

DEPARTMENT OF COMMERCE

Bureau of Standards

Certificate of Analyses

OF

STANDARD SAMPLE NO. 102

SILICA BRICK

(All results are based on samples dried at 105°-110°C.)

Analysts*	SiO ₂	Al ₂ O ₃	Total iron as Fe ₂ O ₃	TiO ₂	ZrO ₂	P ₂ O ₅	MnO	CaO	MgO	Na₂O	K₂O	Loss on ignition
1.....	93.98	1.98	0.64	0.15	0.02	0.022	-----	2.29	0.21	0.08	0.29	0.37
2.....	93.95	1.95	.66	.16	.03	.024	0.004	2.29	.20	.07	.30	.40
3.....	93.94	1.97	.65	.17	.014	.023	-----	2.30	.21	.04	.29	.38
4.....	93.85	1.94	.66	.15	.02	.03	-----	2.32	.22	.06	.30	.45
5.....	93.88	2.01 ^b	.64	.17	-----	-----	-----	2.24	.19	.09	.27	.36
.....	93.99	2.04 ^b	.70	-----	-----	-----	-----	2.25	.21	.05	.27	.30
.....	93.10 ^a	1.84 ^b	.73	.15	-----	-----	-----	2.29	.21	-----	-----	.36
8.....	94.02	1.99 ^b	.64	.16	-----	-----	.02 ^a	2.30	.20	.09	.26	.41
9.....	93.92	1.96 ^b	.62	.15	.02	-----	.005	2.34	.20	.03	.31	.37
Averages...	93.94	1.96	.66	.16	.021	.025	.005	2.29	.21	.06	.29	.38

* Omitted from the average.
^a Includes TiO₂, ZrO₂, or P₂O₅ and is not averaged with the other results.

* LIST OF ANALYSTS

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|---|---|
| <ol style="list-style-type: none"> 1. H. B. Knowles, Bureau of Standards. 2. M. O. Lamar, Norton Co., Worcester, Mass. 3. Booth, Garrett & Blair, Philadelphia, Pa. 4. Edgar B. Read, American Refractories Institute, Mellon Institute, Pittsburgh, Pa. 5. L. J. Trostel, chief chemist, General Refractories Co., Baltimore, Md. | <ol style="list-style-type: none"> 6. E. J. Lavino & Co., Plymouth Meeting Laboratory, Plymouth Meeting, Pa. 7. C. E. Nesbitt, chief chemist, Edgar Thomson Works, Carnegie Steel Co., Braddock, Pa. 8. R. H. H. Pierce, chief chemist, Harbison-Walker Refractories Co., Pittsburgh, Pa. 9. F. G. Kelley, chief chemist, Tennessee Coal, Iron & Railroad Co., Ensley, Ala. |
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Washington, D. C.
 April 29, 1932

George K. Burgess
 Director.

* See attached sheet for revised values for Na₂O, K₂O, and Li₂O. (3-1-1955)

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 alkalis 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 alkalis in these standard samples:

<u>Standard</u>	<u>Na₂O</u> <u>%</u>	<u>K₂O</u> <u>%</u>	<u>Li₂O</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 ₅	0.32	.001
Magnesite 104	.01 ₅	.01 ₅	.001

*Dash indicates no changes.

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

U. S. DEPARTMENT OF COMMERCE
NATIONAL BUREAU OF STANDARDS

SUPPLEMENTARY CERTIFICATE
OF
STANDARD SAMPLE No. 102
SILICA BRICK

Density - - 2.33 g/cm³ at 25°C

The above value was obtained as follows:

The weighed sample was placed in the partially filled picnometer and very thoroughly mixed with the test liquid (distilled water) by stirring with a glass rod and evacuating to remove entrapped air. The picnometer was then completely filled with the test liquid and the excess removed by filter paper. All weighings made in air and applied in the following formula:

$$d_1 = (d_w - \rho) \frac{(W_s - W_p)}{(W - W_1) + (W_s - W_p)} + \rho$$

in which

d_1 = density in grams per milliliter

d_w = density of calibrating liquid (usually water)

W_s = apparent mass of substance

W_p = apparent mass of picnometer

W = apparent mass of picnometer filled with calibrating liquid

W_1 = apparent mass of picnometer substance and calibrating liquid to fill

ρ = air density

Specific gravity at temperature t^*/t° may be obtained by dividing d_1 at temperature t by density of water at temperature t .

The formula assumes that the temperature and air density remain the same throughout the determination of the density of the sample.

(Signed) LYMAN J. BRIGGS, Director.

Washington, D. C.
May 13, 1937