Blended Cement Samples 83 & 84

Please Note:

- Both of these cements are ASTM C595 Blended Hydraulic Cements. Sample No. 83 is a Type IL(13) and Sample No. 84 is a Type IL(10).

- Please allow until March 8th for receipt of samples.

- Closing date for submitting all test results is April 19, 2019.

- IMPORTANT!! Data Entry Confirmation - After you successfully submit test results on the CCRL website:
  - You will receive a confirmation screen.
  - You will receive a confirmation email sent to the email provided on the data entry page.
  - Sign out and sign in again, visit the Data Entry page to review and confirm your test results. If the Data Entry page is blank CCRL did NOT receive your test results.
  - **Print and keep** the confirmation email and confirmation screen as proof your data was submitted.

- If you did not receive data entry confirmation visit [Trouble Data Entry Trouble Shooting](#) or contact CCRL at 240-436-4800.
February 20, 2019

TO: Participants in the CCRL BLENDED Cement Proficiency Sample Program

SUBJECT: Blended Cement Proficiency Samples No. 83 and No. 84

The current pair of samples in the Blended Cement Proficiency Sample Program was shipped to your laboratory. Both cements are ASTM C595 Blended Cement. Sample No. 83 is a Type IL(13) and Sample No. 84 is a Type IL(10). The samples for the physical tests are packaged in plastic bags and weigh approximately 7,500 grams each. The samples for chemical analysis are in glass vials and weigh approximately 30 grams each.

Please allow until March 8th, 2019, for receipt of these samples (non-receipt date). Please weigh these bags to ensure that you have received the proper amount of each material. If the samples have not been received on this date or if the samples you received were damaged, notify us by calling 240-436-4800. Replacement samples will be sent. Failure to notify us by this date may result in you not receiving replacement samples in time to perform the necessary testing. Additional shipping charges will be incurred, if contact is not made by the non-receipt date.

Instructions covering the proposed tests, and the necessary data sheets for reporting the test results, are on the following pages. Please read these carefully before proceeding with the tests.

Each sample should be tested separately. The tests should be made as soon as possible after the samples are received, and the results should be promptly reported to CCRL upon completion of the tests. Test results should be entered at our website: [http://www.ccrl.us/](http://www.ccrl.us/). Notice and information about the final report will be sent by email.

Additional samples of this sample pair and past CCRL samples are available for sale. These samples can be used for research, technician training, and test equipment verification. Contact us for availability and pricing.

Sincerely,

Kent Niedzielski
Program Manager
Proficiency Sample Program
Cement and Concrete Reference Laboratory
INSTRUCTIONS FOR TESTING

The two samples for the physical tests are packaged in plastic bags, each of which contains approximately 7,500 grams of cement. The two samples for chemical analyses are sealed in glass vials, each of which contains approximately 30 grams of cement. The physical and chemical samples for the odd numbered sample represent one cement, and the physical and chemical samples for the even numbered sample represent another cement. The odd and even numbered samples should NOT be combined. Both cements are ASTM C595 Blended Hydraulic Cements. Sample No. 83 is a Type IL(13) and Sample No. 84 is a Type IL(10).

Insofar as your laboratory is prepared to do so, make the chemical and physical determinations on each sample in accordance with the current edition of the ASTM Standard Specification for Blended Hydraulic Cements (C595), and with the various standards and specifications to which it refers. It is preferred that the same operator make all physical tests on both samples, and that the same chemist make all chemical determinations on both samples. The results of a single determination should be reported rather than an average of duplicate determinations.

PHYSICAL TESTS

Prior to testing, pass the cement for the physical tests through a No. 20 sieve in accordance with ASTM Specification C183.

Perform fineness tests on cement taken from the 7,500 g sample.

Perform the following physical tests on each sample in accordance with the current ASTM methods designated below.

