

DEPARTMENT OF COMMERCE

Bureau of Standards  
Certificate of Analyses

OF

STANDARD SAMPLE NO. 97

FLINT CLAY

[All results are based on a sample dried for two hours at 140° C.]

Analysts*	SiO <sub>2</sub>	Al <sub>2</sub> O <sub>3</sub>	Total iron as Fe <sub>2</sub> O <sub>3</sub>	TiO <sub>2</sub>	ZrO <sub>2</sub>	P <sub>2</sub> O <sub>5</sub>	Total vanadium as V <sub>2</sub> O <sub>5</sub>	Cr <sub>2</sub> O <sub>3</sub>	CaO	MgO	K <sub>2</sub> O	Na <sub>2</sub> O	Total sulphur as SO <sub>3</sub>	MnO	CuO	Loss on ignition
1	42.80	38.86	0.96	2.33	0.23	0.08	0.040	0.081	0.10	0.26	0.54	0.37	0.044	0.002	0.003	13.32
2	42.99	38.65	1.00	2.28	.25	.06	.036	.073	.14	.27	.55	.26	-----	-----	-----	13.33
3	42.80	39.54 <sup>a</sup>	1.01	2.41	-----	-----	-----	-----	.08	.27	.81	-----	-----	-----	-----	13.46
4	42.89	38.71	.95 <sup>b</sup>	2.44	.26	.08	.044	.091	.08	.23	.55	.28	.04	<.005	-----	13.37
5	42.80	38.84	1.01	2.40	.25	.06	.04	-----	.10	.28	.51	.34	-----	-----	-----	13.36
6	42.87	39.01 <sup>c</sup>	1.00	2.40	.30 <sup>c</sup>	.09	.040	.07	.20 <sup>c</sup>	.32 <sup>c</sup>	.41 <sup>c</sup>	.36	-----	-----	-----	13.38
7	42.94	39.00 <sup>c</sup>	.98 .92 <sup>b</sup>	2.38	.24	.08	-----	-----	.08	.21	.98	-----	-----	-----	-----	13.31
8	42.90	38.94 <sup>a</sup>	.98 <sup>d</sup>	2.40	-----	-----	-----	-----	.14	.27	.57	.37	-----	-----	-----	13.30
Averages...	42.87	38.77	.98	2.38	.25	.08	.040	.079	.10	.26	.54	.33	.042	.002	.003	13.35

Analyst No. 1 also reported 0.015 per cent of BaO and 0.0002 per cent of MoO<sub>3</sub>.

This is a Morgan Run Flint Clay taken from either the Sharon or Mercer Horizon, Decatur Township, Clearfield County, Pa.

- \*Includes ZrO<sub>2</sub>, P<sub>2</sub>O<sub>5</sub>, V<sub>2</sub>O<sub>5</sub>, and Cr<sub>2</sub>O<sub>3</sub> and is not averaged with other results.
- <sup>b</sup>Separated iron by the use of H<sub>2</sub>S in an ammoniacal tartrate solution; then determined it gravimetrically.
- <sup>c</sup>Omitted from the average.

<sup>d</sup>Combined oxides fused with K<sub>2</sub>S<sub>2</sub>O<sub>7</sub>, reduced with H<sub>2</sub>S, and titrated with KMnO<sub>4</sub>.

For methods of analysis used in most of the work on this sample see Analysis of Bauxite and of Refractories of High Alumina Content by G. E. F. Lundell and J. I. Hoffman, Research Paper No. 5, B. S. Jour. Research, vol. 1, p. 91; 1928.

\*LIST OF ANALYSTS

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| <ol style="list-style-type: none"> <li>1. James I. Hoffman, Bureau of Standards.</li> <li>2. W. F. Muehlberg, chief chemist, Newburgh Steel Works, Cleveland, Ohio.</li> <li>3. L. J. Trostel, chief chemist, General Refractories Co., Baltimore, Md.</li> <li>4. M. O. Lamar, Norton Co., Worcester, Mass.</li> <li>5. R. H. H. Pierce, chief chemist, Harbison-Walker Refractories Co., Pittsburgh, Pa.</li> </ol> | <ol style="list-style-type: none"> <li>6. Pittsburgh Testing Laboratory, C. A. Speaker, analyst, Pittsburgh, Pa.</li> <li>7. E. B. Read, Refractories Fellowship, Mellon Institute of Industrial Research, Pittsburgh, Pa.</li> <li>8. C. E. Nesbitt, chief chemist, Edgar Thomson Works, Carnegie Steel Co., Braddock, Pa.</li> </ol> |
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Washington, D. C.  
August 31, 1931

*George K. Burgess*  
Director.

REVISED VALUES FOR ALKALIES IN NBS

STANDARD SAMPLES 76, 77, 78, 97, 98, 102, and 104

When these standards were issued originally, data on the alkalies were included at that time though recognized as somewhat incomplete. Later spectrographic examination indicated the presence of significant amounts of lithium in some of these materials. Recently, the alkali contents of these standards have been redetermined at the National Bureau of Standards by flame-photometric methods. New certificates of analysis will be prepared, but in the interim the following new tentative values are indicated for the alkalies in these standard samples:

<u>Standard</u>	<u>Na<sub>2</sub>O</u> <u>%</u>	<u>K<sub>2</sub>O</u> <u>%</u>	<u>Li<sub>2</sub>O</u> <u>%</u>
Refractory No. 76	0.15	1.54	0.11
Refractory No. 77	.06	-*	.35
Refractory No. 78	.06	-	.20
Clay 97	.07	-	.23
Clay 98	.26	"	.03
Silica Brick 102	.01	0.32	.001
Magnesite 104	.01 <sub>5</sub>	.01 <sub>5</sub>	.001

\*Dash indicates no changes.

Washington, D. C.  
March 2, 1955  
(Revised 9-1-55)