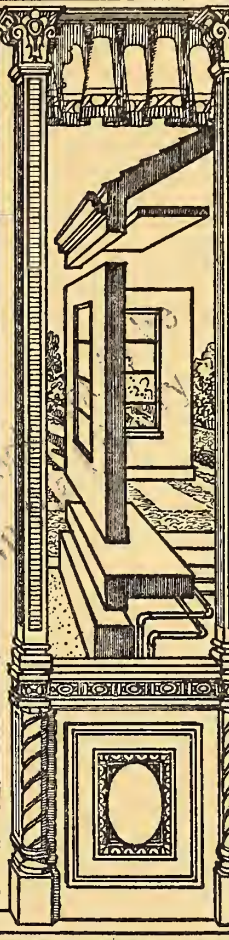
U. S. DEPARTMENT OF COMMERCE

BUILDING MATERIALS AND STRUCTURES

REPORT BMS60

Strength, Absorption, and Resistance to Laboratory Freezing and Thawing of Building Bricks Produced in the United States

by JOHN W. McBURNEY *and* JOSEPH C. RICHMOND



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Foreword

During the past 10 years a laboratory study of the resistance of building brick to freezing and thawing has been in progress at the National Bureau of Standards. Tests were made on a total of 4,558 bricks, comprising 722 samples of the various gradings produced by 229 manufacturers. These samples were collected from 36 of the 48 States, as well as from the principal cities of the United States.

This paper reports the compressive and transverse strengths, water absorptions, by two methods, saturation coefficients, and either the number of cycles of freezing and thawing required to produce failure, or the percentage loss in weight after 51 cycles of freezing and thawing for 3,368 of these bricks, representing 525 gradings as produced by 209 manufacturers. Average results, by grades, for all tests except freezing and thawing, are given for the remaining 197 gradings, representing 1,190 specimens, which include samples from 20 additional manufacturers.

These results should prove useful in (1) providing information for specification writers, (2) illustrating the types and qualities of bricks available in different sections of the United States, and (3) indicating needed improvements in certain districts.

Lyman J. Briggs, *Director.*

Strength, Absorption, and Resistance to Laboratory Freezing and Thawing of Building Bricks Produced in the United States

by John W. McBurney *and* Joseph C. Richmond

CONTENTS

ABSTRACT

This paper reports the compressive and transverse strengths, water absorptions, saturation coefficients, and either the number of cycles of freezing and thawing required to produce failure or the loss in weight after 51 cycles for each of 3,368 bricks representing 525 gradings produced by 209 manufacturers. Average results for all tests except freezing and thawing are given for an additional 197 gradings or samples, comprising a total of 1,190 specimens. These 197 gradings include samples from 20 additional manufacturers.

I. INTRODUCTION

For the past 10 years the National Bureau of Standards has conducted, as part of the work on masonry and masonry materials, a study of the durability of building brick. A survey conducted jointly by the Common Brick Manufacturers Association of America and the Bureau, which was started in 1930, included laboratory freezing-and-thawing tests. In the ensuing decade additional samples were received and tested from time to time. Partial reports of the results have been communicated to the manufacturers supplying the samples and partial reports in summary have been published [1, 2].[1] The detailed results have hitherto not been published.

Publication is now undertaken for several reasons: (1) The Tentative Specifications for Building Brick (made from clay or shale) C 62–37T of the American Society for Testing Materials were recently revised (1939) [3] to provide for the waiver of certain physical requirements if a sample had been subjected to 50 cycles of freezing and thawing without the resulting loss in weight exceeding certain limits. This revision, furthermore, provided that "A particular lot or shipment shall be given the same grading as a previously tested lot, without repeating the freezing-and-thawing test, provided the brick are made by the same manufacturer from similar raw materials and by the same method of forming; and provided also

[1] Figures in brackets indicate the literature references at the end of this paper.

that a sample of five bricks selected from the particular lot has an average and individual minimum strength not less than a previously graded sample, and has average and individual maximum water absorption and saturation coefficient not greater than those of the previously tested sample graded according to the freezing-and-thawing test." Data presented in this paper, therefore, can be used as "reference sample" reports, as provided in this specification. (2) A number of individuals and organizations interested in the preparation of specifications for building brick have indicated the desirability of making these data generally available for examination and analysis by others in this field. (3) Though these data do not represent a complete cross section of the building bricks produced throughout the entire United States, it is believed that architects, engineers, and contractors will find them useful from the standpoint of indicating the expected durability and other properties of bricks in particular districts.

II. SAMPLING, AND DISTRIBUTION OF SOURCES

Unless otherwise indicated, all samples were collected as part of the 1930 survey [1]. In this survey, 221 manufacturers submitted samples of their bricks. Quoting from the 1933 paper [1], "Each manufacturer was requested to submit a sample consisting of not fewer than five bricks for each commercial grade as classified and marketed by him. Where soft or salmon (underburned) brick were produced, a special sample representing that grade was requested, even though such brick were not marketed. Information as to the percentage of the kiln product represented by each sample was in all cases secured from the manufacturer. If it were the manufacturer's practice to sell the entire output of the kiln without sorting or classifying, then a sample of 15 bricks was requested. It was suggested that this 'kiln run' sample should be selected so as to represent a vertical section of the kiln setting."

The plant numbers and grade numbers in the present paper are those originally assigned to the manufacturers in 1930. The plant numbers range from 1 to 221 and were assigned in the order of receipt of samples.

In 1936 [4] 23 shipments of brick were purchased by the Bureau and sampled. Some of these shipments were from plants represented in the 1930 survey and were ordered to represent certain of the gradings previously sampled. Other shipments were from plants not previously sampled. Insofar as the samples represent plants and gradings previously sampled, the same numbers were assigned. These resamples are distinguished by the notation "1936," as are the new plants which have designating numbers beginning at 222. A third series of samples was received in 1937 [5], and they are so designated.

It was stated with reference to the 1930 survey [1]: "That portion of the United States situated between the Mississippi River and the Rocky Mountains, as well as several sections of the south are poorly represented." The same statement applies to the Pacific coast and to the Rocky Mountain States, with the exception of Colorado. The reader is referred to table 1 of the 1933 paper [1] for figures on the distribution of sources and completeness of sampling represented by the 1930 survey.

It should be pointed out that the results reported on freezing-and-thawing tests represent only the poorer grades of the samplings on hand, for the following reason. Samples were selected for test in the inverse order of their expected durability. The first freezing-and-thawing tests were made on samples classified by the manufacturer as "salmons." When these specimens had failed, the next grade in order of increasing durability was tested. In general, durability correlates positively with strength and negatively with a water absorption and saturation coefficient. Therefore, when a sample, or grading, of a particular manufacturer had successfully passed 50 cycles of freezing and thawing, no tests were made on samples which exceeded the satisfactory sample in strength and were characterized by lower absorption and saturation coefficient. Relatively few tests were made on bricks which had properties complying with grade SWof Specification C 62–39T of the American Society for Testing Materials. Certain districts (Connecticut, Hudson Valley, and Chicago) are represented by freezing and thawing tests on nearly all samples submitted as a part of the 1930 Survey, since these samples

exhibited some departures from the usual relation between freezing-and-thawing results and physical properties.

III. METHODS OF TESTING

Compressive strengths, moduli of rupture, and absorptions by cold immersion and by boiling were determined by methods complying in essence with those described in the American Society for Testing Materials' Standard Methods for Testing Brick C 67–39 [6]. Weighings for the absorption determinations in the 1930 survey were made to the nearest 5.0 grams. Succeeding samples were weighed to the nearest 1.0 gram, as were all of the freezing-and-thawing test specimens. Originally, the saturation coefficients were calculated by dividing the absorption after 48-hr cold immersion by the absorption measured by 5-hr boiling. Since 1936 the practice of using, as the numerator, the absorption resulting from 24-hr cold immersion has been followed.

Method A of "Freezing-and-Thawing Tests of Brick" (ASTM Designation C 67–39T [7]) was used except during the last year of this work, when method B of the same standard was substituted. Data have been published [5] which indicate that these two methods are of comparable severity.

IV. PRESENTATION OF DATA, BY PRODUCING DISTRICTS

The data on physical properties (strength, absorption, and saturation coefficients) and the results of freezing-and-thawing tests are presented in tables 1 to 25. Additional information, such as method of forming, raw material, percentage of kiln represented by the sample, the manufacturer's description of the grade, and, in some cases, the location of the plant, are given.

The following abbreviations are used in the tables:

SM=sand-struck, soft-mud process.
WM=water-struck, soft-mud process.
DP=dry-press process.
SDP=semidry-press process.
SC=stiff-mud, side-cut process.
EC=stiff-mud, end-cut process.
C=clay.
FC=fire clay.
S=shale.
F=failure.
c=cycles.

Unless otherwise indicated, the loss in weight is that resulting from 51 cycles of freezing and thawing by method A. Where the designation (B) is used, the results are for 50 cycles and the test was made by method B. When failure occurred earlier, the number of cycles required for failure is substituted for loss in weight. In the last columns of the respective tables are entered the results obtained from additional cycles, insofar as such tests were made.

TABLE 1.—*Properties of bricks produced in Maine, New Hampshire, and Vermont*

[All samples received were made from surface clay and were formed by the soft-mud process]

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
	lb/in.²	*lb/in.²*	%	%		%	
Plant 4, grade 1 ("Arch," 23 percent of kiln, SM, C)							
1	1450	7600	4.3	7.4	0.58	No test	
2	905	10450	4.4	7.9	.56	0.20	
3	480	7810	3.1	5.1	.61	.51	
4	1470	7300	2.8	6.3	.44	.08	
5	1885	7750	1.0	3.3	.30	.09	
Avg	1240	8180	3.1	6.0	0.50	0.22	
Plant 4, grade 2 ("Selected Body," 65 percent of kiln, SM, C)							
1	1600	10900	3.0	5.5	0.55	0.00	
2	1120	10250	4.6	8.0	.58	.08	
3	1640	11500	4.0	6.1	.66	.00	
4	1090	7350	6.7	10.8	.62	.00	
5	1085	10100	7.0	10.5	.67	.20	
Avg	1305	10020	5.1	8.2	0.62	0.06	
Plant 4, grade 2a ("Second sample of grade 2")							
1	980	7430	9.0	11.9	0.76	0.11	
2	860	7690	7.0	10.0	.70	.08	
3	1140	10000	4.6	7.2	.64	.10	
4	990	6380	5.3	8.9	.60	.11	
5	1475	8550	1.6	2.2	.73	.11	
Avg	1090	8010	5.5	8.0	0.69	0.10	
Plant 4, grade 3 ("Light Hard," 12 percent of kiln, SM, C)							
1	705	5000	14.0	16.2	0.86	0.36	% 0.36(87c)
2	555	4310	15.0	17.3	.87	.36	.36(87c)
3	810	4860	12.2	14.6	.84	.29	.29(87c)
4	585	5000	14.8	16.6	.89	.70	.70(87c)
5	720	4490	14.4	16.1	.89	.34	.42(87c)
Avg	675	4730	14.1	16.2	0.87	0.41	0.43(87c)

TABLE 1.—*Properties of bricks produced in Maine, New Hampshire, and Vermont*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption: 48-hr cold immersion	Water absorption: 5-hr boiling	Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
Plant 6, grade 1 ("Arch," 20 percent of kiln, SM, C)							
	lb/in.²	*lb/in.²*	%	%		%	%
1	1080	8940	3.8	6.2	0.61	0.10	
2	1585	9910	3.5	6.0	.58	.00	
3	1615	9830	4.4	7.0	.63	.09	
4	970	8650	6.9	9.2	.75	.58	
5	1540	8600	4.3	6.9	.62	.00	
Avg	1360	9190	4.6	7.1	0.64	0.15	
Plant 6, grade 2 ("Body," 60 percent of kiln, SM, C)							
1	795	3920	1.7	5.7	0.30	0.35	
2	855	9350	4.3	6.4	.67	.09	
3	1265	7940	4.9	8.1	.61	.19	
4	1015	6100	4.8	7.7	.62	.00	
5	990	6070	8.7	11.2	.78	.09	
Avg	985	6680	4.9	7.8	0.60	0.14	
Plant 6, grade 3 ("Light Hard," 20 percent of kiln, SM, C)							
1	1220	7220	8.4	11.3	0.74	0.20	0.20(84c)
2	1180	5320	11.9	13.8	.86	.29	.29(84c)
3	525	6400	13.0	14.2	.92	.25	.25(84c)
4	915	5450	14.4	16.1	.90	.34	.34(84c)
5	870	5620	15.0	16.4	.91	.38	.38(84c)
Avg	940	6000	12.5	14.4	0.87	0.29	0.29(84c)
Plant 21, grade 1 ("Body," 65 percent of kiln, SM, C)							
1	1365	14550	3.6	5.2	0.69	0.10	
2	1410	10750	2.2	3.8	.58	.11	
3	1360	11800	9.0	11.4	.79	.60	
4	1770	13400	7.5	9.8	.77	.23	
5	1765	15800	5.3	7.8	.68	.10	
Avg	1535	13260	5.5	7.6	0.70	0.23	
Plant 21, grade 2 ("Bench," 20 percent of kiln, SM, C)							
1		9090	10.3	12.2	0.84	0.38	
2	1240	13100	7.0	9.7	.72	.33	
3	520	7790	12.6	14.5	.87	.50	
4	1260	10400	10.1	12.4	.81	.45	
5	1430	9700	5.4	7.4	.73	.20	
Avg	1110	10020	9.1	11.2	0.79	0.37	
Plant 21, grade 3 ("Light Hard," 10 percent of kiln, SM, C)							
1	485	5370	16.0	17.5	0.91	0.64	
2	760	5990	14.5	15.6	.93	.54	
3	1070	9420	13.4	15.5	.86	.41	
4	760	4960	13.5	16.0	.84	.49	
5	920	5110	13.8	16.0	.86	.53	
Avg	800	6170	14.2	16.1	0.88	0.52	
Plant 21, grade 4 ("Soft," 5 percent of kiln, SM, C)							
1	710	4000	17.2	18.9	0.91	0.33	0.44(75c)
2	445	4720	15.8	17.3	.91	.45	.45(75c)
3	735	5160	15.6	17.9	.87	.23	.35(75c)
4	645	4620	14.3	16.2	.88	.26	.39(75c)
5	780	4480	17.1	18.2	.94	.59	.70(75c)
Avg	660	4600	16.0	17.7	0.90	0.37	0.47(75c)
Plant 26, grade 1 ("Kiln Run Hard," percentage of kiln unknown, SM, C)							
Avg (20)	1610	10070	9.1	11.6	0.77	Not tested	

TABLE 1.—*Properties of bricks produced in Maine, New Hampshire, and Vermont*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption: 48-hr cold immersion	Water absorption: 5-hr boiling	Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
Plant 26, grade 1A ("Hard," (1936) percentage of kiln unknown, SM, C)							
	lb/in.²	*lb/in.²*	(24-hr) %	%		%	
1	1375	14350	4.0	6.5	0.61	0.35	
2	1480	11900	4.9	7.8	.63	.14	
3	1815	12400	4.7	7.6	.62	.22	
4	1290	11350	4.4	7.8	.57	.23	
5	1920	11750	4.3	6.6	.65	.00	
6	965	9130	5.8	9.4	.62	.11	
7	1455	12320	4.5	7.3	.62	.21	
8	1465	12800	5.0	8.4	.61	.00	
9	1565	11300	5.0	8.0	.63	.22	
10	1625	12130	4.6	7.4	.62	.27	
11	1970	8675	3.6	4.7	.76	.10	
12	1790	11150	4.8	7.5	.65	.11	
13	1725	13880	4.8	7.6	.64	.21	
14	1760	11510	4.5	7.3	.62	.21	
15	1405	11500	4.8	7.7	.63	.11	
16	1625	6540	4.8	7.4	.66	.11	
17	1515	13300	4.8	7.4	.65	.22	
18	1740	13520	3.4	5.5	.62	.11	
19	1505	14100	2.9	4.8	.62	.00	
20	1820	11350	3.9	5.9	.67	.13	
Avg	1595	11740	4.5	7.1	0.63	0.15	
Plant 26, grade 2 ("Face," percentage of kiln unknown, WM, C)							
1	1690	11150	2.9	5.7	0.51	0.10	
2	1790	13150	5.1	7.2	.71	.21	
3	1765	14200	5.0	6.9	.72	.13	
4	1885	11600	3.6	6.7	.54	.21	
5	1255	11100	11.8	14.7	.80	.23	
Avg	1675	12240	5.7	8.2	0.66	0.18	
Plant 26, grade 2A ("Hard," (1936) percentage kiln unknown, WM, C)							
			(24-hr)				
1	1745	10480	8.4	12.3	0.68	0.26	
2	1665	10000	11.2	13.8	.81	.22	
3	2745	11800	7.5	12.0	.63	.13	
4	1705	12000	9.1	12.0	.76	.24	
5	1750	12200	8.1	11.7	.69	.45	
6	2055	11300	6.1	8.8	.69	.26	
7	2015	11200	3.6	5.8	.62	.31	
8	1825	11300	9.9	12.8	.77	.11	
9	1225	11400	3.7	6.0	.62	.10	
10	1150	11600	6.0	8.4	.71	.34	
11	2425	17700	4.8	7.0	.69	.11	
12	1440	12000	9.2	12.0	.77	1.88	
13	1245	13300	3.9	5.4	.73	.00	
14	1750	12400	2.5	4.9	.52	.13	
15	1800	11400	4.9	7.9	.62	.13	
16	2150	15150	5.6	9.9	.57	.27	
17	1735	12850	2.9	5.2	.55	.11	
18	2300	12500	7.8	11.2	.70	.22	
19	1315	16700	3.5	4.2	.85	.14	
20	1685	16100	1.3	2.2	.57	.00	
Avg	1785	12670	6.0	8.6	0.68	0.27	
Plant 26, grade 3 ("Light Hard," (1936) percentage of kiln unknown, WM, C)							
			(24-hr)				
1	1070	6830	13.8	16.0	0.86	0.43	
2	1420	10200	11.3	13.8	.82	.22	
3	1210	6960	14.0	16.6	.85	3.68	
4	755	4680	18.5	21.6	.86	F 27c	
5	1090	6850	16.8	19.3	.87	F 33c	
6	1875	8450	9.7	13.8	.70	0.21	
7	845	8050	14.2	16.2	.88	1.36	
8	1110	6230	15.1	18.7	.81	F 36c	
9	1110	7200	13.1	15.6	.84	0.35	
10	1065	11400	10.1	13.0	.78	.12	
11	1285	7670	13.8	16.0	.86	.47	
12	1490	9800	9.9	14.4	.69	.33	
13	2125	7400	11.9	15.5	.77	.26	
14	1335	8400	13.5	16.6	.81	2.97	
15	1840	7800	11.3	14.0	.81	0.34	
16	1090	10000	12.3	14.9	.82	.28	
17	1395	7800	15.1	17.5	.87	3.28	
18	1665	7700	13.2	15.8	.84	F 29e	
19	1640	7980	15.2	17.7	.86	1.80	
20	1475	6230	14.8	17.8	.83	.94	
Avg	1345	7880	13.4	16.2	.82		

TABLE 1.—*Properties of bricks produced in Maine, New Hampshire, and Vermont*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
Plant 26, grade 4 ("Light Hard," (1936) percentage of kiln unknown, SM, C)							
	lb/in.²	*lb/in.²*	%	%		%	
1	720	4770	15.2	17.3	0.88	0.56	
2	865	5500	16.3	18.4	.88	.57	
3	625	3720	17.9	19.9	.90	.93	
4	470	3780	13.9	17.6	.79	.76	
5	855	5480	13.6	17.1	.80	.51	
6	510	2960	17.8	19.7	.90	2.08	
7	430	3130	19.4	20.6	.95	3.08	
8	910	5810	13.0	16.1	.81	.42	
9	725	4220	14.5	17.6	.82	.57	
10	425	3120	16.6	19.8	.84	1.07	
11	720	5500	12.8	16.3	.79	.42	
12	875	5900	13.2	16.5	.81	.39	
13	590	3300	19.8	20.6	.97	5.41	
14	570	3300	16.8	19.4	.87	1.59	
15	315	2120	17.1	20.5	.84	3.15	
16	750	5480	16.5	18.8	.88	.85	
17	910	5530	14.8	17.2	.86	.44	
18	620	3540	17.1	19.4	.88	.94	
19	610	3550	17.9	19.8	.90	.84	
20	575	4770	13.6	17.5	.78	.82	
Avg	650	4280	15.9	18.5	0.86	1.27	
Plant 48, grade 1 ("Selected Body," 70 percent of kiln, SM, C)							
Avg (5)	1450	12950	6.9	9.4	0.75	Not tested	
Plant 48, grade 2 ("Arch and Clinker," 10 percent of kiln, SM, C)							
Avg (5)	1455	14670	3.2	5.0	0.62	Not tested	
Plant 48, grade 3 ("Light hard or backing," 10 percent of kiln, SM, C)							
1	1070	8990	12.1	14.2	0.85	0.14 (B)	
2	1300	10650	12.4	14.0	.89	.34 (B)	
3	920	6580	14.4	15.7	.92	.26 (B)	
4	775	5990	15.8	17.0	.93	.24 (B)	
5	1030	8130	12.0	14.4	.83	.12 (B)	
Avg	1020	8070	13.3	15.1	0.88	0.22 (B)	
Plant 48, grade 4 ("Salmon," 10 percent of kiln, SM, C)							
1	-------	2080	17.0	17.0	1.00	F 3c	
2	260	4980	17.0	18.7	.91	[a] 26.20	
3	-------	5240	16.7	17.5	.95	F 3c	
4	-------	4980	16.2	17.9	.91	1.70	
5	1060	6220	17.0	18.2	.93	1.20	
Avg	-------	4700	16.8	17.9	0.94	-------	
Plant 67, grade 1 ("Clinkers," 15 percent of kiln, SM, C)							
Avg (5)	1775	12850	1.5	2.9	0.53	Not tested	
Plant 67, grade 2 ("Dark reds," 20 percent of kiln, SM, C)							
Avg (15)	1580	8720	4.0	7.1	0.58	Not tested	
Plant 67, grade 3 ("Backers," 20 percent of kiln, SM, C)							
Avg (5)	1210	7860	3.2	6.5	0.48	Not tested	

[a] 3.00 percent loss at 12 cycles.

TABLE 1.—*Properties of bricks produced in Maine, New Hampshire, and Vermont*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
Plant 67, grade 4 ("Light reds," 15 percent of kiln, SM, C)							
	lb/in.²	*lb/in.²*	%	%		%	
1	1125	8740	7.3	10.7	0.68	F 3c (B)	
2	1770	12500	7.9	8.8	.90	F 3c (B)	
3	1650	11850	8.4	10.1	.83	0.11 (B)	
4	1820	10500	10.1	11.8	.86	.00 (B)	
5	-------	8890	13.1	14.8	.89	1.47 (B)	
Avg	1590	10500	9.4	11.2	0.83	-------	
Plant 67, grade 5 ("Light Hard," 30 percent of kiln, SM, C)							
						%	
1	1100	5000	14.0	16.5	0.85	0.49	0.61 (66c)
2	1030	4730	13.8	16.3	.85	.41	.51 (66c)
3	1125	5190	12.9	15.1	.86	.11	.11 (66c)
4	785	4900	13.0	15.4	.84	.81	.81 (66c)
5	1135	7560	12.4	14.4	.86	.31	.31 (66c)
Avg	1035	5480	13.2	15.5	0.85	0.43	0.47 (66c)
Plant 84, grade 1 ("Dark face," 30 percent of kiln, SM, C)							
Avg (5)	1440	8830	7.3	11.0	0.66	Not tested	
Plant 84, grade 2 ("Light face," 30 percent of kiln, SM, C)							
1	1080	7130	15.2	18.5	0.82	0.00 (B)	
2	1215	5910	17.5	20.7	.85	.00 (B)	
3	1260	6700	16.1	19.3	.83	.21 (B)	
4	925	5610	15.9	19.2	.83	.33 (B)	
5	920	4600	17.3	20.4	.85	.10 (B)	
Avg	1080	5990	16.4	19.6	0.84	0.13 (B)	
Plant 84, grade 3 ("Bench," 75 percent of kiln, SM, C)							
Avg (5)	1495	12200	6.1	7.8	0.76	Not tested	
Plant 84, grade 4 ("Light hard," 25 percent of kiln, SM, C)							
1	480	2850	19.5	24.4	0.80	0.37 (B)	
2	405	2320	19.9	25.1	.79	1.30 (B)	
3	345	2330	18.5	22.6	.82	0.82 (B)	
4	375	2180	18.6	22.6	.82	.61 (B)	
5	550	2770	19.1	23.0	.83	.44 (B)	
Avg	430	2490	19.1	23.5	0.81	0.71 (B)	
Plant 84, grade 5 ("Pale," 75 percent of kiln, SM, C)							
1	550	2440	20.2	23.2	0.87	0.12	0.24 (63c)
2	530	3160	23.7	25.0	.95	F 12c	
3	435	2460	20.1	22.6	.89	F 42c	
4	460	3380	22.8	24.7	.92	8.40	9.16 (63c)
5	170	1120	20.8	25.3	.82	F 45c	
Avg	430	2510	21.5	24.2	0.89	-------	
Plant 84, grade 6 ("Dark face," 30 percent of kiln, WM, C)							
Avg (5)	1505	13210	4.4	6.2	0.70	Not tested	

TABLE 1.—*Properties of bricks produced in Maine, New Hampshire, and Vermont*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
Plant 84, grade 7 ("Light face," 30 percent of kiln, WM, C)							
	lb/in.²	*lb/in.²*	%	%		%	
1	1375	10100	6.2	9.2	0.67	0.00 (B)	
2	1460	9900	6.8	9.4	.72	.24 (B)	
3	1520	9550	6.3	9.0	.70	.11 (B)	
4	2300	11500	6.5	8.8	.74	.00 (B)	
5	1385	10580	8.0	11.2	.71	.21 (B)	
Avg	1610	10330	6.8	9.5	0.71	0.11 (B)	
Plant 84, grade 8 ("Bench," 75 percent of kiln, WM, C)							
Avg (5)	1325	7950	5.8	7.6	0.75	Not tested	
Plant 84, grade 9 ("Light hard," 25 percent of kiln, WM, C)							
1	1410	8650	10.7	14.3	0.75	0.12 (B)	
2	1550	8520	11.0	13.7	.80	.11 (B)	
3	1470	6820	12.2	14.9	.82	.11 (B)	
4	1705	9190	11.2	14.0	.80	.34 (B)	
5	1390	8930	13.2	15.7	.84	.00 (B)	
Avg	1505	8420	11.7	14.5	0.80	0.14 (B)	
Plant 84, grade 10 ("Pale," 75 percent of kiln, WM, C)							
						%	
1	465	4040	20.3	22.8	0.89	F 42c	
2	395	3660	18.7	21.5	.87	F 39c	
3	640	3980	19.0	21.7	.88	0.87	F 57c
4	535	3760	19.7	22.3	.88	.51	0.51 (63c)
5	330	3230	18.9	21.9	.86	4.30	5.33 (63c)
Avg	475	3730	19.3	22.0	0.88		
Plant 96, grade 1 ("Kiln run," 100 percent of kiln, SM, C)							
Avg (16)	980	5410	8.3	11.2	0.70	Not tested	
Plant 108, grade 1 ("Kiln run," 100 percent of kiln, SM, C)							
Avg (15)	995	7470	8.8	10.9	0.78	Not tested	
Plant 128, grade 1 ("Dark red common face," 25 percent of kiln, SM, C)							
Avg (5)	1720	16660	1.3	1.9	0.76	Not tested	
Plant 128, grade 2 ("Bright Red Common," 40 percent of kiln, SM, C)							
Avg (5)	1995	12030	6.4	9.4	0.68	Single test, 0.00 % loss.	
Plant 128, grade 3 ("Arch," 15 percent of kiln, SM, C)							
Avg (5)	1580	11840	6.8	8.4	0.82	Not tested	
Plant 128, grade 4 ("Light hard," 20 percent of kiln, SM, C)							
1	1885	6610	11.4	14.8	0.77	0.10	
2	1635	7510	10.5	14.2	.74	.21	
3	1780	8450	11.1	13.9	.80	.11	
4	2120	7390	10.3	11.9	.87	.21	
5	1030	5990	13.8	17.4	.79	.31	
Avg	1690	7190	11.4	14.4	0.79	0.19	

TABLE 2.—*Properties of bricks produced in Massachusetts*

[All samples received with the exception of those from plant 7 (side-cut) were formed by the soft-mud process. All bricks were made from surface clay. Much of the Massachusetts brick production resembles that from Maine, New Hampshire, and Vermont in appearance and properties]

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
Plant, 5, grade 1 ("Common face," 60 percent of kiln, SM, C)							
	lb/in.²	*lb/in.²*	%	%		%	
1	1170	5230	7.7	10.4	0.74	No test	
2	1220	4820	7.6	11.4	.67	0.00	
3	1120	4960	7.8	10.4	.75	.13	
4	1145	5350	7.5	10.7	.70	.00	
5	875	6720	8.5	10.8	.79	.11	
Avg	1105	5420	7.8	10.7	0.73	0.06	
Plant 5, grade 2 ("Merchantable," 90 percent of kiln, SM, C)							
1	1240	6790	12.5	13.5	0.93	0.10 (B)	
2	1450	5470	10.4	11.6	.90	.12	
3	980	5380	12.6	13.8	.91	.25	
4	1200	4750	15.5	16.8	.92	.25	
5	835	3910	16.2	17.3	.94	.23	
Avg	1140	5260	13.4	14.6	0.92	0.19 (A & B)	
Plant 5, grade 3 ("Backup," 10 percent of kiln, SM, C)							
						%	
1	905	3930	16.2	18.6	0.87	0.39	0.39 (77c)
2	870	3870	17.3	18.6	.93	.52	.52 (77c)
3	1120	3820	19.5	20.7	.94	.47	.47 (77c)
4	730	3020	20.1	22.0	.91	.49	.49 (77c)
5	585	2780	18.8	21.5	.88	1.00	1.30 (77c)
Avg	840	3480	18.4	20.3	0.91	0.57	0.63 (77c)
Plant 7, grade 1 ("Face," 33⅓ percent of kiln, SC, C)							
1	1885	13700	2.7	5.0	0.54	0.09	
2	2450	13300	2.8	4.5	.62	.00	
3	2180	15200	3.3	5.4	.61	.33	
4	3120	12750	3.0	4.3	.70	.00	
5	2490	12700	1.9	3.1	.61	.00	
Avg	2425	13530	2.7	4.5	0.62	0.08	
Plant 7, grade 2 ("Semi-face," 33⅓ percent of kiln, SC, C)							
1	985	7130	13.5	16.6	0.81	0.62	
2	1075	6310	14.6	17.1	.85	F 37c	
3	1370	7300	16.6	19.0	.87	F 27c	
4	1180	8250	10.3	13.9	.74	0.21	
5	1020	3830	17.1	19.5	.88	F 27c	
Avg	1125	6560	14.4	17.2	0.83		
Plant 7, grade 3 ("Outside," 17⅓ percent of kiln, SC, C)							
1	940	6080	14.4	16.8	0.86	F 50c (B)	
2	1120	5990	11.9	15.0	.79	0.31 (B)	
3	1130	6370	15.1	18.3	.82	.27 (B)	
4	650	4290	15.3	17.0	.90	.23 (B)	
5	580	7610				No test	
Avg	885	6070	14.2	16.8	0.84		

TABLE 2.—*Properties of bricks produced in Massachusetts*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption: 48-hr cold immersion	Water absorption: 5-hr boiling	Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
		Plant 7, grade 4 ("Baekup," 16 percent of kiln, SC, C)					
	*lb/in.*²	*lb/in.*²	%	%		%	
1	1390	7780	11.7	14.0	0.84	0.36	F 63c
2	745	4370	19.4	22.4	.87	F 38c	
3	600	3370	19.7	21.8	.90	F 21c	
4	420	4780	17.2	20.7	.83	F 27c	
5	615	3290	17.6	19.7	.89	F 8c	
Avg	755	4710	17.1	19.7	0.87		
		Plant 27, grade 1 ("Arch," 26 percent of kiln, SM, C)					
1	445	4290	20.8	24.7	0.84	0.91	
2	1090	6740	10.3	12.9	.80	.51	
3	300	2680	16.8	21.8	.77	.49	
4	710	3500	16.3	20.7	.79	.54	
5	755	3800	17.4	21.6	.81	.84	
Avg	660	4200	16.3	20.3	0.80	0.66	
		Plant 27, grade 2 ("Body, middle catch," 35 percent of kiln, SM, C)					
1	1110	6050	13.8	17.7	0.78	0.61	
2	965	5420	14.5	18.2	.80	.48	
3	990	5740	14.4	18.0	.80	.62	
4	1105	5810	15.9	19.9	.80	.79	
5	1265	9070	6.9	11.1	.62	.21	
Avg	1085	6420	13.1	17.0	0.76	0.54	
		Plant 27, grade 3 ("Body, Top catch," 35 percent of kiln, SM, C)					
1	1010	5380	14.9	18.4	0.81	0.36	
2	500	2990	19.2	22.8	.84	.62	
3	1195	5760	12.4	16.0	.77	.24	
4	950	4410	13.8	18.4	.75	.41	
5	680	4130	18.8	23.0	.82	.73	
Avg	865	4530	15.8	19.7	0.80	0.47	
		Plant 27, grade 4 ("Double coaled," 4 percent of kiln, SM, C)					
							%
1	370	1535	25.3	30.4	0.83	0.88	1.26 (75c)
2	460	3380	19.1	25.8	.74	2.00	2.59 (75c)
3	1415	4470	9.4	20.0	.47	0.25	0.25 (75c)
4	305	1600	21.0	27.4	.77	.76	1.14 (75c)
5	370	2100	14.7	24.5	.60	.87	1.52 (75c)
Avg	585	2620	17.9	25.6	0.68	0.95	1.35 (75c)
		Plant 32, grade 1 ("Run of kiln merchantable," 90 percent of kiln, SM, C)					
1	1015	4460	10.6	14.1	0.75	0.56	
2	1370	2830	4.0	6.3	.64	.58	
3	890	3350	10.1	12.8	.79	.53	
4	775	3340	2.1	4.7	.45	.21	
5	1350	4120	2.2	4.4	.50	.45	
6	935	3360	13.9	17.6	.79	.61	
7	960	4160	14.0	17.7	.79	.73	
8	1030	3590	14.9	18.2	.82	.52	
9	1415	6340	13.5	16.8	.80	.43	
10	1105	4480	13.8	17.2	.80	.49	
11	875	3740	18.3	21.7	.84	.46 (B)	
12	725	3620	18.2	21.9	.83	2.18 (B)	
13	895	4080	17.7	20.8	.85	0.15 (B)	
14	740	3730	17.8	21.0	.85	.13 (B)	
15	1005	3880	16.7	20.2	.83	.30 (B)	
Avg	1005	3940	12.5	15.7	0.76	0.56 (A&B)	

TABLE 2.—*Properties of bricks produced in Massachusetts*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption: 48-hr cold immersion	Water absorption: 5-hr boiling	Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
		Plant 32, grade 2 ("Salmon," 10 percent of kiln, SM, C)					
	*lb/in.*²	*lb/in.*²	%	%		%	
1	200	2040	19.6	22.3	0.88	F 2c	
2	280	1440	19.8	22.4	.88	F 2c	
3	545	2260	19.1	21.6	.88	F 14c	
4	495	2540	19.9	23.2	.86	F 2c	
5	325	1260	19.8	21.9	.90	F 2c	
Avg	370	1910	19.6	22.3	0.88	F 4c	
		Plant 110, grade 1 ("Bodybrick," 66.7 percent of kiln, SM, C)					
Avg (6)	1480	8500	6.5	10.2	0.64	Not tested	
		Plant 110, grade 2 ("Hard arch," 16 percent of kiln, SM, C)					
1	1685	13550	5.3	7.4	0.72	0.00 (B)	
2	1370	9800	4.4	6.7	.66	.00 (B)	
3	1695	10680	3.9	6.3	.62	.16 (B)	
4	1100	10970	4.8	6.6	.73	.12 (B)	
5	1470	10450	5.7	8.2	.70	.10 (B)	
6	1315	12100	5.2	7.0	.74	.52 (B)	
Avg	1440	11260	4.9	7.0	0.70	0.15 (B)	
		Plant 110, grade 3 ("Light hard," 17 percent of kiln, SM, C)					
1	750	6340	14.8	16.7	0.88	0.00	
2	1060	6030	13.0	15.1	.86	.00	
3	1090	6340	14.3	16.6	.86	.00	
4	1155	6730	14.8	17.2	.86	.00	
5	1400	5650	14.1	16.3	.87	.00	
6	1200	6500	12.4	14.6	.85	.11	
Avg	1110	6260	13.9	16.1	0.86	0.02	
		Plant 115, grade 1 ("Colonial," 10 percent of kiln, SM, C)					
Avg (6)	2055	13490	0.78	1.3	0.56	Not tested	
		Plant 115, grade 1A ("Water struck," 50 percent of kiln, WM, C)					
Avg (6)	1775	14800	4.3	6.0	0.72	Not tested	
		Plant 115, grade 2 ("Body," 70 percent of kiln, SM, C)					
Avg (6)	1600	11210	6.0	8.5	0.70	Not tested	
		Plant 115, grade 3 ("Light hard," 20 percent of kiln, SM, C)					
1	1515	9000	11.9	15.1	0.79	0.13	
2	975	8250	12.7	15.3	.83	.00	
3	1305	6830	14.7	17.1	.86	.00	
4	1385	7370	9.9	12.2	.81	.00	
5	1070	7100	11.0	13.6	.81	.13	
6	725	8860	13.3	16.4	.81	.00	
Avg	1165	7900	12.2	15.0	0.82	0.04	

TABLE 2.—*Properties of bricks produced in Massachusetts*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
	*lb/in.*²	*lb/in.*²	%	%		%	
Plant 146A, grade 1 ("Bench," 3 percent of kiln, SM, C)							
1	1870	11600	3.3	5.0	0.66	0.22	
2	1780	10450	1.3	2.5	.52	.13	
3	1555	10450	6.3	8.9	.71	.31	
4	1475	7290	1.6	3.2	.50	.21	
5	2000	5510	1.1	2.2	.50	.33	
Avg	1735	9060	2.7	4.4	0.58	0.24	
Plant 146A, grade 2 ("Body," 90 percent of kiln, SM, C)							
Avg (5)	1455	5900	8.9	11.5	0.78	Not tested	
Plant 146A, grade 3 ("Light hard," 7 percent of kiln, SM, C)							
1	435	2350	17.7	20.8	0.85	1.98	
2	875	2900	17.9	20.1	.89	0.67	
3	550	3150	18.7	21.2	.88	1.01	
4	650	2540	18.1	21.6	.84	1.28	
5	425	3520	18.5	20.1	.92	6.56	
Avg	585	2890	18.2	20.8	0.88	2.30	
Plant 146B, grade 1 ("Bench," 3 percent of kiln, SM, C)							
1	1640	6190	2.5	7.0	0.36	0.10	
2	1720	9950	0.9	1.3	.69	.00	
3	2390	17700	2.3	3.7	.62	.00	
4	1590	5790	2.7	4.9	.55	.00	
5	1600	8890	5.0	7.9	.63	.10	
Avg	1790	9700	2.7	5.0	0.57	0.04	
Plant 146B, grade 2 ("Body," 90 percent of kiln, SM, C)							
Avg (5)	2190	12710	4.4	7.0	0.62	Not tested	
Plant 146B, grade 3 ("Brush," percentage of kiln unknown, SM, C)							
1	2200	15930	3.9	4.9	0.80	0.00	
2	3050	14450	0.9	2.2	.41	.00	
3	2380	15900	4.4	7.8	.56	.10	
4	2280	17850	2.9	3.8	.76	.10	
5	2140	17650	5.0	7.0	.72	.20	
Avg	2410	16360	3.4	5.1	0.65	0.08	
Plant 146C, grade 1 ("Bench," 3 percent of kiln, SM, C)							
1	1425	9500	5.2	8.5	0.61	0.09 (B)	
2	2135	11350	3.5	5.5	.64	.00 (B)	
3	1820	12500	3.6	6.2	.58	.10 (B)	
4	1680	8580	4.0	7.1	.56	.09 (B)	
5	1695	6760	1.5	4.5	.33	.10 (B)	
Avg	1750	9740	3.6	6.4	0.54	0.08 (B)	
Plant 146C, grade 2 ("Body," 90 percent of kiln, SM, C)							
1	2480	12950	1.1	2.7	0.41	0.11	
2	2145	12700	1.5	2.5	.60	.20	
3	2045	13150	2.8	4.5	.62	.11	
4	2085	9020	3.2	5.7	.56	.51	
5	1830	7980	6.5	8.1	.80	.11	
Avg	2115	11160	3.0	4.7	0.60	0.21	