Blended Hydraulic Cements ............................................................ ASTM C595-18
Normal Consistency ........................................................................ ASTM C187-16
Time of Setting, Vicat ...................................................................... ASTM C191-13
Soundness, Autoclave ...................................................................... ASTM C151-18
Air Content of Mortar ...................................................................... ASTM C185-15a
Specific Gravity ............................................................................... ASTM C188-17
Compressive Strength (nine cube batch)......................................... ASTM C109-16a
Fineness, Air Permeability .............................................................. ASTM C204-17
Fineness, by the 45 µm (No. 325) Sieve .......................................... ASTM C430-17
Heat of Hydration .......................................................................... ASTM C186-17
Heat of Hydration using Isothermal Conduction Calorimetry ......... ASTM C1702-17
Perform the following chemical tests in accordance with ASTM C114-18 on each sample.

- Silicon dioxide, $\text{SiO}_2$
- Aluminum oxide, $\text{Al}_2\text{O}_3$
- Ferric oxide, $\text{Fe}_2\text{O}_3$
- Calcium oxide, $\text{CaO}$
- Magnesium oxide, $\text{MgO}$
- Sulfur trioxide, $\text{SO}_3$
- Loss on ignition
- Insoluble residue
- Potassium oxide, $\text{K}_2\text{O}$
- Titanium dioxide, $\text{TiO}_2$
- Sodium oxide, $\text{Na}_2\text{O}$
- Phosphorus pentoxide, $\text{P}_2\text{O}_5$
- Zinc oxide, $\text{ZnO}$
- Manganese oxide, $\text{Mn}_2\text{O}_3$
- Chloride, $\text{Cl}$
- Chromium oxide, $\text{Cr}_2\text{O}_3$

It is preferred that one chemist make the chemical tests on both samples, on the same day. The results of a single determination should be reported rather than the average result of duplicate determinations.

**INSTRUCTIONS FOR REPORTING**

For the sake of uniformity, report the values for the various tests to the nearest significant number indicated in the reporting forms. Be sure to indicate what chemical analysis procedure was used.

Test results should be entered at our website: [http://www.ccrl.us/](http://www.ccrl.us/).
CCRL PROFICIENCY SAMPLE PROGRAM
BLEND CEMENT SAMPLES NO. 83 AND NO. 84
CHEMICAL ANALYSIS REPORT FORM

RETURN TO:
Cement and Concrete Reference Laboratory
4441 Buckeystown Pike, Suite C
Frederick, Maryland 21704

Enter test results at our website: www.ccrl.us

e-mail: ________________________________

CHEMICAL ANALYSIS

NOTE: Test results reported on this form should be the laboratory's “best effort”. The method used should be the method used to qualify cement, or test cement for acceptance or rejection.

<table>
<thead>
<tr>
<th>Sample No.</th>
<th>Sample No.</th>
<th>Test ID</th>
<th>X-ray</th>
<th>ASTM Alternate</th>
<th>ASTM Reference</th>
<th>A.A.</th>
<th>Other (specify)</th>
</tr>
</thead>
<tbody>
<tr>
<td>83</td>
<td>84</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Report values below to nearest 0.01%:

- Silicon dioxide, SiO\(_2\) 10
- Aluminum oxide, Al\(_2\)O\(_3\) 21
- Ferric oxide, Fe\(_2\)O\(_3\) 30
- Calcium oxide, CaO 40
- Magnesium oxide, MgO 50
- Sulfur trioxide, SO\(_3\) 60
- Loss on ignition 70
- Insoluble residue 80
- Potassium oxide, K\(_2\)O 100
- Titanium dioxide, TiO\(_2\) 103

Check the method used:

- ASTM Alternate Wet Method
- ASTM Reference Wet Method
- A.A.
- Other (specify)

Please provide the following information the XRF equipment used for these results:

- XRF instrument: □ energy dispersive □ wavelength dispersive
- Sample preparation: □ pressed powder □ fused glass disk

Comments:

Tests performed by ________________________________ Date ________________________________
Tests reported by ________________________________ Title ________________________________
Phone ________________________________ FAX ________________________________ CCRL laboratory number ____________
## CCRL PROFICIENCY SAMPLE PROGRAM
### BLENDDED CEMENT SAMPLES No. 83 AND No. 84
### CHEMICAL ANALYSIS REPORT FORM

