Portland-Limestone Cement Samples 1 & 2

Please Note:

- Please allow until July 5th for receipt of samples. CCRL must be notified by this date of missing or damaged samples to assure replacement samples can be received in time for testing.

- Both cements are ASTM C595 Portland-Limestone Cements.

How to Submit Test Results:

- On the CCRL Home Page, enter your lab number and PIN and click on “SIGN IN”.
- Click on “PLC Physical” or “PLC Chemical” from the menu on the left.
- Click on “Enter Data”
- Make sure the information at the top of the screen is accurate.
- Carefully enter your data. Round data properly. **Data that is not rounded correctly cannot be submitted until correction is made. You will receive an error saying you have bad data, and the data will not be entered into the website.**
- DO NOT enter “N/A” or zeros for data that you are not reporting, leave this data area blank. Zeros will be interpreted as data.
- Once all data has been entered click on the “Submit Data” button.
- You should see a confirmation screen. **Print the confirmation screen for your records**.
- If you have trouble entering or do not receive confirmation visit Data Entry Trouble Shooting or contact CCRL via ccrl@astm.org or by calling 240-436-4800, prior to the closing date. **CCRL cannot make accommodations for data received after the closing date.**
- **Sign out of the website and login again to check that your data was submitted properly.** You may add data or make corrections up to the closing date.
- **The closing date for submitting test results is August 16, 2024**.

CCRL Portland-Limestone Cement 1		
Oxides	**Limestone**	**Inorganic processing addition**
SiO_2	6.10	0.0
Al_2O_3	1.38	0.0
Fe_2O_3	0.46	0.0
CaO	48.76	0.0
SO_3	0.65	0.0
CO_2	36.1	0.0

Ingredient	**% by mass**
Inorganic processing addition	0.0

CCRL Portland-Limestone Cement 2		
Oxides	**Limestone**	**Inorganic processing addition**
SiO_2	7.93	0.0
Al_2O_3	2.58	0.0
Fe_2O_3	1.42	0.0
CaO	47.08	0.0
SO_3	0.96	0.0
CO_2	35.12	0.0

Ingredient	**% by mass**
Inorganic processing addition	0.0

June 13, 2024

TO: Participants in the CCRL Portland-Limestone Cement Proficiency Sample Program

SUBJECT: Portland-Limestone Cement Proficiency Samples No. 1 and No. 2

The current pair of samples in the Portland-Limestone Cement Proficiency Sample Program was shipped to your laboratory. Both cements are ASTM C595 Portland-Limestone Cements. The samples for the physical tests are packaged in plastic bags and weigh approximately 9,000 grams each. The samples for chemical analysis are in glass vials and weigh approximately 50 grams each.

Please allow until July 5th, 2024, 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/. 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

CCRL PROFICIENCY SAMPLE PROGRAM
PORTLAND-LIMESTONE CEMENT SAMPLES NO. 1 AND NO. 2

INSTRUCTIONS FOR TESTING

The two samples for the physical tests are packaged in plastic bags, each of which contains approximately 9,500 grams of cement. The two samples for chemical analyses are sealed in glass vials, each of which contains approximately 50 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 Portland-Limestone Cements.

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. There are in some cases, tests included in this program that may not currently be required.

After requests from some representatives of the material producers, some tests that are not currently required to be performed on this material have been included in the program. As is always the case with CCRL proficiency samples, you don't have to run any tests that you don't normally perform or don't care to be accredited for, if you are participating in the program to satisfy accreditation requirements.

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 9,500 g sample.

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

Blended Hydraulic Cements	ASTM C595-23
Compressive Strength	ASTM C109-23
Soundness, Autoclave	ASTM C151-23
Air Content of Mortar	ASTM C185-20
Normal Consistency	ASTM C187-23
Specific Gravity	ASTM C188-17
Time of Setting, Vicat	ASTM C191-21
Fineness, Air Permeability	ASTM C204-24
Fineness, by the 45 m (No. 325) Sieve	ASTM C430-17
Early Stiffening(Paste Method)	ASTM C451-21
Expansion of Mortar Bars Stored in Water	ASTM C1038-24
Heat of Hydration using Isothermal Conduction Calorimetry	ASTM C1702-23

CHEMICAL TESTS

Perform the following chemical tests in accordance with ASTM C114-22 on each sample.