TABLE 2.—*Properties of bricks produced in Massachusetts*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
	*lb/in.*²	*lb/in.*²	%	%		%	
Plant 146C, grade 3 ("Tops," percentage of kiln unknown, SM, C)							
1	1150	4660	12.6	16.0	0.79	0.34	
2	1010	4400	12.8	16.0	.80	.26	
3	860	5030	15.0	17.4	.86	.48	
4	820	4000	14.9	17.5	.85	.65	
5	1300	6470	12.3	15.1	.82	.27	
Avg	1030	4910	13.5	16.4	0.82	0.40	
Plant 146C, grade 4 ("Light hard," 7 percent of kiln, SM, C)							
1	700	3650	15.4	18.8	0.82	0.46	
2	2200	9640	10.9	13.5	.81	.31	
3	750	5170	17.5	20.8	.80	1.04	
4	805	3710	15.9	20.0	.80	.82	
5	1300	7300	15.0	17.1	.88	.31	
Avg	1150	5890	14.9	18.0	0.83	0.59	
Plant 160, grade 1 ("Arch," 25 percent of kiln, SM, C)							
1	830	6730	11.6	13.8	0.84	0.22	
2	1245	7590	10.8	12.0	.90	.25	
3	940	5940	9.8	11.4	.86	.33	
4	1490	6970	6.2	7.5	.83	.12	
5	1300	6750	3.7	4.3	.86	.11	
Avg	1160	6800	8.4	9.8	0.86	0.21	
Plant 160, grade 2 ("Body," 60 percent of kiln, SM, C)							
1	1885	8120	5.6	6.8	0.82	0.12	
2	1655	6260	5.5	7.1	.64	.22	
3	1640	6270	5.6	7.7	.73	.28	
4	1090	5560	5.5	6.9	.80	.14	
5	1525	5700	6.0	7.7	.78	.11	
Avg	1560	6380	5.6	7.2	0.75	0.17	
Plant 160, grade 3 ("Light Hard," 15 percent of kiln, SM, C)							
1	495	2210	16.6	18.5	0.90	0.51	
2	795	3380	13.3	16.0	.83	.14	
3	685	3370	13.7	15.9	.86	.22	
4	460	4720	17.8	19.6	.91	.61	
5	805	2740	17.0	19.4	.88	.35	
Avg	650	3280	15.7	17.9	0.88	0.37	
Plant 170, grade 1 ("Body," 60 percent of kiln, WM, C)							
1	315	9170	7.4	9.6	0.77	No test	
2		7150	8.3	10.6	.78	0.12	
3	400	4810	5.1	8.1	.63	No test	
4	1335	5570	4.1	6.7	.61	0.00	
5	1260	8140	3.2	5.3	.60	.09	
Avg	830	6970	5.6	8.1	0.68	0.07	
Plant 170, grade 1A ("Second sample of grade 1")							
Avg (5)	1430	8120	3.5	7.1	0.49	Not tested	
Plant 170, grade 2 ("Bench," 20 percent of kiln, WM, C)							
1	1590	7200	8.6	11.3	0.76	0.19	
2	975	6060	1.9	3.9	.49	.19	
3	1015	5530	10.7	12.9	.83	.09	
4	565	3380	12.4	15.9	.78	.21	
5	1085	6080	8.9	11.1	.80	.19	
Avg	1045	5650	8.5	11.0	0.73	0.17	

TABLE 2.—*Properties of bricks produced in Massachusetts*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption: 48-hr cold immersion	Water absorption: 5-hr boiling	Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
Plant 170, grade 2A ("Second sample of grade 2")							
	lb/in.²	*lb/in.²*	%	%		%	
Avg (5)	1195	6600	4.1	7.8	0.52	Not tested	
Plant 170, grade 3 ("Tops," 15 percent of kiln, WM, C)							
1	780	4420	14.6	16.3	0.90	1.13	
2	675	5190	13.4	16.0	.84	0.31	
3	825	4920	14.6	16.3	.90	.11	
4	710	4900	14.4	16.5	.87	F 26c	
5	1000	5240	12.4	14.8	.84	0.12	
Avg	800	4930	13.9	16.0	0.87		
Plant 179, grade 1 ("Areh," 15 percent of kiln, SM, C)							
Avg (5)	1245	6720	9.6	12.3	0.77	Not tested	
Plant 179, grade 2 ("Face," 70 percent of kiln, SM, C)							
Avg (5)	1185	6720	9.0	12.3	0.73	Not tested	
Plant 179, grade 3 ("Salmon," 15 percent of kiln, SM, C)							
1	825	4180	18.7	21.1	0.89	0.35 (B)	
2	920	2600	18.9	25.8	.73	.25 (B)	
3	915	4100	18.5	21.6	.86	.13 (B)	
4	1060	4500	18.0	20.8	.90	.23 (B)	
5	870	3590	18.2	21.0	.87	.23 (B)	
Avg	920	3790	18.5	22.1	0.85	0.24 (B)	
Plant 191, grade 1 ("Beneh," 20 percent of kiln, SM, C)							
Avg (5)	900	5570	8.5	10.8	0.76	Not tested	
Plant 191, grade 2 ("Body," 60 percent of kiln, SM, C)							
Avg (5)	1045	6130	11.8	14.6	0.80	Not tested	
Plant 191, grade 3 ("Light hard," 20 percent of kiln, SM, C)							
1	1020	4520	15.0	17.9	0.84	0.48 (B)	
2	990	4900	15.7	18.4	.85	.37 (B)	
3	785	2560	19.4	21.4	.91	.51 (B)	
4	1000	2000	12.9	20.4	.63	.54 (B)	
5	805	4640	15.2	18.1	.84	.47 (B)	
Avg	920	3720	15.6	19.2	0.81	0.47 (B)	
Plant 205, grade 1 ("Clinker," 5 percent of kiln, SM, C)							
Avg (5)	1110	6530	4.8	8.2	0.56	Not tested	
Plant 205, grade 2 ("Areh," 15 percent of kiln, SM, C)							
Avg (5)	830	5480	7.9	11.9	0.67	Not tested	
Plant 205, grade 3 ("Hard face," 50 percent of kiln, SM, C)							
Avg (5)	930	5150	10.8	13.7	0.78	Not tested	

TABLE 2.—*Properties of bricks produced in Massachusetts*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption: 48-hr cold immersion	Water absorption: 5-hr boiling	Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
Plant 205, grade 4 ("Salmon," 20 percent of kiln, SM, C)							
	lb/in.²	*lb/in.²*	%	%		%	
1	385	2460	13.0	16.9	0.77	0.45 (B)	
2	575	2950	14.0	17.4	.81	.45 (B)	
3	500	2200	14.1	17.4	.81	.54 (B)	
4	520	3510	13.6	17.0	.80	.55 (B)	
5	605	2780	13.5	17.1	.79	.41 (B)	
Avg	515	2780	13.6	17.2	0.80	0.48 (B)	
Plant 205, grade 5 ("Soft," 10 percent of kiln, SM, C)							
1	585	2950	16.6	18.3	0.91	2.41 (B)	
2	740	4300	14.8	17.3	.86	0.37 (B)	
3	640	3600	16.0	17.8	.90	.28 (B)	
4	695	3250	15.8	17.8	.89	2.27 (B)	
5	695	3270	15.7	18.0	.87	0.37 (B)	
Avg	670	3470	15.8	17.8	0.89	1.14 (B)	
Plant 211, grade 1 ("Hard," 60 percent of kiln, SM, C)							
Avg (8)	675	4070	10.3	15.3	0.66	Not tested	
Plant 211, Grade 2 ("Light hard and interior backers," 40 percent of kiln, SM, C)							
1	785	3250	16.7	21.2	0.79	0.23 (B)	
2	280	1550	19.4	24.6	.79	1.91 (B)	
Avg	535	2400	18.0	22.9	0.79	1.07 (B)	

TABLE 3.—*Properties of bricks produced in Connecticut*

[All samples without exception were made from surface clay and formed by the sand-struck, soft-mud process. The descriptions have accordingly been omitted from the grade designations]

Specimen number	Modulus of rupture	Compressive strength	Water absorption: 48-hr cold immersion	Water absorption: 5-hr boiling	Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
Plant 24, grade 1 ("Colonial," 27 percent of kiln)							
	lb/in.²	*lb/in.²*	%	%		%	
1	1100	9650	13.9	17.4	0.80	0.14	
2	1275	9300	14.2	17.6	.81	.34	
3	1340	9560	12.3	15.1	.81	.14	
4	985	9320	14.6	18.5	.79	.26	
5	1445	6830	16.9	20.6	.82	.25	
Avg	1230	8930	14.4	17.8	0.81	0.23	
Plant 24, grade 2 ("Dark reds," 40 percent of kiln)							
1	1050	7320	19.1	21.6	0.88	0.38	
2	545	4570	21.8	25.6	.85	.60	
3	935	6510	19.9	21.9	.91	1.23	
4	740	5890	20.3	23.1	.88	0.42	
5	635	5590	20.8	24.3	.86	.23	
Avg	780	5980	20.4	23.3	0.88	0.57	

TABLE 3.—*Properties of bricks produced in Connecticut*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption: 48-hr cold immersion	Water absorption: 5-hr boiling	Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
	lb/in.²	*lb/in.²*	%	%		%	%
Plant 24, grade 3 ("Inside," 33 percent of kiln)							
1	620	4810	21.8	24.1	0.90	0.47	F 74c
2	390	3480	23.5	26.2	.90	F 15c	
3	530	3600	23.3	25.1	.93	2.30	F 60c
4	500	3290	23.0	24.4	.94	2.80	F 75c
5	620	4090	22.5	24.2	.93	0.36	1.42 (75c)
Avg	530	3850	22.8	24.8	0.92		
Plant 34, grade 1 ("Face," 85 percent of kiln)							
1	490	5620	13.8	17.3	0.78	0.14 (B)	
2	485	4200	15.5	19.7	.79	.42 (B)	
3	410	5850	16.2	20.6	.79	.29 (B)	
4	625	6550	18.9	22.3	.85	.13 (B)	
5	415	3560	19.5	23.2	.84	.41 (B)	
Avg	485	5160	16.8	20.6	0.81	0.28 (B)	
Plant 34, grade 2 ("Backup," 15 percent of kiln)							
1	710	3400	20.3	23.1	0.88	F 18c	
2	1015	4470	18.9	21.7	.87	0.28	
3	950	4130	18.9	21.4	.88	.13	
4	560	4200	17.0	20.6	.83	.85	
5	500	3470	17.4	20.5	.85	.46	
Avg	745	3930	18.5	21.5	0.86		
Plant 35, grade 1 ("Arch and Sewer," 20 percent of kiln)							
1	1200	8310	9.7	12.0	0.81	0.23	
2	1140	11000	13.5	16.0	.84	.37	
3	1205	9770	10.9	14.1	.77	.38	
4	630	14450	8.9	11.4	.78	.38	
5	1080	7070	14.6	17.2	.85	.66	
Avg	1050	10120	11.5	14.1	0.81	0.40	
Plant 35, grade 2 ("Dark face," 60 percent of kiln)							
1	875	6690	16.8	19.5	0.86	0.54	
2	1205	7100	15.3	17.7	.86	.59	
3	1290	9250	13.7	16.5	.83	.66	
4	1020	7510	14.9	17.3	.86	.47	
5	760	6950	16.0	18.3	.87	.71	
Avg	1030	7500	15.3	17.9	0.86	0.59	
Plant 35, grade 3 ("Light hards or red face," 20 percent of kiln)							
1	465	8030	14.5	17.1	0.85	0.53	
2	795	7840	17.4	18.0	.97	.37	
3	1000	7100	14.4	17.5	.82	.38	
4	940	6640	15.1	17.3	.87	.34	
5	925	6470	18.5	21.7	.85	.25	
Avg	825	7220	16.0	18.3	0.87	0.37	
Plant 68, grade 1 ("Vitrified," 2 percent of kiln)							
1	2380	10500	0.9	3.2	0.28	0.18	
2	2700	15450	.0	0.5	[a]	.00	
3	2840	15550	.5	.5	[a]	.10	
4	2350	17750	.5	1.0	.50	.29	
5	2690	15450	.4	0.4	[a]	.09	
Avg	2590	14940	0.5	1.1		0.13	

[a] These brick were weighed only to the nearest 5 grams. With these low absorptions, saturation coefficients have no significance, unless more accurate weighings are made.

TABLE 3.—*Properties of bricks produced in Connecticut*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption: 48-hr cold immersion	Water absorption: 5-hr boiling	Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
	lb/in.²	*lb/in.²*	%	%		%	
Plant 68, grade 2 ("Special facing," 5 percent of kiln)							
1	2000	14250+	6.3	8.5	0.74	0.00	
2	1415	8520	5.4	8.3	.65	.00	
3	1740	10700	4.8	8.0	.60	.11	
4	1470	8800	3.4	6.3	.54	.00	
5	1635	7820	5.1	8.0	.64	.11	
Avg	1650	10020+	5.0	7.8	0.63	0.04	
Plant 68, grade 3 ("Colonial," 25 percent of kiln)							
1	1900	7310	9.1	11.5	0.79	0.12	
2	1605	10850	7.2	9.4	.77	.11	
3	1345	8630	7.1	9.5	.75	.12	
4	1070	5980	8.6	10.5	.82	.12	
5	1805	8690	8.0	10.3	.78	.11	
Avg	1545	8290	8.0	10.2	0.78	0.11	
Plant 68, grade 4 ("Arch," 5 percent of kiln)							
1	1635	8970	1.8	2.4	0.75	0.00	
2	1230	8660	8.9	10.3	.86	.14	
3	1135	8650	11.4	12.6	.91	.24	
4	915	8090	10.3	12.1	.85	.12	
5	1355	8680	6.7	8.3	.81	.33	
Avg	1255	8610	7.8	9.1	0.84	0.17	
Plant 68, grade 5 ("Red Outside," 30 percent of kiln)							
1	920	7370	14.2	15.9	0.89	0.23	
2	695	5600	14.1	16.2	.87	.32	
3	1420	6600	14.2	16.2	.88	.95	
4	990	6820	14.6	16.6	.88	.66	
5	1130	6290	10.7	12.7	.84	.40	
Avg	1030	6540	13.6	15.5	0.87	0.51	
Plant 68, grade 6 ("Light outside," 30 percent of kiln)							
1	1070	4500	18.1	19.3	0.94	0.47	
2	1035	5680	17.8	20.6	.86	.43	
3	740	4090	18.2	20.1	.91	.25	
4	975	5740	17.8	19.6	.91	.49	
5		4750	17.6	19.1	.92	.46	
Avg	955	4950	17.9	19.7	0.91	0.42	
Plant 68, grade 7 ("Light hards," 3 percent of kiln)							
1	735	3800	20.0	23.4	0.85	1.14	% 1.26(66c)
2	890	5520	18.5	20.2	.92	F 39c	
3	755	3170	19.5	20.1	.97	0.47	0.47(66c)
4	850	4500	18.4	19.1	.96	1.45	F 59c
5	430	4630	19.2	20.3	.95	F 38c	
Avg	730	4320	19.1	20.6	0.93		
Plant 68, grade 8 ("Special facing," percentage of kiln unknown)							
1	835	4730	18.0	19.9	0.90	0.26	
2	965	2880	17.5	20.1	.87	.27	
3	1175	3240	16.7	20.0	.84	.40	
4	670	4720	16.2	18.6	.87	.36	
5	870	2956	17.8	20.8	.85	.49	
Avg	905	3700	17.2	19.9	0.87	0.36	

TABLE 3.—*Properties of bricks produced in Connecticut*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption: 48-hr cold immersion	Water absorption: 5-hr boiling	Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
	lb/in.²	*lb/in.²*	%	%		%	
Plant 76, grade 1 ("Arch," 25 percent of kiln)							
1	1850	8780	11.5	15.4	0.75	0.11	
2	1350	8200	9.1	12.4	.73	.11	
3	1715	10850	11.6	15.3	.76	.21	
4	1980	8490	10.4	13.7	.76	.11	
5	2105	10200	12.6	16.0	.79	.11	
Avg	1800	9300	11.0	14.6	0.76	0.13	
Plant 76, grade 2 ("Light Hard," 25 percent of kiln)							
1	1060	6280	16.0	21.5	0.74	0.44	
2	790	6180	20.4	22.4	.91	.53	
3	1255	5640	19.9	22.7	.88	.57	
4	915	7090	20.5	21.1	.97	.94	
5	860	6990	16.7	22.4	.75	.34	
Avg	975	6440	18.7	22.0	0.85	0.56 *	
Plant 76, grade 3 ("Face," grades 3 and 4 together represent 50 percent of kiln)							
1	1240	8920	14.8	18.7	0.79	0.26	
2	1250	9500	14.6	18.7	.78	.24	
3	1605	9400	15.0	19.0	.79	.26	
4	1130	8550	16.4	18.8	.87	.36	
5	1395	8920	13.4	18.3	.73	.12	
Avg	1325	9060	14.8	18.7	0.79	0.25	
Plant 76, grade 4 ("Special facing," grades 3 and 4 together represent 50 percent of kiln)							
1	2160	9730	11.7	14.2	0.83	0.17	
2	1150	8360	17.3	19.8	.87	.34	
3	1470	10400	16.0	19.3	.83	.34	
4	1695	10950	13.6	16.4	.83	.29 (B)	
5	1390	7810	16.3	19.7	.83	.41	
Avg	1575	9450	15.0	17.9	0.84	0.31 (A & B)	
Plant 106, grade 1 ("Special facing," 2 percent of kiln)							
Avg (5)	1370	10230	8.0	13.6	0.59	Not tested	
Plant 106, grade 2 ("Outside," 67 percent of kiln)							
1	1170	9920	14.5	17.1	0.85	0.40	
2	1620	10670	14.1	16.6	.85	.24	
3	1140	8250	14.5	17.5	.83	.24	
4	685	7140	15.2	17.9	.85	1.43	
5	1250	9540	14.1	16.8	.84	0.27	
Avg	1175	9100	14.5	17.2	0.84	0.52	
Plant 106, grade 3 ("Arch," 14 percent of kiln)							
1	580	4080	21.5	24.5	0.88	0.48	
2	960	6170	21.0	25.0	.84	F 13c	
3	590	4150	22.0	25.4	.87	0.57	
4	700	3740	21.7	24.8	.87	1.00	
5	1065	5460	20.0	24.5	.82	F 26e (B)	
Avg	780	4720	21.2	24.8	0.86		

TABLE 3.—*Properties of bricks produced in Connecticut*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption: 48-hr cold immersion	Water absorption: 5-hr boiling	Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
	lb/in.²	*lb/in.²*	%	%		%	
Plant 106, grade 4 ("Inside," 17 percent of kiln)							
1	540	4310	21.5	23.8	0.90	F 28c	
2	825	4150	19.9	24.1	.83	0.36	
3	570	3920	20.0	23.6	.85	.49	
4	330	1720	22.6	28.9	.78	3.66	
5	335	1850	22.4	28.3	.79	3.03	
Avg	520	3190	21.3	25.7	0.83		
Plant 153A, grade 1 ("No. 1 Hard," 20 percent of kiln)							
1	1530	10000	4.3	6.4	0.67	0.11	
2	1750	10650	3.8	5.0	.76	.00	
3	1790	11700	3.1	5.2	.60	.00 (B)	
4	1740	9160	3.4	5.7	.60	.11	
5	1970	9170	2.0	3.4	.59	.27	
6	2070	11300	3.3	4.4	.75	.11	
Avg	1810	10330	3.3	5.0	0.66	0.10 (A & B)	
Plant 153A, grade 2 ("No. 2 Hard," 20 percent of kiln)							
1	1340	8270	11.8	15.5	0.76	0.50	
2	850	6910	12.6	16.1	.78	.35	
3	1035	7600	11.8	15.4	.77	.59	
4		6160	16.4	19.2	.86	3.66	
5	845	4240	15.5	18.9	.82	0.80	
6	1330	6690	10.8	14.6	.74	.32	
Avg	1080	6640	13.2	16.6	0.79	1.04	
Plant 153A, grade 3 ("No. 1 Medium," 20 percent of kiln)							
1	865	5850	15.2	17.4	0.87	0.46	
2	710	5150	16.8	18.8	.89	.42	
3	665	5560	17.8	20.4	.87	.40	
4	690	4900	17.2	19.8	.87	.90	
5	665	4870	17.3	20.0	.87	1.10	
6	935	4850	17.5	19.8	.88	0.57	
Avg	755	5200	17.0	19.4	0.88	0.64	
Plant 153A, grade 4 ("No. 2 Medium," 20 percent of kiln)							
1	595	4060	18.1	20.0	0.91	0.63	
2		4040	18.2	20.0	.91	.73	
3	375	4080	17.4	19.7	.88	1.23	
4	1040	4430	17.3	19.5	.89	0.45	
5	575	3800	18.9	21.1	.90	.78	
6	405	3730	18.6	20.5	.91	1.54	
Avg	600	4020	18.1	20.1	0.90	0.89	
Plant 153A, grade 5 ("Soft," 20 percent of kiln)							
1	670	2700	18.6	25.3	0.74	0.94	
2	430	2530	19.8	24.8	.79	3.69	
3	420	2370	20.4	26.0	.79	6.50	
4	715	4210	18.3	21.7	.84	0.68	
5	595	3680	16.5	20.4	.81	.51	
6	495	3630	18.3	20.9	.88	1.65	
Avg	555	3190	18.6	23.2	0.81	2.33	

TABLE 3.—*Properties of bricks produced in Connecticut*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
	lb/in.²	*lb/in.²*	*%*	*%*		*%*	
Plant 153B, grade 1 ("Hard," 20 percent of kiln)							
1	890	7550	15.6	17.0	0.92	0.14	
2	2070	9090	13.4	15.3	.88	.13	
3	1715	8600	11.9	14.9	.80	.45	
4	1275	8210	15.5	17.4	.89	.13	
5	1815	7130	9.1	10.5	.87	.26	
6	2170	9120	10.3	11.0	.94	.14	
Avg	1655	8280	12.6	14.4	0.88	0.21	
Plant 153B, grade 2 ("No. 1 Medium," 30 percent of kiln)							
1	1105	5590	17.9	18.5	0.97	0.93	
2	1580	6560	18.2	19.0	.96	.29	
3	1040	4430	20.3	21.3	.95	F 19c	
4	1130	6320	17.9	18.5	.97	0.37	
5	875	7250	15.2	17.2	.88	.66	
6	1020	5340	17.2	18.5	.93	.26	
Avg	1125	5920	17.8	18.8	0.94		
Plant 153B, grade 3 ("No. 2 Medium," 30 percent of kiln)							
1	890	5780	19.1	21.3	0.90	F 29c	
2	650	5000	19.5	22.1	.88	F 17c	
3		5050	19.3	21.7	.89	3.40	
4	540	6410	21.0	22.5	.93	F 26c	
5	860	5190	19.7	22.2	.89	F 44c	
6	1070	7170	19.7	21.8	.90	F 18c	
Avg	800	5770	19.7	21.9	0.90		
Plant 153B, grade 4 ("Soft," 20 percent of kiln)							
1	1200	8130	14.5	15.8	0.92	0.27	
2	840	5440	19.7	20.4	.96	F 16c	
3	1060	5320	20.0	20.6	.97	F 30c	
4	1095	7070	18.4	20.4	.90	F 33c	
5	1130	6400	20.2	21.6	.93	F 30c	
6	940	4060	21.4	22.1	.97	F 15c	
Avg	1045	6070	19.0	20.2	0.94		
Plant 153C, grade 1 ("Hard," 20 percent of kiln)							
1	1125	5310	7.1	11.7	0.61	0.26	
2	1000	5190	7.4	11.7	.63	.37	
3	855	5200	7.0	11.5	.61	.38	
4	895	4750	6.4	11.4	.56	.29	
5	1070	5890	8.2	12.0	.68	.25	
6	620	3760	7.5	12.6	.60	.34	
Avg	925	5020	7.3	11.8	0.62	0.32	
Plant 153C, grade 2 ("No. 1 Medium," 30 percent of kiln)							
1	1435	5860	9.6	11.5	0.83	0.00	
2	1185	6580	8.5	12.1	.70	.48	
3	1040	4370	9.9	11.2	.89	.00	
4	1175		11.0	14.9	.74	.13	
5	1285	4000	8.6	12.9	.67	.12	
6	945	4290	11.3	15.0	.75	.00	
Avg	1175	5020	9.8	12.9	0.76	0.12	

TABLE 3.—*Properties of bricks produced in Connecticut*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
	lb/in.²	*lb/in.²*	*%*	*%*		*%*	
Plant 153C, grade 3 ("No. 2 Medium," 30 percent of kiln)							
1	995	3950	12.8	16.5	0.78	0.49	
2	1265	5110	12.1	16.2	.75	.20	
3	1030	3040	11.0	14.5	.76	.28	
4	1275	4310	9.6	11.4	.84	.12	
5	1210	3110	12.7	16.8	.76	.13	
6	1110	3670	9.6	11.5	.83	.00	
Avg	1155	3860	11.30	14.5	0.79	0.20	
Plant 153C, grade 4 ("Soft," 20 percent of kiln)							
1	670	2940	18.5	22.4	0.83	0.45	
2	605	2300	18.6	22.3	.83	.37	
3	790	2580	20.0	22.2	.90	.59	
4	455	2540	19.0	22.1	.86	.85	
5	540	2680	19.5	23.1	.84	.73	
6	825	1920	18.6	25.5	.73	5.00	
Avg	650	2490	19.0	22.9	0.83	1.33	
Plant 175, grade 1 ("Bottom," 20 percent of kiln)							
1	1500	9330	8.4	11.2	0.75	0.11	
2	1885	9090	6.4	9.3	.69	.12	
3	1335	6980	10.0	13.6	.73	.12	
4	1455	10230	8.0	10.8	.74	.11	
5	1910	7940	6.4	9.3	.69	.12	
6	540	7500	9.6	12.6	.76	.24	
Avg	1440	8510	8.1	11.1	0.73	0.14	
Plant 175, grade 2 ("Middle and top," 60 percent of kiln)							
1	790	7860	13.9	16.3	0.85	0.35	
2	1000	7030	14.0	16.3	.86	.11	
3	1370	6060	14.1	16.4	.86	.23	
4	1280	7730	14.4	16.7	.86	.60	
5	1135	6810	12.3	14.6	.84	.12	
6	860	5490	16.2	18.4	.88	.30	
Avg	1070	6830	14.2	16.4	0.86	0.28	
Plant 175, grade 3 ("Arch," 10 percent of kiln)							
1	1635	9740	7.9	9.6	0.82	0.11	
2	1225	9570	7.0	10.2	.69	.13	
3	750	9040	7.0	10.5	.67	.12	
Avg	1205	9450	7.3	10.1	0.73	0.12	
Plant 175, grade 4 ("Salmon," 10 percent of kiln)							
1	1035	6460	16.6	18.3	0.91	1.49	
2	970	6020	16.7	19.0	.88	0.36	
3	810	5160	16.8	18.5	.91	.45	
Avg	940	5880	16.7	18.6	0.90	0.73	
Plant 176, grade 1 ("Arch or clinkers," 5 percent of kiln)							
Avg (5)	1365	8240	6.8	9.0	0.75	Not tested	

TABLE 3.—*Properties of bricks produced in Connecticut*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption: 48-hr cold immersion	Water absorption: 5-hr boiling	Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
Plant 176, grade 2 ("Dark face," 20 percent of kiln)							
	lb/in.²	*lb/in.²*	%	%		%	
Avg (6)	1675	8760	1.9	4.4	0.35	Not tested	
Plant 176, grade 3 ("Common face," 40 percent of kiln)							
1	1815	8960	10.7	11.9	0.90	0.36 (B)	
2	2010	7800	9.0	10.8	.83	.12 (B)	
3	1810	8260	9.6	11.9	.81	.23 (B)	
4	2160	9450	9.0	10.3	.87	.14 (B)	
5	1640	8890	9.6	10.8	.89	.24 (B)	
Avg	1885	8670	9.6	11.1	0.86	0.22 (B)	
Plant 176, grade 4 ("Light face," 30 percent of kiln)							
1	1430	7820	12.9	14.7	0.88	0.86	
2	1500	7450	12.6	14.8	.85	.68	
3	1295	8250	13.4	14.6	.92	.47	
4	1280	7190	14.1	16.5	.85	.59	
5	1375	7250	12.7	14.6	.87	.25	
Avg	1375	7590	13.1	15.0	0.87	0.57	
Plant 176, grade 5 ("Light hard," 5 percent of kiln)							
1	790	4550	16.9	19.2	0.88	0.58	
2	1390	5660	19.3	20.0	.96	F 42c	
3	715	2600	19.2	20.9	.92	7.56	
4	530	2630	19.5	20.7	.94	8.60	
5	1405	2640	17.4	18.7	.93	0.50	
6	675	3390	20.3	22.1	.92	4.88	
Avg	920	3580	18.8	20.3	0.92		

TABLE 4.—*Properties of bricks produced in the Hudson Valley District*

[With one exception, all plants reported that their samples were made from surface clay. The exception (plant 187) submitted one grade made from a clay-shale mixture. All of these bricks were formed by the sand-struck, soft-mud process]

Specimen number	Modulus of rupture	Compressive strength	Water absorption: 48-hr cold immersion	Water absorption: 5-hr boiling	Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
Plant 23, grade 1 ("Commercial hard," 98 percent of kiln)							
	lb/in.²	*lb/in.²*	%	%		%	%
1	580	4360	18.0	21.8	0.83	0.90	0.90(75c)
2	745	4040	16.7	21.2	.79	.61	.76(75c)
3	600	4600	18.6	22.1	.84	.55	.59(75c)
4	425	3620	18.9	22.6	.84	1.60	1.77(75c)
5	725	4980	17.7	21.1	.84	0.68	0.95(75c)
Avg	615	4320	18.0	21.8	0.83	0.87	0.99(75c)

TABLE 4.—*Properties of bricks produced in the Hudson Valley District*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption: 48-hr cold immersion	Water absorption: 5-hr boiling	Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
Plant 45, grade 1 ("Commercial hard," 92 percent of kiln)							
	lb/in.²	*lb/in.²*	%	%		%	
1	410	7110	14.2	18.3	0.78	1.79	
2	320	3970	15.7	19.5	.80	0.93	
3	475	7780	10.9	14.0	.78	.47	
4	545	6050	10.4	14.3	.73	.66	
5	485	5280	14.2	18.2	.78	.95	
Avg	445	6040	13.1	16.9	0.77	0.96	
Plant 45, grade 2 ("Arch," 6 percent of kiln)							
1	670	4800	15.3	19.4	0.79	0.98	
2	300	5930	11.3	15.0	.75	1.13	
3	355	4820	14.3	18.4	.78	0.68	
4	385	5610	13.9	18.2	.76	.44	
5	490	5990	13.9	18.0	.77	.70	
Avg	440	5430	13.7	17.8	0.77	0.79	
Plant 45, grade 3 ("Salmon," 2 percent of kiln)							
1	445	2440	10.4	17.2	0.61	1.79	
2	390	2200	13.8	20.2	.68	F 27c	
3	280	2380	10.8	18.3	.59	1.36	
4	420	3600	12.1	19.2	.63	3.65	
5	535	2920	9.5	17.6	.54	0.81	
Avg	415	2710	11.3	18.5	0.61		
Plant 46, grade 1 ("Commercial hard," 97 percent of kiln)							
1	610	4120	15.4	19.4	0.79	0.46	
2	900	3800	12.6	16.3	.77	1.20	
3	705	5510	15.2	18.6	.82	0.41	
4	620	3850	14.0	18.1	.77	.47	
5	710	4590	15.8	19.1	.83	.53	
6	670	5420	15.4	18.8	.82	.68	
7	710	4630	15.8	19.6	.81	.25	
8	445	4830	15.6	19.1	.82	.35	
9	855	4580	14.5	17.9	.81	.28	
10	800	5500	14.9	18.5	.81	.48	
Avg	705	4680	14.9	18.5	0.80	0.51	
Plant 75, grade 1 ("Select all hard," 50 percent of kiln)							
1	785	5260	14.7	18.4	0.80	0.75	
2	710	5840	15.5	18.6	.83	No test	
3	780	6130	15.0	18.4	.82	do	
4	840	5190	15.6	18.8	.83	0.83	
5	810	5600	13.4	17.7	.76	.61	
Avg	785	5600	14.8	18.4	0.81	0.73	
Plant 75, grade 2 ("Run of kiln, hard," 90 percent of kiln)							
1	920	5890	16.0	18.7	0.86	0.70	
2	480	4820	13.5	17.5	.77	.64	
3	540	4780	16.5	19.8	.83	.66	
4	-------	4800	16.4	19.3	.85	.72	
5	685	5360	12.7	16.4	.77	.36	
Avg	655	5130	15.0	18.3	0.82	0.62	
Plant 75, grade 3 ("Hard swelled or lammies," 5 percent of kiln)							
1	(a)	6940	4.0	6.4	0.63	0.32	
2	-------	6180	4.7	7.8	.60	.62	
3	-------	7100	4.4	9.4	.47	.25	
4	-------	7420	4.2	7.2	.58	.12	
5	-------	8010	3.7	5.9	.63	.14	
Avg	-------	7130	4.2	7.3	0.58	0.29	

[a] Too irregular in shape for determination of modulus of rupture.

TABLE 4.—*Properties of bricks produced in the Hudson Valley District*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
	*lb/in.*²	*lb/in.*²	%	%		%	%
Plant 75, grade 4 ("Salmons," 10 percent of kiln)							
1	315	2450	17.2	21.4	0.80	F 42c	
2	560	2340	19.9	25.5	.78	9.70	F 51c
3	460	2660	17.8	20.8	.86	2.74	5.96 (63c)
4	355	2230	17.1	20.6	.83	F 33c	
5	285	1010	24.6	32.1	.77	F 2c	
Avg	395	2140	19.3	24.1	0.81		
Plant 88, grade 1 ("Common," 95 percent of kiln)							
1	645	3250	19.4	23.0	0.84	0.97	0.97(54c)
2	640	3390	19.1	22.8	.89	.87	1.11(54c)
3	660	4030	13.5	17.7	.76	.59	0.59(54c)
4	435	7240	15.9	19.1	.83	.64	.64(54c)
5	780	4370	16.4	20.1	.82	.90	1.20(54c)
6	590	3970	18.1	22.6	.80	1.17	1.55(54c)
7	1100	4610	13.7	17.9	.77	0.63	1.26(54c)
8	605	4310	17.2	21.6	.80	1.59	1.73(54c)
9	850	5920	18.4	22.7	.81	0.85	1.27(54c)
10	415	4440	17.2	21.9	.79	.94	0.94(54c)
Avg	670	4550	16.9	20.9	0.81	0.92	1.13(54c)
Plant 94, grade 1 ("Hard," 95 percent of kiln)							
1	795	3380	18.7	22.5	0.83	2.40	2.40(54c)
2	535	4680	11.1	14.1	.79	1.86	1.86(54c)
3	1450	4530	5.9	8.8	.67	5.60	5.75(54c)
4	665	4900	13.4	16.5	.81	1.86	2.12(54c)
5	1100	5600	15.5	18.3	.85	0.42	0.42(54c)
6	1095	4900	19.9	23.1	.86	.64	.64(54c)
7	855	4740	18.3	21.6	.85	F 48c	
8	410	2550	21.3	25.0	.85	F 39c	
9	645	3060	22.2	24.8	.90	1.20	1.37(54c)
10	595	2470	21.6	24.7	.88	4.97	6.33(54c)
Avg	815	4080	16.8	19.9	0.83		
Plant 94, grade 1A ("Second sample (1936) of grade1," 95 percent of kiln)							
			(24-hr)				
1	400	3540	14.5	19.1	0.76	1.80	
2	580	3750	18.7	21.9	.85	1.20	
3	425	3590	19.1	22.7	.84	1.73	
4	500	4460	18.8	22.0	.85	1.62	
5	290	2320	18.3	20.3	.90	1.79	
6	460	3880	18.7	21.1	.89	1.92	
7	470	3610	19.0	22.3	.85	1.35	
8	375	3000	18.9	22.0	.86	1.20	
9	310	3230	18.8	23.0	.82	1.70	
10	480	3600	18.1	20.3	.89	1.08	
11	580	5480	15.9	19.5	.82	0.94	
12	445	2950	19.3	23.2	.83	1.30	
13	450	3550	17.9	22.1	.81	1.14	
14	635	3520	18.6	22.1	.84	1.21	
15	445	4180	16.1	20.8	.77	0.99	
16	370	2710	20.0	23.0	.87	1.71	
17	445	3300	19.2	22.7	.85	1.63	
18	425	4240	18.0	21.4	.84	1.20	
19	635	3740	18.2	21.3	.85	1.26	
20	610	3800	18.1	21.1	.86	1.75	
Avg	465	3620	18.2	21.6	0.84	1.42	
Plant 94, grade 2 ("Light hard," 5 percent of kiln)							
1	475	1260	14.5	21.4	0.68	0.85	1.02(54c)
2	755	4250	18.9	25.5	.74	8.50	8.92(54c)
3	615	1440	11.9	18.3	.65	0.73	0.92(54c)
4	970	4100	16.5	22.6	.73	1.40	2.10(54c)
5		2180	17.1	20.7	.83	4.70	4.90(54c)
Avg	705	2650	15.8	21.7	0.73	3.24	3.57(54c)

TABLE 4.—*Properties of bricks produced in the Hudson Valley District*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
	*lb/in.*²	*lb/in.*²	%	%		%	%
Plant 95, grade 1 ("Kiln run," 93 to 95 percent of kiln)							
1	945	6020	12.4	15.2	0.82	0.61	
2	515	5290	14.0	17.3	.81	.34	
3	940	7270	5.2	9.0	.58	.26	
4	545	5390	15.3	18.8	.81	.59	
5	685	5190	15.3	17.8	.86	.86	
6		4530	16.0	19.4	.82	.92	
7	720	4730	14.6	18.0	.81	.67	
8	520	4810	15.3	18.8	.81	.82	
9	570	5270	13.3	16.9	.79	.85	
10	555	7400	12.0	15.8	.76	.88	
11	595	4940	12.6	16.1	.78	1.21	
12	475	5340	12.7	16.0	.79	0.78	
13	585	5650	12.7	15.9	.80	.77	
14	615	6600	11.7	15.3	.76	.73	
15	475	5400	12.3	16.0	.77	.74	
Avg	625	5590	13.0	16.4	0.80	0.74	
Plant 95, grade 2 ("Lammies," 0.5 percent of kiln)							
Avg (5)		6340	5.0	11.8	0.43	Not tested	
Plant 95, grade 3 ("Heading course—hard," 1.25 percent of kiln)							
Avg (5)	580	2810	11.6	21.8	0.53	Not tested	
Plant 95, grade 4 ("Heading course—light," 25 percent of kiln)							
1	715	3190	16.1	25.9	0.62	2.70	3.23(57c)
2	925	2880	9.1	17.0	.54	0.52	0.78(57c)
3	515	3020	17.7	26.9	.66	2.17	2.48(57c)
4	355	1460	19.0	28.9	.66	7.50	8.19(57c)
5	195	1770	19.2	28.7	.67	9.02	F 57c
Avg	540	2460	16.2	25.5	0.63	4.38	
Plant 95, grade 5 ("Light hards," 2 percent of kiln)							
1	175	2630	16.3	18.9	0.86	3.28	3.66 (57c)
2	230	2630	15.9	18.3	.87	2.34	2.46 (57c)
3	235	1030	18.0	28.1	.64	8.77	9.25 (57c)
4	165	1120	16.7	28.4	.59	4.60	5.20 (57c)
5	145	1920	14.2	22.7	.63	5.31	5.60 (57c)
Avg	190	1860	16.2	23.3	0.72	4.86	5.23 (57c)
Plant 95, grade 6 ("Select," 70 percent of kiln)							
1	890	5090	9.7	13.7	0.71	0.49	
2	670	3310	12.6	17.6	.72	1.14	
3	875	4710	11.8	16.3	.72	0.66	
4	780	4700	9.1	13.6	.67	.52	
5	1035	4810	10.3	15.1	.68	.73	
6	795	5380	9.6	14.4	.63	.60	
7	915	4240	9.8	14.7	.62	.87	
8	655	4040	13.0	17.1	.76	.69	
9	785	5020	11.1	15.8	.70	1.06	
10	900	4880	11.3	16.2	.70	0.71	
11	660	3610	12.7	17.5	.72	1.09	
12	810	4930	10.7	16.0	.67	0.46	
Avg	815	4560	11.0	15.7	0.69	0.75	

TABLE 4.—*Properties of bricks produced in the Hudson Valley District*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
	*lb/in.*²	*lb/in.*²	%	%		%	
Plant 130, grade 1 ("Kiln run," 60 percent of kiln)							
1	905	4500	15.3	18.7	0.82	Not tested	
2	410	4330	16.4	20.1	.82	0.63	
3	860	6950	12.0	14.4	.83	Not tested	
4	1250	6100	9.9	12.8	.77	0.43	
5	725	5040	13.7	17.0	.81	.52	
6		4930	13.4	17.8	.75	Not tested	
7	580	4320	15.5	18.6	.83	0.62	
8	265	5130	12.6	16.5	.76	.67	
9	335	5850	10.5	14.3	.73	.61	
10	590	5500	13.9	18.3	.76	.88	
11	780	5810	14.7	18.0	.82	.67	
12	970	6730	16.5	18.6	.89	.83	
13		7170	15.5	17.3	.90	1.11	
14	925	5850	16.3	18.9	.86	0.89	
15	930	7080	16.0	18.0	.89	.98	
16	605	6380	16.9	19.9	.85	.98	
17	595	6080	15.7	19.0	.83	.50	
18	660	5840	14.6	18.5	.79	.52	
19	760	5570	16.2	19.2	.85	.96*	
20	805	6770	12.8	16.8	.76	.41	
Avg	720	5800	14.4	17.6	0.82	0.72	
Plant 130, grade 2 ("Salmon," 10 percent of kiln)							
1	450	2790	20.0	23.2	0.86	F 9c	
2		2720	20.0	22.2	.90	F 9e	
3		2680	21.1	23.6	.89	F 1e	
4		2770	19.8	23.2	.85	F 9e	
5	485	3160	19.4	23.2	.84	F 21c	
Avg	470	2820	20.1	23.1	0.87	F 10e	
Plant 136, grade 1 ("Arch," 33⅓ percent of kiln)							
1	740	3050	15.4	20.0	0.77	1.23	
2	595	3130	4.7	8.3	.57	0.47	
3	1290	4220	8.9	13.0	.68	.41	
4	755	3150	14.0	18.5	.76	.76	
5	1075	4220	11.2	15.1	.74	.53	
Avg	890	3550	10.8	15.0	0.70	0.68	
Plant 136, grade 2 ("Middle," 33⅓ percent of kiln)							
1	920	3710	18.7	22.9	0.82	2.41	
2	690	4440	15.7	19.9	.79	0.60	
3	555	3310	17.7	22.0	.80	.43	
4	845	3870	16.7	21.3	.78	.54	
5	560	3350	16.9	20.9	.81	.54	
Avg	715	3740	17.1	21.4	0.80	0.90	
Plant 136, grade 3 ("Top," 33⅓ percent of kiln)							
1	610	3140	17.6	22.3	0.79	1.42	
2	730	3230	17.9	22.5	.80	0.66	
3	655	3630	17.8	22.7	.78	.30	
4	745	3880	17.4	21.7	.80	.87	
5	655	3660	15.4	19.8	.78	.62	
Avg	680	3510	17.2	21.8	0.79	0.77	
Plant 147, grade 1 ("Arch," 18 percent of kiln)							
1	1120	8010	9.7	12.1	0.80	0.48	
2	565	5330	8.9	12.0	.74	1.52	
3	935	5460	16.4	19.5	.84	0.62	
Avg	875	6270	11.7	14.5	0.79	0.87	

