

UNITED STATES DEPARTMENT OF COMMERCE
WASHINGTON 25, D. C.

National Bureau of Standards

Certificate of Analyses

Standard Sample 177 Portland Cement

ANALYST	SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	^a TiO ₂	P ₂ O ₅	^b CaO	SrO	MgO	SO ₃	Mn ₂ O ₃	Na ₂ O	K ₂ O	^c Loss on Ignition
1.....	21.91	5.26	{ ^d 2.43 2.40 }	0.26	^e 0.05	64.29	^f 0.05	2.43	1.59	^g 0.05	{ ^h 0.15 ⁱ 1.15 }	{ ^h 0.57 ⁱ 1.55 }	1.11
2.....	21.88	5.28	^j 2.39	.28	^k 0.05	64.28	^l 0.05	2.42	1.59	.05	^m 1.14	ⁿ 1.57	1.11
3.....	^o 21.96	5.20	2.38	.28	{ ^k 0.04 ⁿ 0.04 }	64.41	-----	2.46	1.56	.04	^m 1.14	ⁿ 1.57	1.15
4.....	21.90	^o 5.38	2.40	.25	-----	64.27	-----	2.45	1.63	^g 0.04	^p 1.15	^p 1.59	1.19
5.....	21.96	^o 5.50	2.38	-----	.03	64.37	-----	2.48	1.56	.04	-----	-----	1.19
6.....	^l 21.91	^l 5.26	^l 2.37	.28	-----	^l 64.26	-----	^l 2.51	^l 1.55	^g 0.05	^p 1.13	^p 1.56	^l 1.04
7.....	21.93	5.25	2.39	.24	.04	64.37	-----	2.50	1.60	.06	^p 1.12	^p 1.56	1.17
8.....	21.85	5.26	2.39	.22	.04	64.40	-----	2.37	1.55	.03	ⁱ 1.12	ⁱ 1.60	1.17
9.....	^q 21.97	5.24	2.36	.27	{ ^k 0.05 ⁿ 0.05 }	^r 64.56	-----	2.48	1.62	^g 0.04	^p 1.13	^p 1.56	1.16
10.....	21.90	^{l, o} 5.76	^l 2.45	-----	.05	^l 64.35	-----	^l 2.48	^l 1.60	.06	^l 1.13	^l 1.58	^l 1.14
11.....	21.93	5.36	2.36	.24	.03	64.27	-----	2.40	1.58	.04	{ ⁱ 1.12 ^p 1.12 }	{ ⁱ 1.51 ^p 1.55 }	1.18
12.....	21.94	5.31	2.38	.26	.04	64.18	-----	2.48	1.61	.04	{ ⁱ 1.16 ^{p, q} 1.11 }	^p 1.57	1.14
13.....	^m 21.87	5.30	2.37	.25	.05	64.38	-----	2.44	1.60	.06	^p 1.13	^p 1.58	1.15
Average...	21.92	5.27	2.39	0.26	0.04	64.32	0.05	2.45	1.59	0.05	0.14	0.57	1.15

^a H₂O₂-photometric method (ASTM Spec. C114-56T).
^b All values for CaO include SrO.
^c 1 g heated at 900° to 1,000° C. for 15 min. in a covered platinum crucible (ASTM Spec. C114-53).
^d NH₄CNS-photometric.
^e Molybdenum-blue photometric.
^f Flame photometric. See Anal. Chem. 27, 913 (1955).
^g Periodate photometric.

^h Flame photometric. Silica removed by HF-HClO₄ treatment.
ⁱ Gravimetric. Decomposition with NH₄Cl-CaCO₃ (ASTM Spec. C114-53).
^j Includes 0.12 FeO converted to Fe₂O₃.
^k Phosphovanadomolybdate method.
^l Federal Test Methods, Standard No. 158 (1957).
^m NH₄Cl-HCl digestion. ASTM alternate method (C114-53).

ⁿ Gravimetric, weighed as Mg₂P₂O₇.
^o Omitted from average, value includes TiO₂ or P₂O₅.
^p Flame photometric (ASTM Spec. C114-56T).
^q Double dehydration with HClO₄ with intervening filtration.
^r Not included in the average.
 Analyst 1 reported 0.004-percent Li₂O.

List of Analysts

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A. V. ASTIN, *Director*.