

Pozzolan Samples 43 & 44

Important Information Please Note:

- Read all instructions before testing.
- Please allow until August 15 for receipt of these samples. There is a total of three boxes. One box for Sample No. 43 and one for Sample No. 44 and one box of portland cement used in testing the pozzolans.
- Plastic bags must be properly identified before removal from boxes.
- Both pozzolans are Class F fly ash
- Closing date for test results is September 19, 2008 (October 3 for 28/35 day test results)
- Reporting CaO - CaO is now reported with minor oxides (SrO and BaO included) and without minor oxides.
- Available alkali results are being requested for research purposes. This test will not routinely be requested on future samples.



July 29, 2008

To: Participants in the CCRL Pozzolan Proficiency Sample Program

SUBJECT: Pozzolan Proficiency Samples No. 43 and No. 44

The current pair of samples in the Pozzolan Proficiency Sample Program are being forwarded by FedEx Ground to domestic addresses. Various methods are being used for international shipments. Each sample for chemical analysis is packaged in a glass vial and contains approximately 30 grams of material. The samples for the physical tests are packaged separately and weigh approximately 2300 grams each. In addition, approximately 18000 grams of portland cement is provided for use when testing these samples.

Please allow until **August 15, 2008** for receipt of these samples. If you have not received the samples on this date, or if the samples you receive are seriously damaged, notify us by sending email to ccrl@nist.gov or by calling 301-975-6704. Replacement samples will be forwarded

The two materials are ASTM C618 fly ashes. Tests are to be conducted separately on each sample. Read the enclosed instructions before proceeding with any testing. It is mandatory that these instructions and ASTM standard C311-05 be followed. These tests should be conducted as soon as possible after the samples are received, and the test results should be promptly reported to CCRL upon completion of testing. Test results should be entered at our website: <http://www.ccrl.us/>. The closing date for test results submitted through our website will be September 19, 2008. The results for 28/35-day tests will be accepted until October 3, 2008.

Additional samples of these materials and other 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,

Robin K. Haupt, Supervisor
CCRL Proficiency Sample Program
Cement and Concrete Reference Laboratory
Materials and Construction Research Division
Building and Fire Research Laboratory

CCRL PROFICIENCY SAMPLE PROGRAM POZZOLAN SAMPLES NO. 43 & NO. 44

INSTRUCTIONS FOR TESTING

The contents for the odd numbered sample represent one pozzolan and the contents for the even numbered sample represent another pozzolan. The odd and even numbered samples should not be combined. **Sample No. 43 is a Class F** and fly ash and **Sample No. 44 is a Class F** fly ash.

The pozzolan samples you receive have been processed to ensure uniformity. Care should be taken to avoid segregation while preparing the material for testing.

Chemical Tests

The two samples for chemical analysis are sealed in glass vials, each of which contains around 30 g of pozzolan.

The following chemical tests are specified in ASTM Standard C311-05. Perform these chemical tests indicated below on each sample, following your normal testing procedure. Except for the material to determine moisture content and loss on ignition, the pozzolan should be oven dried prior to chemical analysis.

| | |
|--|---|
| Moisture content | Loss on ignition |
| Silicon Dioxide, SiO ₂ | Sodium oxide, Na ₂ O |
| Aluminum oxide, Al ₂ O ₃ | Potassium oxide K ₂ O |
| Ferric oxide, Fe ₂ O ₃ | Available sodium oxide, Na ₂ O |
| Calcium oxide, CaO ¹ | Available potassium oxide K ₂ O |
| Magnesium oxide, MgO | Total available alkalies (equivalent Na ₂ O) |
| Sulfur trioxide, SO ₃ | |

¹**Note:** CaO must now be reported as CaO with minor oxides or CaO without minor oxides. Spectroscopic methods like atomic absorption inductively coupled plasma (ICP), and XRF determine Ca without minor oxides (wo/minor). Reference methods (wet chemistry) determine Ca along Sr and Ba (w/minor).

It is preferred that one analyst 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.