TABLE 4.—*Properties of bricks produced in the Hudson Valley District*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
	*lb/in.*²	*lb/in.*²	%	%		%	
Plant 147, grade 2 ("Second bench," 18 percent of kiln)							
1	1080	5100	14.6	18.5	0.79	0.51	
2	1275	7900	11.6	14.2	.82	.39	
3	1285	6250	12.2	16.0	.76	.64	
Avg	1215	6420	12.8	16.2	0.79	0.51	
Plant 147, grade 3 ("Third bench," 18 percent of kiln)							
1	770	5490	8.3	12.4	0.67	0.28	
2	395	5660	9.5	12.4	.77	.32	
3		6010	8.3	11.5	.72	.25	
Avg	580	5720	8.7	12.1	0.72	0.28	
Plant 147, grade 4 ("Fourth bench," 18 percent of kiln)							
1	1120	7520	12.4	15.0	0.83	0.52	
2	1360	7000	13.0	15.0	.87	.68	
3	1180	7150	14.1	16.3	.87	.59	
Avg	1220	7220	13.2	15.4	0.86	0.60	
Plant 147, grade 5 ("Fifth bench," 18 percent of kiln)							
1	1090	2810	17.1	20.1	0.85	1.18	
2	1195	4270	17.3	20.4	.85	0.86	
3	1125	6750	17.5	20.8	.84	.78	
Avg	1135	4590	17.3	20.4	0.85	0.94	
Plant 147, grade 6 ("Salmon," 10 percent of kiln)							
1	600	5500	20.5	24.3	0.84	2.42	
2	510	3010	19.7	26.5	.74	1.81	
3	535	2240	20.5	26.9	.76	1.42	
Avg	550	3580	20.2	25.9	0.78	1.88	
Plant 148, grade 1 ("Kiln run hard—top," 30 percent of kiln)							
1	725	3970	16.9	19.3	0.82	1.45	
2	540	3750	16.4	20.5	.80	1.65	
3	645	3350	16.5	19.6	.84	2.60	
4	625	4110	14.6	18.3	.80	1.47	
5	725	3590	16.2	19.5	.83	2.08	
Avg	650	3750	16.1	19.4	0.82	1.85	
Plant 148, grade 2 ("Kiln run hard—middle," 30 percent of kiln)							
1	795	4770	15.6	18.8	0.83	1.13	
2	670	3530	15.7	18.7	.84	0.96	
3	810	3900	16.0	18.8	.85	1.26	
4	715	3530	16.3	19.3	.84	0.96	
5	785	3430	16.9	20.1	.84	1.04	
Avg	755	3830	16.1	19.1	0.84	1.78	
Plant 148, grade 3 ("Kiln run hard—bottom," 30 percent of kiln)							
1	725	3170	16.2	19.5	0.83	0.79	
2	575	3220	16.0	18.9	.85	.60	
3	625	3770	16.2	18.6	.87	.75	
4	535	4420	15.4	18.3	.84	.95	
5	465	4650	15.7	18.9	.83	.63	
Avg	585	3850	15.9	18.8	0.84	0.74	

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TABLE 4.—*Properties of bricks produced in the Hudson Valley District*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
	*lb/in.*²	*lb/in.*²	%	%		%	
Plant 148, grade 4 ("Salmon," 10 percent of kiln)							
1	475	3630	16.1	18.5	0.87	2.18	
2	175	1925	20.4	27.0	.76	9.50	
3	180	1680	19.2	23.3	.82	F 3c	
4	285	1650	18.6	23.1	.81	9.60	
5	255	1385	21.2	30.3	.67	F 33e	
Avg	275	2050	19.1	24.4	0.79		
Plant 149, grade 1 ("Top," 30 percent of kiln)							
1	870	5150	13.6	16.7	0.81	0.86	
2	925	3540	10.8	15.8	.68	.43	
3	1585	8140	3.4	4.1	.67	.27	
4	1215	6520	8.9	11.1	.80	.59	
5	1160	5140	13.1	15.4	.85	.46	
Avg	1150	5700	10.0	12.6	0.76	0.52	
Plant 149, grade 2 ("Middle," 30 percent of kiln)							
1	565	2310	16.4	20.7	0.79	0.86	
2	750	2420	16.0	19.9	.80	.90	
3	695	2920	12.3	17.3	.71	.61	
4	420	2420	13.6	18.2	.75	.91	
5	720	3490	10.3	14.7	.70	.59	
Avg	630	2710	13.7	18.2	0.75	0.77	
Plant 149, grade 3 ("Bottom," 30 percent of kiln)							
1	870	3520	13.9	17.7	0.78	0.88	
2	590	2660	11.3	15.8	.72	.75	
3	790	2750	10.2	15.0	.68	.68	
4	750	3370	15.2	18.8	.81	.72	
5	565	2720	15.3	19.3	.79	.80	
Avg	715	3000	13.2	17.3	0.76	0.77	
Plant 155, grade 1 ("Kiln run hard—top," 30 percent of kiln)							
1	540	3180	16.2	20.8	0.78	F 33c	
2	465	2330	15.2	19.6	.78	0.88	
3	580	2570	16.8	21.0	.80	.98	
4	560	2900	15.1	19.5	.77	1.64	
5	640	3240	15.2	19.6	.78	0.73	
Avg	560	2840	15.7	20.1	0.78		
Plant 155, grade 2 ("Kiln run hard—middle," 30 percent of kiln)							
1	475	2770	14.9	19.0	0.78	0.69	
2	325	2420	12.3	17.8	.69	.55	
3	430	2490	17.5	21.9	.75	.75	
4	419	2790	12.2	17.4	.70	.52	
5	670	3670	15.4	20.1	.77	.94	
Avg	460	2830	14.5	19.2	0.74	0.69	
Plant 155, grade 3 ("Kiln run hard—bottom," 30 percent of kiln)							
1	675	2440	10.8	15.6	0.69	0.36	
2	590	2720	12.0	16.5	.73	.63	
3	350	2130	17.2	21.6	.80	.90	
4	645	3610	12.5	17.0	.74	.54	
5	810	3170	10.5	15.2	.69	.58	
Avg	615	2810	12.6	17.2	0.73	0.60	

TABLE 4.—*Properties of bricks produced in the Hudson Valley District*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
	*lb/in.*²	*lb/in.*²	%	%		%	
Plant 155, grade 4 ("Salmon," 10 percent of kiln)							
1	425	1780	19.0	23.0	0.83	F 15e	
2	310	2300	18.6	22.9	.81	F 42e	
3	300	990	23.5	31.6	.74	F 15e	
4	215	940	23.9	32.8	.73	F 15e	
5	345	1420	19.3	24.5	.79	F 42e	
Avg	320	1480	20.9	27.0	0.78	F 26e	
Plant 174, grade 1 ("Arch," 40 percent of kiln)							
1	700	4070	11.3	15.0	0.75	0.46	
2		5120	3.9	6.2	.63	.16	
3	1220	4980	11.6	14.8	.78	.39	
4	425	5510	2.1	4.2	.50	.28	
5	590	4000	6.6	9.9	.67	.33	
Avg	735	4740	7.1	10.0	0.67	0.32	
Plant 174, grade 2 ("All hard—middle and top," 90 percent of kiln)							
1	540	3260	17.3	21.5	0.80	1.11	
2	530	3460	16.8	20.8	.81	0.67	
3	650	4020	13.8	18.1	.76	.29	
4	300	2480	12.5	15.2	.83	.54	
5	595	3220	16.0	20.7	.77	.40	
6	480	2580	16.5	20.9	.79	1.14	
7	615	3700	15.6	20.1	.78	0.78	
8	450	3440	15.4	19.9	.77	.64	
9	590	3670	16.5	20.1	.82	.73	
10	565	3490	13.8	18.2	.76	.63	
Avg	530	3330	15.4	19.6	0.79	0.69	
Plant 174, grade 3 ("Light hard or salmon," 6 percent of kiln)							
1	340	1960	23.5	29.5	0.80	8.78 (B)	
2	395	2720	20.7	23.2	.89	0.54 (B)	
3		3010	20.0	23.0	.87	.90 (B)	
4	435	1770	24.0	30.1	.80	No test	
5	425	3400	19.5	21.8	.89	do	
Avg	400	2570	21.5	25.5	0.85	3.41 (B)	
Plant 181, grade 1 ("Kiln run," 100 percent of kiln)							
1	520	4280	18.1	19.4	0.93	0.25 (B)	
2	470	3570	19.0	21.4	.89	.80 (B)	
3	470	3770	17.2	19.0	.91	.52 (B)	
4	470	4290	15.5	19.8	.78	.48 (B)	
5	940	2850	17.0	24.0	.71	F 5c (B)	
6	790	3560	10.8	15.8	.66	0.50 (B)	
7	1080	2960	12.6	17.1	.74	.36 (B)	
8	1430	5630	8.6	12.2	.70	.29 (B)	
9	1335	4570	9.0	13.3	.68	.24 (B)	
10	1140	2800	9.2	13.8	.67	.26 (B)	
11	1005	3350	11.3	15.7	.72	.38 (B)	
12	1425	4540	9.0	13.2	.68	.14 (B)	
13	845	3970	19.7	22.7	.87	F 8c (B)	
14	700	2720	19.3	22.1	.87	F 50c (B)	
15	375	2730	18.2	20.1	.91	F 1c (B)	
Avg	865	3710	14.3	18.0	0.78		
Plant 181, grade 2 ("Salmon," 5 percent of kiln)							
1	475	3530	19.1	22.7	0.84	F 4c (B)	
2		3630	19.6	20.6	.95	F 21c (B)	
3		3010	20.0	22.7	.88	F 9c (B)	
4	460	3070	20.0	23.2	.86	F 18c (B)	
5	425	2970	19.8	22.7	.87	F 2c (B)	
Avg	455	3240	19.7	22.4	0.88	F 11c (B)	

TABLE 4.—*Properties of bricks produced in the Hudson Valley District*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
Plant 181, grade 3 ("Body," 95 percent of kiln)							
Avg (5)	*lb/in.*² 1055	*lb/in.*² 4830	% 10.5	% 15.2	0.69	% Not tested	
Plant 187, grade 1 ("Arch," 5 percent of kiln)							
1	490	4080	18.7	19.4	0.96	F 20c (B)	
2	630	3500	18.1	18.7	.97	0.42 (B)	
3	185	4170	19.6	20.6	.95	Not tested	
4	155	4020	19.6	20.8	.94	F 2c (B)	
5	735	4820	18.6	19.8	.94	Not tested	
Avg	440	4120	18.9	19.9	0.95		
Plant 187, grade 2 ("Commercial hard," 85 percent of kiln)							
1	915	4470	18.8	20.1	0.94	0.39 (B)	
2	1045	4270	19.7	20.4	.97	.39 (B)	
3	930	5310	19.7	20.4	.97	.25 (B)	
4	915	4190	18.9	20.2	.94	.26 (B)	
5	785	5230	18.3	19.3	.95	.32 (B)	
Avg	920	4700	19.1	20.1	0.95	0.32 (B)	
Plant 187, grade 3 ("Salmon," 10 percent of kiln)							
1	675	3320	21.7	22.4	0.97	F 5c (B)	
2	285	3260	20.8	21.6	.96	F 5c (B)	
3	555	3060	20.5	21.1	.97	F 2c (B)	
4		2740	23.0	24.6	.94	F 1c (B)	
5	585	2880	21.8	22.7	.96	F 3c (B)	
Avg	525	3050	21.6	22.5	0.96	F 3c (B)	
Plant 187, grade 4 ("Shale clay mixture," 80 percent of kiln)							
1	550	3090	12.6	16.3	0.77	0.42 (B)	
2	925	6390	11.9	15.2	.78	.22 (B)	
3	840	3610	12.2	16.1	.76	.29 (B)	
4	640	6520	14.7	17.8	.83	.31 (B)	
5	820	7710	11.7	14.4	.81	.11 (B)	
Avg	755	5460	12.6	16.0	0.79	0.27 (B)	
Plant 188, grade 1 ("Arch")[b]							
1	1220	8050	13.0	15.5	0.81	0.31 (B)	
2	750	5840	17.0	19.9	.85	.23 (B)	
3	940	6230	14.9	16.8	.89	.25 (B)	
4	840	5190	16.9	20.0	.84	.38 (B)	
5	340	5950	16.2	19.1	.85	.44 (B)	
Avg	820	6250	15.6	18.3	0.85	0.32 (B	
Plant 188, grade 2 ("Middle")[b]							
1	290	5420	13.0	16.2	0.80	0.39 (B)	
2	680	6600	16.2	19.3	.84	.52 (B)	
3	805	6390	17.3	20.0	.87	F 50c (B)	
4	675	5460	16.5	19.1	.86	0.63 (B)	
5	715	5600	17.3	20.8	.83	1.40 (B)	
Avg	630	5890	16.1	19.1	0.84		

TABLE 4.—*Properties of bricks produced in the Hudson Valley District*— Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
Plant 188, grade 3 ("Top")[b]							
1	*lb/in.*² 765	*lb/in.*² 6190	% 17.2	% 19.3	0.89	% 0.97 (B)	
2	520	3760	20.3	22.9	.89	.39 (B)	
3	420	5900	17.2	20.0	.86	.29 (B)	
4	540	4680	17.1	20.1	.85	.36 (B)	
5	710	4590	17.0	20.0	.85	.81 (B)	
Avg	590	5020	17.8	20.5	0.87	0.56 (B)	
Plant 201, grade 1 ("Arch," 8 percent of kiln)							
1	800	3550	11.2	17.2	0.65	9.98 (B)	
2	360	6180	6.9	10.8	.64	F 39c (B)	
3	950	6130	12.6	16.5	.76	0.40 (B)	
4	880	5080	7.7	11.6	.66	.52 (B)	
5	865	5370	8.6	13.0	.66	.72 (B)	
Avg	770	5260	9.4	13.8	0.67		
Plant 201, grade 2 ("Clinker," 5 percent of kiln)							
1	1065	5180	6.1	10.8	0.56	No test	
2	1630	5010	4.8	10.2	.47	0.56 (B)	
3	995	4580	5.7	10.2	.56	.38 (B)	
4	515	4470	8.9	13.3	.67	.71 (B)	
5	955	3510	6.8	11.5	.59	.68 (B)	
Avg	1030	4550	6.5	11.2	0.57	0.58 (B)	
Plant 201, grade 3 ("Commercial," 87 percent of kiln)							
1	1285	5730	11.2	15.4	0.73	0.98 (B)	
2	1235	5400	12.1	16.3	.74	.72 (B)	
3	1240	6310	11.3	15.1	.75	.57 (B)	
4	1125	3870	12.4	17.1	.73	.71 (B)	
5	1280	5[illegible]30	12.3	16.8	.73	No test	
Avg	1235	5400	11.9	16.1	0.74	0.74 (B)	
Plant 222, grade 1 ("Light Hard," (1936) percentage of kiln unknown)							
1	320	2050	(24-hr) 22.9	25.5	0.90	1.28	
2	305	2000	22.1	24.4	.91	1.64	
3	140	2070	20.8	22.7	.92	1.82	
4	195	2540	22.6	24.3	.93	1.39	
5	705	3680	20.9	23.1	.90	7.61	
6	305	1750	22.4	24.7	.91	1.55	
7	310	2150	21.5	24.5	.88	1.05	
8	300	2150	22.7	25.8	.88	F 48c	
9	820	5770	18.1	20.6	.88	1.06	
10	605	3580	20.4	22.8	.90	0.36	
11	485	2360	21.5	22.7	.95	1.34	
12	145	1480	23.0	25.2	.91	7.00	
13	1160	7360	16.0	18.5	.86	0.13	
14	295	1820	21.7	23.8	.91	F 1c	
15	310	2300	21.3	23.5	.91	0.73	
16	395	3300	21.6	23.4	.92	.80	
17	540	4300	19.9	22.5	.88	.43	
18	260	1670	21.4	23.9	.90	1.67	
19	500	3440	19.6	21.6	.91	0.81	
20	350	2540	22.2	24.1	.92	2.40	
Avg	420	3420	21.1	23.4	0.90		

[b] Grades 1, 2, and 3 together represent 100 percent of kiln.

TABLE 5.—*Properties of bricks produced in New York State, excluding the Hudson Valley District*

[On the basis of the few samples submitted, it appears that brick made from surface clay and formed by the soft-mud process are produced in the eastern part of the State, and that side-cut shale brieks are produced in the western part]

Specimen number	Modulus of rupture	Compressive strength	Water absorption: 48-hr cold immersion	Water absorption: 5-hr boiling	Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
	lb/in.²	*lb/in.²*	%	%		%	
Plant 15, grade 1 ("Clinker," 1.0 percent of kiln, SC, S)							
1	1790	7140	6.4	9.8	0.65	0.23	
2	870	4600	13.5	16.2	.83	.68	
3	2120	10900	3.9	7.2	.54	.22	
4	1930	10100	5.1	7.9	.65	.22	
5	1760	7050	9.0	12.0	.75	.60	
Avg	1695	7960	7.6	10.6	0.68	0.39	
Plant 15, grade 2 ("Textured face," 10 percent of kiln, SC, S)							
1	730	4960	15.2	17.4	0.87	1.60	
2	815	4930	14.5	16.9	.86	1.18	
3	740	4580	16.1	18.3	.88	1.42	
4	905	5030	15.0	17.4	.86	1.58	
5	790	3960	17.2	19.4	.88	1.87	
Avg	795	4690	15.6	17.9	0.87	1.55	
Plant 15, grade 3 ("Common," 89 percent of kiln, SC, C)							
1	620	3490	17.9	20.2	0.89	F 30c	%
2	795	4900	18.6	21.2	.88	F 39c	
3	630	2640	18.2	20.1	.91	2.40	9.37 (84c)
4	905	3310	18.0	21.0	.86	0.78	F 78e
5	765	3920	18.9	21.3	.89	F 45e	
Avg	745	3650	18.3	20.8	0.89		
Plant 190, grade 1 ("Clinker," 0.5 to 3.0 percent of kiln, SC, S)							
Avg (5)	2230	9020	4.9	6.8	0.71	Not tested	
Plant 190, grade 2 ("Kiln run common," 97 to 99.5 percent of kiln, SC, S							
1	1930	8900	5.6	7.8	0.72	[a]+0.34 (B)	
2	2250	9180	6.8	9.0	.76	[a]+.09 (B)	
3	2230	10250	5.7	7.4	.77	−.17 (B)	
4	2180	9450	5.9	8.1	.73	.09 (B)	
5	2090	9530	5.7	7.8	.73	.24 (B)	
6	1790	9630	6.2	8.0	.78	.18 (B)	
7	1750	7890	6.9	9.1	.76	.17 (B)	
8	1910	8340	7.0	9.0	.78	.16 (B)	
9	980	3470	14.4	16.4	.87	.65 (B)	
10	1125	3190	14.1	15.7	.90	4.11 (B)	
Avg	1825	7980	7.8	9.8	0.78		
Plant 198, grade 1 ("Run of kiln," 100 pereent of kiln, SM, C)							
1	480	2970	17.4	22.9	0.76	0.37 (B)	
2	565	3980	19.2	23.6	.81	.37 (B)	
3	310	2520	21.0	25.3	.83	.72 (B)	
4	355	2340	21.6	25.8	.84	.83 (B)	
5	275	2690	21.2	24.6	.86	.95 (B)	
6	530	2780	19.2	23.6	.81	.25 (B)	
7	385	2320	19.1	24.1	.79	.68 (B)	
8	485	2140	21.1	24.7	.86	.49 (B)	
9	310	3220	19.9	24.3	.82	.51 (B)	
10	1080	3910	15.8	21.7	.73	.79 (B)	
11	565	2450	19.8	24.8	.80	.86 (B)	
12	495	2200	22.4	26.8	.84	.75 (B)	
13	420	2200	22.1	26.4	.84	.57 (B)	
14	105	770	23.6	26.6	.89	F 5c (B)	
15	125	1000	25.7	26.8	.96	F 12c (B)	
Avg	430	2500	20.6	24.8	0.83		

[a] The gain in weight produced by 59 cycles of freezing and thawing in specimens 1 and 2 of grade 2 of plant 190 may have been caused by hydration of lime.

TABLE 6.—*Properties of bricks produced in New Jersey*

[All samples received were made from surface clay. The shale bricks made in the northern part of the state were not represented. The methods of forming include soft-mud and stiff-mud (side-cut and end-cut) processes. Dry-press bricks are also made in New Jersey but no samples were received]

Specimen number	Modulus of rupture	Compressive strength	Water absorption: 48-hr cold immersion	Water absorption: 5-hr boiling	Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
	lb/in.²	*lb/in.²*	%	%		%	
Plant 16, grade 1 ("Clinker face from arches," 5 percent of kiln, EC, C)							
1	1380	3520	4.5	8.1	0.56	0.45 (B)	
2	1030	5080	3.9	7.3	.53	.29 (B)	
3	365	5100	5.5	8.9	.62	.20 (B)	
4	1890	5640	4.2	7.9	.53	.28 (B)	
5	1230	5520	4.6	9.3	.49	.93 (B)	
Avg	1180	4970	4.5	8.3	0.55	0.43 (B)	
Plant 16, grade 2 ("Face brick from arches," 5 percent of kiln, EC, C)							
1	1035	5040	7.1	10.1	0.70	0.10 (B)	
2	710	4410	6.8	10.9	.62	.18 (B)	
3	1125	5300	5.7	9.2	.62	.31 (B)	
4	605	4590	4.6	7.3	.63	.27 (B)	
5	815	4000	7.0	10.2	.69	.32 (B)	
Avg	860	4670	6.2	9.5	0.65	0.24 (B)	
Plant 16, grade 3 ("Common rough hard from arches," 25 percent of kiln, EC, C)							
1	1345	3990	9.8	12.8	0.77	0.41	
2	565	3540	10.6	13.3	.80	.18	
3	850	3930	9.3	13.2	.70	.22	
4	975	3470	13.0	16.0	.81	.24	
5	720	3370	9.7	13.0	.75	.22	
Avg	890	3660	10.5	13.7	0.77	0.25	
Plant 16, grade 4 ("Common hard from above arches," 18.7 percent of kiln, EC, C)							
1	605	3400	10.9	14.4	0.76	0.92	
2	1160	3770	7.6	11.7	.65	.12	
3	485	3300	8.3	12.0	.69	.52	
4	1085	3480	8.7	12.2	.71	.26	
5	405	1930	10.2	14.3	.71	9.82	
Avg	750	3180	9.1	12.9	0.70	2.55	
Plant 16, grade 5 ("Straight hard from top," 16 percent of kiln, EC, C)							
1	1545	3750	9.0	12.9	0.70	1.46	
2	1435	3400	11.2	15.8	.71	0.53	
3	610	3470	10.2	14.1	.72	.19	
4	990	2590	11.7	15.2	.77	.41	
5	560	3700	9.7	13.8	.70	.28	
Avg	1025	3380	10.4	14.4	0.72	0.58	
Plant 16, grade 6 ("Swelled bricks—coalies," 20 pereent of kiln, EC,C)							
Avg (5)	760	2950	8.8	14.4	0.61	Not tested	
Plant 16, grade 7 ("Red straight—backup," 12.9 percent of kiln, EC, C)							
1	940	3060	12.9	16.7	0.77	0.54	
2	1305	3420	12.8	16.3	.79	.31	
3	395	1660	14.4	18.0	.80	.92	
4	1085	2390	14.6	17.5	.83	.99	
5	790	1550	12.8	19.0	.67	1.13	
Avg	900	2420	13.5	17.5	0.77	0.78	

TABLE 6.—*Properties of bricks produced in New Jersey*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption: 48-hr cold immersion	Water absorption: 5-hr boiling	Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
	lb/in.²	*lb/in.²*	%	%		%	%
Plant 16, grade 8 ("Hard Salmon—backup," 11.0 percent of kiln, EC, C)							
1	665	2600	16.3	19.5	0.84	1.48	2.05 (84c)
2	445	1800	17.6	20.7	.85	1.08	F 75c
3	550	2310	16.2	19.5	.83	0.67	2.67 (84e)
4	330	2000	16.0	18.6	.86	.96	1.71 (84c)
5	470	1220	20.4	25.0	.82	F 34c	
Avg	495	1990	17.3	20.7	0.84		
Plant 16, grade 9 ("Soft Salmon," 5.6 percent of kiln, EC, C)							
1	510	960	17.9	22.9	0.78	8.90	F 60c
2	400	1220	22.0	26.8	.82	F 3c	
3	305	1340	19.1	23.7	.81	F 12c	
4	380	1400	20.9	24.8	.84	F 3c	
5	335	1250	20.1	25.0	.80	F 5c	
Avg	385	1230	20.0	24.6	0.81		
Plant 31, grade 1 ("Special face," 25 percent of kiln, EC, C)							
1	795	4750	5.9	10.2	0.58	0.43	
2	1320	4740	5.6	9.4	.60	.37	
3	1035	4210	9.0	12.9	.70	.78	
4	1090	3940	7.9	11.9	.66	.27	
5	1105	4310	8.8	12.8	.69	.54	
Avg	1070	4390	7.4	11.4	0.65	0.48	
Plant 31, grade 2 ("Straight Hard," 25 percent of kiln, EC, C)							
1	745	2840	11.8	15.0	0.79	0.39	
2	650	2530	12.6	15.8	.80	.53	
3	710	2480	13.0	15.2	.85	.43	
4	920	1880	14.0	16.8	.83	.56	
5	900	2440	13.0	16.2	.80	.37	
Avg	785	2430	12.9	15.8	0.81	0.46	
Plant 31, grade 3 ("Common Hard," 25 percent of kiln, EC, C)							
1	890	2230	11.5	15.2	0.76	0.31	
2	475	1600	12.4	18.9	.66	.47	
3	1425	3220	9.9	13.4	.74	.12	
4	740	3220	6.8	11.0	.62	.51	
5	380	1680	10.9	19.4	.56	.61	
Avg	780	2390	10.3	15.6	0.67	0.50	
Plant 31, grade 4 ("Light Hard," 10 percent of kiln, EC, C)							
1	345	1260	20.2	24.5	0.83	1.47	
2	900	2520	16.0	19.4	.82	0.55	
3	830	2520	15.0	18.3	.82	.52	
4	595	1440	15.3	21.5	.71	.61	
5	545	1180	16 6	21.7	.76	1.28	
Avg	645	1780	16.6	21.1	0.79	0.89	
Plant 31, grade 5 ("Swells," 10 percent of kiln, EC, C)							
1	1130	3590	9.0	13.8	0.65	1.08	
2	1065	4420	6.8	11.3	.60	0.45	
3	1275	3860	6.3	11.4	.55	.45	
4	1035	4000	8.2	16.4	.50	.35	
5	750	2730	9.2	17.8	.52	.66	
Avg	1050	3720	7.9	14.1	0.56	0.60	

TABLE 6.—*Properties of bricks produced in New Jersey*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption: 48-hr cold immersion	Water absorption: 5-hr boiling	Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
	lb/in.²	*lb/in.²*	%	%		%	
Plant 31, grade 6 ("Salmon," 5 percent of kiln, EC, C)							
1	525	1830	23.5	26.2	0.90	F 3c	
2	480	1440	21.4	25.4	.84	F 3c	
3	295	1560	19.9	24.0	.83	F 12c	
4	250	980	24.5	30.9	.79	F 6c	
5		1610	22.2	26.5	.84	F 6c	
Avg	385	1480	22.3	26.6	0.84	F 6c	
Plant 43, grade 1 ("Straight Hard," 60 percent of kiln, SC, C)							
1	335	3500	10.4	14.5	0.72	0.35 (B)	
2	425	3760	10.5	14.0	.75	.36 (B)	
3	525	3100	10.6	14.5	.73	9.62 (B)	
4	445	3710	9.9	13.2	.75	0.67 (B)	
5	350	3730	8.6	13.2	.65	.31 (B)	
Avg	415	3560	10.0	13.9	0.72	2.26 (B)	
Plant 43, grade 2 ("Arch," 25 percent of kiln, SC, C)							
1	555	4010	9.1	12.8	0.71	F 50c (B)	
2	485	3990	7.7	12.1	.64	0.27 (B)	
3	665	5180	8.5	12.4	.69	.23 (B)	
4	500	4390	7.8	12.2	.64	.20 (B)	
5	570	6520	9.4	12.6	.75	.33 (B)	
Avg	555	4820	8.5	12.4	0.69		
Plant 43, grade 3 ("Salmon," 15 percent of kiln, SC, C)							
1	615	3720	12.8	15.8	0.81	1.50	
2	510	4830	14.4	17.7	.81	F 9c	
3	400	3650	15.4	18.3	.84	F 8c	
4	450	2750	18.4	20.4	.90	F 3c	
5	380	2690	18.7	21.3	.88	F 3c	
Avg	470	3530	15.9	18.7	0.85		
Plant 57, grade 1 ("Smooth Face," 46 percent of kiln, SC, C)							
1	890	7240	6.4	9.9	0.65	0.40	
2	1100	8890	4.2	7.8	.54	.10	
3	935	8940	3.7	7.5	.49	.09	
4	845	8530	5.2	9.1	.57	.26	
5	1225	9250	4.8	8.3	.58	.18	
Avg	1000	8570	4.9	8.5	0.57	0.29	
Plant 57, grade 2 ("Textured Face," 46 percent of kiln, SC, C)							
1	445	6970	6.0	9.3	0.64	0.28	
2	840	5210	5.3	9.7	.55	.29	
3	365	6590	4.2	8.5	.49	.09	
4	500	6520	6.5	9.9	.66	.78	
5	440	7090	6.5	10.0	.65	.17	
Avg	520	6480	5.7	9.5	0.60	0.52	
Plant 60, grade 1 ("Commercial Hard," 90 percent of kiln, SM, C)							
1	1480	8040	9.9	12.2	0.81	0.23 (B)	
2	1160	7190	10.6	12.8	.83	.34 (B)	
3	825	5080	12.4	15.2	.82	.23 (B)	
4	720	5000	12.3	14.9	.83	.52 (B)	
5	545	7370	12.8	14.9	.86	.43 (B)	
6	455	5230	11.5	14.6	.79	No test	
Avg	865	6320	11.6	14.1	0.82	0.35 (B)	

TABLE 6.—*Properties of bricks produced in New Jersey*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
	*lb/in.*²	*lb/in.*²	%	%		%	%
Plant 60, grade 2 ("Pale or salmon," 10 percent of kiln, SM, C)							
1		2770	23.3	[a]	[a]	F 6c	3.34 (63c)
2	970	3070	20.8			3.00	
3		740	22.4			F 36c	
4	190	1080	22.2			F 1c	
5	95	1510	21.7			F 1c	
6	90	510	21.2			F 2c	
Avg	335	1610	21.9				
Plant 87, grade 1 ("No. 1 Grade," 43 percent of kiln, SM, C)							
1	770	3320	13.3	18.2	0.73	0.14 (B)	
2	515	3770	15.4	20.6	.75	.29 (B)	
3	755		13.8	19.1	.72	.26 (B)	
4	1000	5240	14.4	20.3	.71	.34 (B)	
5	935	4940	10.8	15.7	.69	.17 (B)	
Avg	795	4320	13.5	18.8	0.72	0.24 (B)	
Plant 87, grade 2 ("No. 2 Grade," 43 percent of kiln, SM, C)							
1	755	6600	13.1	18.3	0.72	0.00 (B)	
2	855	4340	10.5	15.7	.67	.13 (B)	
3	325	6870	7.3	11.3	.65	.32 (B)	
4	505	7540	7.3	12.7	.57	.37 (B)	
5	670	4560	13.7	19.4	.71	.34 (B)	
Avg	625	5980	10.4	15.5	0.66	0.23 (B)	
Plant 87, grade 2A ("Second sample of Grade 2")							
1	525	7250	6.6	13.2	0.50	0.15 (B)	
2	425	9400	9.6	15.7	.61	.17 (B)	
3	885	6250	10.3	15.4	.67	.13 (B)	
4	895	7990	9.5	14.6	.65	.15 (B)	
5	545	4730	8.5	13.8	.62	.00 (B)	
Avg	655	7120	8.9	14.5	0.61	0.12 (B)	
Plant 87, grade 3 ("Arch," 1.0 percent of kiln, SM, C)							
1	2150	7640	7.1	13.7	0.52	0.26 (B)	
2	595	5936	6.6	11.6	.57	.17 (B)	
3	530	7130	6.6	10.4	.58	.19 (B)	
4	1275	7900	6.8	12.9	.53	.15 (B)	
5	1245	9210	7.8	13.3	.59	.31 (B)	
Avg	1160	7560	7.0	12.4	0.57	0.22 (B)	
Plant 87, grade 4 ("Light Hard," 4 percent of kiln, SM, C)							
1	330	2590	18.9	23.3	0.79	1.39	
2	365	2420	19.6	24.0	.82	0.78	
3	290	2270	18.5	23.1	.80	0.35	
4	180	2400	19.4	23.7	.82	1.01	
5	355	2430	19.1	23.1	.83	1.04	
Avg	305	2420	19.1	23.4	0.81	0.91	

[a] Grade 2 of plant 60 was partially disintegrated by boiling, with consequent loss in weight. The absorption measure by 5-hr. boiling and the saturation coefficients are therefore unknown.

TABLE 6.—*Properties of bricks produced in New Jersey*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
	*lb/in.*²	*lb/in.*²	%	%		%	%
Plant 87, grade 5 ("Salmon," 4 percent of kiln, SM, C)							
1	250	2360	18.9	24.4	0.78	1.11	1.11 (63c)
2	140	1760	19.5	24.4	.80	3.80	F 60c
3	305	1740	22.3	27.0	.83	F 39c	
4	215	1890	20.5	25.6	.80	1.20	1.54 (63c)
5	215	1610	18.6	23.7	.79	1.03	1.28 (63c)
Avg	225	1870	20.0	25.0	0.80		
Plant 151, grade 1 ("Kiln Run," percentage of kiln unknown, SM, C)							
1	670	4420	16.2	20.1	0.81	0.39	
2	1010	5750	12.7	15.5	.82	.28	
3	590	9040	9.2	12.1	.76	.14	
4	1300	9000	9.6	12.4	.77	.28	
5	685	5880	15.5	18.3	.85	.42	
6	830	5500	15.4	17.9	.86	.26	
7	455	8150	9.3	12.4	.75	.31	
8	995	7260	10.8	15.1	.71	.29	
9	470	6360	9.9	13.4	.74	.23	
10	555	4100	17.5	20.6	.85	.62	
11		7750	16.9	19.7	.86	.71	
12		5140	15.7	18.0	.87	.45	
13	680	4420	16.9	19.5	.87	.39	
14	745	8860	14.0	15.9	.88	.12	
15	1140	7960	8.4	11.2	.75	.19	
Avg	780	6640	13.2	16.1	0.81	0.34	
Plant 189, grade 1 ("Kiln Run," percentage of kiln unknown, SM, C)							
1	1415	5220	6.9	11.1	0.62	0.11 (B)	
2	910	9740	5.0	6.9	.72	.25 (B)	
3	1650	11540	6.7	8.1	.83	.13 (B)	
4	1455	12070	7.8	9.2	.85	.14 (B)	
5	1100	8630	5.8	7.7	.75	.39 (B)	
6	1920	8120	7.1	9.0	.79	.13 (B)	
7	1650	10440	5.7	8.2	.70	.13 (B)	
8	1800	8760	5.9	8.5	.69	.39 (B)	
9	1750	6560	7.9	9.4	.84	.29 (B)	
10	1880	10900	8.3	9.5	.87	.24 (B)	
11	1785	9380	7.3	9.4	.78	.10 (B)	
12	1915	6110	7.7	9.7	.79	.20 (B)	
13	2110	10880	6.4	8.2	.78	.23 (B)	
14	1550	6670	7.3	9.1	.80	.00 (B)	
15	1835	9340	7.9	9.6	.82	.11 (B)	
Avg	1650	8960	6.9	8.9	0.78	0.19 (B)	
Plant 214, grade 1 ("Hard," 50 percent of kiln, EC, C)							
Avg (5)	1250	3020	10.1	13.7	0.73	Not tested	
Plant 214, grade 2 ("Medium," 30 percent of kiln, EC, C)							
1	895	1910	15.1	18.8	0.80	0.28 (B)	
2	875	1910	14.4	18.1	.80	.21 (B)	
3	860	1710	16.4	19.8	.83	.68 (B)	
4	495	1840	16.1	19.8	.81	.65 (B)	
5	990	2300	17.2	20.4	.84	1.12 (B)	
Avg	825	1930	15.8	19.4	0.82	0.59 (B)	
Plant 214, grade 3 ("Soft," 20 percent of kiln, EC, C)							
1	975	1830	20.8	24.5	0.85	F 8c (B)	
2	805	1610	20.1	23.6	.85	F 11c (B)	
3	835	1850	21.0	24.2	.87	F 5c (B)	
4	765	1850	20.9	23.9	.87	F 6c (B)	
5	710	1740	19.4	22.3	.87	F 6c (B)	
Avg	820	1780	20.4	23.7	0.86	F 7c (B)	

TABLE 7.—*Properties of bricks produced in Delaware and Maryland*

[The samples reported were all made from surface clay and were formed by the soft-mud or the stiff-mud (side-cut and end-cut) process. No bricks from Western Maryland, which are made from shale and formed by the side-cut process, are included. These shale bricks closely resemble, in properties, the bricks reported in table 10]

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
Plant 64, grade 1 ("Full range face," 60 percent of kiln, SM, C)							
	lb/in.²	*lb/in.²*	%	%		%	%
Avg (5)	625	3010	10.6	16.5	0.63	Not tested	
Plant 64, grade 2 ("Red range face," 35 percent of kiln, SM, C)							
1	1120	3830	12.5	17.5	0.71	0.20 (B)	
2	695	3360	13.8	19.4	.71	.25 (B)	
3	640	3210	9.2	15.8	.58	.33 (B)	
4	1175	3610	11.2	16.1	.70	.19 (B)	
5	530	3090	12.2	17.1	.71	.00 (B)	
Avg	835	3420	11.8	17.2	0.68	0.19 (B)	
Plant 64, grade 3 ("Salmons," 5 percent of kiln, SM, C)							
1	360	1520	19.6	24.3	0.81	F 3c	
2	750	2060	17.1	21.5	.80	1.00	1.22 (66c)
3	570	2140	16.6	21.0	.79	F 48c	
4	280	710	22.8	27.9	.82	F 2c	
5	265	1000	22.1	27.3	.81	F 2c	
Avg	445	1490	19.6	24.4	0.81		
Plant 64, grade 4 ("Range medium to salmon," (1937) percentage of kiln unknown, SM, C)							
1	680	2240	12.8	19.7	0.65	0.62	0.83 (75c)
2	540	3000	12.9	19.3	.66	.44	.66 (75c)
3	670	2330	13.6	19.7	.69	.70	.90 (75c)
4	685	2540	13.0	19.3	.68	.58	.58 (75c)
5	475	2740	15.0	21.0	.71	.69	.79 (75c)
6	435	2140	15.4	21.5	.72	1.58	1.82 (75c)
7	590	2070	16.0	21.9	.74	0.69	0.69 (75c)
8	505	2180	17.0	23.2	.74	F 31c	
9	770	2200	16.1	21.7	.74	0.75	.75 (75c)
10	660	2050	16.7	22.3	.75	4.48	F 57c
11	420	1870	18.0	23.4	.77	F 8c	
12	440	1620	18.0	23.6	.76	6.05	8.00 (75c)
13	550	1550	19.3	24.5	.79	F 8c	
14	450	2170	18.1	23.5	.77	F 8c	
15	260	1130	19.9	25.3	.78	F 3c	
16	270	1160	19.8	24.7	.80	F 2c	
17	305	1490	20.1	24.9	.80	F 2c	
18	285	1360	20.5	25.1	.82	F 2c	
19	240	920	19.9	23.9	.84	F 2c	
20	240	890	20.9	25.5	.82	F 2c	
Avg	475	1880	17.2	22.7	0.75		
Plant 65, grade 1 ("Face," 25 percent of kiln, EC, C)							
1	1005	3270	7.7	10.8	0.71	0.00 (B)	
2	1330	5060	9.1	12.2	.74	.20 (B)	
3	1360	4930	8.3	11.2	.74	.19 (B)	
4	1075	4240	10.8	13.2	.82	.49 (B)	
5	1330	4710	11.5	14.4	.80	.19 (B)	
Avg	1220	4440	9.5	12.4	0.76	0.20 (B)	
Plant 65, grade 2 ("Arch," 70 percent of kiln, EC, C)							
1	1380	4270	8.1	11.3	0.72	0.21 (B)	
2	710	3390	11.2	14.6	.77	.43 (B)	
3	905	3440	11.3	14.5	.78	.28 (B)	
4	1350	4310	9.6	13.3	.72	.43 (B)	
5	955	4560	12.4	15.6	.80	.65 (B)	
Avg	1060	3990	10.5	13.9	0.76	0.40 (B)	