Enter test results at our website: [www.ccrl.us](http://www.ccrl.us)

FROM: 

______________________________

______________________________

e-mail: ________________________

<table>
<thead>
<tr>
<th>Sample No. 83</th>
<th>Sample No. 84</th>
<th>Test ID</th>
<th>X-ray</th>
<th>ASTM Reference Wet Method</th>
<th>ASTM Reference Wet Method</th>
<th>A.A.</th>
<th>Other (specify)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Report values below to nearest 0.001%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sodium oxide, Na₂O</td>
<td></td>
<td>90</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phosphorus pentoxide, P₂O₅</td>
<td></td>
<td>102</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zinc oxide, ZnO</td>
<td></td>
<td>99</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manganic oxide, Mn₂O₃</td>
<td></td>
<td>101</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chloride, Cl</td>
<td></td>
<td>104</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chromium oxide, Cr₂O₃</td>
<td></td>
<td>105</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Please provide the following information the XRF equipment used for these results.*

- **XRF instrument:**
  - □ energy dispersive
  - □ wavelength dispersive

- **Sample preparation:**
  - □ pressed powder
  - □ fused glass disk

**Comments:**

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Tests performed by ______________________________________________ Date ____________________

Tests reported by _______________________________________________ Title ____________________

Phone ______________________ FAX ______________________ CCRL laboratory number ________
**CCRL PROFICIENCY SAMPLE PROGRAM**
**BLEND CEMENT SAMPLES NO. 83 AND NO. 84**
**PHYSICAL TESTS REPORT FORM**

RETURN TO:  
Cement and Concrete Reference Laboratory  
4441 Buckeystown Pike, Suite C  
Frederick, Maryland 21704

Enter test results at our website: [www.ccrl.us](http://www.ccrl.us)

e-mail: ________________________________

<table>
<thead>
<tr>
<th>TEST RESULTS</th>
<th>Sample No. 83</th>
<th>Sample No. 84</th>
</tr>
</thead>
<tbody>
<tr>
<td>NORMAL CONSISTENCY:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water (nearest 0.1 percent by weight of cement)</td>
<td></td>
<td>[110]</td>
</tr>
<tr>
<td>VICAT TIME OF SETTING:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Initial Set, Report in minutes (nearest 1 minute)</td>
<td></td>
<td>[120]</td>
</tr>
<tr>
<td>Final Set, Report in minutes (nearest 5 minutes)</td>
<td></td>
<td>[121]</td>
</tr>
<tr>
<td>AUTOCLAVE EXPANSION:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Final Reading</td>
<td></td>
<td>[160]</td>
</tr>
<tr>
<td>Initial Reading</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Difference</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percent Expansion (nearest 0.01 percent)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AIR CONTENT OF MORTAR:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percent Air (nearest 0.1 percent)</td>
<td></td>
<td>[170]</td>
</tr>
<tr>
<td>Mixing water (nearest 0.1 percent by weight of cement)</td>
<td></td>
<td>[180]</td>
</tr>
<tr>
<td>Flow Obtained (nearest percent)</td>
<td></td>
<td>[190]</td>
</tr>
<tr>
<td>Specific Gravity (nearest 0.01 g/cm³)</td>
<td></td>
<td>[310]</td>
</tr>
<tr>
<td>COMPRESSIVE STRENGTH:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3-day, total load, lbs.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average 3-day (nearest 10 psi)</td>
<td></td>
<td>[200]</td>
</tr>
</tbody>
</table>

Tests performed by ________________________________ Date ________________________________
Tests reported by ________________________________ Title ________________________________
Phone ________________________________ FAX ________________________________ CCRL laboratory number __________