Physical Tests

The two samples for the physical tests are packaged in plastic bags, each of which contains approximately 2300 g of pozzolan. Approximately 18000 g of portland cement is provided with these samples. This cement should be used for the following test methods which require a portland cement.

Physical Tests (Continued)

The following physical tests are specified in ASTM Standard C311-05. In accordance with the capabilities of your laboratory, perform the following physical tests on each sample.

| | |
|---|--|
| Density | Fineness by 45- μ m sieve |
| Increase of drying shrinkage of mortar bars | Soundness by autoclave expansion |
| Air entrainment of mortar | Strength activity index with portland cement |
| Effectiveness of mineral admixture in controlling alkali silica-reactions | |

It is preferred that the same operator make the physical tests on both sample on the same day.

Instructions for Air-Entrainment of Mortar - Test No. 350:

In calculating the percent of Vinsol resin required to produce 18 percent air content, the actual weight of the Vinsol resin solids must be used and not the weight of the Vinsol resin solution. Laboratories which desire to prepare their own Vinsol resin solution may refer to ASTM C226-02 section 3.3.4.2 for guidance. For those laboratories using a commercially prepared Vinsol resin admixture of unknown concentration, ASTM C494-05, section 18.2, provides a procedure for determining residue content of a liquid admixture. It should be noted that, in practice, this test is used to monitor the uniformity of air-entraining agent requirements of a particular pozzolan source over a period of time. For the purpose of this proficiency sample program, the ability of the laboratory to determine the proper amount of air-entraining agent for a particular pozzolan is being tested.

Instructions for Effectiveness of Mineral Admixture in Controlling Alkali Silica-Reaction -Test No.390:

Results shall be evaluated using relative expansion limits. Use the portland cement provided for the control mixture and the test mixture. The test mix shall consist of 320 g of portland cement and 80 g of mineral admixture.

INSTRUCTIONS FOR REPORTING

For the sake of uniformity, report the values for the various physical tests to the nearest significant number indicated on the report forms, and report the values for the chemical analysis to the nearest 0.01 percent. Be sure to indicate on the report form the chemical procedure used for each test.

Test results should be entered at our website: <http://www.ccr1.us>. The closing date for test results submitted through our website will be September 19, 2008. The results for 28/35-day tests will be accepted until October 3, 2008.

**CCRL PROFICIENCY SAMPLE PROGRAM
POZZOLAN SAMPLES NO. 43 AND NO. 44
CHEMICAL TESTS REPORT FORM**

RETURN TO: R.K. Haupt, Supervisor, PSP
Cement and Concrete Reference Laboratory
National Institute of Standards and Technology
100 Bureau Drive, Stop 8618
Gaithersburg, Maryland 20899-8618
FAX: 301-975-2243

FROM: _____

e-mail: _____
Check here if name or address has changed _____

check here if test results also submitted at CCRL data entry web

CHEMICAL ANALYSIS TEST RESULTS
(Report values to nearest 0.01%)