TABLE 7.—*Properties of bricks produced in Delaware and Maryland*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
Plant 65, grade 3 ("Salmon," 5 percent of kiln, EC, C)							
	lb/in.²	*lb/in.²*	%	%		%	
1	400	2120	15.3	19.4	0.79	5.70	F 66c
2	385	1930	22.0	24.6	.90	F 2c	
3	425	1780	19.8	22.1	.90	F 3c	
4	640	3060	16.0	18.7	.86	F 9c	
5	575	2840	18.5	21.0	.88	F 3c	
Avg	485	2350	18.3	21.2	0.87		
Plant 66, grade 1 ("Sewer brick," 25 percent of kiln, SC, C)							
1	1500	9290	9.5	11.5	0.83	0.00 (B)	
2	1280	6950	10.9	13.0	.84	.00 (B)	
3	1600	6190	10.6	12.7	.83	.08 (B)	
4	1400	6740	10.6	12.8	.83	.00 (B)	
5	1355	7760	11.1	12.8	.87	.18 (B)	
Avg	1425	7390	10.5	12.6	0.84	0.05 (B)	
Plant 66, grade 2 ("Arch," 70 percent of kiln, SC, C)							
1	1670	8450	8.3	10.1	0.82	0.28 (B)	
2	1750	12000	5.5	7.3	.75	.00 (B)	
3	1775	8710	4.9	7.1	.69	.09 (B)	
4	2190	12180	6.1	8.2	.74	.08 (B)	
5	1605	7460	8.5	10.7	.79	.15 (B)	
Avg	1800	9760	6.7	8.7	0.76	0.12 (B)	
Plant 66, grade 3 ("Salmon," 5 percent of kiln, SC, C)							
1	585	2950	17.3	19.1	0.91	F 3c	
2	740	4630	17.3	18.9	.92	F 3c	
3	695	4350	17.4	18.9	.92	F 3c	
4	1150	5130	15.0	17.1	.88	F 9c	
5	635	4140	17.5	19.0	.92	F 4c	
Avg	760	4240	16.9	18.6	0.91	F 4c	
Plant 66, grade 3A ("Salmon," (1936) 5 percent of kiln, SC, C)							
			(24-hr)				
1	785	8180	7.8	9.3	0.84	0.45	
2	1005	5820	13.1	14.8	.88	F 17c	
3	980	6060	6.7	8.7	.76	0.39	
4	70	5570	14.1	15.7	.90	F 9c	
5	1110	7880	5.1	7.0	.72	0.82	
6	705	5320	12.7	14.2	.89	F 12c	
7	1565	8510	8.2	10.1	.81	0.26	
8	1295	8110	11.9	13.5	.88	F 37c	
9	1225	6000	9.4	11.2	.84	F 30c	
10	920	5000	12.1	14.1	.86	F 19c	
11	1255	6160	10.7	12.4	.86	0.85	
12	1145	5940	11.0	12.4	.88	F 16c	
13	895	7180	9.0	10.8	.84	0.61	
14	1160	9170	7.4	9.4	.78	.30	
15	625	6810	12.0	13.8	.87	F 8c	
16	1475	7890	4.8	6.3	.76	0.19	
17	660	6170	11.2	13.2	.84	F 17c	
18	560	7500	10.7	12.4	.86	F 27c	
19	1060	7890	8.8	10.5	.84	0.36	
20	845	6260	9.6	11.3	.85	.92	
Avg	965	6870	9.8	11.5	0.84		

TABLE 7.—*Properties of bricks produced in Delaware and Maryland*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
	*lb/in.*²	*lb/in.*²	(24-hr) %	%		%	%
Plant 66, grade 3B ("Salmon," (1937) 5 percent of kiln, SC, C)							
1	2220	9800	8.3	9.8	0.84	0.00	0.11 (75)
2	875	7920	8.8	10.7	.83	F 3c	
3	1130	7080	11.6	13.4	.86	F 30c	
4	1560	6260	10.5	12.2	.86	.24	0.24 (75c)
5	1320	6880	12.0	13.8	.87	F 19c	
6	1435	6500	12.0	13.8	.86	2.66	F 56c
7	620	5680	11.9	13.6	.88	F 21c	
8	1065	7790	12.6	14.4	.88	F 26c	
9	1115	5530	13.0	14.7	.88	F 24c	
10	1080	8360	11.3	12.9	.88	F 23c	
11	910	6080	12.4	14.1	.88	F 20c	
12	1375	8270	12.3	13.9	.88	F 20c	
13	1045	4460	14.6	16.5	.88	F 12c	
14	1045	6760	14.0	15.8	.88	F 8c	
15	1275	6700	13.8	15.6	.89	F 15c	
16	1390	7170	14.2	15.8	.90	F 19c	
17	1280	7380	13.2	14.7	.90	F 16c	
18	910	6440	14.6	16.5	.89	F 11c	
19	960	7040	13.2	14.8	.90	F 18c	
20	1030	4170	15.4	17.1	.90	F 7c	
Avg	1180	6810	12.5	14.2	0.88		
Plant 103, grade 1 ("Arch," 35 percent of kiln, EC, C)							
1	1380	6400	5.4	8.9	0.61	0.00 (B)	
2	1330	5530	4.2	8.4	.50	.42 (B)	
3	1845	4350	5.6	9.5	.54	.11 (B)	
4	550	4320	7.4	11.1	.67	.45 (B)	
5	1340	4720	9.8	13.5	.73	.12 (B)	
Avg	1290	5060	6.5	10.3	0.61	0.22 (B)	
Plant 103, grade 2 ("Hard red," 55 percent of kiln, EC, C)							
1	905	3720	10.0	13.3	0.75	0.13	
2	1350	3970	10.7	13.9	.77	.11	
3	1210	4020	10.7	13.6	.79	.57	
4	1315	4510	11.4	14.4	.79	.00	
5	1340	3540	9.9	13.4	.74	.23	
Avg	1225	3950	10.5	13.7	0.77	0.21	
Plant 103, grade 3 ("Hand made," percentage of kiln unknown, SM, C)							
Avg (5)	630	4500	9.4	14.6	0.64	Not tested	
Plant 103, grade 4 ("Salmon," 10 percent of kiln, EC, C)							
1	285	2580	13.4	16.8	0.80	0.40	
2	690	2830	15.8	19.0	.83	.44	
3	825	3050	15.4	19.0	.81	.00	
4	465	2760	14.7	17.3	.85	F 30c	
5	560	2180	17.6	20.6	.86	F 3c	
Avg	565	2680	15.4	18.5	0.83		

TABLE 7.—*Properties of bricks produced in Delaware and Maryland*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weigbt loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
	*lb/in.*²	*lb/in.*²	(24-hr) %	%		%	%
Plant 103, grade 4A ("Salmon," (1937) percentage of kiln unknown, EC, C)							
1	525	3040	13.1	16.1	0.82	1.17	1.36 (75c)
2	355	2240	15.4	18.8	.82	F 6c	
3	705	2840	14.0	16.8	.83	2.80	3.40 (75c)
4	410	2850	15.5	18.8	.82	F 6c	
5	390	2500	15.4	18.5	.83	F 8c	
6	315	2420	15.5	18.6	.84	F 8c	
7	305	2480	15.5	18.5	.84	F 4c	
8	275	2400	16.0	19.2	.84	F 3c	
9	645	2690	14.8	17.6	.84	F 20c	
10	450	3000	14.7	17.5	.84	F 27c	
11	565	2590	15.2	17.9	.84	F 5c	
12	640	2850	14.4	17.1	.84	F 34c	
13	525	3100	15.2	17.9	.85	F 5c	
14	405	2300	15.0	18.4	.85	F 6c	
15	340	2860	14.6	17.0	.86	F 12c	
16	375	3140	14.3	16.7	.86	F 48c	
17	625	2680	15.1	17.6	.86	F 12c	
18	495	3670	14.2	16.4	.86	F 12c	
19	605	3460	14.4	16.5	.88	F 12c	
20	500	3400	14.8	16.8	.88	F 5c	
Avg	470	2830	14.9	17.6	0.84		
Plant 118, grade 1 ("Vitrified," 4 percent of kiln, SC, C)							
Avg (5)	2345	10080	2.0	3.6	0.54	Not tested	
Plant 118, grade 2 ("Hard," 80 percent of kiln, SC, C)							
Avg (5)	1845	7580	7.3	8.9	0.82	Not tested	
Plant 118, grade 3 ("Light bard," 7 percent of kiln, SC, C)							
1	1195	7740	11.8	13.7	0.86	0.19 (B)	
2	1145	6900	12.2	14.2	.86	.20 (B)	
3	1420	6680	12.8	14.8	.87	F 42c (B)	
4	1315	4790	13.5	15.4	.88	0.09 (B)	
5	1335	6450	12.7	14.6	.87	F 41c (B)	
Avg	1280	6510	12.6	14.5	0.87		
Plant 118, grade 4 ("Salmon," 9 percent of kiln, SC, C)							
1	860	4110	17.3	19.6	0.88	F 8c	
2	725	3720	18.9	21.1	.89	F 3c	
3	905	4330	17.1	19.2	.89	F 6c	
4	860	4080	17.6	19.5	.90	F 6c	
5	590	3130	19.2	21.4	.90	F 6c	
Avg	790	3870	18.0	20.2	0.89	F 6c	
Plant 17?, grade 1 ("Special dark," 30 percent of kiln, EC, C)							
Avg (5)	1595	8500	5.9	9.3	0.63	Not tested	

TABLE 7.—*Properties of bricks produced in Delaware and Maryland*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
Plant 173, grade 2 ("Dark," 20 percent of kiln, EC, C)							
	lb/in.²	*lb/in.²*	%	%		%	
Avg (5)	1015	4850	9.6	12.6	0.76	Not tested	
Plant 173, grade 3 ("Reds," 10 percent of kiln, EC, C)							
1	725	3340	13.1	15.7	0.83	0.31 (B)	
2	610	3230	13.7	15.7	.87	1.38 (B)	
3	605	3580	13.2	15.6	.85	0.39 (B)	
4	910	3720	12.5	15.4	.81	.25 (B)	
5	625	3050	12.5	15.4	.81	.33 (B)	
Avg	695	3380	13.0	15.6	0.83	0.52 (B)	
Plant 173, grade 4 ("Arch," 30 percent of kiln, EC, C)							
Avg (5)	1185	7110	5.8	8.7	0.63	Not tested	
Plant 173, grade 5 ("Salmon," 10 percent of kiln, EC, C)							
1	270	2300	13.5	15.8	0.86	F 6e	
2	285	2700	14.2	16.3	.87	F 6c	
3	320	2730	14.0	15.8	.89	F 15e	
4	865	3400	13.6	15.2	.90	1.01	
5	525	2890	13.5	17.0	.79	F 24c	
Avg	450	2800	13.8	16.0	0.86		
Plant 207, grade 1 ("Dark face," 10 percent of kiln, SM, C)							
Avg (5)	1175	9830	8.4	14.3	0.59	Not tested	
Plant 207, grade 2 ("Light face," 10 percent of kiln, SM, C)							
Avg (5)	1615	10730	5.5	11.2	0.48	Not tested	
Plant 207, grade 3 ("Dark red," 20 percent of kiln, SM, C)							
Avg (5)	1275	8100	10.1	15.5	0.65	Not tested	
Plant 207, grade 4 ("Straight hard," 40 percent of kiln, SM, C)							
Avg (5)	1245	11070	5.2	11.0	0.45	Not tested	
Plant 207, grade 5 ("Light hard," 20 percent of kiln, SM, C)							
Avg (5)	810	5930	11.9	17.4	0.68	Not tested	

TABLE 8.—*Properties of bricks produced in the Philadelphia (Pa.) District*

[All samples received from the Philadelphia District were made from surface clay and were formed either by the soft-mud or the stiff-mud end-cut process]

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
Plant 29, grade 1 ("Common hard," 25 percent of kiln, SM, C)							
	lb/in.²	*lb/in.²*	%	%		%	
Avg (5)	815	7160	11.1	15.9	0.69	Not tested	
Plant 29, grade 2 ("Stretchers," 50 percent of kiln, SM, C)							
1	680	8290	9.1	14.0	0.65	0.42	
2	725	6600	9.8	14.0	.70	.49	
3	565	8730	8.5	13.8	.62	.31	
4	675	5890	9.3	13.8	.67	.33	
5	555	9070	8.4	13.8	.61	.12	
Avg	640	7720	9.0	13.9	0.65	0.33	
Plant 29, grade 3 ("Salmon," 15 percent of kiln, SM, C)							
1	245	1560	18.7	24.1	0.78	1.09	
2	400	1910	19.2	25.6	.75	0.90	
3	570	1620	19.5	27.5	.71	.81	
4	245	1490	19.1	24.6	.78	1.54	
5	245	1500	17.9	22.5	.80	1.73	
Avg	340	1620	18.9	24.9	0.76	1.21	
Plant 30, grade 1 ("Special face," 10 percent of kiln, SM, C)							
1	1275	10450	5.5	11.1	0.50	0.28	
2	1510	11300	6.9	12.3	.56	.30	
3	1270	10050	3.5	7.5	.47	.23	
4	1215	9430	6.6	12.0	.55	.24	
5	1380	11850	5.7	10.9	.52	.31	
Avg	1330	10620	5.6	10.8	0.52	0.27	
Plant 30, grade 2 ("Stretchers," 25 percent of kiln, SM, C)							
1	995	7200	8.8	14.4	0.61	0.55	
2	995	6470	8.8	13.7	.64	.59	
3	855	7320	10.1	15.9	.64	.48	
4	1080	7770	8.5	14.4	.59	.54	
5	610	7100	9.4	14.8	.63	.50	
Avg	905	7170	9.1	14.6	0.62	0.57	
Plant 30, grade 3 ("Common hard," 60 percent of kiln, SM, C)							
1	1015	7930	9.7	14.7	0.66	0.51	
2	985	7670	10.3	14.9	.69	.62	
3	1100	8400	7.7	12.9	.60	.35	
4	1195	8220	9.2	13.9	.66	.35	
5	720	6200	9.3	13.4	.69	.62	
Avg	1005	7680	9.2	14.0	0.66	0.49	

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TABLE 8.—*Properties of bricks produced in the Philadelphia (Pa.) District*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
	lb/in.²	*lb/in.²*	%	%		%	
Plant 30, grade 4 ("Salmon," 5 percent of kiln, SM, C)							
1	520	4070	13.2	18.7	0.71	0.33	
2	695	5360	13.0	18.1	.72	.21	
3	560	5120	13.0	18.3	.71	.29	
4	445	4830	14.8	19.8	.75	.66	
5	465	3880	15.4	19.6	.79	.28	
Avg	540	4650	13.9	18.9	0.74	0.35	
Plant 49, grade 1 ("Common hard," 40 percent of kiln, SM, C)							
1	795	5170	11.9	17.3	0.69	0.32	
2	710	4640	11.6	15.9	.73	.42	
3	615	4080	15.3	19.8	.77	.63	
4	490	4570	15.0	19.3	.78	.77	
5	580	4370	15.8	19.9	.79	.52	
Avg	640	4570	13.9	18.4	0.75	0.53	
Plant 49, grade 2 ("Stretchers," 38 percent of kiln, SM, C)							
Avg (5)	610	5060	12.3	17.1	0.71	Not tested	
Plant 49, grade 3 ("Light hard," 12 percent of kiln, SM, C)							
1	445	3880	17.0	21.3	0.80	F 42c (B)	
2	365	2610	20.2	24.6	.82	0.44 (B)	
3	345	3070	18.0	24.1	.75	.33 (B)	
4	555	3250	17.9	22.9	.78	.46 (B)	
5	380	2660	19.5	24.4	.80	.37 (B)	
Avg	415	3290	18.5	23.5	0.79		
Plant 49, grade 4 ("Salmon, 10 percent of kiln, SM, C)							
1	635	2590	18.4	23.1	0.80	0.59	% 0.83 (75c)
2	465	2500	18.4	23.1	.80	.68	.82 (75c)
3	165	1050	24.0	29.1	.83	1.53	F 63c
4		850	24.0	29.7	.81	1.49	F 63c
5	105	760	24.6	29.7	.83	2.80	4.63 (75c)
Avg	345	1550	21.9	26.9	0.81	1.42	
Plant 58, grade 1 ("Face," 20 percent of kiln, SM, C)							
1	725	5790	9.5	14.3	0.66	0.53	
2	820	7650	5.1	10.2	.50	.31	
3	915	8040	6.7	11.3	.59	.13	
4	680	6610	3.9	8.2	.48	.43	
5	610	8240	5.3	9.9	.54	.26	
Avg	750	7270	6.1	10.8	0.55	0.33	
Plant 58, grade 2 ("Sewer brick," 20 percent of kiln, SM, C)							
1	1190	8610	10.4	15.4	0.68	0.45	
2	845	6940	10.6	14.6	.73	.27	
3	580	8900	8.3	13.7	.61	.20	
4	725	9010	7.9	13.2	.60	.26	
5	845	9310	8.0	13.2	.61	.35	
Avg	835	8550	9.0	14.0	0.65	0.31	

TABLE 8.—*Properties of bricks produced in the Philadelphia (Pa.) District*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
	lb/in.²	*lb/in.²*	%	%		%	
Plant 58, grade 3 ("Straight hard," 20 percent of kiln, SM, C)							
1	590	6620	10.8	15.2	0.71	0.36	
2	335	5710	13.9	18.8	.74	.61	
3	590	6130	13.5	18.4	.73	.36	
4	550	6250	13.0	18.4	.71	.54	
5	435	4420	15.7	20.7	.76	.55	
Avg	500	5830	13.4	18.3	0.73	0.48	
Plant 58, grade 4 ("Hard," 20 percent of kiln, SM, C)							
1	470	5230	13.3	17.6	0.76	0.57	
2	885	5370	11.5	15.8	.73	.19	
3	830	7240	8.9	13.9	.64	.10	
4	650	5280	13.6	17.5	.78	.19	
5		4970	13.9	18.2	.76	1.53	
Avg	710	5620	12.2	16.6	0.73	0.52	
Plant 58, grade 5 ("Salmon," 20 percent of kiln, SM, C)							
1		2680	19.1	23.9	0.80	0.57	1.05 (75c)
2	235	1860	19.1	23.5	.81	.88	F 60c
3	320	2400	18.7	23.4	.80	.63	0.84 (75c)
4	245	2300	19.7	25.1	.79	.69	0.89 (75c)
5	70	1020	22.9	28.4	.81	2.69	4.68 (75c)
Avg	220	2050	19.9	24.9	0.80	1.09	
Plant 63, grade 1 ("Common hard," 60 percent of kiln, EC, C)							
Avg (5)	755	5980	8.7	12.2	0.71	Not tested	
Plant 63, grade 2 ("Straight," 25 percent of kiln, EC, C)							
Avg (5)	1090	8850	7.2	11.0	0.66	Not tested	
Plant 63, grade 3 ("Salmon," 15 percent of kiln, EC, C)							
1	205	2180	15.0	18.2	0.82	0.75	1.03 (66c)
2	210	2010	15.6	19.3	.81	3.40	3.70 (66c)
3	210	1850	16.6	20.2	.83	F 51c	
4			17.2	21.6	.80	3.70	4.47 (66c)
5	240	2310	15.2	18.8	.81	F 12c	
Avg	215	2090	15.9	19.6	0.81		
Plant 79, grade 1 ("Straight hard," 33 percent of kiln, SM, C)							
Avg (5)	390	5360	11.5	16.6	0.69	Not tested	
Plant 79, grade 2 ("Rough hard or common," 33 percent of kiln, SM, C)							
Avg	720	4690	13.0	18.3	0.71	Not tested	
Plant 79, grade 3 ("Salmon," 33 percent of kiln, SM, C)							
1	335	2170	18.5	23.8	0.78	1.06	1.19 (63c)
2	145	1420	19.7	23.9	.82	F 6c	
3	190	1420	20.6	26.1	.79	F 36c	
4	165	1480	19.9	25.2	.79	2.25	2.91 (63c)
5	205	1480	19.9	24.7	.81	F 12c	
Avg	210	1590	19.7	24.7	0.80		

TABLE 8.—*Properties of bricks produced in the Philadelphia (Pa.) District*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption: 48-hr cold immersion	Water absorption: 5-hr boiling	Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
Plant 86, grade 1 ("Straight hard," 30 percent of kiln, SM, C)							
	*lb/in.*²	*lb/in.*²	%	%		%	
1	700	4300	15.1	21.0	0.72	0.68	
2	455	4170	15.7	20.9	.75	.52	
3	690	5280	12.4	18.2	.68	.29	
4	940	6550	12.0	17.7	.68	.46	
5	335	4640	15.6	21.8	.72	1.14	
Avg	625	4990	14.2	19.9	0.71	0.62	
Plant 86, grade 2 ("Common hard," 50 percent of kiln, SM, C)							
	1050	6630	11.7	17.3	0.68	0.19	
2	665	6040	11.8	16.8	.73	.18	
3	905	5840	11.8	16.9	.70	.31	
4	490	5200	14.2	20.1	.71	.61	
5	750	6730	11.5	17.0	.68	.28	
Avg	770	6090	12.2	17.6	0.70	0.31	
Plant 86, grade 3 ("Salmon," 20 percent of kiln, SM, C)							
						%	
1	345	4030	18.5	24.4	0.76	1.08	1.27 (66e)
2	140		21.8	27.3	.80	F 12e	
3	260	2610	20.9	26.9	.78	2.29	2.79 (66e)
4	165	1320	21.6	28.1	.77	3.95	4.80 (66e)
5	170	1780	19.8	25.4	.78	3.97	4.68 (66e)
Avg	215	2440	20.5	26.4	0.78		
Plant 105, grade 1 ("Common hard," 50 percent of kiln, EC, C)							
Avg (5)	1000	8140	8.2	11.9	0.68	Not tested	
Plant 105, grade 2 ("Straight hard," 25 percent of kiln, EC, C)							
Avg (5)	1300	6230	11.5	15.5	0.75	Not tested	
Plant 105, grade 2A ("Second sample (1930) of grade 2")							
Avg (5)	1015	7870	9.9	13.6	0.72	Not tested	
Plant 105, grade 2B ("Third sample (1936) of grade 2")							
			(24-hr)				
1	860	6100	13.2	18.3	0.72	0.29	
2	790	4400	12.7	18.1	.70	[a] 2.34	
3	870	6890	12.0	16.7	.72	0.31	
4	925	4745	11.8	17.1	.69	.10	
5	945	6000	13.0	18.1	.72	.45	
6	505	6790	12.2	17.3	.70	.20	
7	825	6360	12.7	17.8	.71	.33	
8	780	5560	13.1	18.3	.72	.19	
9	560	5490	12.3	17.3	.71	.22	
10	885	6750	11.2	16.1	.70	.48	
11	945	5550	12.2	17.5	.70	.35	
12	655	4700	12.5	17.3	.72	.21	
13	740	4350	12.8	18.2	.70	.31	
14	870	7210	11.0	15.3	.72	.22	
15	1055	7500	11.4	15.7	.72	.29	
16	815	6640	11.5	16.2	.71	.40	
17	1065	6780	11.1	15.4	.72	.30	
18	920	7010	11.8	16.8	.70	.30	
19	940	5740	12.1	17.3	.70	.20	
20	710	6680	12.2	17.5	.70	.28	
Avg	820	6060	12.1	17.1	0.71	0.39	

[a] 2.10-percent loss on 21st cycle.

TABLE 8.—*Properties of bricks produced in the Philadelphia (Pa.) District*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption: 48-yr cold immersion	Water absorption: 5-hr boiling	Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
Plant 105, grade 3 ("Salmon," 25 percent of kiln, SM, C)							
	*lb/in.*²	*lb/in.*²	%	%		%	
1	475	3960	16.0	20.3	0.79	0.38	
2	925	5030	14.9	19.4	.77	.20	
3	820	5410	16.4	20.1	.82	.32	
4	705	3130	9.7	13.6	.71	.10	
5	215	1910	20.3	24.5	.83	[b] 6.18	
Avg	630	3890	15.5	19.6	0.78	1.49	
Plant 141, grade 1 ("Dark hard," 40 percent of kiln, SM, C)							
Avg (5)	1125	9390	6.9	12.2	0.57	Not tested	
Plant 141, grade 2 ("Medium hard," 45 percent of kiln, SM, C)							
Avg (5)	1165	9190	8.5	13.8	0.62	Not tested	
Plant 141, grade 3 ("Salmon," 15 percent of kiln, SM, C)							
1	895	4400	13.9	19.8	0.70	0.64	
2	930	3870	14.1	19.3	.73	.52	
3	605	4020	14.1	19.8	.72	.34	
4	430	2670	15.8	21.3	.74	1.58	
5	515	3230	14.9	19.7	.76	0.87	
Avg	675	3640	14.6	20.0	0.73	0.79	

[b] Progressive spalling.

TABLE 9.—*Properties of bricks produced in Eastern Pennsylvania (excluding Philadelphia)*

[The samples tested included bricks made from clay, shale, and mixtures of clay and shale, formed by either the soft-mud or the stiff-mud side-cut process]

Specimen number	Modulus of rupture	Compressive strength	Water absorption: 48-hr cold immersion	Water absorption: 5-hr boiling	Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
Plant 18, grade 1 ("Special face," 15 percent of kiln, SM, C)							
	*lb/in.*²	*lb/in.*²	%	%		%	
1	670	5350	7.0	13.9	0.50	0.10 (B)	
2	640	4370	7.8	14.1	.55	.10 (B)	
3	805	5090	5.5	11.9	.46	.09 (B)	
4	675	6420	8.2	15.0	.55	.31 (B)	
5	520	4520	8.3	14.3	.58	.28 (B)	
Avg	660	5150	7.4	13.8	0.53	0.18 (B)	
Plant 18, grade 2 ("Face," 25 percent of kiln, SM, C)							
1	820	6550	7.9	13.7	0.58	0.21 (B)	
2	440	5920	8.1	14.8	.55	.28 (B)	
3	565	5200	7.4	13.3	.56	.15 (B)	
4	580	5070	10.0	16.3	.61	.11 (B)	
5	670	5650	6.9	13.0	.57	.14 (B)	
Avg	615	5680	8.1	14.2	0.57	0.18 (B)	

TABLE 9.—*Properties of bricks produced in Eastern Pennsylvania (excluding Philadelphia)*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption: 48-hr cold immersion	Water absorption: 5-hr boiling	Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
Plant 18, grade 3 ("Dark reds," 25 percent of kiln, SM, C)							
	lb/in.²	*lb/in.²*	%	%		%	
1	455	3890	10.5	16.4	0.64	0.40 (B)	
2	460	4030	10.2	16.7	.61	.46 (B)	
3	450	3660	10.8	17.5	.62	.41 (B)	
4	535	3700	11.1	17.5	.63	.42 (B)	
5	840	6130	7.8	13.6	.57	.48 (B)	
Avg	545	4280	10.1	16.3	0.61	0.43 (B)	
Plant 18, grade 4 ("Medium reds," 25 percent of kiln, SM, C)							
1	365	3580	11.0	17.5	0.63	0.70 (B)	
2	570	4260	10.2	16.1	.63	.58 (B)	
3	600	4490	10.0	15.9	.63	.40 (B)	
4	455	3520	10.7	17.0	.63	.50 (B)	
5	465	3720	10.8	17.0	.64	.35 (B)	
Avg	490	3920	10.5	16.7	0.63	0.51 (B)	
Plant 18, grade 5 ("Light reds," 9.5 percent of kiln, SM, C)							
1	325	1860	15.2	22.2	0.68	1.44	
2	450	2530	13.4	20.1	.67	0.68	
3	295	1760	14.4	20.8	.69	1.81	
4	400	2530	13.5	20.0	.67	0.55	
5	290	2200	12.7	18.8	.68	1.14	
Avg	350	2180	13.8	20.4	0.68	1.12	
Plant 18, grade 6 ("Salmons," 0.5 percent of kiln, SM, C)							
						%	
1	270	980	15.7	21.7	0.72	1.21	3.53 (84c)
2	215	1380	14.4	20.5	.70	.72	1.34 (84c)
3	300	1820	14.6	21.2	.69	.61	1.21 (84c)
4	195	990	15.1	21.9	.69	1.25	2.90 (84c)
5	245	1630	14.9	20.9	.71	1.00	2.39 (84c)
Avg	245	1360	14.9	21.2	0.70	0.96	2.27 (84c)
Plant 18, grade 6A ("Second sample (1936) of grade 6")							
			(24-hr)				
1	205	1150	16.6	23.7	0.70	1.69	
2	100	1145	18.2	25.2	.72	3.13	
3	180	1450	16.5	24.1	.68	3.19	
4	180	1365	16.3	23.8	.68	1.47	
5	135	1325	15.8	23.7	.66	2.29	
6	280	1280	16.3	23.6	.70	1.44	
7	150	1375	16.5	24.0	.69	1.81	
8	185	1405	15.1	22.7	.66	1.12	
9	160	1175	16.7	23.7	.70	1.21	
10	255	1250	17.0	23.9	.71	1.96	
11	220	1120	17.1	24.2	.70	1.80	
12	275	1175	18.1	25.6	.72	1.42	
13	165	1130	17.2	24.1	.72	2.21	
14	215	1000	17.0	24.2	.70	2.20	
15	325	1215	16.8	24.2	.70	2.01	
16	295	1960	14.0	21.5	.65	0.95	
17	235	1445	15.2	23.0	.66	2.05	
18	150	1190	17.4	24.7	.70	2.58	
19	160	1260	16.9	23.8	.71	1.68	
20	230	1295	16.3	23.4	.70	1.45	
Avg	205	1280	16.0	23.9	0.69	1.88	
Plant 19, grade 1 ("Commercial hard, face," 55 percent of kiln, SC, S)							
1	1375	8250	5.8	8.4	0.69	0.32	
2	1380	8130	6.0	8.6	.70	.30	
3	1740	9900	6.4	9.1	.70	.11	
4	1690	10300	6.5	9.2	.71	.11	
5	1160	7560	8.8	10.4	.85	.11	
Avg	1470	8830	6.7	9.1	0.73	0.19	

TABLE 9.—*Properties of bricks produced in Eastern Pennsylvania (excluding Philadelphia)*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption: 48-hr cold immersion	Water absorption: 5-hr boiling	Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
Plant 19, grade 2 ("Commercial hard," 45 percent of kiln, SC, S)							
	lb/in.²	*lb/in.²*	%	%		%	
1	1840	8710	8.0	9.9	0.81	0.25	
2	2160	7250	6.9	8.9	.78	.10	
3	1730	7770	8.2	10.0	.82	.27	
4	1450	6790	10.9	12.7	.86	.36	
5	1175	5590	12.4	13.8	.90	.29	
Avg	1670	7220	9.3	11.1	0.83	0.25	
Plant 19, grade 3 ("Clinker," 3 percent of kiln, SC, S)							
Avg (5)	1350	10780	5.1	7.0	0.65	Not tested	
Plant 19, grade 4 ("Textured," 80 percent of kiln, SC, S)							
1	1235	11700	6.5	8.6	0.76	0.54	
2	2010	10300	6.0	7.7	.78	.34	
3	1660	10600	7.7	9.6	.80	.48	
4	1820	11650	6.4	8.2	.78	.45	
5	1815	10400	6.7	8.5	.79	.36	
Avg	1710	10930	6.7	8.5	0.78	0.43	
Plant 37, grade 1 ("Face," 65 percent of kiln, SC, C and S mixture)							
1	2030	12050	8.2	9.7	0.84	0.59	
2	1860	14600	8.1	9.6	.84	.31	
3	2500	14600+	2.3	3.8	.61	.08	
4	3850	20600+	1.8	3.5	.51	.09	
5	1960	12500	5.4	6.8	.79	.29	
Avg	2440	14870+	5.2	6.7	0.72	0.27	
Plant 37, grade 2 ("Common Hard," 25 percent of kiln, SC, C and S mixture)							
1	1860	8630	9.1	10.6	0.86	0.22	
2	1785	19350	5.9	7.0	.84	.16	
3	1255	10200	10.0	11.6	.86	.33	
4	940	5210	14.1	15.5	.91	.55	
5	905	6050	13.6	15.1	.90	.66	
Avg	1350	9890	10.5	12.0	0.87	0.38	
Plant 37, grade 3 ("Salmon," 10 percent of kiln, SC, C and S mixture)							
1	235	1720	16.1	17.9	0.90	F 3c	
2	830	6170	13.7	15.2	.90	F 27c	
3	1180	5460	13.2	14.8	.89	F 38c	
4	1040	5910	15.3	16.7	.92	F 27c	
5		1700	16.2	17.9	.91	F 3c	
Avg	820	4190	14.9	16.5	0.90	F 20c	
Plant 38, grade 1 ("Stretchers or dark hard," 30 percent of kiln, SC, S)							
Avg (5)	3180	19720	1.3	2.5	0.52	Not tested	
Plant 38, grade 2 ("Straight hard," 35 percent of kiln, SC, S)							
1	3090	16750	2.4	3.5	0.69	0.00	
2	3200	18850	2.3	3.5	.66	.00	
3	3470	17050	2.9	3.7	.78	.00	
4	3500	17950	2.3	3.5	.66	.15	
5	2700	16550	3.3	4.9	.67	.99	
Avg	3190	17430	2.6	3.8	0.69	0.23	

TABLE 9.—*Properties of bricks produced in Eastern Pennsylvania (excluding Philadelphia)*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
	*lb/in.*²	*lb/in.*²	%	%		%	
Plant 38, grade 3 ("Light hard," 25 percent of kiln, SC, S)							
1	1300	13000	4.3	5.4	0.80	0.22	
2	1570	11150	5.7	7.0	.81	.26	
3	1465	12500	4.6	5.9	.78	.52	
4	1980	11400	6.1	7.4	.82	.35	
5	1700	10800	6.7	8.6	.78	.49	
Avg	1615	11770	5.5	6.9	0.80	0.37	
Plant 38, grade 4 ("Salmon," 10 percent of kiln, SC, S)							
1	890	5550	11.2	12.4	0.90	2.47	
2	1025	4700	11.3	12.6	.90	2.51	
3	535	3580	12.8	14.1	.91	F 24c	
4	630	3970	12.1	13.3	.91	F 15c	
5	510	3240	12.2	13.6	.90	F 6c	
Avg	720	4210	11.9	13.2	0.90		
Plant 44, grade 1 ("Commercial face," 80 percent of kiln, SM, S)							
1	1065	4840	6.2	10.8	0.57	0.62	
2	1105	4100	8.1	12.6	.64	.50	
3	850	3770	9.6	14.6	.66	.70	
4	780	4600	8.1	13.1	.62	.50	
5	960	4730	6.1	10.9	.56	.38	
Avg	950	4410	7.6	12.4	0.61	0.54	
Plant 44, grade 2 ("Dark red straight hard," 75 percent of kiln, SC, S)							
1	1070	6540	9.8	13.0	0.75	0.97	
2	1220	6400	9.9	12.7	.78	.47	
3	915	7230	10.0	12.9	.78	.67	
4	1005	4790	10.0	12.8	.78	.64	
5	870	5430	9.0	12.3	.73	.57	
Avg	1015	6010	9.7	12.7	0.76	0.66	
Plant 44A, grade 1 ("Dark hard," percentage of kiln unknown, SC, S)							
1	1445	7990	9.2	11.2	0.82	0.40	
2	1450	7000	9.1	10.9	.84	.58	
3	1750	10250	6.4	8.3	.77	.45	
4	1475	7430	8.2	10.1	.81	.45	
5	1410	7420	7.8	10.2	.76	.47	
Avg	1505	8000	8.1	10.1	0.81	0.47	
Plant 55, grade 1 ("Face," 72 percent of kiln, SM, C and S mixture)							
Avg (5)	1185	6830	8.4	12.9	0.65	Not tested	
Plant 55, grade 2 ("Liners," 20 percent of kiln, SM, C and S mixture)							
1	605	3520	17.3	21.8	0.79	F 50c (B)	
2	940	3700	15.3	19.9	.77	0.34 (B)	
3	695	2840	17.4	21.7	.80	.43 (B)	
4	515	3180	18.6	22.8	.82	.84 (B)	
5	720	3620	17.0	21.3	.80	.32 (B)	
Avg	695	3370	17.1	21.5	0.80		

TABLE 9.—*Properties of bricks produced in Eastern Pennsylvania (excluding Philadelphia)*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
	*lb/in.*²	*lb/in.*²	%	%		%	%
Plant 55, grade 3 ("Salmon," 3 percent of kiln, SM, C and S mixture)							
1	480	2090	21.7	26.4	0.82	0.42	0.64 (75c)
2	385	1910	24.2	28.4	.85	1.12	1.75 (75c)
3	405	1920	22.9	27.1	.85	0.63	1.15 (75c)
4	435	1580	23.5	28.7	.82	.92	1.27 (75c)
5	245	1070	25.9	30.4	.85	F 9c	
Avg	390	1710	23.6	28.2	0.84		
Plant 62, grade 1 ("Hard," 50 percent of kiln, SC, C)							
1	1130	5330	10.2	12.3	0.83	0.10 (B)	
2	1610	6610	10.7	12.3	.87	.11 (B)	
3	1190	5690	13.3	14.9	.89	.10 (B)	
4	1110	3860	12.4	14.3	.87	.19 (B)	
5	780	5320	13.2	15.5	.85	.46 (B)	
Avg	1165	5360	12.0	13.9	0.86	0.19 (B)	
Plant 62, grade 2 ("Medium," 45 percent of kiln, SC, C)							
1	985	5690	14.3	15.8	0.91	0.20 (B)	
2	765	5920	14.1	15.6	.90	.10 (B)	
3	945	6190	14.0	15.2	.92	.24 (B)	
4	615	4480	15.9	17.4	.91	.20 (B)	
5	750	4310	15.4	17.3	.89	.29 (B)	
Avg	810	5320	14.7	16.3	0.91	0.24 (B)	
Plant 62, grade 3 ("Soft," 5 percent of kiln, SC, C)							
1	825	4480	17.1	18.8	0.91	F 51c	
2	690	3550	18.4	20.0	.92	8.10	F 54c
3	825	4440	18.9	20.6	.92	3.40	F 57c
4	500	3560	19.6	21.2	.92	F 36c	
5	655	3890	20.1	21.6	.93	F 12c	
Avg	700	3980	18.8	20.4	0.92		
Plant 70, grade 1 ("Face," 20 percent of kiln, SM, C)							
1	1405	8220	8.8	13.2	0.67	0.10	
2	1130	8130	10.3	14.7	.70	.22	
3	1165	10250	10.5	15.3	.69	.53	
4	1465	8500	12.9	16.7	.77	.43	
5	1060	7790	11.8	16.5	.72	.10	
Avg	1245	8580	10.9	15.3	0.71	0.28	
Plant 70, grade 2 ("Common," 70 percent of kiln, SM, C)							
1	1480	8200	12.6	17.5	0.72	0.97 (B)	
2	1195	5700	12.4	17.3	.72	.35 (B)	
3	1260	5670	12.7	16.7	.76	.09 (B)	
4	1300	5770	13.4	17.9	.75	.18 (B)	
5	1415	7150	10.5	15.5	.68	.09 (B)	
Avg	1330	6500	12.3	17.0	0.73	0.34 (B)	

TABLE 9.—*Properties of brieks produced in Eastern Pennsylvania (exeluding Philadelphia)*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weigbt loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
Plant 70, grade 2A ("Second sample (1936) of grade 2")							
	*lb/in.*²	*lb/in.*²	(24-hr) %	%		%	
1	825	5920	12.6	17.1	0.74	1.60	
2	495	5770	12.6	17.0	.74	0.21	
3	905	5010	12.3	16.7	.74	.29	
4	700	5800	12.5	16.7	.75	.28	
5	1045	5290	13.7	17.9	.76	.39	
6	685	5560	13.2	17.6	.75	.32	
7	765	5150	13.3	17.8	.75	.21	
8	805	4850	14.8	19.6	.76	.52	
9	745	5890	8.8	13.6	.65	.20	
10	790	4760	13.6	17.8	.76	.30	
11	1090	4570	13.8	18.0	.77	.21	
12	1095	4300	13.2	17.6	.75	.28	
13	910	5600	12.2	16.5	.74	.32	
14	1025	5150	12.5	16.9	.74	.48	
15	1080	5160	12.8	15.3	.84	.21	
16	1135	4680	12.5	17.0	.74	.27	
17	435	5230	11.9	16.3	.73	.37	
18	860	5410	12.6	17.0	.74	.36	
19	1035	6120	12.8	17.3	.74	.46	
20	780	5820	13.5	17.9	.75	.50	
Avg	860	5300	12.8	17.1	0.75	0.39	
Plant 70, grade 3 ("Salmon," 10 percent of kiln, SM, C)							
1	880	5100	14.3	18.9	0.76	0.20	
2	635	3420	19.7	23.7	.83	F 27c	
3	820	3980	19.7	24.3	.81	0.62	
4	615	3500	19.6	24.2	.81	.52	
5	785	4500	17.5	22.3	.79	2.20	
Avg	745	4100	18.2	22.7	0.80		
Plant 172, grade 1 ("Stretchers," 50 percent of kiln, SM, C)							
Avg (5)	795	5080	13.9	18.0	0.77	Not tested	
Plant 172, grade 2 ("Hard," 25 percent of kiln, SM, C)							
Avg (5)	1015	6270	11.6	15.2	0.76	Not tested	
Plant 172, grade 3 ("Salmon," 25 percent of kiln, SM, C)							
1	305	2590	20.8	24.6	0.85	1.74	
2	275	1880	21.9	25.3	.87	F 6c	
3	615	3590	18.6	23.1	.81	0.50	
4	425	2420	20.2	24.3	.83	1.10	
5	550	2960	19.1	23.0	.83	0.98	
Avg	435	2690	20.1	24.1	0.84		
Plant 180, grade 1 ("Vitrified," 25 percent of kiln, SC, S)							
Avg (5)	2990	19450+	1.1	2.3	0.48	Not tested	
Plant 180, grade 2 ("Straight hard," 60 percent of kiln, SC, S)							
Avg (5)	1675	11990+	5.5	7.4	0.74	Not tested	
Plant 180, grade 3 ("Rough hard," 6 percent of kiln, SC, S)							
Avg (5)	1730	11650+	5.9	7.5	0.72	Not tested	

TABLE 9.—*Properties of brieks produced in Eastern Pennsylvania (excluding Philadelphia)*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
Plant 180, grade 4 ("Light hard," 6 percent of kiln, SC, S)							
	*lb/in.*²	*lb/in.*²	%	%		%	
1	885	5230	9.9	12.3	0.80	0.55 (B)	
2	1020	6100	9.3	11.7	.79	.19 (B)	
3	1120	7550	8.5	10.9	.78	.23 (B)	
4	980	7550	9.0	10.4	.86	.18 (B)	
5	865	5200	10.5	12.1	.87	.24 (B)	
Avg	975	6330	9.4	11.5	0.82	0.27 (B)	
Plant 180, grade 5 ("Salmon," 3 percent of kiln, SC, S)							
1	705	4000	11.6	13.9	0.83	0.37 (B)	
2	565	3810	12.4	14.9	.83	.99 (B)	
3	785	5050	11.0	13.1	.84	.16 (B)	
4	1030	6490	9.7	11.6	.84	.10 (B)	
5	905	6450	9.0	10.7	.84	.17 (B)	
Avg	800	5160	10.7	12.8	0.84	0.36 (B)	
Plant 223, grade 1 ("Multicored face," (1936) percentage of kiln unknown, SC, S, deaired)							
			(24-hr)				
1	745	5970	9.7	[a] 11.2	[a] 0.86	0.59	
2	620	5340	10.2	11.7	.87	.80	
3	655	7160	9.3	11.1	.84	.53	
4	820	6170	9.4	11.0	.85	.79	
5	615	5780	10.4	12.0	.87	.81	
6	385	6360	9.3	10.8	.86	.69	
7	820	6990	9.5	11.7	.82	.79	
8	565	5380	9.6	11.6	.83	.47	
9	720	4710	10.4	11.9	.88	.92	
10	590	6410	9.7	11.5	.84	.65	
11	640	6930	8.8	10.4	.84	.90	
12	645	6590	9.7	11.3	.86	.72	
13	580	6480	10.1	11.7	.86	.83	
14	675	6160	10.7	12.6	.85	.78	
15	500	6550	9.3	10.9	.86	.59	
16	625	5730	9.3	10.9	.86	1.00	
17	675	6650	9.0	10.6	.84	0.70	
18	780	6590	9.1	10.6	.86	1.61	
19	405	5250	10.2	11.8	.86	1.73	
20	720	7130	8.8	10.5	.84	0.66	
Avg	640	6220	9.6	11.3	0.85	0.83	

[a] Water absorption by 5-hr boiling is probably not a true measure of total fillable pore space for deaired bricks, hence the saturation coefficients are higher than would be those calculated from the true porosity.