Silicon dioxide,	SiO_2	Titanium dioxide,	TiO_2
Aluminum oxide,	Al_2O_3	Sodium oxide,	Na_2O
Ferric oxide,	Fe_2O_3	Phosphorus pentoxide,	P_2O_5
Calcium oxide,	CaO	Zinc oxide,	ZnO
Magnesium oxide,	MgO	Manganic oxide,	Mn_2O_3
Sulfur trioxide,	SO_3	Chloride,	Cl
Loss on ignition		Chromium oxide,	Cr_2O_3
Insoluble residue		Carbon dioxide,	CO_2
Potassium oxide,	K_2O	Limestone Content	
Strontium oxide,	SrO		

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 that 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: www.ccrl.us/

CCRL PROFICIENCY SAMPLE PROGRAM
PORTLAND-LIMESTONE CEMENT SAMPLES NO. 1 AND NO. 2
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

FROM: _____

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.

	Sample No. 1	Sample No. 2	Test ID	X-ray ✳	ASTM Alternate Wet Method	ASTM Reference Wet Method	A.A.	Other (specify)
Report values below to nearest 0.01%				Check the method used				
Silicon dioxide, SiO_2			10	☐	☐	☐	☐	☐
Aluminum oxide, Al_2O_3			21	☐	☐	☐	☐	☐
Ferric oxide, Fe_2O_3			30	☐	☐	☐	☐	☐
Calcium oxide, CaO			40	☐	☐	☐	☐	☐
Free Calcium oxide			41	☐	☐	☐	☐	☐
Magnesium oxide, MgO			50	☐	☐	☐	☐	☐
Sulfur trioxide, SO_3			60	☐	☐	☐	☐	☐
Loss on ignition			70	☐	☐	☐	☐	☐
Insoluble residue			80	☐	☐	☐	☐	☐
Potassium oxide, K_2O			100	☐	☐	☐	☐	☐
Titanium dioxide, TiO_2			103	☐	☐	☐	☐	☐

✳**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
PORTLAND-LIMESTONE CEMENT SAMPLES NO. 1 AND NO. 2
CHEMICAL ANALYSIS REPORT FORM

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

FROM: _____

_____

_____

e-mail: _____

	Sample No. 1	Sample No. 2	Test ID	X-ray ✳	ASTM Alternative Wet Method	ASTM Reference Wet Method	A.A.	Other (specify)
Report values below to nearest 0.001%				Check the method used				
Sodium oxide, Na_2O			90	☐	☐	☐	☐	☐
Strontium oxide, SrO			92	☐	☐	☐	☐	☐
Zinc oxide, ZnO			99	☐	☐	☐	☐	☐
Manganic oxide, Mn_2O_3			101	☐	☐	☐	☐	☐
Phosphorus pentoxide, P_2O_5			102	☐	☐	☐	☐	☐
Chloride, Cl			104	☐	☐	☐	☐	☐
Chromium oxide, Cr_2O_3			105	☐	☐	☐	☐	☐

✳**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

Carbon dioxide, CO_2			97	Report vale to nearest 0.01%
Method used to determine CO_2 (as described in Appendix X2 of C114) - ☐ Split loss on ignition ☐ Thermogravimetric analysis (TGA) ☐ ASTM Test method C 25, section 22 ☐ XRF ☐ Combustion by induction furnace/IR ☐ ASTM Test method E 350 ☐ Other				
Limestone content			98	Report values to nearest 0.1%
CO_2 content in limestone	36.1 %	35.12 %		These values used in calculation of limestone content

Comments:

Tests performed by _____ Date _____

Tests reported by _____ Title _____

Phone _____ FAX _____ CCRL laboratory number _____

CCRL PROFICIENCY SAMPLE PROGRAM
PORTLAND-LIMESTONE CEMENT SAMPLES NO. 1 AND NO. 2
PHYSICAL TESTS REPORT FORM

RETURN TO: Kent Niedzielski
Program Manager, Proficiency Sample Programs
Cement and Concrete Reference Laboratory
4441 Buckeystown Pike, Suite C
Frederick, Maryland 21704
Enter test results at our website: www.ccrl.us

FROM: _____
_____
_____
_____
_____
e-mail: _____

TEST RESULTS
Report as Indicated in ( )

	Sample No. 1	Sample No. 2	
NORMAL CONSISTENCY:			
Water *(nearest 0.1 percent by weight of cement)*			[110]
VICAT TIME OF SETTING:			
Initial Set, Report in **minutes** *(nearest 1 minute)*			[120]
Final Set, Report in **minutes** *(nearest 5 minutes)*			[121]

Is automated Vicat Instrument used? ☐ yes ☐ no

Manufacturer of automated Vicat: _____

FALSE SET (PASTE METHOD):			
Final Penetration / Initial Penetration *(nearest percent)*			[150]