| | Sample No. 43 | Sample No. 44 | ASTM Alternate | PROCEDURE FOLLOWED | | | Other (specify) |
|---|---------------|---------------|----------------|--------------------|-------|-------|-----------------|
| | | | | ASTM Reference | X-Ray | A.A. | |
| Moisture content | _____ | _____ | [05] _____ | _____ | _____ | _____ | _____ |
| Silicon dioxide (SiO_2) | _____ | _____ | [10] _____ | _____ | _____ | _____ | _____ |
| Aluminum oxide (P_2O_5 & TiO_2 included) | _____ | _____ | [20] _____ | _____ | _____ | _____ | _____ |
| Aluminum oxide (P_2O_5 & TiO_2 not included) | _____ | _____ | [21] _____ | _____ | _____ | _____ | _____ |
| Ferric oxide (Fe_2O_3) | _____ | _____ | [30] _____ | _____ | _____ | _____ | _____ |
| Calcium oxide ¹ (CaO) ¹ with minor oxides (SrO & BaO included) | _____ | _____ | [40] _____ | _____ | _____ | _____ | _____ |
| Calcium oxide ² (CaO) ² without minor oxides (SrO & BaO not included) | _____ | _____ | [42] _____ | _____ | _____ | _____ | _____ |
| Magnesium oxide (MgO) | _____ | _____ | [50] _____ | _____ | _____ | _____ | _____ |
| Sulfur trioxide (SO_3) | _____ | _____ | [60] _____ | _____ | _____ | _____ | _____ |
| Loss on ignition | _____ | _____ | [70] _____ | _____ | _____ | _____ | _____ |
| Sodium oxide (Na_2O) | _____ | _____ | [90] _____ | _____ | _____ | _____ | _____ |
| Potassium oxide (K_2O) | _____ | _____ | [100] _____ | _____ | _____ | _____ | _____ |
| Available sodium oxide (Na_2O) | _____ | _____ | [91] _____ | _____ | _____ | _____ | _____ |
| Available potassium oxide (K_2O) | _____ | _____ | [93] _____ | _____ | _____ | _____ | _____ |
| Total available alkalis (equivalent Na_2O) | _____ | _____ | [95] _____ | _____ | _____ | _____ | _____ |

Please furnish the following information:

Type of x-ray used: _____ energy dispersive _____ wavelength dispersive
 _____ sequential _____ simultaneous
 Type of A. A. used: _____ flame _____ ICP

Tests performed by _____ Date _____
 Tests reported by _____ Title _____
 Phone _____ FAX _____ CCRL laboratory number _____

**CCRL PROFICIENCY SAMPLE PROGRAM
POZZOLAN SAMPLES NO. 43 AND NO. 44
PHYSICAL TESTS REPORT FORM**

RETURN TO: R.K. Haupt, Supervisor, PSP
Cement and Concrete Reference Laboratory
National Institute of Standards and Technology
100 Bureau Drive, Stop 8618
Gaithersburg, Maryland 20899-8618
FAX: 301-975-2243

FROM: _____

e-mail: _____
Check here if name or address has changed _____

check here if test results also
submitted at CCRL data entry web

PHYSICAL TEST RESULTS
Report Values as Indicated in ()

| | <u>Sample No. 43</u> | <u>Sample No. 44</u> | |
|--|--------------------------|--------------------------|-------|
| DENSITY: <i>(nearest 0.01 g/cm³)</i> | _____ | _____ | [310] |
| FINENESS: | | | |
| 45 µm (No. 325) Sieve, Corrected percent <u>retained</u> <i>(nearest 0.01 percent)</i> | _____ | _____ | [281] |
| | <u>No. 43</u> | <u>No. 44</u> | |
| Correction Factor for 45 µm sieve <i>(nearest 0.01 percent)</i> | _____ | _____ | |
| INCREASE OF DRYING SHRINKAGE OF MORTAR BARS: <i>(nearest 0.001 percent)</i> . | _____ | _____ | [340] |
| SOUNDNESS - by autoclave expansion: | | | |
| Percent expansion <i>(nearest 0.01 percent)</i> | _____ | _____ | [160] |
| NORMAL CONSISTENCY: | | | |
| Water <i>(nearest 0.1% by weight of cement & pozzolan)</i> | _____ | _____ | [110] |
| AIR ENTRAINMENT OF MORTAR: | | | |
| ¹ Vinsol resin, <i>(nearest 0.001% by weight of cement & pozzolan)</i> | _____ | _____ | [350] |

¹See instructions - page 2 (Air-Entrainment of Mortar - Test No. 350).