TABLE 10.—*Properties of brieks produced in West Virginia and Western Pennsylvania*

[All samples received were formed by the stiff-mud, side-cut process. With few exceptions, shale was the raw material. Fire clay and mixtures of clay and shale were also reported as raw materials]

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
Plant 14, grade 1 ("Arch," 25 percent of kiln, SC, S)							
	*lb/in.*²	*lb/in.*²	%	%		%	
Avg (5)	1865	9530	5.1	7.2	0.70	Not tested	

TABLE 10.—*Properties of bricks produced in West Virginia and Western Pennsylvania*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption: 48-hr cold immersion	Water absorption: 5-hr boiling	Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
	lb/in.²	*lb/in.²*	%	%		%	
Plant 14, grade 2 ("Select," 15 percent of kiln, SC, S)							
1	1805	8490	7.9	10.2	0.77	0.37 (B)	
2	1470	7070	9.1	10.8	.84	.35 (B)	
3	1450	6380	7.7	9.6	.80	.18 (B)	
4	1670	6350	7.8	9.7	.80	.18 (B)	
5	1300	7240	8.3	10.1	.82	.26 (B)	
Avg	1540	7110	8.2	10.1	0.81	0.27 (B)	
Plant 14, grade 3 ("50 percent of kiln run," SC, S)							
1	1125	4710	11.6	13.3	0.87	0.43 (B)	
2	1420	7750	9.1	10.9	.83	.44 (B)	
3	1560	6090	6.9	9.1	.76	.26 (B)	
4	1590	7730	8.8	10.8	.82	.29 (B)	
5	1480	8400	8.3	10.2	.81	.28 (B)	
6	1570	7350	7.6	9.6	.79	.24 (B)	
7	1665	9050	8.5	10.2	.83	.43 (B)	
8	1905	8990	6.5	8.7	.75	.17 (B)	
9	1270	8960	9.4	11.3	.83	.31 (B)	
10	1440	7650	9.2	11.0	.84	.43 (B)	
11	1460	6780	8.7	10.9	.80	.35 (B)	
12	1720	9820	7.3	9.1	.80	.18 (B)	
13	1765	6390	7.4	9.5	.78	.33 (B)	
14	1680	6070	8.0	9.8	.82	.45 (B)	
15	2210	11850	5.3	7.4	.72	.25 (B)	
Avg	1590	7840	8.2	10.1	0.80	0.32 (B)	
Plant 14, grade 4 ("Salmon," 10 percent of kiln, SC, S)							
1	820	3030	12.6	14.5	0.87	0.87	% F 66c
2	805	4020	12.8	14.3	.90	F 45c	
3	785	3410	12.7	14.4	.88	1.22	4.10 (84c)
4	720	3460	14.0	15.7	.89	F 18c	
5	655	3670	13.7	15.7	.87	7.10	F 75c
Avg	755	3520	13.2	14.9	0.88		
Plant 36, grade 1 ("Black," 18 percent of kiln, SC, S)							
1	2390	16000	4.4	7.0	0.63	0.09	
2	1980	10850	4.3	7.4	.58	.08	
3	2200	14100	5.5	8.4	.65	.08	
4	1930	13850+	4.3	7.3	.59	.26	
5	1725	13000	4.4	7.4	.59	.15	
Avg	2045	13560+	4.6	7.5	0.61	0.13	
Plant 36, grade 2 ("Hearts," 35 percent of kiln, SC, S)							
1	1990	12850	4.7	8.0	0.59	0.29	
2	1630	12800	5.4	8.1	.67	.09	
3	1120	14950	4.2	7.2	.58	.08	
4	1825	14900	4.4	6.8	.65	.00	
5	2130	14250	4.1	7.0	.59	.08	
Avg	1740	13950	4.6	7.4	0.62	0.11	
Plant 36, grade 3 ("Hard reds," 45 percent of kiln, SC, S)							
1	2100	14250	4.8	7.0	0.69	0.17	
2	2090	8990	7.0	9.4	.74	.08	
3	1820	9340	6.7	9.4	.71	.16	
4	2080	10900	5.1	7.3	.70	.17	
5	1625	10300	6.8	9.7	.70	.17	
Avg	1945	10760	6.1	8.6	0.71	0.15	

TABLE 10.—*Properties of bricks produced in West Virginia and Western Pennsylvania*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption: 48-hr cold immersion	Water absorption: 5-hr boiling	Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
	lb/in.²	*lb/in.²*	%	%		%	
Plant 36, grade 3A ("Second sample of grade 2")							
1	1620	9800	8.6	10.7	0.80	0.34	
2	1530	10300	8.6	10.7	.80	.25	
3	1350	8670	9.1	11.3	.81	.26	
4	1460	9770	8.2	10.8	.76	.17	
5	1535	10000	7.1	10.1	.70	.17	
Avg	1500	9710	8.3	10.7	0.77	0.24	
Plant 36, grade 4 ("Salmon," 2 percent of kiln, SC, S)							
1	435	3280	16.5	18.7	0.88	0.55	
2	640	3880	14.1	16.8	.84	.27	
3	845	4560	13.7	16.1	.85	.28	
4	535	3970	15.4	17.8	.87	.79	
5	430	3580	15.5	17.9	.87	.77	
Avg	575	3850	15.0	17.5	0.86	0.53	
Plant 41, grade 1 ("No. 1 Hard burned common," 25 percent of kiln, SC, S)							
Avg. (5)	2270	13570	3.3	5.2	0.64	Not tested	
Plant 41, grade 2 ("No. 2 Hard burned common," 65 percent of kiln, SC, S)							
Avg. (5)	1910	12450	6.5	8.9	0.73	Not tested	
Plant 41, grade 3 ("Medium burned common," 10 percent of kiln, SC, S)							
1	1265	12650	6.4	8.3	0.77	0.30	
2	1955	12750	6.2	8.3	.75	.33	
3	1540	12600	6.3	8.6	.73	.30	
4	1655	13150	6.7	8.7	.76	.24	
5	1805	12250	6.6	8.7	.76	.33	
Avg (5)	1645	12680	6.4	8.5	0.75	0.30	
Plant 69, grade 1 ("Hard red," 70 percent of kiln, SC, S)							
Avg (5)	1550	13240	3.9	7.0	0.56	Not tested	
Plant 69, grade 2 ("Kiln run red," 90 percent of kiln, SC, S)							
Avg (5)	2035	11690	5.9	8.6	0.69	Not tested	
Plant 69, grade 3 ("Medium red," 20 percent of kiln, SC, S)							
Avg (5)	2390	12320	7.6	10.1	0.75	Not tested	
Plant 69, grade 4 ("Salmon," 10 percent of kiln, SC, S)							
1	1000	4990	11.1	13.3	0.83	0.44	% 0.53 (66c)
2	1145	4730	12.0	14.5	.83	.77	.86 (66c)
3	960	4740	12.3	14.7	.84	.87	.95 (66c)
4	1430	6390	11.1	13.2	.84	.93	1.02 (66c)
5	755	5720	11.6	13.7	.85	.77	0.94 (66c)
Avg	1060	5310	11.6	13.9	0.84	0.76	0.86 (66c)

TABLE 10.—*Properties of bricks produced in West Virginia and Western Pennsylvania*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
	lb/in.²	*lb/in.²*	%	%		%	
Plant 69, grade 5 ("Kiln run buff," 90 percent of kiln, SC, FC)							
1	1800	10800	6.4	8.7	0.74	0.46	
2	2730	13600	3.8	5.9	.64	.17	
3	886	7670	9.3	11.2	.83	.50	
4	2250	12850	3.6	6.7	.54	.18	
5	1155	9420	6.1	8.2	.74	.49	
Avg	1765	10870	5.8	8.1	0.70	0.36	
Plant 69, grade 6 ("Medium buff," 50 percent of kiln, SC, FC)							
1	1660	12000	6.4	8.2	0.78	0.27	
2	1370	6890	6.7	8.4	.80	.53	
3	2040	12300	6.0	7.7	.78	.26	
4	2170	11850	5.7	7.5	.76	No test	
5	1725	10650	6.3	8.4	.75	No test	
Avg	1795	10740	6.2	8.0	0.77	0.35	
Plant 80, grade 1 ("Top of kiln" (down draft), 20 percent of kiln, SC, S)							
Avg (6)	2030	8120	4.5	6.5	0.69	Not tested	
Plant 80, grade 2 ("Middle of kiln" (down draft), 65 percent of kiln, SC, S)							
1	2120	10100	5.1	7.4	0.69	0.23	
2	2120	10750	4.8	7.0	.69	.44	
3	1885	9300	5.5	7.2	.76	.25	
4	2130	9900	5.0	7.1	.70	.17	
5	2560	11100	4.1	6.1	.67	.16	
6	2280	10450	4.8	7.1	.68	.27	
Avg	2185	10270	4.9	7.0	0.70	0.25	
Plant 80, grade 3 ("Bottom of kiln" (down draft), 5 percent of kiln, SC, S)							
1	1100	4920	8.6	10.7	0.80	0.60	
2	985	4160	9.1	11.4	.80	.46	
3	765	3450	10.7	13.2	.81	.50	
4	825	3920	10.3	12.5	.82	.89	
5	965	4000	10.0	12.0	.83	.64	
6	1010	4180	9.0	11.0	.82	.39	
Avg	940	4100	9.6	11.8	0.81	0.58	
Plant 140, grade 1 ("Clinker," 5 percent of kiln, SC, S)							
1	2200	22500	1.6	3.9	0.44	0.08 (B)	
2	2490	21500	2.4	4.4	.54	.08 (B)	
3	1635	18150	1.1	4.2	.26	.00 (B)	
4	2670	24500	1.4	3.8	.37	.00 (B)	
5	2570	23800	1.8	4.3	.42	.07 (B)	
6	2980	22500	1.6	3.9	.41	.16 (B)	
Avg	2425	22160	1.6	4.1	0.41	0.06 (B)	
Plant 140, grade 2 ("All hard," 60 percent of kiln, SC, S)							
1	1850	13200	5.8	8.5	0.68	0.15 (B)	
2	2330	16850	4.0	6.6	.61	.15 (B)	
3	2240	15000	3.7	6.4	.58	.00 (B)	
4	2120	15700	4.3	6.7	.64	.16 (B)	
5	1960	12780	5.2	7.8	.67	.00 (B)	
6	1425	12120	7.4	9.8	.75	.14 (B)	
Avg	1990	14280	5.1	7.6	0.66	0.10 (B)	

TABLE 10.—*Properties of bricks produced in West Virginia and Western Pennsylvania*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
	lb/in.²	*lb/in.²*	%	%		%	
Plant 140, grade 3 ("Medium rough hard," 30 percent of kiln, SC, S)							
1	960	6680	9.7	11.5	0.84	0.18 (B)	
2	1000	8560	10.7	12.9	.83	.25 (B)	
3	1330	9590	10.4	12.5	.83	.62 (B)	
4	1590	10730	7.7	9.9	.78	.17 (B)	
5	1245	8600	8.1	9.9	.82	.18 (B)	
6	1035	5020	11.7	13.7	.85	.25 (B)	
Avg	1195	8200	9.7	11.7	0.82	0.28 (B)	
Plant 140, grade 4 ("Salmon," 5 percent of kiln, SC, S)							
1	885	5200	13.4	15.6	0.86	0.43	
2	635	3290	14.7	16.5	.89	F 21e	
3	855	4600	13.1	15.4	.85	0.32	
4	485	2690	14.7	16.9	.87	F 8e	
5	735	4530	13.9	15.7	.89	0.36	
6	580	2460	15.1	16.7	.90	F 6e	
Avg	695	3800	14.2	16.1	0.88		
Plant 143, grade 1 ("Vitrified," 20 percent of kiln, SC, S)							
1	2340	11150	3.3	6.7	0.49	0.15 (B)	
2	2750	19800	1.8	5.5	.33	.00 (B)	
3	2520	17750	3.3	6.3	.52	.07 (B)	
4	2440	16600	3.4	6.1	.56	.15 (B)	
5	2385	11200	3.7	6.3	.59	.07 (B)	
Avg	2485	15300	3.1	6.2	0.50	0.09 (B)	
Plant 143, grade 2 ("Commereial hard," 70 percent of kiln, SC, S)							
Avg (10)	2200	13940	4.8	7.4	0.63	Not tested	
Plant 143, grade 3 ("Salmon," 10 percent of kiln, SC, S)							
1	1130	7960	8.6	10.8	0.80	0.81	
2	1180	5740	10.9	13.3	.82	.70	
3	970	4920	12.2	14.4	.85	1.40	
4	985	5220	11.7	14.1	.83	1.17	
5	1000	4650	12.4	14.7	.84	1.95	
Avg	1055	5700	11.2	13.5	0.83	1.21	
Plant 145, grade 1 ("Face," 85 percent of kiln, SC, C and S)							
Avg (5)	2095	9970	7.0	9.1	0.77	Not tested	
Plant 145, grade 2 ("Areh," 10 percent of kiln, SC, C and S)							
1	2330	11170	6.6	9.6	0.69	0.18 (B)	
2	2250	12630	6.8	9.8	.69	.17 (B)	
3	1850	12000	6.8	9.2	.74	.16 (B)	
4	1550	10000	8.8	10.8	.82	.24 (B)	
5	2000	9600	7.7	10.2	.76	.10 (B)	
Avg	1995	11080	7.3	9.9	0.74	0.17 (B)	
Plant 145, grade 3 ("Salmon," 5 percent of kiln, SC, C and S)							
1	1250	7170	10.6	12.5	0.85	0.38	
2	1645	6620	9.1	11.3	.81	.35	
3	1125	6040	11.4	13.6	.84	.70	
4	1265	5400	10.4	12.4	.84	.58	
5	1165	6610	10.0	12.2	.82	.52	
Avg	1290	6370	10.3	12.4	0.83	0.51	

TABLE 10.—*Properties of bricks produced in West Virginia and Western Pennsylvania*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
	*lb/in.*²	*lb/in.*²	%	%		%	
Plant 157, grade 1 ("Common hard," 85 percent of kiln, SC, S)							
Avg (5)	1500	7190	7.5	9.1	0.83	Not tested	
Plant 163, grade 1 ("Hard," 50 percent of kiln, SC, S)							
Avg (5)	3195	16160	0.90	2.60	0.35	Not tested	
Plant 163, grade 2 ("Medium," 40 percent of kiln, SC, S)							
Avg (5)	2305	11570	3.6	6.1	0.60	Not tested	
Plant 163, grade 3 ("Soft," 10 percent of kiln, SC, S)							
1	2400	11500	5.2	7.4	0.70	0.00	
2	2540	12890	3.8	5.7	.67	.00	
3	2500	13000	4.2	6.2	.68	.00	
4	2230	10840	4.8	7.2	.67	.00	
5	2380	12090	5.1	7.0	.73	.08	
Avg	2410	12060	4.6	6.7	0.69	0.02	
Plant 177, grade 1 ("Common," 98 percent of kiln, SC, S)							
Avg (14)	2260	9240	4.8	6.8	0.73	Not tested	
Plant 210, grade 1 ("Representative sample," percentage of kiln unknown, SC, S)							
Avg (5)	2050	11890	4.1	6.1	0.67	Not tested	
Plant 224, grade 1 ("Hard," (1936) percentage of kiln unknown, SC, S)							
			(24-hr)				
1	1685	14150	2.9	5.2	0.56	0.16	
2	1320	15050	3.0	5.0	.59	.28	
3	1640	15750	2.9	5.0	.57	.10	
4	1330	12950	1.8	3.3	.54	.10	
5	1745	13100	0.9	2.3	.39	.20	
6	2210	11150	3.0	5.2	.58	.24	
7	1690	13100	2.8	5.0	.56	.16	
8	1425	9500	2.9	5.2	.56	.25	
9	1055	13200	3.0	5.1	.58	.22	
10	3220	16400	1.1	2.6	.42	.10	
11	905	15250	3.0	5.0	.60	.09	
12	1040	12650	2.9	4.9	.59	.10	
13	1540	13800	2.4	4.3	.56	.17	
14	1575	14600	3.5	5.6	.63	.20	
15	2300	13200	2.8	4.9	.57	.19	
16	1785	14900	2.1	4.0	.53	.18	
17	2400	11300	2.8	4.9	.56	.08	
18	1170	16550	2.9	5.1	.57	.10	
19	1530	14700	3.5	5.6	.63	.28	
20	2150	12550	3.3	5.6	.60	.17	
Avg	1685	13690	2.7	4.7	0.56	0.17	

TABLE 10.—*Properties of bricks produced in West Virginia and Western Pennsylvania*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
Plant, 224, grade 2 ("Light hard" (1936), percentage of kiln unknown, SC, S)							
	*lb/in.*²	*lb/in.*²	(24-hr) %	%		%	
1	1035	6320	11.9	14.0	0.85	0.43	
2	1320	6640	11.0	13.0	.84	.28	
3	1250	6730	11.6	13.4	.86	.43	
4	1165	6840	11.4	13.4	.86	.34	
5	1205	7450	11.2	13.0	.86	.40	
6	995	4870	13.7	15.4	.89	F 49c	
7	1035	4680	13.5	15.3	.88	F 36c	
8	960	5530	12.2	14.1	.86	0.45	
9	1280	5410	10.4	12.2	.86	1.36	
10	1185	5910	11.8	13.8	.86	0.42	
11	930	5290	12.1	13.8	.87	.72	
12	1195	6840	11.8	12.7	.85	.43	
13	1295	6490	11.5	13.5	.85	.51	
14	795	5590	13.2	15.2	.87	.54	
15	1110	5850	12.5	14.6	.86	.41	
16	965	3860	13.3	15.1	.88	.93	
17	1195	6310	11.8	13.9	.85	.43	
Avg	1110	5960	12.1	13.9	0.86		
Plant 224, grade 3 ("Unmarketable Salmons," (1937) percentage of kiln unknown, SC, S)							
			(24-hr)				
1	265	2000	13.9	17.3	0.80	6.22	F 53c
2	295	1910	14.5	18.2	.80	F 10c	
3	125	1010	15.7	19.4	.81	F2c	
4	150	1320	15.2	18.7	.82	F 4c	
5	210	1590	15.1	18.4	.82	F 2c	
6	260	1720	15.0	18.5	.82	F 2c	
7	230	1700	15.1	18.4	.82	F 5c	
8	180	1440	15.3	18.6	.82	F 2c	
9	140	1060	15.5	18.6	.83	F 1c	
10	140	1260	15.6	18.9	.82	F 2c	
11	300	2160	15.1	18.1	.84	F 10c	
12	135	1150	15.6	18.9	.83	F 2c	
13	150	1780	16.1	19.1	.84	F 2c	
14	120	1190	15.7	18.2	.84	F 1c	
15	140	1340	16.6	19.7	.84	F 1c	
16	180	1560	15.7	18.6	.84	F 2c	
17	270	1910	15.6	18.4	.84	F 13c	
18	260	1980	15.2	18.1	.84	F 10c	
19	235	2230	15.2	17.8	.86	F 10c	
20	215	2100	15.1	17.9	.84	F 9c	
Avg	200	1620	15.3	18.5	0.83		
Plant 225, grade 1 ("Hard," (1936) percentage of kiln unknown, SC, FC)							
			(24-hr)				
1	2725	14190	0.5	1.8	0.27	0.29	
2	2765	15120	.7	2.4	.29	.17	
3	2920	15380	.8	2.3	.34	.24	
4	2655	16970	.7	2.3	.32	.24	
5	2915	17000	.8	2.3	.34	.09	
6	2410	19170	.8	2.1	.36	[a].93	
7	2880	16160	.5	1.9	.26	.18	
8	3135	17750	.7	2.2	.32	.18	
9	3160	14050	.7	2.0	.34	.00	
10	2695	12580	.8	2.2	.36	.18	
11	2550	19420	.8	2.4	.32	.50	
12	2435	18540	.8	2.4	.34	.08	
13	2050	16080	1.0	2.5	.38	.33	
14	2770	12270	0.6	2.2	.28	.19	
15	2275	18970	.8	2.5	.31	.16	
16	2705	15160	.7	2.4	.31	.08	
17	2235	12770	.5	1.9	.26	.09	
18	2620	18070	.7	2.3	.32	.17	
19	2625	14220	.8	2.1	.36	.42	
20	2985	13330	.7	2.0	.38	.17	
Avg	2675	15860	0.7	2.2	0.32	0.23	

[a] Loss of 0.80 percent occurred on 18th cycle.

TABLE 11.—*Properties of bricks produced in Ohio*

[The samples represent bricks formed by the soft-mud and the stiff-mud side-cut processes. The raw materials include surface clay, fire clay, and shale]

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
	*lb/in.*²	*lb/in.*²	%	%		%	%
Plant 2, grade 1 ("Common," percentage of kiln unknown, SC, S)							
1	1540	11890	6.4	8.6	0.74	0.16	0.16 (87c)
2	1620	14770	5.2	7.4	.70	.08	.08 (87c)
3	1765	14600	5.4	7.8	.69	.00	.00 (87c)
4	2170	18290	3.0	4.7	.64	.00	.00 (87c)
5	1690	13620	4.3	6.5	.66	.00	.00 (87c)
6	1950	15950	1.2	3.3	.36	.25	.25 (87c)
7	1690	16150	2.1	4.1	.51	.00	.00 (87c)
8	2130	19050+	0.8	2.1	.38	.00	.00 (87c)
Avg	1820	15540+	3.6	5.6	0.58	0.06	0.06 (87c)
Plant 2A, grade 1 ("Common," percentage of kiln unknown, SC, S)							
1	3305	20280	2.0	4.1	0.49	0.15	0.15 (87c)
2	2100	14190	1.2	2.4	.50	.00	.00 (87c)
3	2680	15240	3.5	5.6	.62	.08	.08 (87c)
4	2770	17690+	2.4	4.3	.56	.09	.09 (87c)
5	3350	20650	2.4	4.4	.55	.07	.07 (87c)
6	3270	19570+	1.7	3.8	.45	.08	.08 (87c)
7	1985	13450	5.8	7.8	.74	.14	.14 (87c)
8	1575	12650	5.2	7.0	.74	.08	.08 (87c)
Avg	2630	16700+	3.0	4.9	0.58	0.09	0.09 (87c)
Plant 3, grade 1 ("90 percent kiln run," SC, S)							
1	1690	12100	2.9	4.9	0.59	0.00	0.00 (87c)
2	1285	8970	4.1	7.4	.55	.09	.09 (87c)
3	1170	11050	4.4	7.4	.59	.09	.09 (87c)
4	1515	8900	4.6	7.1	.65	.08	.08 (87c)
5	1460	9800	5.6	7.3	.74	.09	.09 (87c)
Avg	1425	10160	4.3	6.8	0.62	0.07	0.07 (87c)
Plant 3, grade 2 ("Salmon," 10 percent of kiln, SC, S)							
1	765	7150	10.8	13.1	0.83	0.54	0.54 (87c)
2	545	5570	10.8	13.8	.78	.52	.52 (87c)
3	590	6340	12.2	15.1	.81	.49	.58 (87c)
4	595	5600	11.4	13.8	.83	.41	.41 (87c)
5	550	5740	12.1	15.0	.81	.66	.73 (87c)
Avg	610	6080	11.5	14.2	0.81	0.52	0.56 (87c)
Plant 74, grade 1 ("Clinker," 0.1 percent of kiln, SM, C)							
Avg (5)	1890	9700	0.4	1.1	0.27	Not tested	
Plant 74, grade 2 ("Face," 6 percent of kiln, SM, C)							
1	2140	11300	4.3	5.4	0.80	0.44 (B)	
2	2110	8770	6.3	8.6	.73	.11 (B)	
3	2090	11300	4.7	5.2	.90	.21 (B)	
4	1780	9800	7.6	11.5	.66	.25 (B)	
5	2380	13050	0.6	3.3	.18	.00 (B)	
Avg	2100	10840	4.7	6.8	0.65	0.20 (B)	
Plant 74, grade 3 ("Sewer (arch)," 5 percent of kiln, SM, C)							
Avg (5)	1405	9840	7.9	11.7	0.68	Not tested	

TABLE 11.—*Properties of bricks produced in Ohio*—Con.

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
Plant 74, grade 4 ("Hard," 84.9 percent of kiln, SM, C)							
	*lb/in.*²	*lb/in.*²	%	%		%	%
1	955	4980	16.3	19.6	0.83	0.77 (B)	
2	1015	5430	16.0	19.1	.84	1.25 (B)	
3	1455	9800	8.7	13.7	.63	0.22 (B)	
4	1600	10900	9.3	13.4	.69	0.10 (B)	
5	565	3480	17.2	20.0	.86	1.57 (B)	
Avg	1120	6920	13.5	17.2	0.77	0.78 (B)	
Plant 74, grade 5 ("Salmon," 4 percent of kiln, SM, C)							
1	555	3700	18.5	20.2	0.92	3.10	3.36 (63c)
2	515	2900	18.1	20.8	.87	3.50	4.04 (63c)
3	550	3380	17.0	19.2	.89	4.20	4.52 (63c)
4	620	2650	16.6	20.1	.83	3.70	4.05 (63c)
5	515	3770	17.5	19.3	.91	5.60	5.92 (63c)
Avg	550	3280	17.5	19.9	0.88	4.02	4.38 (63c)
Plant 92, grade 1 ("Hard," 10 percent of kiln, SC, S)							
1	1660	10900	5.4	7.1	0.76	0.08	
2	1720	11700	5.5	7.6	.72	.17	
3	1400	13600	5.2	6.9	.75	.17	
4	1885	12300	5.0	6.7	.75	.08	
5	1760	12750	5.5	7.2	.76	.08	
Avg	1685	12250	5.3	7.1	0.76	0.12	
Plant 92, grade 2 ("Medium," 70 percent of kiln, SC, S)							
1	1810	13300	5.2	7.0	0.74	0.09	
2	1750	13850	5.7	7.0	.82	.09	
3	1675	10700	6.1	7.4	.82	.09	
4	1570	11150	6.6	8.4	.79	.18	
5	1350	10250	7.0	8.7	.80	.09	
Avg	1630	11850	6.1	7.7	0.79	0.11	
Plant 92, grade 3 ("Soft," 20 percent of kiln, SC, S)							
1	1560	11150	7.5	9.3	0.81	0.18	0.18 (57c)
2	1505	10800	7.5	9.2	.82	.08	.08 (57c)
3	1680	7570	8.6	10.4	.83	.18	.18 (57c)
4	1395	7280	9.7	10.9	.89	.08	.08 (57c)
5	1000	6700	10.8	12.5	.87	.34	.34 (57c)
Avg	1430	8700	8.8	10.5	0.84	0.17	0.17 (57c)
Plant 101, grade 1 ("Light red common," 30 percent of kiln, SC, S)							
Avg (5)	1530	11410	8.5	11.3	0.75	Not tested	
Plant 101, grade 2 ("Full range commons," 60 to 80 percent of kiln, SC, S)							
Avg (5)	2100	17090+	4.1	6.8	0.49	Not tested	
Plant 101, grade 3 ("Dark range commons," 30 percent of kiln, SC, S)							
1	3510	21400+	0.4	2.1	0.19	No test	
2	2730	21900+	1.2	3.6	.33	0.00	
3	2330	23200	1.9	5.0	.38	.00	
4	2360	20060+	4.3	7.3	59	.00	
5	2210	18700	5.1	8.2	.62	.09	
Avg	2630	21040+	2.6	5.2	0.42	0.02	

TABLE 11.—*Properties of bricks produced in Ohio*—Con.

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
	lb/in.²	*lb/in.²*	%	%		%	
Plant 101, grade 4 ("Full range clay common," percentage of kiln unknown, SC, FC)							
1	2210	19450	3.3	4.8	0.69	No test	
2	2190	20500	3.3	4.3	.77	No test	
3	2100	21100+	3.4	4.3	.79	0.10	
4	2060	20500	0.9	2.8	.32	.00	
5	1890	22300	1.4	2.9	.48	.00	
Avg	2090	20770+	2.5	3.8	0.61	0.03	
Plant 101, grade 5 ("Full range common," percentage of kiln unknown, SC, FC)							
Avg (5)	2495	16350	4.7	6.6	0.65	Not tested	
Plant 111, grade 1 ("Commons," 98 percent of kiln, SC, S)							
Avg (5)	800	10560	7.4	9.3	0.79	Not tested	
Plant 111, grade 2 ("Clinkers," 2 percent of kiln, SC, S)							
Avg (5)	795	12120	3.8	6.3	0.60	Not tested	
Plant 114, grade 1 ("Clinkers," 5 percent of kiln, SM, C)							
Avg (5)	2035	10610	4.5	6.8	0.73	Not tested	
Plant 114, grade 2 ("Hard," 5 percent of kiln, SM, C)							
1	855	4030	21.7	27.1	0.80	No test	
2	1690	7010	18.0	23.8	.76	do	
3	660	3880	23.7	26.6	.89	1.78 (B)	
4	640	3630	22.1	26.7	.83	0.58 (B)	
5	445	3900	20.1	23.9	.84	1.39 (B)	
Avg	855	4490	21.1	25.6	.82	1.25 (B)	
Plant 114, grade 3 ("Common, 90 percent kiln run," SM, C)							
1	880	3340	20.5	24.0	0.85	1.50	
2	810	4260	18.9	20.1	.94	1.10	
3	365	3960	23.5	27.1	.87	1.50	
4	565	3400	24.0	27.2	.88	2.90	
5	620	2940	20.7	21.6	.96	5.60	
Avg	650	3580	21.5	24.0	.90	2.52	
Plant 116, grade 1 ("Kiln run," percentage of kiln unknown, SM, C)							
1	910	3730	21.5	24.5	0.88	0.00	% F 60c
2	650	3180	22.8	26.9	.85	F 42c	
3	960	4980	18.4	22.1	.83	0.25	0.49 (63c)
4	870	3580	22.6	26.8	.84	F 21c	
5	660	2610	23.8	26.8	.89	F 42c	
6	420	2450	24.2	26.8	.90	F 50c	
7	1020	3840	19.9	23.3	.85	F 45c	
8	1005	4540	18.7	22.3	.84	F 50c	
9	1020	3460	21.8	25.5	.86	F 48c	
10	1010	4020	20.9	25.0	.84	F 18c	
Avg	850	3640	21.5	25.0	.86		
Plant 120, grade 1 ("Face," 10 percent of kiln, SM, C)							
Avg (6)	3425	15620	0.35	0.78	0.36	Not tested	

TABLE 11.—*Properties of bricks produced in Ohio*—Con.

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
	lb/in.²	*lb/in.²*	%	%		%	
Plant 120, grade 2 ("Face (Variable shades)," 30 percent of kiln, SM, C)							
1	2410	9650	3.1	5.8	0.53	0.36 (B)	
2	3200	8410	0.5	2.5	.20	.10 (B)	
3	1970	11550	4.0	5.9	.68	.30 (B)	
4	3170	12300	1.5	4.0	.38	.33 (B)	
5	2180	9540	3.8	7.2	.53	.19 (B)	
6	2090	9750	5.9	9.3	.64	No test	
Avg	2505	10200	3.1	5.8	0.59	0.26 (B)	
Plant 120, grade 3 ("Selected commons," 20 percent of kiln, SM, C)							
Avg (6)	1300	7870	7.8	11.5	0.68	Not tested	
Plant 120, grade 4 ("Commons, light," 25 percent of kiln, SM, C)							
Avg (6)	950	6210	11.7	15.6	0.75	Not tested	
Plant 120, grade 5 ("Backup (Salmon)," 15 percent of kiln, SM, C)							
1	720	4670	14.6	17.8	0.82	0.51 (B)	
2	375	3160	17.4	20.5	.85	.53 (B)	
3	960	3720	15.9	18.9	.84	1.10 (B)	
4	460	5930	15.1	18.6	.81	.30 (B)	
5	675	4240	16.5	20.1	.82	.37 (B)	
6	830	4250	15.8	18.8	.84	.73 (B)	
Avg	670	4330	15.9	19.1	0.83	0.71 (B)	
Plant 122, grade 1 ("Vitrified," 18 percent of kiln, SC, S)							
Avg (5)	2085	18100+	3.1	5.4	0.57	Not tested	
Plant 122, grade 2 ("Hard," 30 percent of kiln, SC, S)							
Avg (5)	2415	17580	2.1	3.9	0.54	Not tested	
Plant 122, grade 3 ("Medium," 50 percent of kiln, SC, S)							
Avg (5)	2090	14670	4.6	6.5	0.70	Not tested	
Plant 122, grade 4 ("Soft or salmon," 2 percent of kiln, SC, S)							
1	715	6290	10.0	12.1	0.83	0.50	
2	1010	6300	8.7	10.9	.80	.35	
3	655	6900	9.7	11.8	.82	.43	
4	955	6720	8.7	10.5	.83	.35	
5	890	6720	9.3	11.1	.84	.65	
Avg (5)	845	6590	9.3	11.3	0.82	0.46	
Plant 208, grade 1 ("Line," 70 percent of kiln, SM, C)							
Avg (13)	755	4600	9.5	14.0	0.66	One tested, 0.38 percent loss	
Plant 208, grade 2 ("Backup," 20 to 30 percent of kiln, SM, C)							
1	510	2340	13.6	18.3	0.74	1.26	
2	340	2260	12.8	17.7	.72	0.43 (B)	
3	760	3010	13.1	16.9	.78	.25 (B)	
4	595	2690	13.1	16.9	.78	.44 (B)	
5	645	2350	13.4	17.2	.78	.67	
Avg	570	2530	13.2	17.4	0.76	0.61 (A & B)	

TABLE 12.—*Properties of bricks produced in Detroit District*

[All samples received were formed from surface clay by the soft-mud process. The "kiln run" and "stock" grades were fired in scove kilns. The "exterior" grades were reported to be from downdraft kilns.]

