-X** samples respectively.

**NOTE: LABORATORIES SHOULD TAKE CAUTION REGARDING NEGATIVE CALIBRATION FACTORS. A LARGE NEGATIVE CALIBRATION FACTOR SUGGESTS THAT THE ASPHALT CEMENT HAS NOT BEEN COMPLETELY BURNED DURING THE IGNITION RUN.**

## D) Ignited Aggregate Gradation

- 1) Carefully transfer the total residue after ignition to a weighing pan and weigh to the nearest 0.1g.
- 2) Proceed with the washed gradation as described in LS-292.
- 3) Laboratories shall complete the attached work sheets (Tables 1-4) and submit copies of the output tapes from the ignition furnace runs.

All test results shall be reported online and submitted by **January 3 2020**. An example of a completed report form is shown on pages 3 and 4.

Hard copies of the report forms and work sheets (including Tables 1-4) must be submitted by **January 3 2020** by mail or courier to:

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



**Ignition Furnace Report - Certification Program**

- ▶ CCIL Confidential Lab # CCIL 999
- ▶ Lab Name: Demo Lab
- ▶ Tested by:
  - Lab Technician
  - Supervisor / Manager
  - Not listed

Please specify

Super Technician

**Ignition Furnace Report**

Calibration Factor Samples

Test	Sample I	Sample II	Sample III
19.0	100	100	100
16.0	100	100	100
13.2	97.6	98.4	98.1
9.5	84.7	85.4	85.1
4.75	63.6	63.4	63.8
2.36	52.1	52.0	52.4
1.18	43.7	43.5	43.6
0.600	33.7	33.5	33.7
0.300	20.6	19.9	20.4
0.150	8.3	8.0	8.2
0.075	3.2	3.1	3.1
Calibration Factor	0.22	0.16	0.14

Sample #1 Used  
A-IGCF-100

Sample #2 Used  
A-IGCF-125

Sample #3 Used  
A-IGCF-150

# YEAR 2020 CCIL CORRELATION

Bituminous Mix Samples			
Test	Sample A-IGMF	Sample B-IGMF	
%A.C. (Corrected)	5.03	5.35	
19.0	100	100	
16.0	100	100	
13.2	98.1	98.4	
9.5	85.1	85.4	
4.75	63.8	63.4	
2.36	52.4	52.0	
1.18	43.6	43.5	
0.600	33.7	33.5	
0.300	20.4	19.9	
0.150	8.2	8.0	
0.075	3.1	3.1	
Comments			
Average Calibration Factor is 0.17			

**TABLE 1: In-House Prepared Calibration Factor Samples**

General Information						
Company Name						
Technician's Name				Date		
Specific Information						
		Calibration Factor Samples				
		Code No.	Code No.	Code No.	Code No.	Code No.
Laboratory Balance						
A	Mass of sample tray, lid, catch pan, g					
B	Mass of sample tray, lid, catch pan, sample, g					
$C = (B - A)$	Initial Mass of Sample, g					
D	Mass of sample tray, lid, catch pan, sample after ignition, g					
$E = (D - A)$	Final mass of sample after ignition, g					
Furnace Balance						
F	Final mass of sample after ignition, g (data tape)					
$G = (C - F)$	Loss Furnace, g					
$H = (G/C) \times 100$	Loss Furnace, %					
I	Loss Furnace Correction, %					
$J = (H - I)$	Total Loss Furnace, % (Apparent AC)					
K	Total AC added, %					
$L = (J - K)$	Calibration Factor, %					
Furnace Temperature Information						
Test temperature shown on controls, °C						
Initial temperature from data tape, °C						

**YEAR 2020 CCIL CORRELATION**

Maximum temperature from data tape, °C					
Final temperature from data tape, °C					

**TABLE 2: Gradation of In-House Prepared Calibration Factor Samples (After Ignition)**

		Calibration Factor Samples				
		Code No.	Code No.	Code No.	Code No.	Code No.
Laboratory Balance	Initial Mass, g					
	Final Mass, g					
Furnace Balance	Initial Mass, g					
	Final Mass, g					
AGGREGATE						
Dry mass before washing, g						
Dry mass after washing, g						
GRADATION	% Passing					
	16.0 mm					
	13.2 mm					
	9.5 mm					
	4.75 mm					
	2.36 mm					
	1.18 mm					
	600 µm					
	300 µm					
	150 µm					
75 µm						

Laboratory Name: \_\_\_\_\_

**YEAR 2020 CCIL CORRELATION**

Date Tested: \_\_\_\_\_

**TABLE 3: Test Results – Pre-mixed HMA Samples**

General Information						
Company Name						
Technician's Name					Date	
Specific Information						
		Prepared HMA Samples				
		Code No.	Code No.	Code No.	Code No.	Code No.
Laboratory Balance						
A	Mass of sample try, lid, catch pan, g					
B	Mass of sample tray, lid, catch pan, sample, g					
$C = (B - A)$	Initial Mass of Sample, g					
D	Mass of sample tray, lid, catch pan, sample after ignition, g					
$E = (D - A)$	Final mass of sample after ignition, g					
Furnace Balance						
F	Final mass of sample after ignition, g (data tape)					
$G = (C - F)$	Loss Furnace, g					
$H = (G/C) \times 100$	Loss Furnace, %					
I	Loss Furnace Correction, %					
$J = (H - I)$	Total Loss Furnace, % (Apparent AC)					
CF*	Correction Factor, %					
$L = (J - CF)$	Asphalt Cement, %					
Furnace Temperature Information						
Test temperature shown on controls, °C						
Initial temperature from data tape, °C						
Maximum temperature form data tape, °C						
Final temperature from data tape, °C						

**YEAR 2020 CCIL CORRELATION**

\* CF = Calibration factor as derived from the testing in TABLE 1

Date Tested: \_\_\_\_\_

**TABLE 4: Gradation of Aggregates from Pre-mixed HMA Samples  
(After Ignition)**

		Prepared HMA Samples				
		Code No.	Code No.	Code No.	Code No.	Code No.
Laboratory Balance	Initial Mass, g					
	Final Mass, g					
Furnace Balance	Initial Mass, g					
	Final Mass, g					
<b>AGGREGATE</b>						
Dry mass before washing, g						
Dry mass after washing, g						
<b>GRADATION</b>	<b>% Passing</b>					
	16.0 mm					
	13.2 mm					
	9.5 mm					
	4.75 mm					
	2.36 mm					
	1.18 mm					
	600 µm					
	300 µm					
	150 µm					
75 µm						

Laboratory Name: \_\_\_\_\_



**YEAR 2020 CCIL CORRELATION**

Date Tested: \_\_\_\_\_