Tests performed by _____ Date _____
Tests reported by _____ Title _____
Phone _____ FAX _____ CCRL laboratory number _____

**CCRL PROFICIENCY SAMPLE PROGRAM
POZZOLAN SAMPLES NO. 43 AND NO. 44
PHYSICAL TESTS REPORT FORM**

RETURN TO: R.K. Haupt, Supervisor, PSP
Cement and Concrete Reference Laboratory
National Institute of Standards and Technology
100 Bureau Drive, Stop 8618
Gaithersburg, Maryland 20899-8618
FAX: 301-975-2243

FROM: _____

e-mail: _____
Check here if name or address has changed _____

STRENGTH ACTIVITY INDEX WITH PORTLAND CEMENT:

| | <u>No. 43</u> | <u>No. 44</u> | |
|---|---------------|---------------|-------|
| Control Mix: | | | |
| Flow obtained (<i>nearest percent</i>) | _____ | _____ | |
| Test Mix: | | | |
| Mixing water (<i>nearest 0.1% by weight of cement & pozzolan</i>) | _____ | _____ | |
| Flow obtained (<i>nearest percent</i>) | _____ | _____ | |
| Strength Activity Index: | | | |
| 7-day (<i>nearest percent</i>) | _____ | _____ | [359] |
| 28-day (<i>nearest percent</i>) | _____ | _____ | [360] |
| WATER REQUIREMENT: Percent of control (<i>nearest percent</i>) | _____ | _____ | [370] |

²EFFECTIVENESS OF MINERAL ADMIXTURE IN CONTROLLING ALKALI SILICA-REACTIONS:

| | <u>No. 43</u> | <u>No. 44</u> | |
|---|---------------|---------------|-------|
| Mortar bar expansion from control mix, E _r | _____ | _____ | |
| Mortar bar expansion from test mix, E _t | _____ | _____ | |
| Reduction of mortar expansion (E _r - E _t) x 100/ E _r (<i>nearest percent</i>) | _____ | _____ | [390] |

²See instructions - page 2 (Effectiveness of Mineral Admixture in Controlling Alkali Silica-Reactions -Test No.390)

Tests performed by _____ Date _____
Tests reported by _____ Title _____
Phone _____ FAX _____ CCRL laboratory number _____

**CCRL PROFICIENCY SAMPLE PROGRAM
POZZOLAN SAMPLES NO. 43 AND NO. 44
28 & 35-DAY REPORT FORM**

RETURN TO: R.K. Haupt, Supervisor, PSP
Cement and Concrete Reference Laboratory
National Institute of Standards and Technology
100 Bureau Drive, Stop 8618
Gaithersburg, Maryland 20899-8618
FAX: 301-975-2243

FROM: _____

e-mail: _____
Check here if name or address has changed _____

NOTE: Laboratories which perform these tests may return the 28 & 35-day results to CCRL by separate letter on this special form. These results must be received no later than October 3, 2008.

28-DAY CHEMICAL ANALYSIS
(Report values to nearest 0.01%)

PROCEDURE FOLLOWED

| | <u>Sample No. 43</u> | <u>Sample No. 44</u> | [] | <u>ASTM Alternate</u> | <u>ASTM Reference</u> | <u>X-Ray</u> | <u>A.A.</u> | <u>Other (specify)</u> |
|---|--------------------------|--------------------------|------|---------------------------|---------------------------|--------------|-------------|----------------------------|
| Available sodium oxide <i>(Na₂O)</i> | _____ | _____ | [91] | _____ | _____ | _____ | _____ | _____ |
| Available potassium oxide <i>(K₂O)</i> | _____ | _____ | [93] | _____ | _____ | _____ | _____ | _____ |
| Total available alkalies <i>(equivalent Na₂O)</i> | _____ | _____ | [95] | _____ | _____ | _____ | _____ | _____ |

28 & 35-DAY PHYSICAL TESTS
(Report to value indicated)

| | <u>Sample No. 43</u> | <u>Sample No. 44</u> |
|---|--------------------------|--------------------------|
| INCREASE OF DRYING SHRINKAGE OF MORTAR BARS: <i>(nearest 0.001 percent)</i> | _____ | _____ [340] |
| STRENGTH ACTIVITY INDEX WITH PORTLAND CEMENT: <i>28-day (nearest percent)</i> | _____ | _____ [360] |

Remarks:

Tests performed by _____ Date _____
Tests reported by _____ Title _____
Phone _____ FAX _____ CCRL laboratory number _____