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
Plant 8, grade 1 ("Stock," percentage of kiln unknown, SM, C)							
	lb/in.²	*lb/in.²*	%	%		%	%
1	385	2310	19.7	23.5	0.84	0.75	
2		2000	15.6	19.8	.79	.39	
3	610	3130	15.9	19.2	.83	.49	
4	485	2490	19.2	22.9	.84	.33	
5	445	2020	20.3	23.6	.86	.77	
Avg	480	2390	18.1	21.8	0.83	0.55	
Plant 8, grade 2 ("95 percent kiln run," salmons excluded, SM, C)							
1	815	4270	15.6	19.7	0.79	0.28	0.28 (84c)
2	1010	3790	15.7	20.6	.76	.20	.29 (84c)
3	785	3550	16.4	20.5	.80	.62	.82 (84c)
4	950	4540	15.4	19.8	.78	.22	.22 (84c)
5	555	3550	15.8	20.1	.79	.77	1.14 (84c)
Avg	820	3940	15.8	20.1	0.78	0.42	0.55 (84c)
Plant 9, grade 1 ("Stock," percentage of kiln unknown, SM, C)							
1	450	3880	20.7	20.7	1.00	2.60	
2	465	4140	22.0	22.5	0.98	0.80	
3	720	4070	21.3	21.3	1.00	.70	
4	970	4500	21.7	21.7	1.00	1.81	
5		4130	22.4	23.2	0.97	6.55	
Avg	650	4140	21.6	21.9	0.99	2.49	
Plant 9, grade 2 ("95 percent kiln run," salmons excluded, SM, C)							
1	620	3490	21.2	23.5	0.90	0.94	3.40 (81c)
2	395	2590	24.7	28.0	.88	F 19c	
3	895	3150	24.0	27.6	.87	F 21c	
4	540	3280	23.8	27.6	.86	F 35c	
5	480	2900	22.8	25.9	.88	F 9c	
Avg	585	3080	23.3	26.5	0.88		
Plant 10, grade 1 ("Stock," percentage of kiln unknown, SM, C)							
1	710	3920	18.5	20.5	0.90	0.40 (B)	
2	240	3070	19.6	22.8	.86	No test	
3	430	3170	18.8	21.0	.90	0.72 (B)	
4	805	3390	19.0	21.1	.90	.27 (B)	
5	735	3180	18.5	21.0	.88	.37 (B)	
Avg	585	3350	18.9	21.3	0.89	0.44 (B)	
Plant 10, grade 2 ("95 percent kiln run," salmons excluded, SM, C)							
1	560	2570	22.0	25.2	0.87	0.60	
2	760	3500	19.0	21.1	.90	.53	
3	680	3300	18.6	21.3	.87	.65	
4	460	3020	21.1	23.4	.90	.57	
5	725	3050	18.8	19.9	.94	.69	
Avg	635	3090	19.9	22.2	0.90	0.61	
Plant 10, grade 3 ("Salmons," 5 percent of kiln, SM, C)							
1	550	3460	19.2	20.3	0.94	2.70	4.10 (81c)
2	725	2560	19.6	21.1	.93	2.10	3.30 (81c)
3	600	2280	20.3	21.8	.93	2.40	4.80 (81c)
4	215	2080	18.3	20.0	.92	1.00	2.30 (81c)
5	680	2330	19.8	20.9	.95	1.30	2.70 (81c)
Avg	555	2540	19.4	20.8	0.93	1.90	3.44 (81c)

TABLE 12.—*Properties of bricks produced in Detroit District*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
Plant 11, grade 1 ("Exterior," percentage of kiln unknown, SM, C)							
	lb/in.²	*lb/in.²*	%	%		%	%
1	2320	8630	4.7	5.8	0.81	No test	
2	930	10800	1.2	1.8	.67	0.00 (B)	
3	1410	5880	8.5	11.6	.73	.12 (B)	
4	1450	11680	3.0	3.5	.86	.00 (B)	
5	2800	8960	2.7	3.3	.82	No test	
Avg	1780	9190	4.0	5.2	0.78	0.04 (B)	
Plant 11, grade 2 ("Stock," percentage of kiln unknown, SM, C)							
1	815	5250	14.6	17.8	0.82	No test	
2	1280	4980	13.2	18.7	.71	do	
3	945	6070	14.1	18.5	.76	0.22 (B)	
4	1045	5790	14.5	18.4	.79	.13 (B)	
5	1165	4890	15.6	19.2	.81	.12 (B)	
Avg	1050	5400	14.4	18.5	0.78	0.16 (B)	
Plant 11, grade 3 ("95 percent kiln run," salmons excluded, SM, C)							
1	565	3490	18.7	20.7	0.90	0.58	0.67 (84c)
2	660	3470	19.3	21.1	.92	0.54	.72 (84c)
3	495	2880	19.7	22.0	.90	3.70	3.90 (84c)
4	520	3030	19.3	21.5	.90	0.55	0.65 (84c)
5		2650	20.9	23.3	.90	.74	.98 (84c)
Avg	560	3100	19.6	21.7	0.90	1.22	1.38 (84c)
Plant 12, grade 1 ("Exterior," percentage of kiln unknown, SM, C)							
1	1970	6910	4.1	7.0	0.59	0.00	
2	1605	3840	7.8	12.0	.65	.00	
3	1550	5000	10.0	13.9	.72	.11	
4	1310	4860	9.3	14.2	.65	.22	
5	1570	4750	9.2	13.3	.69	.31	
Avg	1600	5070	8.1	12.1	0.66	0.13	
Plant 12, grade 2 ("Stock," percentage of kiln unknown, SM, C)							
1	1080	3590	19.0	24.2	0.79	F 50c (B)	
2	595	4360	18.8	22.3	.84	No test	
3	580	3850	21.9	25.4	.86	F 31c (B)	
4	1025	4030	20.0	23.9	.84	F 34c (B)	
5	540	3250	22.5	25.6	.89	No test	
Avg	765	3820	20.4	24.3	0.84	F 38c (B)	
Plant 12, grade 3 ("95 percent kiln run," salmons excluded, SM, C)							
1	710	2740	21.9	25.0	0.88	2.30	2.50 (84c)
2	635	2920	21.7	25.2	.86	0.40	0.61 (84c)
3	590	2450	22.5	26.2	.86	6.20	6.30 (84c)
4	385	3450	21.3	25.0	.85	0.25	0.49 (84c)
5	640	3500	21.1	23.7	.89	.72	0.93 (84c)
Avg	590	3010	21.7	25.0	0.87	1.97	2.17 (84c)
Plant 13, grade 1 ("Exterior Type A," percentage of kiln unknown, SM, C)							
Avg (5)	2370	9500	1.4	2.9	0.44	Not tested	

TABLE 12.—*Properties of bricks produced in Detroit District*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption: 48-hr cold immersion	Water absorption: 5-hr boiling	Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
Plant 13, grade 2 ("Exterior type B," percentage of kiln unknown, SM, C)							
	lb/in.²	*lb/in.²*	%	%		%	
1	1960	9500	2.4	4.1	0.59	0.24 (B)	
2	1830	9060	0.5	1.6	.31	.11 (B)	
3	2370	10000	.5	1.9	.26	.09 (B)	
4	1920	11350	.5	1.0	.50	.00 (B)	
5	2095	9510	.5	1.0	.50	.10 (B)	
Avg	2035	9880	0.9	1.9	0.43	0.11 (B)	
Plant 13, grade 3 ("Exterior Type C," percentage of kiln unknown, SM, C)							
1	1425	6410	6.1	8.9	0.69	0.09 (B)	
2	1020	3930	11.4	15.9	.72	.34 (B)	
3	890	3920	12.2	16.8	.73	.35 (B)	
4	1430	6300	7.0	11.3	.62	.11 (B)	
5	1265	7510	6.9	9.0	.77	.32 (B)	
Avg	1205	5610	8.7	12.4	0.71	0.24 (B)	
Plant 13, grade 4 ("Exterior Type D," percentage of kiln unknown, SM, C)							
1	2610	11500	0.9	2.2	0.40	0.09 (B)	
2	2980	14800	.5	1.4	.36	.09 (B)	
3	2420	9800	.6	3.2	.19	.25 (B)	
4	2120	12400	1.3	2.6	.50	.13 (B)	
5	2180	11000	1.4	3.6	.39	.18 (B)	
Avg	2460	11900	0.9	2.6	0.37	0.15 (B)	
Plant 13, grade 5 ("Stock," percentage of kiln unknown, SM, C)							
1	415	2420	22.0	24.6	0.89	0.94 (B)	
2	335	2490	21.7	24.2	.90	1.14 (B)	
3	635	2620	22.1	26.0	.85	0.49 (B)	
4	610	2880	21.1	23.7	.89	.72 (B)	
5	485	2320	21.0	23.0	.91	.90 (B)	
Avg	495	2550	21.6	24.3	0.89	0.84 (B)	
Plant 13, grade 6 ("95 percent of kiln run," salmons excluded, SM, C)							
						%	
1	545	2550	20.1	23.9	0.84	0.43	0.65 (84c)
2	515	2800	19.5	23.6	.83	.31	.31 (84c)
3	425	2650	20.6	23.9	.86	1.03	1.29 (84c)
4	650	3100	19.3	23.7	.81	0.44	.44 (84c)
5	655	3030	20.0	23.1	.87	.41	.62 (84c)
Avg	555	2830	19.9	23.6	0.84	0.52	0.66 (84c)
Plant 13, grade 6A ("Second sample (1936) of grade 6")							
			(24-hr)				
1	680	3860	21.3	24.9	0.86	1.27	
2	365	3580	20.5	23.8	.86	1.04	
3	535	3540	19.9	22.4	.88	2.06	
4	635	3850	19.4	22.7	.86	0.91	
5	790	3260	21.0	24.6	.86	.83	
6	550	2980	21.2	23.9	.89	.90	
7	470	3020	21.1	25.1	.84	.65	
8	500	2920	20.7	23.8	.87	.86	
9	535	4300	19.9	23.2	.86	.91	
10	650	3740	19.2	21.8	.88	1.36	
11	530	3850	20.0	23.5	.85	1.49	
12	625	3320	20.3	22.9	.88	0.91	
13	750	4520	19.8	23.2	.86	.60	
14	425	3280	22.0	26.0	.84	F 24c	
15	580	3070	20.7	23.5	.88	0.89	
16	295	----	22.0	26.0	.84	F 51c	
17	635	3210	21.0	24.0	.88	0.94	
18	485	3070	20.9	22.3	.94	2.01	
19	540	4520	18.6	21.5	.86	0.59	
20	695	3380	21.9	25.6	.86	1.04	
Avg	565	3540	20.6	23.7	0.87	----	

TABLE 13.—*Properties of bricks produced in Wisconsin*

[All samples received were formed from surface clay by either the soft-mud or the stiff-mud, side-cut process. Many of the bricks contain finely divided free lime which hydrates and carbonates with time, causing significant gains in weight. This high lime content is the cause of the characteristic light color of many of these samples]

Specimen number	Modulus of rupture	Compressive strength	Water absorption: 48-hr cold immersion	Water absorption: 5-hr boiling	Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
Plant 50, grade 1 ("Sewer," 4 percent of kiln, SM, C)							
	lb/in.²	*lb/in.²*	%	%		%	%
1	1975	7370	10.5	15.7	0.67	0.13	0.13 (78c)
2	1760	9270	6.8	10.7	.64	.00	.00 (78c)
Avg	1870	8320	8.6	13.2	0.66	0.06	0.06 (78c)
Plant 50, grade 2 ("Select," 46 percent of kiln, SM, C)							
1	940	5350	16.3	20.1	0.81	0.00	0.00 (78c)
2	985	5440	14.8	18.9	.78	.20	.31 (78c)
Avg	965	5400	15.6	19.5	0.80	0.10	0.16 (78c)
Plant 50, grade 3 ("Common," 46 percent of kiln, SM, C)							
1	485	2660	21.4	24.7	0.87	0.26	0.39 (78c)
2	445	3070	21.1	24.7	.85	.41	.62 (78c)
Avg	465	2860	21.2	24.7	0.86	0.34	0.50 (78c)
Plant 50, grade 4 ("Soft," 4 percent of kiln, SM, C)							
1	440	2390	20.9	24.6	0.85	0.60	0.90 (78c)
2	640	2590	22.4	24.7	.91	.83	1.18 (78c)
Avg	540	2490	21.6	24.6	0.88	0.72	1.04 (78c)
Plant 61, grade 1 ("Clinkers," 5 percent of kiln, SM, C)							
Avg (5)	1285	10590	8.9	12.2	0.78	Not tested	
Plant 61, grade 2 ("Hard," 90 percent of kiln, SM, C)							
1	1725	7140	15.5	21.0	0.74	0.13 (B)	
2	1850	6900	13.8	18.6	.74	.14 (B)	
3	1060	6450	19.5	23.0	.85	.53 (B)	
4	930	5190	20.7	25.8	.80	F 50c (B)	
5	645	4470	23.8	28.5	.84	F 50c (B)	
Avg	1240	6030	18.7	23.4	0.79	----	
Plant 61, grade 3 ("Soft," 5 percent of kiln, SM, C)							
1	465	1960	26.1	29.3	0.89	0.13	1.53 (101c A & B)
2	455	2300	26.6	30.5	.87	.91	1.04 (66c)
3	300	1850	25.8	29.0	.89	[a]+.77	+0.77 (66c)
4	475	2980	20.6	24.4	.84	.63	.75 (66c)
5	305	2050	26.0	30.3	.86	1.85	2.13 (66c)
Avg	400	2230	25.0	28.7	0.87	----	
Plant 129, grade 1 ("Clinker," 10 percent of kiln, SC, C)							
Avg (5)	2505	11180	8.5	14.1	0.57	Not tested	
Plant 129, grade 2 ("Commercial hard," 40 percent of kiln, SC, C)							
1	1320	5350	19.9	26.3	0.76	0.23 (B)	
2	935	4650	21.6	26.7	.81	.25 (B)	
3	1130	4080	21.4	26.6	.81	.12 (B)	
4	925	4370	20.4	25.9	.79	.12 (B)	
5	940	5090	22.0	27.6	.80	.00 (B)	
Avg	1050	4710	21.1	26.6	0.79	0.14 (B)	

[a] These bricks have a high lime content. The gain in weight is due to hydration and carbonation of the lime.

TABLE 13.—*Properties of bricks produced in Wisconsin*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
	lb/in.²	*lb/in.²*	%	%		%	
1	510	1830	29.4	34.1	0.86	No test	
2	400	1900	29.4	33.6	.88		
3	255	1600	29.3	33.9	.86		
4	365	1740	29.2	33.9	.86	1.27 (B)	
5	350	1480	29.2	34.1	.86	1.93 (B)	
Avg	375	1710	29.3	33.9	0.86	1.60 (B)	
Plant 129, grade 3 ("Select white," 30 percent of kiln, SC, C)							
1	575	2150	26.2	29.2	0.90	F 12c	
2	340	1180	29.9	33.2	.90	F 10c	
3	325	1130	33.3	37.7	.88	F 10c	
4	260	1600	32.4	35.1	.92	F 10c	
5	355	1660	29.1	32.3	.90	F 12c	
Avg	370	1540	30.2	33.5	0.90	F 11c	
Plant 129, grade 4 ("Soft or backup," 20 percent of kiln, SC, C)							
1	930	3145	(24-hr) 24.5	27.7	0.88	F 38c	
2	295	1380	32.3	35.8	.90	F 1c	
3	140	1715	32.2	35.3	.91	F 1c	
4	305	940	33.2	35.6	.93	F 9c	
5	820	3200	22.8	26.8	.85	F 38c	
6	650	2120	29.7	33.0	.90	F 9c	
7	165	1615	32.2	34.8	.92	F 31c	
8	355	2280	27.9	31.8	.88	F 8c	
9	815	6070	23.1	25.7	.90	F 1c	
10	280	1965	33.0	36.6	.90	F 9c	
11	530	1615	32.9	36.7	.90	F 9c	
12	475	1390	33.3	36.0	.93	F 3c	
13	620	1690	28.7	32.1	.89	F 1c	
14	590	1565	32.6	35.3	.92	F 16c	
15	395	1805	33.1	36.3	.91	F 3c	
16	300	1056	35.7	37.8	.94	F 6c	
17	430	1545	33.9	36.3	.93	F 6c	
Avg	480	2080	30.7	33.7	0.91	F 11c	
Plant 150, grade 1 ("Clinker," 2½ percent of kiln, SM, C)							
1	910	3980	5.4	6.9	0.78	0.15	
2	940	4190	5.4	8.1	.67	.27	
3	1090	4060	4.0	6.7	.60	.27	
4	1745	3950	3.7	6.8	.54	.25	
5	1245	3870	5.0	7.8	.64	.14	
Avg	1185	4010	4.7	7.3	0.65	0.22	
Plant 150, grade 1A ("Second sample of grade 1")							
Avg (5)	1150	5180	12.7	15.7	0.81	Not tested	
Plant 150, grade 2 ("Commercial hard," 80 percent of kiln, SM, C)							
1	830	2880	22.2	24.6	0.90	0.95	
2	755	2760	20.5	21.7	.95	1.68	
3	845	2910	21.3	23.3	.91	0.80	
4	760	2440	20.1	21.5	.94	.29	
5	690	2760	21.3	25.0	.85	F 36c	
Avg	775	2750	21.1	23.2	0.91		

TABLE 13.—*Properties of bricks produced in Wiseonsin*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
Plant 150, grade 3 ("Red commercial hard," percentage of kiln unknown, SM, C)							
	lb/in.²	*lb/in.²*	%	%		%	
1	995	4900	14.6	16.8	0.87	0.44	
2	675	4270	17.4	19.3	.90	.74	
3	770	3870	18.2	20.3	.90	.81	
4	770	4240	16.9	18.8	.90	.52	
5	715	3900	18.5	20.6	.90	2.00	
Avg	785	4240	17.1	19.2	0.89	0.99	
Plant 150, grade 4 ("Medium," 12½ percent of kiln, SM, C)							
1		3280	20.8	23.3	0.89	F 38c	
2	485	2930	22.4	24.3	.92	0.50	
3	510	3100	22.2	24.8	.90	F 37c	
4	580	3620	22.0	24.1	.91	0.70	
5	700	2340	22.4	25.0	.90	.92	
Avg	570	3050	22.0	24.3	0.90		
Plant 150, grade 5 ("Salmon," 5 percent of kiln, SM, C)							
1	290	2680	21.0	22.4	0.94	F 33c	
2	560	2900	21.6	23.0	.94	2.34	
3	515	2560	22.2	24.8	.90	F 27c	
4	465	1820	23.3	26.7	.87	F 48c	
5	545	2400	16.7	18.4	.91	F 11c	
Avg	475	2470	21.0	23.1	0.91		
Plant 154, grade 1 ("Clinker," 5 percent of kiln, SC, C)							
1	1235	11600	10.9	12.6	0.87	0.57	
2	1935	10850	1.8	2.4	.75	.12	
3	2580	12050	5.1	6.1	.84	.00	
4	2480	9610	2.5	3.4	.74	.00	
5	2330	6330	6.2	7.5	.83	.00	
Avg	2110	10090	5.3	6.4	0.81	0.14	
Plant 154, grade 2 ("Hard white," 80 percent of kiln, SM, C)							
1	1175	5190	10.2	13.5	0.76	0.26	
2	620	5150	16.4	19.8	.83	.56	
3	435	5190	15.2	19.2	.79	.53	
4	820	4420	20.2	22.2	.91	.65	
5	845	4730	16.6	19.9	.83	.33	
Avg	780	4940	15.7	18.9	0.82	0.57	
Plant 154, grade 3 ("Hard," 80 percent of kiln, SC, C)							
1	2000	10000	12.4	14.0	0.89	0.00	
2	1740	7270	12.7	14.2	.89	.15	
3	1595	6760	19.6	21.5	.91	F 3c	
4	905	5730	20.5	22.3	.92	F 8c	
5	1310	6850	19.9	22.2	.90	F 6c	
Avg	1510	7320	17.0	18.8	0.90		
Plant 154, grade 4 ("Hard red," 80 percent of kiln, SM, C)							
1	1420	8700	1.7	5.1	0.33	0.00	
2	1530	6960	4.4	8.3	.53	.11	
3	940	4780	11.0	14.9	.74	.78	
4	460	2550	17.4	20.3	.86	4.24	
5	755	3900	13.9	17.9	.78	0.46	
Avg	1020	5380	9.7	13.3	0.65	1.12	

TABLE 13.—*Properties of bricks produced in Wisconsin*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption: 48-hr cold immersion	Water absorption: 5-hr boiling	Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
	lb/in.²	*lb/in.²*	%	%		%	
Plant 154, grade 5 ("Soft," 5 percent of kiln, SC, C)							
1	270	2340	21.5	23.1	0.93	F 12c	
2	1060	4540	19.7	21.2	.91	F 4c	
3	255	2870	21.2	22.4	.95	F 9c	
4	930	3690	22.3	24.4	.91	F 12c	
5	630	3510	20.3	21.5	.94	F 12c	
Avg	630	3390	21.0	22.5	0.93	F 10c	
Plant 204, grade 1 ("Common," percentage of kiln unknown, SC, C)							
Avg (5)	1790	6840	12.1	17.7	0.68	Not tested	

TABLE 14.—*Properties of bricks produced in Chicago District*

[All bricks received from the Chicago District were made from surface clay by the stiff-mud, end-cut process]

Specimen number	Modulus of rupture	Compressive strength	Water absorption: 48-hr cold immersion	Water absorption: 5-hr boiling	Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
	lb/in.²	*lb/in.²*	%	%		%	%
Plant 73, grade 1 ("Hard burned common," percentage of kiln unknown, EC, C)							
1	2000	4180	11.7	15.5	0.75	0.89	1.12 (66c)
2	1550	4460	12.0	15.8	.76	1.64	2.01 (66c)
3	1780	3610	13.5	16.8	.80	1.40	1.51 (66c)
4	2250	4740	10.6	14.0	.76	1.87	2.01 (66c)
5	1220	2560	21.7	24.8	.88	F 42c	
Avg	1760	3910	13.9	17.4	0.79		
Plant 109, grade 1 ("Common," percentage of kiln unknown, EC, C)							
1	690	4100	21.6	23.9	0.90	F 27c	
2	630	2450	20.6	26.0	.79	4.77	
3	1295	4220	12.1	15.7	.77	1.04	
4	905	3350	14.6	18.7	.78	1.03	
5	905	2880	17.8	21.6	.82	1.29	
6	1110	3770	11.2	16.0	.70	0.64	
7	780	2780	18.9	22.4	.84	1.69	
8	745	3100	15.7	19.7	.80	1.46	
9	1010	2750	15.6	20.2	.77	2.11	
10	1295	2060	6.7	11.0	.61	0.24	
11	670	2420	18.1	24.0	.75	2.34	
12	605	3800	7.9	11.6	.68	2.16	
13	750	1890	17.7	23.5	.75	1.40	
14	825	2470	11.9	15.5	.77	2.08	
15	970	2850	22.2	24.4	.91	F 3c	
Avg	880	3000	15.5	19.6	0.77		

TABLE 14.—*Properties of bricks produced in Chicago District*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption: 48-hr cold immersion	Water absorption: 5-hr boiling	Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
	lb/in.²	*lb/in.²*	%	%		%	
Plant 152, grade 1 ("Kiln run common," 100 percent of kiln, EC, C)							
1	2290	4200	8.2	11.5	0.71	2.53	
2	2150	2780	13.3	15.8	.84	1.40	
3	1045	4280	17.3	19.3	.90	F 21c	
4	2050	4000	13.7	15.0	.91	2.64	
5	2560	4440	10.8	13.2	.82	0.48	
6	2000	3390	14.3	17.5	.82	1.54	
7	2310	3760	12.8	15.8	.87	0.71	
8	1335	4650	12.5	14.8	.84	1.09	
9	1510	3070	14.2	16.9	.84	0.94	
10	1780	3260	14.2	16.9	.84	1.77	
11	2390	4310	11.5	14.4	.80	0.69	
12	635	3030	16.7	18.9	.88	8.56 (B)	
13	2350	3410	10.9	13.8	.79	0.46	
14	1480	3480	17.3	20.1	.86	F 34c	
15	1480	4800	15.4	18.5	.83	0.99	
Avg	1825	3790	13.5	16.2	0.84		
Plant 152, grade 1A ("Second sample (1936) of grade 1")							
1	1620	3140	13.7 (24-hr)	17.5	0.79	1.89	
2	1620	3640	8.6	12.4	.70	3.91	
3	1630	3600	8.9	12.6	.71	0.74	
4	1510	3250	11.8	15.8	.75	1.18	
5	1080	3650	11.8	16.0	.74	1.39	
6	1170	3200	16.4	20.0	.82	1.71	
7	1410	2660	17.1	20.5	.84	F 27c	
8	1530	5680	6.2	9.3	.67	0.63	
9	870	3150	17.5	20.5	.86	2.94	
10	1230	3770	17.6	20.6	.86	9.00	
11	1000	3110	14.2	17.8	.80	1.92	
12	1270	2700	12.5	16.3	.77	0.75	
13	660	3050	12.0	15.8	.76	1.43	
14	1760	2950	8.6	12.7	.68	0.93	
15	1590	2470	11.7	15.7	.74	.90	
16	1070	4900	5.6	8.6	.66	.41	
17	910	4120	5.8	9.3	.62	.43	
18	1840	3680	12.0	15.2	.79	0.93	
19	1870	4360	6.6	10.1	.65	2.34	
20	1790	2790	12.8	16.9	.76	1.87	
Avg	1370	3500	11.6	15.2	0.75		
Plant 167, grade 1 ("Common kiln run," 85 to 90 percent of kiln, EC, C)							
1	745	2150	21.5	23.4	0.92	F 5c	
2	955	3220	19.5	22.4	.87	F 9c	
3		2050	21.3	23.5	.91	F 43c	
4	855	2720	22.1	24.1	.92	F 19c	
5	955	3420	17.1	20.1	.85	1.10	
6	1700	4480	14.9	18.9	.79	0.62	
7	1620	2630	16.7	21.1	.79	.65	
8	1715	3110	16.7	19.9	.84	.90	
9	1665	4580	13.3	17.3	.77	.81	
10	1270	2640	13.3	17.2	.77	.45	
11	1060	2810	17.5	20.8	.84	.55	
12	1750	3790	13.5	17.1	.79	.36	
13	1520	2960	16.3	20.0	.82	2.00	
14	1425	2430	17.4	20.9	.83	0.93	
15	1080	2390	17.6	23.3	.75	4.52	
Avg	1310	3020	17.2	20.7	0.83		

TABLE 14.—*Properties of bricks produced in Chicago District*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
Plant 168, grade 1 ("Commercial kiln run," 85 to 90 percent of kiln, EC, C)							
	lb/in.²	*lb/in.²*	%	%		%	
1	460	2660	20.2	23.1	0.87	F 38c	
2	625	2730	16.6	19.6	.85	0.90	
3	1245	2830	11.2	15.4	.73	.43	
4	540	3200	21.7	23.9	.91	F 20c	
5	1330	4620	16.3	19.7	.83	F 28c	
6	1025	3530	16.2	19.6	.83	1.76	
7	1090	4050	16.8	20.3	.83	0.84	
8	1175	2800	15.3	19.1	.80	.77	
9	1440	4560	16.4	19.6	.84	.63	
10	1560	3530	17.2	20.5	.84	.44	
11	1240	3400	18.7	21.9	.85	F 41c	
12	1550	3800	17.0	20.6	.83	0.37	
13	2050	3370	14.1	18.1	.78	.68	
14	1645	3770	14.4	18.1	.80	.60	
15	600	1680	20.9	27.0	.77	4.62	
Avg	1170	3370	16.9	20.4	0.82		
Plant 169, grade 1 ("Common kiln run," 85 to 90 percent of kiln, EC, C)							
1	1070	3210	22.8	25.9	0.88	F 24c	
2	1030	2960	19.7	23.6	.84	2.66	
3	1400	3320	21.4	24.6	.87	F 27c	
4	1400	3530	21.5	24.7	.87	F 23c	
5	1080	4060	12.7	17.1	.74	0.29	
6	900	3660	17.9	22.0	.81	.15	
7	1125	5040	17.1	21.4	.80	.53	
8	1165	5210	16.9	20.8	.81	7.75	
9	1220	3110	19.8	23.5	.84	2.56	
10	1230	2750	18.3	22.5	.81	0.94	
11	1805	3490	15.2	19.6	.78	.33	
12	1355	3770	14.3	18.6	.77	.95	
13	1820	3600	11.8	15.6	.76	.97	
14	1800	3360	12.6	16.6	.76	2.02	
15	370	3060	14.7	19.1	.77	F 48c	
Avg	1250	3610	17.1	21.0	0.81		
Plant 171, grade 1 ("Common kiln run," 100 percent of kiln, EC, C)							
1	[a] 795	3590	16.0	19.2	0.83	1.07	
2	675	3150	16.2	19.3	.84	F 1c	
3	600	3650	22.3	24.0	.93	F 1c	
4	470	3850	20.1	22.7	.89	F 21c	
5	610	4900	18.8	22.3	.84	1.03	
6	1400	4050	11.2	14.8	.76	1.46	
7	1755	4740	14.1	17.4	.81	0.76	
8	1640	3800	14.6	18.1	.81	1.05	
9	2000	4420	14.3	17.6	.81	1.27	
10	425	4130	23.1	24.2	.95	F 1c	
11	1135	3150	18.6	20.7	.90	4.00	
12	765	3170	20.3	22.7	.89	F 33c	
13	1265	3320	18.8	21.7	.87	2.96	
14	520	3500	21.1	23.1	.91	3.45	
15	570	3020	20.8	22.9	.91	8.90	
Avg	975	3760	18.0	20.7	0.86		
Plant 178, grade 1 ("Common kiln run," 90 percent of kiln, EC, C)							
1	1200	3960	16.1	17.8	0.90	0.69 (B)	
2	1265	3340	8.5	12.0	.71	1.61 (B)	
3	1810	4090	10.1	15.4	.66	0.53 (B)	
4	2070	4760	9.0	12.0	.75	.48 (B)	
5	1685	4420	9.0	12.5	.72	.30 (B)	
6	1765	3860	9.7	13.5	.72	.54 (B)	
7	1890	4910	9.5	12.5	.76	.36 (B)	
8	2140	2900	9.6	13.8	.70	.21 (B)	
9	1620	5630	8.3	11.6	.72	.55 (B)	
10	1940	4110	11.5	15.2	.76	.97 (B)	
11	1820	4220	10.2	13.4	.76	.21 (B)	
12	2060	3930	9.5	13.7	.69	.42 (B)	
13	1760	3280	10.2	13.8	.74	.36 (B)	
14	1715	3580	8.7	12.3	.71	.41 (B)	
15	1750	4900	9.0	12.4	.73	1.19 (B)	
Avg	1765	4130	9.9	13.5	0.74	0.59 (B)	

[a] The manufacturer classifies this sample as follows: Specimens 1 to 3—arch, 4 to 6—second bench, 7 to 9—third bench, 10 to 12—fourth bench, and 13 to 15—top.

TABLE 14.—*Properties of bricks produced in Chicago District*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
Plant 196, grade 1 ("Common kiln run," 95 percent of kiln, EC, C)							
	lb/in.²	*lb/in.²*	%	%		%	
1	1050	3310	9.0	15.0	0.60	0.48 (B)	
2	1220	1795	10.6	16.4	.65	.32 (B)	
3	900	2960	13.7	18.9	.72	.74 (B)	
4	1135	3080	13.6	19.0	.72	.54 (B)	
5	1125	2440	7.0	13.5	.52	1.86 (B)	
6	930	3000	11.5	17.2	.67	0.52 (B)	
7	1360	2240	10.5	16.8	.62	.73 (B)	
8	1170	3070	8.6	15.1	.57	2.15 (B)	
9	245	2790	9.5	15.3	.62	0.32 (B)	
10	760	2340	14.9	20.2	.74	.53 (B)	
11	1040	2530	9.3	15.5	.60	.37 (B)	
12	1305	2360	7.6	12.8	.59	.35 (B)	
13	1135	2720	10.7	16.3	.66	.34 (B)	
14	1285	2200	15.4	20.5	.75	.64 (B)	
Avg	1045	2630	10.8	16.6	0.64	0.66 (B)	
Plant 199, grade 1 ("Common kiln run," 95 percent of kiln, EC, C)							
1	720	3170	19.8	25.0	0.79	0.72 (B)	
2	535	2950	19.2	24.6	.78	1.45 (B)	
3	605	3080	21.2	26.0	.82	2.04 (B)	
4	570	3190	19.1	24.2	.80	0.55 (B)	
5	690	3140	16.4	22.6	.73	.51 (B)	
6	895	3650	17.3	23.3	.74	.59 (B)	
7	860	4020	18.0	23.3	.77	.66 (B)	
Avg	695	3310	18.7	24.1	0.78	0.92 (B)	
Plant 199, grade 2 ("Kiln run," percentage of kiln unknown, EC, C)							
1	365	2310	24.1	27.0	0.89	1.11 (B)	
2	515	2680	20.5	25.8	.79	0.68 (B)	
3	355	2130	23.9	27.3	.88	1.43 (B)	
4	385	2600	22.5	27.0	.83	1.56 (B)	
5	390	2250	22.6	26.6	.85	1.08 (B)	
6	465	2480	21.1	25.2	.84	1.05 (B)	
7	385	2350	22.4	26.5	.85	1.32 (B)	
Avg	410	2400	22.4	26.5	0.85	1.18 (B)	

TABLE 15.—*Properties of bricks produced in Indiana, Illinois (except Chicago), and Missouri*

[The bricks represented by the samples were made from clay or shale. The principal methods of forming were the stiff-mud, side-cut and the dry-press processes. One plant reported the use of the soft-mud process on a mixture of clay and shale]

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
Plant 51, grade 1 ("Red face," 35 percent of kiln, DP, C)							
	lb/in.²	*lb/in.²*	%	%		%	
1	650	8420	12.6	13.9	0.91	0.35 (B)	
2	735	8210	13.4	15.1	.89	.22 (B)	
3	705	10650	11.6	13.0	.89	.18 (B)	
4	695	9030	12.7	14.3	.89	.11 (B)	
5	600	8140	12.9	14.9	.87	.30 (B)	
6	520	7620	12.5	13.9	.90	.19 (B)	
7	600	11900	11.6	12.9	.90	.17 (B)	
Avg	645	9140	12.5	14.0	0.89	0.22 (B)	

TABLE 15.—*Properties of bricks produced in Indiana, Illinois (except Chicago), and Missouri*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
Plant 51, grade 2 ("Hard baeking," 25 pereent of kiln, DP, C)							
	lb/in.²	*lb/in.²*	%	%		%	
1	740	8180	7.9	9.8	0.81	0.19	
2	500	8750	9.6	11.3	.85	.24	
3	820	15000	9.1	10.6	.86	.50	
4	825	8590	9.8	11.4	.86	.57	
5	730	9420	9.9	12.1	.82	.27	
6	530	8390	13.3	14.8	.90	.60	
7	790	8830	11.3	12.6	.90	3.03 (B)	
Avg	705	9590	10.1	11.8	0.86	0.77 (A & B)	
Plant 51, grade 3 ("Salmon," 40 pereent of kiln, DP, C)							
1	195	2900	20.5	22.1	0.93	F 42e	
2	230	3550	17.5	18.8	.93	F 51e	
3	215	4120	17.0	18.3	.93	0.35	F 60e
4	215	3300	18.4	19.3	.95	1.60	F 60e
5	455	6500	15.8	17.1	.92	0.54	F 60e
6	135	2640	18.8	19.7	.96	F 15e	
Avg	240	3840	18.0	19.2	0.94		
Plant 77, grade 1 ("Hard," 70 pereent of kiln, SC, S)							
Avg (5)	1525	10550	6.3	7.9	0.80	Not tested	
Plant 77, grade 2 ("100 pereent kiln run," SC, S)							
1	1800	10900	8.0	9.8	0.82	0.09 (B)	
2	1450	7350	9.3	11.1	.84	.25 (B)	
3	1840	11900	6.5	8.1	.80	.20 (B)	
4	1580	10000	5.9	7.3	.81	.00 (B)	
5	1600	9720	9.9	11.4	.87	.30 (B)	
Avg	1655	9970	7.9	9.5	0.83	0.17 (B)	
Plant 81, grade 1 ("Hard," 25 pereent of kiln, SC, S)							
1	1175	13350	6.5	8.8	0.74	0.37	
2	1535	12800	6.7	8.7	.77	.10	
3	845	16950	3.7	5.7	.65	.16	
4	1700	15600	5.2	7.7	.68	.09	
5	860	7690	8.5	11.0	.77	.08	
6	1670	11700	7.0	9.6	.73	.00	
Avg	1295	13020	6.3	8.6	0.72	0.13	
Plant 81, grade 2 ("Medium," 60 pereent of kiln, SC, S)							
1	1060	7630	12.5	14.4	0.87	0.30	
2	1190	7090	11.4	13.7	.86	.18	
3	1270	7100	11.9	14.3	.83	.19	
4	1130	6790	12.3	14.5	.85	.09	
5	1005	6840	12.1	14.6	.83	.19	
6	1080	7300	12.2	14.0	.87	.36	
Avg	1120	7120	12.1	14.2	0.85	0.22	
Plant 81, grade 3 ("Salmon," 15 pereent of kiln, SC, S)							
1	1020	6390	15.1	17.1	0.88	0.50	% 0.60 (63e)
2	875	6280	14.0	16.5	.85	.25	1.10 (63e)
3	1020	5980	14.9	17.1	.87	1.17	1.44 (63e)
4	1080	6180	14.9	16.9	.88	1.99	2.19 (63e)
5	955	6630	14.1	16.1	.88	0.59	(lost)
6	830	6150	14.4	16.8	.86	.60	0.84 (63e)
Avg	965	6270	14.6	16.8	0.87	0.85	1.28 (63e)

TABLE 15.—*Properties of bricks produced in Indiana, Illinois (except Chicago), and Missouri*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
Plant 83, grade 1 ("Straight hard eommon," 80 percent of kiln, SC, S)							
	lb/in.²	*lb/in.²*	%	%		%	
Avg (5)	2230	17240	1.6	3.2	0.47	Not tested	
Plant 104, grade 1 ("Hard eommon," 15 pereent of kiln, SC, S)							
Avg (6)	2160	21520+	0.63	2.5	0.24	Not tested	
Plant 104, grade 2 ("Medium eommon," 80 pereent of kiln, SC, S)							
Avg (6)	1650	18860+	4.1	5.7	0.70	Not tested	
Plant 104, grade 3 ("Baekup eommon," 5 pereent of kiln, SC, S)							
1	1365	12250	9.6	11.5	0.83	0.10	
2	960	11880	9.7	11.1	.87	.19	
3	960	11480	9.8	11.6	.84	.62	
4	800	12800	10.5	12.3	.85	.18	
5	905	12670	11.6	14.0	.83	.28	
6	820	11090	12.4	13.9	.89	2.57	
Avg	970	12030	10.6	12.4	0.85	0.66	
Plant 117, grade 1 ("No. 1 Common," 70 pereent of kiln, SC, C and S)							
Avg (5)	1775	11710	6.2	8.4	0.68	Not tested	
Plant 117, grade 2 ("No. 2 Common," 30 pereent of kiln, SC, C and S)							
1	1195	7760	12.4	15.0	0.83	0.10	
2	1400	8110	11.9	13.6	.87	.11	
3	1425	6570	13.6	15.3	.89	.24	
4	870	4940	15.9	17.9	.89	F 25e	
5	955	4790	15.2	17.1	.89	0.50	
Avg	1170	6430	13.8	15.8	0.87		
Plant 124, grade 1 ("Hard," 45 pereent of kiln, SC, S)							
Avg (5)	1560	10300	4.8	6.4	0.75	Not tested	
Plant 124, grade 2 ("Medium," 47 pereent of kiln, SC, S)							
Avg (5)	1360	7470	8.7	10.8	0.81	Not tested	
Plant 124, grade 3 ("Salmon," 8 pereent of kiln, SC, S)							
1	1340	4110	12.5	13.9	0.90	0.29	% 0.29 (54e)
2	1270	4550	11.7	13.1	.89	.43	.43 (54e)
3	610	3400	16.1	17.6	.91	F 18e	
4	1410	4960	11.7	13.2	.89	.37	.37 (54e)
5	835	3730	15.5	17.2	.90	1.03	1.26 (54e)
Avg	1095	4150	13.5	15.0	0.90		
Plant 125, grade 1 ("Hard," 50 pereent of kiln, SC, S)							
Avg (5)	2400	17430	1.8	3.4	0.47	Not tested	
Plant 125, grade 2 ("Medium," 49 pereent of kiln, SC, S)							
Avg (5)	1365	10250	9.3	11.1	0.84	Not tested	

TABLE 15.—*Properties of bricks produced in Indiana, Illinois (except Chicago), and Missouri*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
	*lb/in.*²	*lb/in.*²	%	%		%	%
Plant 125, grade 3 ("Salmon," 1 percent of kiln, SC, C)							
1	1155	7140	12.8	15.0	0.85	0.26	0.53 (57c)
2	1230	7470	13.5	15.7	.86	.18	.45 (57c)
3	1210	6590	13.4	15.3	.88	.30	.40 (57c)
4	1170	6950	13.6	15.5	.88	.36	.55 (57c)
5	1190	8750	11.7	13.5	.87	.35	.35 (57c)
Avg	1190	7380	13.0	15.0	0.87	0.29	0.46 (57c)
Plant 126, grade 1 ("Hard," 99.5 percent of kiln, SC, S)							
Avg (9)	1845	11360	5.4	8.6	0.62	Not tested	
Plant 126, grade 2 ("Hollow," percentage of kiln unknown, SC, S)							
Avg (5)	1205	12460	3.9	7.0	0.55	Not tested	
Plant 126, grade 3 ("Salmon," 0.5 percent of kiln, SC, S)							
1	1170	7920	10.8	12.8	0.84	0.32	0.32 (57c)
2	1055	6620	13.7	15.8	.87	.50	.50 (57c)
3	990	6900	12.5	14.9	.84	.25	.25 (57c)
4	1170	6970	12.3	14.9	.87	.53	.53 (57c)
5	975	6100	14.1	16.3	.86	5.56	5.64 (57c)
Avg	1070	6900	12.7	14.9	0.85	1.43	1.45 (57c)
Plant 132, grade 1 ("Face," 85 percent of kiln, SC, C)							
Avg (6)	3030	13730	0.4	2.2	0.17	Not tested	
Plant 133, grade 1 ("Face," 75 percent of kiln, SC, S)							
1	2260	23700	1.9	4.5	0.42	0.07 (B)	
2	2200	23500+	1.5	4.5	.33	.07 (B)	
3	2260	23500+	2.2	4.4	.50	.15 (B)	
4	2330	22700	1.5	4.1	.37	.07 (B)	
5	2710	18500	3.7	5.8	.64	.34 (B)	
6	2880	18700	3.9	6.2	.63	Not tested	
Avg	2440	21770+	2.4	4.9	0.48	0.14 (B)	
Plant 134, grade 1 ("Face," 70 percent of kiln, SM, C)							
1	1315	14500	2.1	7.4	0.28	0.11 (B)	
2	1455	12000	3.5	8.8	.40	.28 (B)	
3	1370	12100	6.1	11.7	.52	.19 (B)	
4	1590	15450	5.4	10.8	.50	.36 (B)	
5	1590	14000	4.9	9.7	.51	.10 (B)	
6	1475	12900+	4.6	10.2	.45	.93 (B)	
Avg	1465	13490+	4.4	9.8	0.44	0.33 (B)	
Plant 142, grade 1 ("Hard commons," 75 percent of kiln, SC, S)							
Avg (5)	1795	15500	3.0	4.5	0.66	Not tested	

TABLE 15.—*Properties of bricks produced in Indiana, Illinois (except Chicago), and Missouri*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
	*lb/in.*²	*lb/in.*²	%	%		%	
Plant 142, grade 2 ("Medium common," 12.5 percent of kiln, SC, S)							
1	1605	9570	10.0	11.3	0.89	0.17 (B)	
2	1710	10250	8.7	10.5	.83	.18 (B)	
3	1705	9630	8.9	10.3	.86	.19 (B)	
4	1645	11050	8.5	10.1	.84	.24 (B)	
5	1470	11020	9.6	11.3	.85	.34 (B)	
Avg	1625	10300	9.1	10.7	0.85	0.22 (B)	
Plant 142, grade 3 ("Salmon," 12.5 percent of kiln, SC, S)							
1	770	4390	16.4	18.5	0.89	F 18c	
2	1065	4880	14.2	16.0	.89	F 18c	
3	930	5890	15.2	17.4	.88	F 20c	
4	1060	5590	15.6	17.8	.88	F 10c	
5	685	3420	17.9	19.8	.90	F 15c	
Avg	900	4830	15.9	17.9	0.89	F 16c	
Plant 212, grade 1 ("Dark flash," 5 percent of kiln, DP, C)							
Avg (5)	1540	14260	7.7	10.4	0.74	Not tested	
Plant 212, grade 2 ("Hard," 20 percent of kiln, DP, C)							
Avg (5)	670	11060	8.5	10.6	0.80	Not tested	
Plant 212, grade 3 ("Common," 30 percent of kiln, DP, C)							
Avg (5)	705	10750	9.5	12.2	0.74	Not tested	
Plant 212, grade 4 ("Light," 10 percent of kiln, DP, C)							
1	365	7850	12.8	15.3	0.84	0.00 (B)	
2	315	4220	14.7	16.7	.88	3.35 (B)	
3	525	9300	13.9	16.6	.84	0.09 (B)	
4	570	7100	14.2	16.9	.84	.09 (B)	
5	495	6800	13.3	16.2	.82	F 39c (B)	
Avg	455	7050	13.8	16.3	0.84		
Plant 212, grade 5 ("Salmon," 5 percent of kiln, DP, C)							
1		6480	17.0	19.1	0.89	F 29c (B)	
2	145	4470	16.2	18.8	.86	F 45c (B)	
3	175	2400	21.9	24.5	.89	F 42c (B)	
4	305	4700	17.2	20.4	.84	F 47c (B)	
5	265	4790	17.3	19.4	.89	F 47c (B)	
Avg	220	4570	17.9	20.4	0.87	F 42c (B)	
Plant 213, grade 1 ("Common," 97 percent of kiln, SC, C and S)							
Avg(13)	1795	11740+	6.5	8.7	0.69	Not tested	
Plant 213, grade 2 ("Salmon," 3 percent of kiln, SC, C and S)							
1	830	6030	15.7	17.5	0.90	0.31 (B)	
2	1000	5870	15.2	17.0	.89	.36 (B)	
Avg	915	5950	15.4	17.2	0.90	0.34 (B)	

TABLE 16.—*Properties of bricks produced in Nebraska, Iowa, Kansas, and Minnesota*

[All samples received with the exception of those from plant 183 (soft-mud) were formed by the stiff-mud, side-cut process. Both clay and shale are represented. Two types of shale occur in this district. What might be called typical shale is represented by the specimens from plant 17. These bricks correspond in properties to those reported for shale bricks in tables 5, 9, 10, 11, and 15. A hard-burned shale brick, characterized by water absorption by 5-hr boiling exceeding 12 percent, is also produced in this district. The data on the specimens from plant 227 illustrate the properties of bricks made from this type of shale]