Physical reporting form - page 1 of 2
### CCRL PROFICIENCY SAMPLE PROGRAM

**BLENDED CEMENT SAMPLES NO. 83 AND NO. 84**

**PHYSICAL TESTS REPORT FORM**

**RETURN TO:**
Cement and Concrete Reference Laboratory
4441 Buckeystown Pike, Suite C
Frederick, Maryland 21704

Enter test results at our website: [www.ccrl.us](http://www.ccrl.us)

<table>
<thead>
<tr>
<th>Sample No.</th>
<th>Sample No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>83</td>
<td>84</td>
</tr>
</tbody>
</table>

#### COMPRESSIVE STRENGTH (CONTINUED):

<table>
<thead>
<tr>
<th>No. 83</th>
<th>No. 84</th>
</tr>
</thead>
<tbody>
<tr>
<td>7-day, total load, lbs.</td>
<td></td>
</tr>
<tr>
<td>1)</td>
<td></td>
</tr>
<tr>
<td>2)</td>
<td></td>
</tr>
<tr>
<td>3)</td>
<td></td>
</tr>
<tr>
<td>Average 7-day (nearest 10 psi)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No. 83</th>
<th>No. 84</th>
</tr>
</thead>
<tbody>
<tr>
<td>28-day, total load, lbs.</td>
<td></td>
</tr>
<tr>
<td>1)</td>
<td></td>
</tr>
<tr>
<td>2)</td>
<td></td>
</tr>
<tr>
<td>3)</td>
<td></td>
</tr>
<tr>
<td>Average 28-day (nearest 10 psi)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No. 83</th>
<th>No. 84</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mixing Water (nearest 0.1 percent by weight of cement)</td>
<td></td>
</tr>
<tr>
<td>Flow Obtained (nearest percent)</td>
<td></td>
</tr>
</tbody>
</table>

#### FINENESS:

- Air Permeability –
- Air Permeability, (nearest 1 m$^2$/kg)

<table>
<thead>
<tr>
<th>No. 83</th>
<th>No. 84</th>
</tr>
</thead>
<tbody>
<tr>
<td>45 µm (No. 325) Sieve –</td>
<td></td>
</tr>
<tr>
<td>Correction Factor for 45 µm sieve (nearest 0.1 percent)</td>
<td></td>
</tr>
<tr>
<td>45 µm (No. 325) Sieve, Corrected percent passing (nearest 0.01 percent)</td>
<td></td>
</tr>
</tbody>
</table>

### Comments:

Tests performed by: __________________________ Date: __________________________
Tests reported by: __________________________ Title: __________________________
Phone: __________________________ FAX: __________________________ CCRL laboratory number: __________

Physical reporting form - page 2 of 2
ASTM C186 HEAT OF HYDRATION OF HYDRAULIC CEMENT

Sample No. 83      Sample No. 84

HEAT OF SOLUTION:

Dry Cement, cal/g (nearest 0.1 cal/g) .............................................................. [291]
Partially hydrated, 7-day cal/g (nearest 0.1 cal/g) ........................................... [292]
Partially hydrated, 28-day cal/g (nearest 0.1 cal/g) ........................................ [301]

HEAT OF HYDRATION:

7-day, cal/g (nearest 0.1 cal/g) ........................................................................ [290]
28-day, cal/g (nearest 0.1 cal/g) .................................................................... [300]

ASTM C1702 HEAT OF HYDRATION BY ISOTHERMAL CONDUCTION CALORIMETRY

Sample No. 83      Sample No. 84

3-day, J/g (nearest 1 J/g) ................................................................................. [500]
7-day, J/g (nearest 1 J/g) .............................................................................. [510]

Method Used:

☐ Method A - sample and water are both temperature equilibrated and mixed inside the calorimeter.
☐ Method B - sample is mixed outside of the calorimeter then put into the calorimeter.

Instrument Used:

Manufacturer: 
Model: 

Tests performed by ____________________________ Date ____________________________
Tests reported by ____________________________ Title ____________________________
Phone: __________________ Fax: __________________ CCRL Laboratory Number: ____________________________

Heat of Hydration reporting form - page 1 of 1