AUTOCLAVE EXPANSION:	No. 1	No. 2		
Final Reading				
Initial Reading				
Difference				
Percent Expansion *(nearest 0.01 percent)*				[160]
AIR ENTRAINMENT:				
Percent Air *(nearest 0.1 percent)*				[170]
Mixing water *(nearest 0.1 percent by weight of cement)*				[180]
Flow Obtained *(nearest percent)*				[190]
DENSITY:				
Density, (*nearest 0.01 g/cm^3*)				[310]

Tests performed by _____ Date _____
Tests reported by _____ Title _____
Phone _____ Fax _____ CCRL Laboratory Number _____

CCRL PROFICIENCY SAMPLE PROGRAM
PORTLAND-LIMESTONE CEMENT SAMPLES NO. 1 AND NO. 2
PHYSICAL TESTS REPORT FORM

RETURN TO: Kent Niedzielski
Program Manager, Proficiency Sample Programs
Cement and Concrete Reference Laboratory
4441 Buckeystown Pike, Suite C
Frederick, Maryland 21704
Enter test results at our website: www.ccrl.us

FROM: _____
_____
_____
_____
_____
e-mail: _____

Report as Indicated in ( )

			TEST RESULTS Sample No. 1	Sample No. 2	
COMPRESSIVE STRENGTH:	No. 1	No.2			
1-day, total load, lbs.	1)				
	2)				
	3)				
Average 1-day strength *(nearest 10 psi)*					[199]
3-day, total load, lbs.	1)				
	2)				
	3)				
Average 3-day strength *(nearest 10 psi)*					[200]
7-day, total load, lbs.	1)				
	2)				
	3)				
Average 7-day strength *(nearest 10 psi)*					[210]
28-day, total load, lbs.	1)				
	2)				
	3)				
Average 28-day strength *(nearest 10 psi)*					[211]
Flow Obtained for compressive strength mortar - constant water *(nearest percent)*					[230]

Information on cube molds and sealants (used for informational purposes only):

Type of cube mold: ☐ cube mold NOT clamped to base plate ☐ cube mold clamped to base plate

Type of sealant used between cube mold and base plate:
☐ wax ☐ grease ☐ other - please specify _____

FINENESS:

Air Permeability –
Air Permeability, *(nearest 1 m^2/kg)* _____ _____ [270]

45 µm (No. 325) Sieve –

	No. 1	No. 2	
Correction Factor for 45 µm sieve *(nearest 0.1 percent)*			
SRM used for for 45 sieve calibration *(114q, 46h, etc.)*			
45 µm (No. 325) Sieve, Corrected percent passing *(nearest 0.01 percent)*			[281]

Tests performed by _____ Date _____
Tests reported by _____ Title _____
Phone _____ Fax _____ CCRL Laboratory Number _____

CCRL PROFICIENCY SAMPLE PROGRAM
PORTLAND-LIMESTONE CEMENT SAMPLES NO. 1 AND NO. 2
C1038 REPORT FORM

RETURN TO: Kent Niedzielski
Program Manager, Proficiency Sample Program
Cement and Concrete Reference Laboratory
4441 Buckeystown Pike, Suite C
Frederick, Maryland 21704
Enter test results at our website: www.ccrl.us

FROM: _____
_____
_____
_____
_____
e-mail: _____

C1038 EXPANSION OF PORTLAND CEMENT MORTAR BARS STORED IN WATER

	Sample No. 1 Bar				Sample No. 2 Bar			
	#1	#2	#3	#4	#1	#2	#3	#4
Final reading								
Initial reading								
Difference (final - initial)								
Expansion *(Nearest 0.001%)*								
Average expansion [400] *(Nearest 0.001%)*								

A fixed water/cement ratio of 0.485 is specified for C1038 mortar using Portland-limestone cement

	Sample No. 1	Sample No. 2
C1038 Mortar Water [401]		
C1038 Mortar Flow [402]		

Tests performed by _____ Date _____
Tests reported by _____ Title _____
Phone_____ Fax _____ CCRL Laboratory Number_____

CCRL PROFICIENCY SAMPLE PROGRAM
PORTLAND-LIMESTONE CEMENT SAMPLES NO. 1 AND NO. 2
HEAT OF HYDRATION REPORT FORM

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

FROM: _____
_____
_____
_____
_____
e-mail: _____

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

ASTM **C1702 HEAT OF HYDRATION BY ISOTHERMAL CONDUCTION CALORIMETRY**

	Sample No. 1	**Sample No. 2**	
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 _____