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
Plant 17, grade 1 ("Special," 75 percent of kiln, SC, S)							
	lb/in.²	*lb/in.²*	%	%		%	
1	3480	21350	0.4	0.8	0.50	0.08 (B)	
2	2660	21020	.4	1.3	.31	.17 (B)	
3	2760	16800	.4	1.2	.33	.15 (B)	
4	1765	20550	.4	1.2	.33	.16 (B)	
5	1105	18850	.3	1.0	.30	.39 (B)	
Avg	2355	19710	0.4	1.1	0.35	0.19 (B)	
Plant 17, grade 2 ("Dark commons (cored)," 50 percent of kiln, SC, S)							
Avg (5)	1660	16530	2.2	3.8	0.57	Not tested	
Plant 17, grade 3 ("Dark commons (solid)," 50 percent of kiln, SC, S)							
1	2480	18150	1.3	2.7	0.48	0.18 (B)	
2	2490	18900	1.8	3.2	.56	.18 (B)	
3	2260	17200	1.6	2.8	.57	.24 (B)	
4	2210	15500	1.3	2.6	.50	.00 (B)	
5	2380	18150	1.4	2.7	.52	.00 (B)	
Avg	2365	17580	1.5	2.8	0.53	0.12 (B)	
Plant 17, grade 4 ("Medium commons (cored)," 35 percent of kiln, SC, S)							
1	1550	13750	7.8	9.2	0.85	0.10 (B)	
2	1400	13200	7.5	8.9	.74	.28 (B)	
3	1380	11700	7.5	9.4	.80	.09 (B)	
4	1245	10400	7.4	9.3	.80	.19 (B)	
5	1345	13650	6.6	8.5	.78	.00 (B)	
Avg	1385	12540	7.4	9.1	0.79	0.13 (B)	
Plant 17, grade 5 ("Medium commons (solid)," 35 percent of kiln, SC, S)							
1	1725	14600	6.8	8.4	0.81	0.00 (B)	
2	2100	15600	6.1	7.7	.79	.00 (B)	
3	1885	14150	7.8	9.6	.81	.00 (B)	
4	1530	8500	10.4	12.0	.87	.15 (B)	
5	1305	10100	8.9	10.8	.82	.09 (B)	
Avg	1710	12590	8.0	9.7	0.82	0.05 (B)	
Plant 17, grade 6 ("Light commons (cored)," 10 percent of kiln, SC, S)							
1	945	6070	13.0	15.0	0.87	0.00 (B)	
2	1060	7350	11.9	13.8	.86	.09 (B)	
3	915	6790	12.6	14.5	.87	.00 (B)	
4	825	7300	11.7	13.6	.86	.10 (B)	
5	870	8400	11.0	13.0	.85	.20 (B)	
Avg	925	7180	12.0	14.0	0.86	0.08 (B)	
Plant 17, grade 7 ("Light commons (solid)," 10 percent of kiln, SC, S)							
1	1165	6500	13.1	15.2	0.86	0.41 (B)	
2	1270	6180	13.0	14.7	.88	.25 (B)	
3	1140	6180	14.0	15.7	.89	.50 (B)	
4	1055	6510	13.4	15.5	.86	.42 (B)	
5	1175	7180	12.8	14.8	.86	.24 (B)	
Avg	1160	6510	13.3	15.2	0.87	0.36 (B)	

TABLE 16.—*Properties of bricks produced in Nebraska, Iowa, Kansas, and Minnesota*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
Plant 17, grade 8 ("Salmon (cored)," 5 percent of kiln, SC, S)							
	lb/in.²	*lb/in.²*	%	%		%	
1	745	5420	15.0	16.9	0.89	F 33c	
2	630	4270	16.1	17.5	.92	F 9c	
3	420	4200	16.3	17.8	.92	F 8c	
4	645	4470	16.1	17.6	.91	F 9c	
5	515	4140	16.7	18.2	.92	F 9c	
Avg	590	4500	16.0	17.6	0.91	F 14c	
Plant 183, grade 1 ("Clinker," 5 percent of kiln, SM, C)							
Avg (5)	885	6970	9.2	15.6	0.57	Not tested	
Plant 183, grade 2 ("Hard red," 80 percent of kiln, SM,C)							
1	460	2340	15.5	22.1	0.70	0.45 (B)	
2	400	1170	16.0	23.1	.69	.52 (B)	
3	485	2300	14.8	22.1	.67	.34 (B)	
4	330	1310	16.8	23.2	.72	.65 (B)	
5	290	1055	16.5	23.2	.71	1.11 (B)	
Avg	390	1640	15.9	22.7	0.70	0.61 (B)	
Plant 183, grade 3 ("Salmon," 15 percent of kiln, SM, C)							
1	255	1010	16.3	22.9	0.71	1.19 (B)	
2	235	940	17.1	23.4	.73	1.02 (B)	
3	260	1050	17.9	23.9	.75	1.08 (B)	
4	260	1090	17.8	23.7	.75	1.05 (B)	
5	370	1020	17.0	24.0	.71	1.31 (B)	
Avg	275	1020	17.2	23.6	0.73	1.13 (B)	
Plant 218, grade 1 ("Clinker," 2 percent of kiln, SC, C and S)							
Avg (5)	1470	8690	4.1	7.6	0.53	Not tested	
Plant 218, grade 2 ("Textured Face," 16 percent of kiln, SC, C and S)							
Avg (5)	1310	10290	7.4	9.9	0.74	Not tested	
Plant 218, grade 3 ("Common hard," percentage of kiln unknown, SC, C and S)							
Avg (5)	1060	8190	8.3	11.6	0.71	Not tested	
Plant 218, grade 4 ("No. 1 Common hard," 82 percent of kiln, SC, C and S)							
1	1510	10050	7.8	10.8	0.72	0.29	
2	675	5850	13.0	15.5	.84	.32	
3	670	5930	13.3	16.1	.83	.33	
4	1360	9650	7.1	10.2	.69	.09	
5	1495	9470	7.4	10.5	.70	.09	
Avg	1140	8190	9.7	12.6	0.76	0.22	
Plant 219, grade 1 ("Textured face," 65 percent of kiln, SC, S)							
Avg (5)	1160	12400	5.1	7.8	0.66	Not tested	

TABLE 16.—*Properties of bricks produced in Nebraska, Iowa, Kansas, and Minnesota*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption: 48-hr cold immersion	Water absorption: 5-hr boiling	Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
Plant 219, grade 2 ("No. 1 Hard common," 35 percent of kiln, SC, S)							
	lb/in.²	*lb/in.²*	%	%		%	
1	1580	13150	6.4	8.3	0.77	0.18	
2	1760	17200	5.3	7.1	.75	.09	
3	1655	15100	6.6	8.0	.83	.19	
4	1720	16100	6.5	8.3	.78	.09	
5	1685	14800	6.7	8.5	.79	.09	
Avg	1680	15270	6.3	8.0	0.78	0.13	
Plant 220, grade 1 ("Semiclinker," 5 to 10 percent of kiln, SC, S)							
Avg (5)	1565	13620	5.0	7.3	0.68	Not tested	
Plant 220, grade 2 ("Hard," 85 to 90 percent of kiln, SC, S)							
Avg (5)	1325	10180	6.9	9.5	0.73	Not tested	
Plant 220, grade 3 ("Soft," 0 to 5 percent of kiln, SC, S)							
1	1145	7570	9.0	11.7	0.77	0.81	
2	970	7090	9.2	11.2	.82	.16	
3	930	6480	9.7	12.3	.79	.17	
4	1080	6760	9.6	11.8	.81	.15	
5	960	6400	9.6	11.5	.83	.15	
Avg	1015	6860	9.4	11.7	0.80	0.29	
Plant 221, grade 1 ("No. 1 common," 75 percent of kiln, SC, C)							
1	625	5020	14.4	18.0	0.80	0.60	
2	820	6810	11.7	15.4	.76	.28	
3	1020	7350	9.6	13.7	.70	.40	
4	675	7320	10.9	15.0	.73	.62	
5	1015	7680	10.7	14.9	.72	.28	
Avg	830	6840	11.5	15.4	0.74	0.44	
Plant 221, grade 2 ("No. 2 common," 20 percent of kiln, SC, C)							
1	450	4320	15.0	18.8	0.80	0.69	
2	445	4430	14.5	18.9	.77	.80	
3	470	4430	14.2	18.3	.78	1.12	
4	470	4040	14.8	18.8	.79	1.59	
5	450	4250	15.1	19.0	.80	0.98	
Avg	455	4290	14.7	18.8	0.79	1.02	
Plant 226, grade 1 ("Dark to light," (1936) percentage of kiln unknown, SC, S (deaired))							
			(24-hr)				
1	500	9830	6.1	[a] 8.9	[a] 0.69	[1]	
2	595	12920	5.9	9.3	.64	[1]	
3	630	13640	2.1	3.4	.62	[1]	
4	635	9370	2.2	3.4	.64	[1]	
5	570	10950	5.2	9.7	.54	[1]	
6	710	11100	10.0	12.2	.82	[1]	
7	1045	11600	6.9	8.2	.85	[1]	
8	495	10780	4.3	9.7	.44	[1]	
9	1195	13280	0.4	2.3	.16	[1]	
10	715	13070	5.5	9.1	.60	[1]	
11	1560	13280	0.4	4.0	.10	[1]	
12	600	9420	4.7	13.4	.36	[1]	
13	835	12300	4.7	10.9	.44	[1]	
14	735	12180	6.3	9.6	.66	[1]	
15	1740	10220	0.3	1.3	.24	[1]	
16	710	12080	1.5	4.4	.34	[1]	
17	925	10450	10.1	12.5	.81	[1]	
18	765	15350	0.6	5.8	.11	[1]	
19	1050	12730	5.2	5.7	.92	[1]	
20	1460	18550	0.2	0.5	.40	[1]	
Avg	875	12155	4.1	7.2	0.52		

[1] No disintegration.

[a] These deaired bricks have anomalous absorption and are difficult to dry to constant weight, therefore the absorption and saturation coefficient are uncertain and the effect of freezing and thawing was estimated visually instead of by loss in weight. A comparable sample exposed to natural weather showed disintegration in 10 percent of the specimens after 2 years.

TABLE 16.—*Properties of bricks produced in Nebraska, Iowa, Kansas, and Minnesota*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption: 48-hr cold immersion	Water absorption: 5-hr boiling	Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
Plant 227, grade 1 ("Mingled face," (1936) percentage of kiln unknown, SC, S)							
	lb/in.²	*lb/in.²*	(24-hr) %	%		%	
1	620	3800	15.0	17.9	0.84	[b] 0.34	
2	345	4550	10.1	14.7	.68	+.11	
3	555	4090	14.6	18.7	.78	+.22	
4	650	5600	10.4	16.4	.63	.47	
5	700	4070	14.6	19.5	.75	.84	
6	550	3970	11.0	15.9	.70	.55	
7	645	3600	12.6	17.0	.74	.54	
8	625	4600	12.6	22.8	.56	.12	
9	605	4300	13.1	16.7	.79	.00	
10	895	5650	7.6	13.9	.54	.10	
11	840	8100	6.2	13.9	.44	+.23	
12	605	4840	9.9	21.1	.47	.00	
13	550	4410	13.7	22.6	.61	.48	
14	955	6730	7.3	15.7	.46	.32	
15	485	6640	7.3	11.8	.62	.13	
16	705	4620	12.1	16.0	.76	.85	
17	295	4270	9.5	13.7	.70	.81	
18	810	4720	12.1	15.7	.77	.62	
19	575	6050	8.7	13.3	.66	.41	
20	585	9820	3.1	7.9	.40	.10	
21	690	3100	13.4	15.9	.84	.23	
22	585	5970	9.2	14.4	.64	+.10	
23	630	4450	13.6	17.9	.76	.00	
24	830	4680	9.6	19.5	.50	.25	
25	610	3880	15.5	19.9	.78	.73	
26	685	4250	9.4	14.3	.66	.47	
27	710	3500	11.7	16.5	.71	.65	
28	765	4610	12.7	22.2	.58	+.24	
29	725	4560	13.4	17.0	.79	.00	
30	690	5550	8.4	14.5	.58	.21	
31	825	6380	8.3	16.6	.50	+.23	
32	605	4850	10.5	21.4	.49	.12	
33	565	3800	14.3	22.4	.64	.72	
34	825	6370	8.9	19.0	.46	+.35	
35	585	6450	6.3	11.2	.56	.10	
Avg	655	5055	10.8	16.8	0.64		
Plant 229, grade 1 ("Common," (1940) percentage of kiln unknown, SC, S)							
			(24-hr)				
1	740	4100	21.7	27.6	0.79	0.25	
2	525	4640	22.0	25.3	.87	.43	
Avg	650	4370	21.8	26.4	0.83	0.34	
Plant 229, grade 2 ("Common," (1940) percentage of kiln unknown, SC, S)							
			(24-hr)				
1	440	8010	15.5	20.3	0.66	[b] +0.10	
2	635	4480	18.3	23.3	.78	+.15	
3	890	6000	17.0	21.2	.80	−.34	
4	990	4570	17.5	22.5	.78	+.19	
5	1220	4210	17.0	23.0	.74	+.15	
Avg	835	5450	17.1	22.1	0.77		
Plant 230, grade 1 ("Commons," percentage of kiln unknown, SM, C)							
1	535	2920	26.3	31.7	0.83	F 5c	
2	400	1850	27.1	32.9	.82	1.0	
3	445	2245	26.3	32.5	.81	1.1	
4	1030	4210	20.9	27.6	.76	0.6	
5	690	2380	25.0	31.0	.81	1.0	
Avg	620	2720	25.1	31.1	0.81		
Plant 230, grade 2 ("Commons," percentage of kiln unknown, SC, S)							
1	810	4600	18.4	22.1	0.83	F 3c	
2	560	2790	25.8	29.3	.88	F 27c	
3	505	3250	24.2	28.7	.84		
4	505	3100	25.8	29.1	.88	F 22c	
5	985	3700	21.9	25.8	.85	F 18c	
Avg	675	3490	23.2	27.0	0.86		

[b] These bricks contain considerable lime. The gain in weight in some specimens is due to hydration or carbonation of this lime.

TABLE 17.—*Properties of bricks produced in Utah and Wyoming*

[The samples received included brieks made from shale, surface clay, and fire clay and all methods of forming were represented except the soft-mud process. A more complete picture of brick production in Utah is given in the report by Beckstrand and French [8]].

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
Plant 78, grade 1 ("Arch," 10 percent of kiln, DP, C and S)							
	*lb/in.*²	*lb/in.*²	%	%		%	
Avg (5)	980	10090	4.8	7.6	0.63	Not tested	
Plant 78, grade 2 ("Dark common," 30 percent of kiln, DP, C and S)							
1	605	5700	9.3	12.4	0.75	0.52	
2	560	5930	9.2	12.1	.76	.38	
3	725	6200	8.6	12.1	.71	.35	
4	630	5930	9.5	12.5	.76	.50	
5	595	7240	8.6	11.8	.73	.32	
Avg	620	6200	9.0	12.2	0.74	0.41	
Plant 78, grade 3 ("Dark Selects," 30 percent of kiln, DP, C and S)							
1	540	5470	10.1	13.5	0.75	1.06	
2	435	5510	10.9	13.9	.78	.89	
3	485	5040	11.7	14.7	.80	.86	
4	480	4980	9.5	12.4	.77	.57	
5	505	5530	10.1	12.9	.78	.68	
Avg	490	5310	10.5	13.5	0.77	0.82	
Plant 78, grade 4 ("Picked reds," 25 percent of kiln, DP, C and S)							
1	270	4420	12.4	15.8	0.79	No test	
2	325	4250	11.2	13.5	.83		
3	445	5390	12.2	15.0	.81	0.66 (B)	
4	300	3680	11.9	14.8	.80	.85 (B)	
5	505	4240	11.0	12.9	.85	.58 (B)	
Avg	370	4400	11.7	14.4	0.82	0.70 (B)	
Plant 78, grade 5 ("Salmon," 5 percent of kiln, DP, C and S)							
1	305	6250	12.1	13.8	0.88	F 45c	
2	270	5300	14.5	17.5	.83	F 48c	
3	285	5490	13.7	15.4	.89	F 48c	
4	325	5760	15.2	17.8	.85	2.74	F 63c
5	305	5620	13.9	16.9	.82	F 42c	
Avg	300	5670	13.9	16.3	0.85		
Plant 78, grade 6 ("Red sand," percentage of kiln unknown, DP, C and S)							
1	335	5380	9.6	12.3	0.78	0.64	% 0.64 (63c)
2	315	4400	10.4	13.9	.75	1.19	1.29 (63c)
3	225	4740	10.0	12.9	.78	0.60	1.09 (63c)
4	370	5260	10.7	14.2	.75	.47	0.59 (63c)
5	340	5870	9.8	13.8	.71	.36	.36 (63c)
Avg	315	5130	10.1	13.4	0.75	0.65	0.79 (63c)
Plant 78, grade 7 ("Light commons from stock," percentage of kiln unknown, DP, C and S)							
1	125	3920	11.2	14.1	0.80	0.68 (B)	
2	150	4750	9.1	11.4	.80	.36 (B)	
3	185	4510	9.9	11.7	.85	.63 (B)	
4	95	3240	12.4	15.5	.80	.77 (B)	
5		3160	13.7	16.8	.82	.98 (B)	
Avg	140	3920	11.3	13.9	0.81	0.68 (B)	

TABLE 17.—*Properties of bricks produced in Utah and Wyoming*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
Plant 78, grade 8 ("Light sand," percentage of kiln unknown, DP, C and S)							
	*lb/in.*²	*lb/in.*²	%	%		%	%
1	285	3290	13.9	16.7	0.83	2.90	3.00 (63c)
2	225	4350	13.3	15.5	.86	1.24	1.59 (63c)
3	145	3370	13.3	16.2	.82	F 39c	
4	145	2790	14.3	17.2	.83	F 39c	
5	135	2900	12.6	14.3	.88	1.34	1.61 (63c)
Avg	185	3340	13.5	16.0	0.84		
Plant 78, grade 9 ("Dark common," percentage of kiln unknown, SC, C and S)							
Avg (5)	1140	10690	3.2	7.5	0.42	Not tested	
Plant 78, grade 10 ("Textured Dark," percentage of kiln unknown, SC, C and S)							
Avg (5)	905	8470	3.2	7.7	0.42	Not tested	
Plant 78, grade 11 ("Rough texture," percentage of kiln unknown, SC, C and S)							
Avg (5)	975	8340	6.7	10.7	0.62	Not tested	
Plant 78, grade 12 ("Hollow," percentage of kiln unknown, EC, C)							
Avg (5)	835	1790	10.9	15.8	0.69	Not tested	
Plant 182, grade 1 ("Common," 80 percent of kiln, DP, C)							
1	465	3750	22.8	25.9	0.88	F 12c	
2	465	4220	26.8	29.5	.91	F 14c	
3	945	4720	21.4	23.8	.90	F 15c	
4	445	3260	26.6	28.2	.94	F 18c	
5	735	5390	20.2	22.7	.89	F 21c	
Avg	610	4270	23.6	26.0	0.90	F 16c	
Plant 182, grade 2 ("Common," 85 percent of kiln, SC, C)							
1	780	4170	25.4	27.8	0.91	F 2c	
2	670	2770	27.2	30.0	.91	F 6c	
3	1145	4610	25.4	27.6	.92	F 8c	
4	700	3780	26.2	28.7	.91	F 4c	
5	1020	5340	24.6	27.4	.90	F 9c	
Avg	865	4130	25.8	28.3	0.91	F 6c	
Plant 182, grade 3 ("Textured face," 93 percent of kiln, SC, FC)							
Avg (5)	1380	9840	5.9	8.3	0.71	Not tested	
Plant 182, grade 4 ("Vitrified," 96 percent of kiln, SC, FC and S)							
1	2130	11700	3.7	6.0	0.62	0.15	
2	2060	10200	4.9	7.6	.64	.28	
3	2220	9230	3.4	5.7	.60	.08	
4	2310	10180	4.8	7.7	.62	.40	
5	2290	13070	3.5	5.8	.60	.23	
Avg	2200	10880	4.1	6.6	0.62	0.23	

TABLE 18.—*Properties of bricks produced in Colorado*

[The samples received represented bricks made from shale or from clay and formed by the stiff-mud, side-cut or the dry-press process]

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
Plant 56, grade 1 ("Kiln run common," 100 percent of kiln, less salmons, DP, S)							
	lb/in.²	*lb/in.²*	%	%		%	
1	835	11300	7.6	10.1	0.75	0.00 (B)	
2	880	11350	7.9	9.9	.80	.16 (B)	
3		7060	13.4	15.2	.88	.56 (B)	
4	575	9160	11.9	13.5	.88	.15 (B)	
5		8200	11.9	13.7	.87	.24 (B)	
6	500	8360	11.2	13.1	.86	.19 (B)	
7	575	10700	9.5	11.1	.86	.16 (B)	
8	370	8220	12.4	14.2	.87	.44 (B)	
9	645	9130	11.6	13.0	.89	.18 (B)	
10	655	6640	13.2	15.1	.87	.16 (B)	
11	430	6370	13.9	16.2	.86	.31 (B)	
12	475	6130	14.3	16.5	.87	.17 (B)	
13	640	8550	12.6	14.3	.88	.25 (B)	
14	770	8270	12.6	14.6	.86	.00	
15	860	6970	13.1	14.6	.90	No test	
Avg	630	8430	11.8	13.7	0.86	0.21 (B)	
Plant 56, grade 2 ("Salmon," percentage of kiln unknown, DP, S)							
1	455	8110	13.4	14.7	0.91	F 45c	
2	830	9100	12.1	13.4	.90	0.43	F 57c
3	620	6780	13.7	15.1	.91	F 21c	
Avg	635	7980	13.1	14.4	0.91		
Plant 121, grade 1 ("Arch," 25 percent of kiln, DP, S)							
1	870	7420	8.4	10.2	0.82	0.00 (B)	
2	915	8120	11.1	12.6	.88	.23 (B)	
3	580	6530	12.1	13.8	.88	.26 (B)	
4	555	7360	11.7	13.2	.89	.25 (B)	
5	540	6390	11.8	13.6	.87	.46 (B)	
Avg	690	7160	11.0	12.7	0.87	0.24 (B)	
Plant 121, grade 2 ("No. 1 Commons," 50 percent of kiln, DP, S)							
1	485	7180	12.8	14.2	0.90	0.27 (B)	
2	530	7150	13.3	14.8	.90	.41 (B)	
3	390	7400	13.6	14.6	.93	.30 (B)	
4	390	4450	13.5	14.7	.92	F 42c (B)	
5	350	4100	14.0	15.3	.92	F 45c (B)	
Avg	430	6060	13.4	14.7	0.91		
Plant 121, grade 3 ("No. 2 Commons," 18.75 percent of kiln, DP, S)							
1	510	5550	13.7	15.0	0.91	F 43c (B)	
2	325	4470	14.5	16.0	.91	F 33c (B)	
3	415	5330	14.6	16.0	.91	F 21c (B)	
4	330	3640	15.2	16.4	.93	F 28c (B)	
5	465	5550	14.2	15.1	.94	F 33c (B)	
Avg	410	4910	14.4	15.7	0.92	F 32c (B)	
Plant 121, grade 4 ("Salmon," 6.25 percent of kiln, DP, S)							
1	455	5110	14.6	15.8	0.92	F 18c	
2	285	4280	15.3	17.1	.90	F 11c	
3	275	4240	15.4	16.6	.93	F 9c	
4	300	4410	14.7	16.2	.91	F 9c	
5	440	4260	15.6	16.9	.92	F 9c	
Avg	350	4460	15.1	16.5	0.92	F 11c	

TABLE 18.—*Properties of bricks produced in Colorado*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
Plant 139, grade 1 ("Arch," 10 percent of kiln, DP, S)							
	lb/in.²	*lb/in.²*	%	%		%	
1	870	5830	12.4	15.0	0.83	0.52 (B)	
2	1055	5480	12.8	15.1	.85	No test	
3	785	4900	14.7	17.0	.86	do	
4	955	5590	13.2	15.5	.85	0.46 (B)	
5	960	6200	13.2	16.0	.82	.48 (B)	
Avg	925	5600	13.3	15.7	0.84	0.49 (B)	
Plant 139, grade 2 ("Medium," 70 percent of kiln, DP, S)							
1	595	4320	16.7	20.1	0.83	F 49c(B)	
2	645	3920	16.0	18.3	.87	F 50c(B)	
3	780	5740	14.2	16.5	.86	0.83 (B)	
4	670	5350	15.6	17.9	.87	.81 (B)	
5	640	3980	16.5	19.5	.84	1.21 (B)	
Avg	665	4660	15.8	18.5	0.85		
Plant 139, grade 3 ("Salmon," 20 percent of kiln, DP, S)							
1	320	2940	18.7	21.4	0.87	F 9c	
2	280	2770	19.6	22.3	.88	F 4c	
3	295	2990	18.9	22.1	.89	F 6c	
4		2270	19.9	22.4	.89	F 6c	
5	400	2730	19.7	22.2	.89	F 6c	
Avg	325	2740	19.4	21.9	0.88	F 6c	
Plant 139, grade 4 ("Arch," 10 percent of kiln, SC, S)							
1	1520	9170	8.8	11.2	0.79	0.24 (B)	
2	1635	7940	9.0	10.9	.83	.23 (B)	
3	1545	7350	12.3	14.2	.87	.46 (B)	
4	1600	6700	12.0	14.0	.86	.48 (B)	
5	1245	8480	9.7	11.6	.84	.47 (B)	
Avg	1510	7930	10.4	12.4	0.84	0.38 (B)	
Plant 139, grade 5 ("Medium," 70 percent of kiln, SC, S)							
1	1520	6840	13.3	15.2	0.88	No test	
2	1370	7190	13.2	15.0	.88	No test	
3	1450	7730	13.2	15.2	.87	F 48c(B)	
4	1455	6790	12.4	14.2	.87	0.17 (B)	
5	1115	6770	12.8	14.4	.89	.07 (B)	
Avg	1380	7060	13.0	14.8	0.88		
Plant 139, grade 6 ("Salmon," 20 percent of kiln, SC, S)							
1	1445	5470	14.1	15.9	0.89	F 12c	
2	1210	5900	14.7	16.4	.90	F 11c	
3	1415	5890	14.4	15.8	.91	F 6c	
4	1215	5650	14.3	15.8	.91	F 11c	
5	1355	5550	14.0	15.7	.89	F 15c	
Avg	1330	5690	14.3	15.9	0.90	F 11c	
Plant 139, grade 7 ("Medium," percentage of kiln unknown, SC, FC)							
Avg (5)	1435	7860	7.2	9.1	0.80	Not tested	
Plant 164, grade 1 ("No. 1 Common," 75 percent of kiln, SC, S)							
1	1680	8380	6.8	10.7	0.62	0.19	
2	1680	12050	5.8	9.1	.64	.10	
3	1840	8430	7.4	11.3	.65	.20	
4	1375	6430	10.1	13.6	.74	.30	
5	1780	8140	6.7	10.6	.63	.29	
Avg	1670	8690	7.4	11.1	0.66	0.22	

TABLE 18.—*Properties of bricks produced in Colorado*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
	*lb/in.*²	*lb/in.*²	%	%		%	
Plant 165, grade 1 ("No. 1 Common," 75 percent of kiln, SC, S)							
1	2200	8530	9.1	11.1	0.82	0.10	
2	1765	7770	10.8	12.7	.85	.10	
3	1945	8310	8.4	10.5	.80	.10	
4	1950	8740	8.1	10.8	.75	.11	
5	2030	9890	8.6	11.0	.78	.10	
Avg	1980	8650	9.0	11.2	0.80	0.10	
Plant 186, grade 1 ("Vitrified," 20 percent of kiln, SC, C)							
Avg (5)	1445	8710	5.8	8.1	0.71	Not tested	
Plant 186, grade 2 ("Hard," 40 percent of kiln, SC, C)							
Avg (5)	950	6640	8.2	11.5	0.71	Not tested	
Plant 186, grade 3 ("Medium," 25 percent of kiln, SC, C)							
1	905	5630	10.6	13.1	0.81	0.25 (B)	
2	840	6250	10.3	12.8	.81	.34 (B)	
3	660	5890	11.6	14.3	.81	.45 (B)	
4	900	7300	9.5	12.6	.75	.26 (B)	
5	925	6230	10.2	13.1	.78	.33 (B)	
Avg	845	6260	10.4	13.2	0.79	0.33 (B)	
Plant 186, grade 4 ("Soft," 15 percent of kiln, SC, C)							
1	605	4300	13.5	15.8	0.85	F 34c (B)	
2	725	4780	13.4	15.6	.86	0.53 (B)	
3	640	5190	12.8	15.3	.84	.60 (B)	
4	755	4530	13.3	15.6	.85	F 31c (B)	
5	280	5060	13.3	15.4	.86	F 25c (B)	
Avg	600	4770	13.3	15.5	0.85		
Plant 193, grade 1 ("Hard red," 85 percent of kiln, DP, S)							
1	335	3220	15.4	17.2	0.90	F 50c (B)	
2	550	4420	12.6	14.5	.87	8.01 (B)	
3	495	3590	12.6	14.9	.85	0.90 (B)	
4	410	2420	13.7	15.8	.87	.77 (B)	
5	305	2510	15.7	17.8	.88	1.33 (B)	
6	415	3000	14.3	16.1	.89	0.45 (B)	
7	190	2860	14.6	16.7	.87	.60 (B)	
8	505	4000	14.0	15.3	.92	F 34c (B)	
9	480	3920	15.5	17.2	.90	F 17c (B)	
10	295	2430	15.3	17.1	.89	F 34c (B)	
11	370	3380	16.4	17.8	.92	F 10c (B)	
12	550	3760	9.5	11.4	.83	0.29 (B)	
13	235	2310	18.1	20.0	.91	F 19c (B)	
14	315	2520	15.2	17.2	.88	F 42c (B)	
15	275	2110	15.7	17.4	.90	1.71 (B)	
Avg	380	3100	14.6	16.4	0.89		
Plant 193, grade 2 ("Salmon," 15 percent of kiln, DP, S)							
1	275	3210	17.5	19.1	0.92	F 10c (B)	
2	275	3780	17.7	19.1	.93	F 12c (B)	
3	240	3620	17.2	19.2	.90	F 12c (B)	
4	255	3120	17.5	19.4	.90	F 14c (B)	
5	190	3090	17.6	19.2	.92	F 25c (B)	
Avg	245	3360	17.5	19.2	0.91	F 15c (B)	

TABLE 18.—*Properties of bricks produced in Colorado*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
	*lb/in.*²	*lb/in.*²	%	%		%	
Plant 197, grade 1 ("Medium," 60 to 70 percent of kiln, DP, C)							
1	445	5600	10.7	12.3	0.87	0.33 (B)	
2	465	5150	11.0	12.8	.86	.27 (B)	
3	430	5790	9.5	12.2	.78	.27 (B)	
4	445	4830	11.0	12.3	.89	.26 (B)	
5	270	3720	12.4	14.2	.87	.18 (B)	
Avg	410	5020	10.9	12.8	0.85	0.26 (B)	
Plant 197, grade 2 ("Soft," 10 to 15 percent of kiln, DP, C)							
1	525	6000	10.8	12.6	0.86	0.09 (B)	
2	310	4630	12.0	13.9	.86	.74 (B)	
3	340	4210	11.3	13.4	.84	.25 (B)	
4	225	3880	12.1	14.0	.86	.58 (B)	
5	495	4390	10.8	12.9	.84	.31 (B)	
Avg	380	4620	11.4	13.4	0.85	0.39 (B)	

TABLE 19.—*Properties of bricks produced in Washington, Oregon, and California*

[The samples received included bricks made from shale and surface clay and formed by the soft-mud and the stiff-mud, side-cut processes. Data on 13 additional plants in the Los Angeles District were provided by the California Clay Products Institute. All of these plants manufactured brick made from surface clay. The averages were as follows: Modulus of rupture 600 lb/in.²; compressive strength 3,690 lb/in.²; water absorption by 48-hr cold immersion 11.8 percent; water absorption by 5-hr boiling 14.2 percent; saturation coefficient 0.83. Reference is made to Williams' article [9] for additional data on Oregon bricks]

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
	*lb/in.*²	*lb/in.*²	%	%		%	
Plant 39, grade 1 ("Hard commons," 30 percent of kiln, SC, C)							
1	2950	15200	1.2	3.5	0.34	0.08	
2	2320	17250	0.8	3.3	.24	.16	
3	2650	18350	1.3	3.4	.38	.26	
4	3570	19400	1.3	3.4	.38	.08	
5	3080	17600	2.8	4.8	.58	.08	
Avg	2915	17560	1.5	3.7	0.38	0.13	
Plant 39, grade 2 ("Medium," 60 percent of kiln, SC, C)							
1	1840	8110	10.4	13.3	0.78	0.32	
2	1685	9340	9.9	12.8	.77	.25	
3	1460	8400	9.9	12.7	.78	.19	
4	1600	9560	9.9	12.9	.77	.29	
5	1740	10000	9.1	12.1	.75	.30	
Avg	1665	9080	9.8	12.8	0.77	0.27	
Plant 39, grade 3 ("Soft," 10 percent of kiln, SC, C)							
1	470	3250	17.3	20.3	0.85	F 27c	
2	520	3340	16.6	19.7	.84	0.54	
3	520	3180	16.3	19.8	.82	.99	
4	645	2590	17.4	20.4	.85	F 21c	
5	760	3820	17.2	20.2	.85	F 15c	
Avg	585	3240	17.0	20.1	0.84		

TABLE 19.—*Properties of bricks produced in Washington, Oregon, and California*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
Plant 54, grade 1 ("Common over arches," 33⅓ percent of kiln, SC, S)							
	*lb/in.*²	*lb/in.*²	%	%		%	%
Avg (5)	920	6770	11.2	13.5	0.83	Not tested	
Plant 54, grade 2 ("Center of kiln," 33⅓ percent of kiln, SC, S)							
1	655	4610	14.4	16.5	0.87	0.50 (B)	
2	840	4550	13.9	16.4	.85	.49 (B)	
3	720	4430	13.7	16.0	.86	F 47c (B)	
4	525	4490	14.0	16.2	.86	0.45 (B)	
5	600	4700	13.6	15.6	.87	.40 (B)	
Avg	670	4560	13.9	16.1	0.86		
Plant 54, grade 3 ("Top of kiln," 33⅓ percent of kiln, SC, S)							
1	600	4390	15.4	17.2	0.90	F 45c	4.82 (75c)
2	675	3600	15.4	17.1	.90	1.31	F 72c
3	665	3930	14.9	16.8	.89	0.30	0.65 (75c)
4	570	3980	15.2	16.6	.92	.37	3.56 (75c)
5	560	4060	15.5	17.3	.90	1.37	
Avg	615	3990	15.3	17.0	0.90		
Plant 85, grade 1 ("Face," 25 percent of kiln, SC, S)							
1	2800	15350	1.1	4.7	0.23	0.07	
2	2200	14400	3.5	7.4	.47	.00	
3	2190	13700	3.5	7.0	.50	.16	
4	2140	11200	4.4	8.4	.52	.08	
5	1920	12650	2.7	6.6	.41	.00	
Avg	2250	13460	3.0	6.8	0.43	0.06	
Plant 85, grade 2 ("Select common," 50 percent of kiln, SC, S)							
1	690	8190	6.5	10.2	0.64	0.19	
2	1750	8900	5.8	9.3	.64	.09	
3	900	7890	8.6	12.1	.71	.17	
4	1130	8170	9.6	13.0	.74	.17	
5	1170	7730	8.6	11.8	.73	.11	
Avg	1130	8180	7.8	11.3	0.69	0.15	
Plant 85, grade 3 ("100 percent kiln run," SC, C)							
1	1245	8230	10.5	14.0	0.75	0.30	0.50 (63c)
2	890	4810	14.4	17.4	.83	.50	.60 (63c)
3	1095	4610	9.7	13.0	.75	.09	.09 (63c)
4	820	5190	15.4	18.5	.83	.72	.81 (63c)
5	520	2990	16.3	18.9	.86	.95	1.16 (63c)
Avg	915	5170	13.3	16.4	0.80	0.51	0.73 (63c)
Plant 99, grade 1 ("Common," 80 percent of kiln, SM, C)							
1	370	3160	16.5	23.2	0.71	1.65	
2	705	4500	12.4	18.6	.67	0.34	
3	470	3840	12.9	18.8	.69	.43	
4	550	4280	12.3	18.4	.67	.33	
5	335	*2240	16.4	22.9	.72	1.97	
Avg	485	3600	14.1	20.4	0.69	0.94	
Plant 100, grade 1 ("100 percent kiln run," SC, S)							
Avg (15)	625	5460	11.9	16.6	0.71	Not tested	

TABLE 19.—*Properties of bricks produced in Washington, Oregon, and California*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
Plant 137, grade 1 ("Arch," 10 percent of kiln, SC, C)							
	*lb/in.*²	*lb/in.*²	%	%		%	%
1	655	7150	6.4	9.8	0.65	0.26 (B)	
2	685	7450	5.9	9.2	.64	.67 (B)	
3	550	5650	5.7	9.1	.63	.09 (B)	
4	555	7500	5.9	9.1	.65	.32 (B)	
5	405	4820	8.2	11.2	.73	.52 (B)	
Avg	570	6510	6.4	9.7	0.66	0.37 (B)	
Plant 137, grade 2 ("Medium," 80 percent of kiln, SC, C)							
Avg (5)	435	4040	9.9	13.5	0.73	Not tested	
Plant 137, grade 3 ("Soft," 10 percent of kiln, SC, C)							
1	320	2920	11.1	14.7	0.76	1.57	
2	375	3730	10.4	14.4	.72	0.87	
3	305	3170	10.8	14.4	.75	1.44	
4	335	3020	10.7	14.7	.73	1.25	
5	330	2960	10.6	14.3	.74	1.76	
Avg	335	3160	10.7	14.5	0.74	1.38	
Plant 156, grade 1 ("Kiln run common," 100 percent of kiln, SM, C)							
1	720	2900	19.5	24.6	0.79	0.12	
2	780	2200	19.3	23.3	.83	F 9c	
3	790	2930	19.1	24.2	.79	5.25	
4	560	2150	20.7	26.1	.79	F 9c	
5	410	1990	21.8	26.4	.83	1.04	
6	600	1960	21.0	26.1	.80	F 37c	
7	475	1920	21.0	26.0	.81	0.55	
8	440	1800	21.1	26.8	.79	.93	
9	450	1430	22.7	27.5	.82	.97	
10	385	1620	21.9	26.9	.81	1.63	
11	300	1180	23.2	28.0	.83	F 24c	
12	435	1620	22.1	27.6	.80	0.79	
13	320	1470	22.8	27.4	.83	1.37	
14	305	1300	23.4	28.0	.84	1.87	
15	270	1260	23.8	28.0	.85	1.31	
Avg	485	1850	21.6	26.5	0.81		

TABLE 20.—*Properties of bricks produced in Texas*

[All samples received were formed from shale or surface clay by the dry-press or the stiff-mud (side-cut or end-cut) process]

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
Plant 1, grade 1 ("100 percent kiln run," DP, S)							
	*lb/in.*²	*lb/in.*²	%	%		%	%
1	830	6580	10.5	12.5	0.84	0.70	0.90 (90c)
2	655		11.7	13.1	.89	5.50	F 54c
3	615		12.1	14.2	.85	F 42c	
4	655	4370	12.0	13.7	.87	1.10	F 69c
5	760	5230	11.5	12.6	.91	1.60	F 54c
6	725	4320	11.4	13.1	.87	F 42c	
7	880	5460	10.8	12.4	.81	0.40	F 78c
8	680	4430	12.0	13.5	.89	F 42c	
9	790	4550	11.4	13.1	.87	F 45c	
10	810	5840	11.1	13.1	.85	F 45c	
11	725	5120	11.3	12.9	.88	0.49	F 84c
Avg	740	5100	11.4	13.1	0.87		

TABLE 20.—*Properties of bricks produced in Texas*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption: 48-hr cold immersion	Water absorption: 5-hr boiling	Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
		Plant 1, grade 1A ("Second sample of grade 1")					
	lb/in.²	*lb/in.²*	%	%		%	
1	875	7750	15.5	17.7	0.88	F 36c	
2	830	7600	14.8	16.4	.90	F 36c	
3	905	7940	14.7	16.2	.91	F 15c	
4	850	8100	15.0	16.7	.90	F 15c	
5	800	8290	15.7	17.3	.91	F 19c	
6	755	8100	15.4	16.9	.91	F 19c	
7	760	7530	14.8	16.4	.90	F 20c	
8	760	8440	16.1	18.1	.89	F 20c	
9	755	8120	15.9	17.5	.91	F 20c	
10	820	8150	15.0	16.1	.93	F 13c	
11	905	6400	14.9	16.7	.89	F 20c	
12	860	7110	14.7	17.0	.87	F 19c	
13	850	7040	14.6	15.9	.92	F 20c	
14	865	7270	15.1	16.7	.90	F 20c	
15	675	6990	15.2	16.8	.90	F 19c	
Avg	820	7660	15.2	16.8	0.90	F 21c	
		Plant 20, grade 1 ("Reds," 100 percent of kiln, DP, S)					
						%	
1	525	8440	11.2	12.4	0.90	0.26	F 63c
2	935	10000	11.0	12.1	.91	.10	0.21 (81c)
3	960	11250	11.3	12.8	.88	.49	F 60c
4	1230	10350	9.9	11.4	.87	.10	F 72c
5	720	7700	11.8	12.7	.93	.26	F 66c
Avg	875	9550	11.0	12.3	0.90	0.24	
		Plant 20, grade 1A ("Second sample of grade 1 (1936)")					
			(24-hr)				
1	940	6740	13.3	15.2	0.88	1.01	
2	810	6020	12.9	14.8	.87	0.41	
3	1050	7300	12.4	13.9	.89	.52	
4	880	9500	12.6	14.1	.89	.29	
5	850	6290	13.3	15.3	.87	.41	
6	960	6640	13.5	15.3	.88	.10	
7	1085	7540	12.2	13.8	.88	.29	
8	775	7070	11.9	13.4	.88	.59	
9	1120	7730	11.7	13.2	.88	.27	
10	1055	8730	12.4	14.0	.89	.73	
11	1085	9100	12.3	14.2	.88	.60	
12	985	8520	12.2	13.7	.89	.69	
13	1005	8230	12.3	13.8	.89	.29	
14	1130	7690	12.7	14.3	.89	.49	
15	840	6750	13.1	14.9	.88	.41	
16	910	7400	13.4	15.3	.88	.50	
17	900	6190	13.8	16.0	.86	.48	
18	1100	7290	12.2	13.8	.88	.42	
19	855	6900	13.5	15.6	.87	.40	
20	995	7600	13.3	15.0	.88	.38	
Avg	965	7360	12.7	14.5	0.88	0.46	
		Plant 20, grade 2 ("Standard," 100 percent of kiln, DP, S)					
1	845	5570	17.5	18.9	0.93	F 16c (B)	
2	785	7350	18.4	20.4	.90	F 23c (B)	
3	930	6510	18.4	20.0	.92	F 19c (B)	
4	745	5670	19.7	21.7	.91	F 23c (B)	
5	745	5490	17.6	19.0	.93	F 19c (B)	
6	525	4950	18.7	20.2	.93	F 25c (B)	
Avg	760	5920	18.4	20.0	0.92	F 21c (B)	

TABLE 20.—*Properties of bricks produced in Texas*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption: 48-hr cold immersion	Water absorption: 5-hr boiling	Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
		Plant 28, grade 1 ("100 percent kiln run," DP, S)					
	lb/in.²	*lb/in.²*	%	%		%	
1	1100	8970	16.5	18.2	0.91	No test	
2	975	6760	19.7	20.8	.95	do	
3	795	6170	20.6	21.8	.95	F 19c (B)	
4	595	4960	20.1	21.9	.92	F 16c (B)	
5	885	7000	18.7	20.2	.93	F 19c (B)	
6	910	8370	18.6	20.5	.91	F 30c (B)	
7	1015	7540	18.3	20.0	.91	F 22c (B)	
8	885	9050	18.4	20.1	.92	F 16c (B)	
9	1220	9500	16.9	18.6	.91	F 26c (B)	
10	795	8600	17.6	19.3	.91	F 26c (B)	
11	840	8290	19.4	20.6	.94	F 22c (B)	
12	930	6790	18.8	20.4	.92	F 17c (B)	
13	765	5920	20.6	21.7	.95	F 17c (B)	
14	595	5690	20.6	21.6	.95	F 17c (B)	
15	760	6370	21.2	22.4	.95	F 26c (B)	
Avg	870	7330	19.1	20.5	0.93	F 21c (B)	
		Plant 42, grade 1 ("100 percent kiln run common," DP, S)					
1	980	6790	19.1	20.8	0.92	F 16c (B)	
2	1045	6370	18.8	19.9	.95	F 13c (B)	
3	740	5470	19.9	22.0	.91	F 12c (B)	
4	810	5540	18.2	19.8	.92	F 15c (B)	
5	850	6820	18.2	19.8	.92	F 13c (B)	
6	865	5830	18.5	19.6	.94	F 15c (B)	
7	650	6240	19.4	20.6	.94	F 13c (B)	
8	850	5590	18.6	19.7	.94	F 13c (B)	
9	1070	6160	18.5	19.6	.94	F 14c (B)	
10	715	5250	19.9	21.1	.94	F 17c (B)	
11	810	5870	18.4	20.0	.92	F 16c (B)	
12	770	4670	20.0	21.8	.92	F 14c (B)	
13	955	5440	19.1	20.1	.95	F 15c (B)	
14	960	5430	19.1	20.1	.95	F 14c (B)	
15	900	5470	19.8	21.4	.93	F 15c (B)	
16	750	5940	18.7	20.7	.90	F 14c (B)	
Avg	860	5800	19.0	20.4	0.93	F 14c (B)	
		Plant 47, grade 1 ("Flashed," 20 percent of kiln, SC, C)					
Avg (6)	1085	8150	5.4	9.6	0.56	Not tested	
		Plant 47, grade 2 ("Dark," 40 percent of kiln, SC, C)					
Avg (6)	1110	8240	5.5	9.4	0.58	Not tested	
		Plant 47, grade 3 ("Medium," 30 percent of kiln, SC, C)					
Avg (6)	945	7890	7.9	11.2	0.70	Not tested	
		Plant 47, grade 4 ("Light," 10 percent of kiln, SC, C)					
1	875	7440	9.3	12.7	0.73	0.19	
2	830	7570	10.1	12.8	.79	.11	
3	750	5440	11.4	14.2	.80	.19	
4	725	6240	10.4	13.5	.77	.10	
5	700	5040	12.8	15.7	.81	.10	
6	595	5220	11.0	14.1	.78	.00	
Avg	745	6160	10.8	13.8	0.78	0.12	

TABLE 20.—*Properties of bricks produced in Texas*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
	*lb/in.*²	*lb/in.*²	%	%		%	
Plant 82, grade 1 ("100 percent kiln run common," DP, C)							
1	645	5150	10.1	12.2	0.83	0.42	
2	915	5790	9.5	11.7	.81	.22	
3	860	5120	9.3	10.9	.85	.32	
4	880	6070	8.2	9.9	.83	.34	
5	1055	7800	7.5	9.2	.82	.23	
6	540	6410	6.6	8.1	.81	.09	
7	830	5950	7.0	9.1	.77	.10	
8	810	6880	7.4	8.9	.83	.10	
9	800	7160	7.1	9.1	.78	.20	
10	1085	7190	7.2	8.7	.83	.10	
11	910	5550	8.0	9.6	.83	.20	
12	735	6350	7.8	9.3	.84	.19	
13	900	6800	9.4	11.2	.84	.18	
14	565	5230	13.3	15.0	.89	.68	
15	370	6580	12.5	13.8	.91	F 21c	
Avg	795	6270	8.7	10.4	0.83		
Plant 82, grade 2 ("No. 1 Common," 90 percent of kiln, DP, C)							
1	1350	7170	6.3	8.2	0.77	0.00	
2	1095	6680	7.3	8.8	.83	.19	
3	535	9280	5.9	7.3	.81	.00	
4	760	6850	7.5	9.1	.82	.10	
5	950	7440	9.9	11.2	.88	.17	
Avg	940	7480	7.4	8.9	0.82	0.09	
Plant 98, grade 1 ("Arch," 30 percent of kiln, DP, C)							
1	610	7320	12.4	13.4	0.93	F 12c	
2	965	7420	13.6	15.0	.91	F 18c	
3	970	8340	13.8	14.8	.93	F 15c	
4	1040	9110	13.0	14.4	.90	F 18c	
5	950	7750	14.5	16.0	.91	F 15c	
Avg	910	7990	13.5	14.7	0.92	F 16c	
Plant 98, grade 2 ("Middle bench," 30 percent of kiln, DP, C)							
1	875	8840	12.1	13.4	0.90	F 36c	
2	900	9090	12.1	13.6	.89	F 40c	
3	1000	8530	10.7	11.6	.92	F 41c	
4	900	8110	10.8	12.1	.89	F 27c	
5	1115	9800	11.7	13.1	.89	F 32c	
Avg	960	8870	11.5	12.8	0.90	F 35c	
Plant 98, grade 3 ("Top bench," 40 percent of kiln, DP, C)							
Avg (5)	715	8130	12.8	13.9	0.92	Not tested	
Plant 138, grade 1 ("Hard reds," 70 percent of kiln, EC, C)							
Avg (5)	1050	12380	6.9	9.3	0.73	Not tested	
Plant 138, grade 2 ("Medium reds," 30 percent of kiln, EC, C)							
1	1005	8050	12.6	15.0	0.84	0.19 (B)	
2	960	9050	13.6	16.2	.84	F 50c (B)	
3	980	7800	13.3	15.8	.84	F 45c (B)	
4	1065	7710	13.2	15.9	.83	F 45c (B)	
5	980	7280	13.7	16.1	.85	F 45c (B)	
Avg	995	7980	13.3	15.8	0.84		

TABLE 20.—*Properties of bricks produced in Texas*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
	*lb/in.*²	*lb/in.*²	%	%		%	
Plant 194, grade 1 ("Average common," 95 to 98 percent of kiln, SC, S)							
Avg (5)	1650	14660	5.4	8.2	0.65	Not tested	
Plant 194, grade 2 ("Hollow common," percentage of kiln unknown, EC, S)							
Avg (5)	1505	2710	5.3	7.6	0.69	Not tested	
Plant 194, grade 3 ("Average common," 95 to 98 percent of kiln, DP, S)							
1	530	6140	8.4	10.6	0.79	0.27 (B)	
2	995	4880	11.0	13.6	.81	.42 (B)	
3	1270	9040	6.9	8.9	.78	.32 (B)	
4	610	6280	9.1	11.3	.81	.32 (B)	
5	940	3750	9.4	11.5	.82	.41 (B)	
Avg	870	6020	9.0	11.2	0.80	0.35 (B)	
Plant 195, grade 1 ("100 percent kiln run," DP, C)							
1	675	2650	27.4	34.6	0.79	2.54 (B)	
2	660	2300	26.7	34.4	.78	4.52 (B)	
3	645	2570	25.0	32.5	.77	0.33 (B)	
4	605	2460	27.2	34.8	.78	4.29 (B)	
5	460	2220	28.5	35.4	.80	F 4c (B)	
6	635	3180	26.5	34.0	.78	0.38 (B)	
7	570	3430	24.4	31.7	.77	F 5c (B)	
8	1040	3700	20.6	33.0	.62	0.11 (B)	
9	1265	4920	20.3	30.1	.67	.00 (B)	
10	915	3570	21.6	32.9	.66	.32 (B)	
11	900	3290	23.5	35.2	.67	.37 (B)	
12	980	3190	23.9	35.6	.67	.34 (B)	
13	740	3010	25.5	34.8	.73	0.58 (B)	
14	-------	1575	29.4	35.0	.84	No test	
Avg	775	3000	25.0	33.9	0.74		
Plant 195, grade 1A ("Second sample (1936) of grade 1")							
			(24-hr)				
1	720	2950	25.0	33.8	0.74	[a]+0.68	
2	735	3090	23.5	34.5	.68	+.50	
3	595	3050	24.2	32.2	.76	+1.24	
4	940	2910	22.0	32.4	.68	+0.75	
5	950	2800	21.6	31.8	.68	+1.30	
6	540	3010	24.4	32.4	.76	+0.71	
7	680	3070	24.2	32.5	.75	+1.03	
8	580	2870	25.7	32.7	.78	+0.64	
9	685	2470	24.7	34.1	.73	+.41	
10	675	3470	23.4	33.5	.70	+.56	
Avg	710	2970	23.9	33.0	0.73	+0.78	
Plant 195, grade 2 ("Textured," (1936) percentage of kiln unknown, DP, C)							
			(24-hr)				
1	925	4950	25.8	30.9	0.84	0.28	
2	460	4420	28.7	33.8	.85	F 24c	
3	575	5150	26.2	32.6	.80	F 36c	
4	425	3320	28.6	32.6	.88	F 16c	
5	670	4440	25.7	32.5	.80	[a]+0.73	
6	500	4390	28.5	31.6	.90	.13	
7	490	3320	26.9	33.9	.80	F 8c	
8	565	4510	28.7	31.9	.90	F 21c	
9	755	3940	26.4	32.1	.82	F 17c	
10	445	4170	28.0	32.8	.86	F 18c	
Avg	580	4260	27.4	32.5	0.85		

[a] The gain in weight resulting from freezing and thawing of grade 1A is accounted for by the hydration and carbonation of the very considerable lime content of these specimens. Grades 1A and 2 were tested within 60 days of their manufacture. Grade 1 had "aged" for 7 years before starting freezing and thawing tests and gave an average gain in initial dry weight of 8.0 percent. Grade 2 sufficiently disintegrated in 51 cycles so that the resulting loss in weight exceeded the gain results from hydration and carbonation, except for No. 5.

TABLE 20.—*Properties of bricks produced in Texas*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
Plant 203, grade 1 ("Hard," 30 percent of kiln, SC, C)							
	*lb/in.*²	*lb/in.*²	%	%		%	
Avg (5)	1205	7650	5.4	8.6	0.62	Not tested	
Plant 203, grade 2 ("Medium," 60 percent of kiln, SC, C)							
Avg (5)	1085	7110	6.5	9.4	0.69	Not tested	
Plant 203, grade 3 ("Salmon," 10 percent of kiln, SC, C)							
1	770	5830	8.6	12.2	0.70	0.29 (B)	
2	970	7130	8.6	11.6	.74	.17 (B)	
3	1165	7200	9.4	12.4	.75	1.39 (B)	
4	180	6500	8.6	11.7	.73	0.20 (B)	
5	575	6460	8.8	12.2	.72	.20 (B)	
Avg	730	6620	8.8	12.0	0.73	0.45 (B)	
Plant 209, grade 1 ("Solid eommon," 80 percent of kiln, SC, S)							
1	1725	8180	7.7	9.1	0.85	0.36 (B)	
2	1910	7660	8.0	9.5	.84	.23 (B)	
3	1050	6810	7.0	9.0	.78	1.55 (B)	
4	1840	8620	7.7	9.0	.86	0.51 (B)	
5	1715	8630	6.7	7.9	.85	.25 (B)	
6	1795	7650	7.4	8.9	.83	.22 (B)	
Avg	1670	7920	7.4	8.9	0.84	0.52 (B)	
Plant 209, grade 2 ("Textured," 20 percent of kiln, SC, S)							
1	1155	10350	10.4	12.0	0.87	F 45e (B)	
2	1010	7730	9.8	11.1	.87	7.78 (B)	
3	940	9590	9.7	11.5	.84	F 39c (B)	
4	1030	12350	7.8	10.0	.78	4.11 (B)	
5	1085	9310	10.3	12.0	.86	F 43c (B)	
6	1130	8500	9.9	11.6	.85	2.95 (B)	
Avg	1060	9640	9.6	11.4	0.85		
Plant, 209, grade 3 ("Light burned eommon," 20 percent of kiln, SC, S)							
1	1200	6230	11.1	12.8	0.87	F 43e (B)	
2	410	5340	12.8	14.2	.90	F 12c (B)	
3	1145	7310	11.4	13.0	.88	F 38e (B)	
4	915	6090	12.7	14.8	.86	F 7c (B)	
5	1025	6450	11.8	13.6	.87	F 14e (B)	
6	315	8090	9.5	11.3	.84	F 41e (B)	
Avg	835	6580	11.6	13.3	0.87	F 26e (B)	
Plant 215, grade 1 ("100 percent kiln run," SC, S)							
Avg (15)	1390	11810	5.9	7.4	0.75	Not tested	
Plant 216, grade 1 ("100 percent kiln run," SC, S)							
1	2070	14100	3.9	5.0	0.78	No test	
2	2030	12050	6.0	7.8	.77	---do---	
3	1855	14550	6.2	8.1	.77	---do---	
4	1560	13550	8.1	10.2	.79	---do---	
5	2205	12750	8.0	10.0	.80	---do---	
6	1075	9920	9.6	11.1	.86	0.29	
7	1550	10450	9.9	11.3	.88	.09	
8	1175	10550	9.3	11.3	.82	.16	
9	1275	10350	9.9	11.6	.85	.08	
10	1570	11550	8.8	10.6	.83	.28	
11	965	14300	8.7	10.5	.83	.09 (B)	
12	1310	10750	9.5	11.0	.86	.15 (B)	
13	1665	13050	8.9	10.6	.84	.36 (B)	
14	1550	9150	10.3	11.6	.89	.26 (B)	
15	405	10300	9.6	11.8	.81	.74 (B)	
Avg	1485	11820	8.4	10.2	0.83	0.25 (A&B)	

TABLE 20.—*Properties of bricks produced in Texas*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
Plant 217, grade 1 ("100 percent kiln run," DP, S)							
	*lb/in.*²	*lb/in.*²	%	%		%	
1	870	5400	19.2	20.7	0.93	F 16e	
2	805	5730	19.1	20.5	.93	F 18e	
3	1090	5190	18.3	19.7	.93	F 18e	
4	870	4980	18.8	20.6	.91	F 24e	
5	830	6750	18.7	20.1	.93	F 28e	
6	1180	7920	17.5	18.9	.93	F 24e	
7	1140	6540	17.8	19.1	.93	F 18e	
8	875	4870	19.7	21.1	.93	F 18e	
9	900	7050	19.3	20.8	.93	F 18e	
Avg	950	6050	18.7	20.2	0.93	F 20e	
Plant 217, grade 2 ("100 percent kiln run," SC, S)							
1		5670	13.0	15.2	0.86	0.65	
2	860	5080	14.7	17.5	.84	.28	
3	805	5570	13.9	17.2	.81	.19	
4	980	5310	14.1	17.2	.82	.20	
5	420	6150	14.4	16.8	.86	.29	
6	950	5540	14.4	16.7	.86	.18	
7	800	5500	14.4	17.4	.83	.40	
8	745	5110	14.6	17.6	.83	.70	
9	1095	6110	13.8	16.2	.85	.13	
10	335	5230	14.1	17.2	.82	.81	
11	200	4320	14.9	17.0	.88	.57	
12	750	5170	14.2	16.9	.84	.27	
13	635	4820	15.3	17.3	.88	.41	
14	970	5230	14.4	16.7	.86	.33	
Avg	735	5340	14.3	16.9	0.85	0.39	
Plant 217, grade 3 ("Hollow," 100 percent of kiln, EC, S)							
1	1030	1870	13.6	15.6	0.87	0.65	
2	910	2070	13.4	15.8	.85	.47	
3	660	2570	14.2	16.1	.88	.90	
4	805	2550	13.7	16.3	.84	.78	
5	750	2770	13.0	15.6	.83	.91	
Avg	830	2370	13.6	15.9	0.85	0.74	

TABLE 21.—*Properties of bricks produced in Arkansas, Louisiana, Mississippi, and Alabama*

[The samples submitted included brick formed from surface clay, fire clay, or shale by the dry-press and the stiff-mud (side-cut and end-cut) processes. Some of the raw materials are unusual in that variations in time and temperature of firing, instead of producing variation in shades of red (dark to light) bring out entirely different colors (reds, browns, greys, etc.)]

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
Plant 22, grade 1 ("Common," 100 percent of kiln, SC, S)							
	*lb/in.*²	*lb/in.*²	%	%		%	
1	1730	11250	5.0	8.0	0.62	0.08 (B)	
2	2000	9650	4.3	7.1	.61	.10 (B)	
3	1770	10150	7.1	9.9	.72	.08 (B)	
4	1660	9290	7.6	10.0	.76	.10 (B)	
5	1180	6670	9.9	12.4	.80	.16 (B)	
Avg	1670	9400	6.8	9.5	0.70	0.10 (B)	

TABLE 21.—*Properties of bricks produced in Arkansas, Louisiana, Mississippi, and Alabama*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
Plant 22, grade 2 ("Face," 100 percent of kiln, SC, FC)							
	*lb/in.*²	*lb/in.*²	%	%		%	
Avg (5)	1995	14790	3.9	6.2	0.59	Not tested	
Plant 22, grade 3 ("Face," 100 percent of kiln, DP, FC)"							
1	1540	18550+	5.2	8.0	0.65	0.19	
2	1765	19650	4.4	6.4	.69	.40	
3	1170	10900	5.9	8.2	.72	.45	
4	1235	13450	5.5	7.7	.71	.36	
5	1040	10400	5.9	8.2	.72	.27	
Avg	1350	14590+	5.4	7.7	0.70	0.33	
Plant 22, grade 4 ("Face," 100 percent of kiln, DP, S)							
Avg (5)	1909	12690	5.3	7.7	0.69	Not tested	
Plant 22, grade 5 ("Common," 100 percent of kiln, DP, S)							
1	1110	6000	6.4	8.9	0.72	0.34	
2	1050	4520	7.2	9.5	.76	.46	
3	830	6050	7.7	10.0	.77	.73	
4	1025	6130	7.1	9.7	.73	.62	
5	990	4550	7.1	9.3	.76	.45	
Avg	1000	5450	7.1	9.5	0.75	0.51	
Plant 33, grade 1 ("Reds," percentage of kiln unknown, DP, C)							
1	850	9030	13.0	14.7	0.88	0.11 (B)	
2	920	8890	13.4	15.1	.89	.11 (B)	
3	770	7020	13.9	15.5	.90	.10 (B)	
4	725	6670	14.7	16.2	.91	.42 (B)	
Avg	815	7900	13.8	15.4	0.90	0.15 (B)	
Plant 33, grade 2 ("Browns," percentage of kiln unknown, DP, C)							
1	500	4750	13.3	18.2	0.73	0.22	
2	685	4920	15.3	20.5	.75	.21	
3	635	4850	16.9	21.9	.77	.25	
4	375	5370	12.7	16.4	.77	.12	
5	590	4360	15.7	21.1	.74	.73	
Avg	555	4850	14.8	19.6	0.75	0.31	
Plant 52, grade 1 ("100 percent shale common," 50 percent of kiln, SC, S)							
Avg (7)	1875	13770	1.6	3.6	0.45	Not tested	
Plant 52, grade 2 ("80 percent shale common," 50 percent of kiln, SC, S)							
Avg (7)	1520	7380	8.6	10.7	0.81	Not tested	
Plant 53, grade 1 ("Dark face," 20 percent of kiln, EC, C)							
Avg (5)	955	3520	9.7	14.3	0.68	Not tested	
Plant 53, grade 2 ("Light face," 75 percent of kiln, EC, C)							
Avg (5)	645	2720	11.0	15.9	0.69	Not tested	

TABLE 21.—*Properties of bricks produced in Arkansas, Louisiana, Mississippi, and Alabama*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
Plant 53, grade 3 ("Salmon," 5 percent of kiln, EC, C)							
	*lb/in.*²	*lb/in.*²	%	%		%	%
1	410	2120	10.8	16.7	0.65	0.86	1.29 (75c)
2	410	2170	10.6	16.9	.63	1.10	1.55 (75c)
3	635	2470	10.6	17.1	.62	0.71	2.22 (75c)
4	535	2480	11.2	17.1	.65	.94	1.41 (75c)
5	635	2430	11.0	16.4	.67	1.19	1.79 (75c)
Avg	525	2330	10.8	16.8	0.64	0.96	1.65 (75c)
Plant 97, grade 1 ("100 percent kiln run," SC, C)							
Avg (15)	1155	7600	13.7	18.1	0.76	Not tested	
Plant 102, grade 1 ("Common hard," 83 percent of kiln, SC, C)							
Avg (5)	1755	8480	7.7	10.5	0.73	Not tested	
Plant 102, grade 2 ("Clinker," 7 percent of kiln, SC, C)							
Avg (5)	2060	11060	4.8	7.0	0.68	Not tested	
Plant 102, grade 3 ("Salmon," 10 percent of kiln, SC, C)							
1	1010	6350	16.3	18.8	0.87	F 42c	
2	1235	5440	16.3	18.7	.87	0.10	
3	940	5730	16.0	18.3	.87	F 50c	
4	655	4160	17.6	20.6	.85	0.78	
5	805	4850	16.5	19.2	.86	.54	
Avg	930	5310	16.5	19.1	0.86		
Plant 107, grade 1 ("Greys," 80 percent of kiln, EC, C)							
1	1680	6030	13.3	17.8	0.75	0.11 (B)	
2	425	7580	12.2	15.9	.77	.09 (B)	
Avg	1055	6800	12.8	16.8	0.76	0.10 (B)	
Plant 107, grade 2 ("Browns," 15 percent of kiln, EC, C)							
1	665	6870	12.7	16.2	0.78	0.00 (B)	
2	530	5740	13.1	15.7	.83	.31 (B)	
Avg	600	6300	12.9	16.0	0.80	0.16 (B)	
Plant 107, grade 3 ("Reds," 5 percent of kiln, EC, C)							
1	470	3940	12.5	15.9	0.79	9.25 (B)	
2	550	4110	12.6	15.0	.84	0.10 (B)	
Avg	510	4020	12.6	15.4	0.82	4.68 (B)	
Plant 131, grade 1 ("Blue common," 90 percent of kiln, SC, C)							
Avg (10)	1115	6200	10.5	15.0	0.69	Not tested	
Plant 131, grade 1a ("Second sample of grade 1")							
Avg (5)	1045	7050	10.8	15.3	0.70	Not tested	

TABLE 21.—*Properties of bricks produced in Arkansas, Louisiana, Mississippi, and Alabama*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
Plant 131, grade 2 ("Buff commons," 90 percent of kiln, SC, C)							
	*lb/in.*²	*lb/in.*²	%	%		%	
Avg (10)	1160	7500	7.4	12.1	0.61	Not tested	
Plant 131, grade 2A ("Second sample of grade 2")							
Avg (5)	1210	8640	6.9	11.5	0.60	Not tested	
Plant 131, grade 3 ("Face," percentage of kiln unknown, SC, C)							
Avg (10)	1230	6790	8.1	12.2	0.66	Not tested	
Plant 131, grade 4 ("Face," percentage of kiln unknown, SC, C)							
Avg (5)	1700	9490	5.8	9.8	0.58	Not tested	
Plant 131, grade 5 ("Face," percentage of kiln unknown, SC, C)							
Avg (5)	1575	9100	7.2	11.0	0.64	Not tested	
Plant 161, grade 1 ("Arch," 5 percent of kiln, SC, C)							
1	1000	8670	5.7	7.8	0.73	0.42	
2	1055	8540	5.6	7.9	.71	.00	
3	795	10490	5.6	8.4	.67	.19	
4	1055	11460	5.4	7.7	.70	.09	
5	875	10020	5.4	7.9	.68	.10	
Avg	955	9840	5.5	7.9	0.70	0.16	
Plant 161, grade 2 ("Hard," 75 percent of kiln, SC, C)							
1	1770	9070	6.4	8.5	0.75	0.00	
2	1700	8350	5.2	7.6	.68	.19	
3	1640	8280	5.9	8.7	.68	.00	
4	1340	6940	6.1	8.5	.72	.00	
5	1490	8900	7.0	9.1	.77	.11	
Avg	1590	8310	6.1	8.5	0.72	0.06	
Plant 161, grade 3 ("Medium hard," 20 percent of kiln, SC, C)							
1	1730	8300	7.4	9.8	0.76	0.00	
2	1550	8930	7.6	10.4	.73	.00	
3	1690	7650	6.0	8.3	.72	.00	
4	1915	6900	7.3	9.9	.74	.00	
5	1265	7280	7.7	10.5	.73	.00	
Avg	1630	7810	7.2	9.8	0.74	0.00	
Plant 185, grade 1 ("Commercial Hard Browns," 65 percent of kiln, SC, C)							
Avg (6)	1025	8080	11.4	15.7	0.72	Not tested	
Plant 185, grade 2 ("Commercial Hard, Purples," 10 percent of kiln, SC, C)							
Avg (6)	1000	8020	11.4	15.2	0.75	Not tested	
Plant 185, grade 3 ("Commereial Hard, Reds," 24 percent of kiln, SC, C)							
Avg (6)	695	5670	11.4	15.2	0.75	Not tested	

TABLE 21.—*Properties of bricks produced in Arkansas, Louisiana, Mississippi, and Alabama*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
Plant 185, grade 4 ("Salmon," 1.0 percent of kiln, SC, C)							
	*lb/in.*²	*lb/in.*²	%	%		%	
1	310	3490	12.9	16.4	0.79	0.47 (B)	
2	225	3980	12.2	16.3	.75	.49 (B)	
3	.....	3970	12.4	16.0	.77	.36 (B)	
4	.....	4280	12.1	15.5	.78	5.68 (B)	
5	.....	3710	13.1	16.5	.79	0.52 (B)	
6	280	3240	12.9	16.9	.76	.40 (B)	
Avg	270	3780	12.6	16.3	0.77	1.58 (B)	
Plant 202, grade 1 ("Reds," percentage of kiln unknown, DP, C)							
Avg (6)	730	3230	16.3	21.2	0.77	Not tested	
Plant 206, grade 1 ("Average," percentage of kiln unknown, SC, C)							
Avg (5)	1010	9580	10.4	15.0	0.69	Not tested	

TABLE 22.—*Properties of bricks produced in Tennessee*

[All samples received were formed from surface clay or shale either by the dry-press or by the stiff-mud, side-cut method]

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
Plant 25, grade 1 ("Dark to light," 100 percent of kiln, SC, C)							
	*lb/in.*²	*lb/in.*²	%	%		%	
1	1270	10250	8.6	10.8	0.80	0.11	
2	1075	6540	11.4	13.4	.85	.20	
3	1535	6040	7.9	11.1	.71	.42	
4	550	4180	17.0	19.0	.90	F 14c	
5	255	3000	19.4	20.6	.94	F 12c	
Avg	935	6000	12.9	15.0	0.84	.....	
Plant 25, grade 2 ("Dark to light," 100 percent of kiln, SC, S)							
1	1095	9100	7.1	9.9	0.72	0.33	
2	755	8650	9.4	12.5	.75	.31	
3	1170	7690	7.4	10.9	.68	.10	
4	1635	7470	7.6	10.1	.75	.25	
5	1150	8740	8.8	10.7	.82	.37	
Avg	1160	8330	8.1	10.8	0.74	0.27	
Plant 25, grade 3 ("Dark to light," percentage of kiln unknown, SC, S)							
Avg (5)	1435	13270	4.7	6.8	0.68	Not tested	
Plant 59, grade 1 ("All hard common," 90 percent of kiln, SC, C)							
1	1820	20800+	2.4	4.9	0.49	0.08	
2	1910	13650	6.6	8.9	.74	.15	
3	1325	9540	9.7	11.9	.82	.15	
4	1710	12950	6.5	8.8	.74	.15	
5	1430	10950	9.2	10.9	.84	1.22	
6	1380	11050	6.9	9.0	.77	0.26	
Avg	1595	13160+	6.9	9.1	0.73	0.34	

TABLE 22.—*Properties of brick produced in Tennessee*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
Plant 59, grade 2 ("Kiln run average," 100 percent of kiln, SC, C)							
	lb/in.²	*lb/in.²*	%	%		%	
1	1730	11950	6.8	9.3	0.73	0.25	
2	1340	12050	6.7	9.2	.73	.25	
3	1865	13050	7.1	9.3	.76	.21	
4	2730	18350	4.1	6.9	.59	.08	
5	1120	9500	11.6	13.6	.85	.33	
6	635	4550	16.2	18.3	.89	1.30	
Avg	1570	11580	8.8	11.1	0.76	0.40	
Plant 127, grade 1 ("Vitrified," 15 percent of kiln, SC, S)							
1	2880	19150	0.8	4.9	0.16	0.32 (B)	
2	2680	18400	1.1	5.3	.21	.15 (B)	
3	2940	17950	1.1	4.9	.22	.75 (B)	
4	3110	20370	0.7	5.0	.14	.14 (B)	
5	3020	22400	1.1	4.3	.26	.07 (B)	
Avg	2925	19650	1.0	4.9	0.20	0.29 (B)	
Plant 127, grade 2 ("Hard," 45 percent of kiln, SC, S)							
Avg (5)	2425	17330	4.8	7.8	0.61	Not tested	
Plant 127, grade 3 ("Medium," 40 percent of kiln, SC, S)							
Avg (5)	1525	10980	6.8	10.1	0.66	Not tested	
Plant 144, grade 1 ("Common Hard," 92 percent of kiln, DP, C)							
1	1175	10550	9.6	12.1	0.79	0.10 (B)	
2	1025	8270	16.5	18.6	.89	F 38c (B)	
3	1100	7760	12.6	15.0	.84	F 22c (B)	
4	1400	11700	11.5	13.8	.83	0.09 (B)	
5	915	6030	14.1	15.7	.90	.00 (B)	
Avg	1125	8860	12.9	15.0	0.85		
Plant 144, grade 2 ("Select," 25 percent of kiln, DP, C)							
1	1290	11050	12.3	14.9	0.83	0.00 (B)	
2	1155	11550	12.4	14.8	.84	.09 (B)	
3	1070	11150	12.3	14.6	.84	.09 (B)	
4	1710	15600	8.4	10.8	.78	.00 (B)	
5	1700	14800	9.1	12.0	.76	.29 (B)	
Avg	1385	12830	10.9	13.4	0.81	0.09 (B)	
Plant 144, grade 3 ("Salmon," 8 percent of kiln, DP, C)							
1	395	4950	19.0	21.4	0.89	F 24c	
2	315	3780	19.4	21.7	.89	F 24c	
3	295	2720	19.9	21.9	.91	F 10c	
4	285	2530	19.7	21.9	.90	F 10c	
5	365	4030	19.5	22.0	.89	F 12c	
Avg	330	3600	19.5	21.8	0.90	F 16c	

TABLE 23.—*Properties of bricks produced in Kentucky*

[All samples received represented bricks made from surface clay and formed by the dry-press, soft-mud or the stiff-mud, side-cut process]

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
Plant 40, grade 1 ("Arch," 30 percent of kiln, SM, C)							
	lb/in.²	*lb/in.²*	%	%		%	
Avg (5)	660	7500	12.8	17.7	0.72	Not tested	
Plant 40, grade 2 ("Commercial hard," 40 percent of kiln, SM, C)							
Avg (5)	1065	9290	12.2	17.6	0.69	Not tested	
Plant 40, grade 3 ("Pale hard," 20 percent of kiln, SM, C)							
1	610	8410	12.7	17.4	0.73	0.19 (B)	
2	525	9600	11.9	16.8	.71	.22 (B)	
2	970	10250	12.0	17.5	.69	.33 (B)	
4	1095	8890	12.2	17.3	.71	.51 (B)	
5	970	9580	11.6	16.6	.70	.33 (B)	
Avg	835	9350	12.1	17.1	0.71	0.32 (B)	
Plant 40, grade 4 ("Soft," 10 percent of kiln, SM, C)							
1	205	3050	16.2	21.7	0.75	0.71	
2	235	2870	17.0	21.8	.78	.76	
3	425	2940	15.9	21.4	.74	.66	
4	405	3330	16.0	21.2	.75	.57	
5	350	3020	15.8	21.5	.73	1.52	
Avg	325	3040	16.2	21.5	0.75	0.84	
Plant 89, grade 1 ("Hard," percentage of kiln unknown, SC, C)							
1	2420	8300	7.2	10.2	0.71	0.25 (B)	
2	2030	9410	6.0	9.3	.65	.24 (B)	
3	1990	7540	6.5	9.6	.68	.23 (B)	
4	1550	6890	6.0	8.7	.69	.80 (B)	
5	2880	10950	3.1	5.8	.53	.80 (B)	
6	1650	8690	6.8	9.6	.71	.24 (B)	
7	3060	12550	3.4	6.0	.57	.15 (B)	
8	2250	9640	6.7	9.6	.70	.33 (B)	
9	1900	9400	7.6	10.6	.72	1.29 (B)	
10	2170	9140	5.9	9.0	.66	0.00 (B)	
Avg	2190	9250	5.9	8.8	0.66	0.43 (B)	
Plant 89, grade 2 ("Medium hard," percentage of kiln unknown, SC, C)							
Avg (5)	1595	8400	8.6	11.3	0.76	Not tested	
Plant 89, grade 3 ("Soft," percentage of kiln unknown, SC, C)							
1	1065	4280	14.4	17.0	0.85	0.21	% 0.21 (54c)
2	775	3910	15.6	18.3	.85	F 51c	
3	875	4130	15.4	18.3	.84	2.10	2.10 (54c)
4	730	4570	14.9	17.4	.85	0.41	0.92 (54c)
5	840	4290	14.9	16.4	.91	F 48c	
6	840	4910	13.7	16.4	.84	0.18	0.27 (54c)
7	700	4020	15.8	18.5	.85	4.35	4.35 (54c)
8	865	4070	15.2	18.1	.84	0.47	0.47 (54c)
9	995	4590	15.3	17.4	.88	0.42	.63 (54c)
10	700	2870	16.8	19.1	.83	7.18	7.51 (54c)
Avg	840	4160	15.2	17.7	0.85		

TABLE 23.—*Properties of bricks produced in Kentucky*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption: 48-hr cold immersion	Water absorption: 5-hr boiling	Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
Plant 90, grade 1 ("No. 1 Hard," 25 percent of kiln, SM, C)							
	lb/in.²	*lb/in.²*	%	%		%	
1	1320	9540	9.7	14.8	0.66	0.09 (B)	
2	1280	7150	10.8	15.4	.70	.66 (B)	
3	1430	7520	11.8	16.6	.71	.11 (B)	
4	1870	9390	9.2	14.5	.63	.19 (B)	
5	1295	8150	10.4	15.0	.69	.17 (B)	
6	1500	9590	10.4	15.4	.68	.30 (B)	
7	1885	7830	9.6	14.7	.65	.09 (B)	
Avg	1510	8450	10.3	15.2	0.69	0.23 (B)	
Plant 90, grade 2 ("No. 2 Hard," 50 percent of kiln, SM, C)							
Avg (7)	1605	8650	11.2	15.9	0.71	Not tested	
Plant 90, grade 3 ("Medium," 25 percent of kiln, SM, C)							
Avg (7)	1665	7560	12.6	16.8	0.75	Not tested	
Plant 184, grade 1 ("Common hard," 90 percent of kiln, DP, C)							
1	790	5020	12.5	14.3	0.87	0.00 (B)	
2	865	5350	11.8	13.9	.85	.11 (B)	
3	990	5450	14.2	16.2	.88	.00 (B)	
4	655	4320	11.7	13.2	.89	.10 (B)	
5	810	4060	9.3	11.9	.78	.00 (B)	
Avg	820	4840	11.9	13.9	0.85	0.04 (B)	
Plant 184, grade 2 ("Medium," 10 percent of kiln, DP, C)							
1	555	3560	16.5	18.6	0.89	0.21 (B)	
2	400	3550	18.5	20.0	.93	.70 (B)	
3	270	2730	17.8	19.9	.89	.20 (B)	
4	470	4900	16.8	19.2	.88	.11 (B)	
5	660	4800	13.0	15.0	.87	.21 (B)	
Avg	470	3910	16.5	18.5	0.89	0.29 (B)	
Plant 200, grade 1 ("Kiln run hard," 90 percent of kiln, SM, C)							
Avg (5)	1320	8940	11.5	17.9	0.63	Not tested	
Plant 200, grade 2 ("Face Reds," percentage of kiln unknown, SM, C)							
Avg (5)	1400	8230	13.0	18.6	0.70	Not tested	
Plant 200, grade 3 ("Face, mingled shades," percentage of kiln unknown, SM, C)							
Avg (5)	1390	10540	11.4	17.1	0.67	Not tested	
Plant 200, grade 4 ("Salmon," 10 percent of kiln, SM, C)							
1	310	2380	18.1	24.9	0.73	0.73 (B)	
2	365	2490	18.5	25.4	.76	.64 (B)	
3	690	4870	16.4	22.2	.74	.38 (B)	
4	570	3300	17.6	24.2	.73	.73 (B)	
5	840	4950	16.7	22.0	.76	.32 (B)	
Avg	555	3600	17.5	23.7	0.73	0.56 (B)	

TABLE 24.—*Properties of bricks produced in North Carolina*

[The samples submitted represented brieks made from surface clay or shale and formed by the stiff-mud, side-cut and end-cut processes. The report by Greaves-Walker and Fontaine [10] provides a much more complete survey of the properties of North Carolina bricks]

Specimen number	Modulus of rupture	Compressive strength	Water absorption: 48-hr cold immersion	Water absorption: 5-hr boiling	Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
Plant 91, grade 1 ("Common," 75 percent of kiln, EC, C)							
	lb/in.²	*lb/in.²*	%	%		%	
Avg (6)	1060	3580	7.4	12.2	0.61	Not tested	
Plant 112, grade 1 ("Common," 90 percent of kiln, EC, S)							
Avg (6)	1330	6450	10.1	13.6	0.74	Not tested	
Plant 119, grade 1 ("Hard," 40 percent of kiln, SC, S)							
1	3100	9390	4.1	5.5	0.74	0.00 (B)	
2	3200	11400	9.6	11.5	.83	.00 (B)	
3	2660	7910	12.0	13.5	.89	.10 (B)	
4	2000	10370	10.3	12.1	.85	.38 (B)	
5	2410	7730	15.3	17.1	.89	F 45c (B)	
Avg	2675	9360	10.3	11.9	0.84		
Plant 119, grade 2 ("Light hard," 55 percent of kiln, SC, S)							
1	1915	6330	16.1	18.1	0.89	0.10 (B)	
2	2090	7150	17.9	19.9	.90	.00 (B)	
3	1730	6700	17.5	19.8	.88	F 34c (B)	
4	1470	6720	17.7	19.2	.92	0.20 (B)	
5	1935	7090	16.6	18.2	.91	.00 (B)	
Avg	1830	6800	17.2	19.0	0.90		
Plant 119, grade 3 ("Salmon," 5 percent of kiln, SC, S)							
1	205	5060	20.1	21.6	0.93	F 44c	
2	260	5100	20.7	23.2	.89	0.25	
3	1245	4970	20.7	22.7	.91	F 40c	
4	765	3000	24.4	26.1	.93	F 45c	
5	1115	3310	22.2	23.7	.94	F 25c	
6	1150	4600	21.9	23.6	.93	0.24	
Avg	1070	4360	21.7	23.5	0.92		
Plant 166, grade 1 ("100 percent, kiln run," EC, C)							
1	1280	3470	10.6	15.7	0.68	0.40	
2	960	3860	12.0	16.5	.73	.25	
3	1675	3490	12.4	16.7	.74	.26	
4	1425	4090	12.2	17.2	.71	.11	
5	1255	3810	12.7	16.6	.76	.19	
6	1680	4350	12.3	16.2	.76	.10	
7	1545	3980	11.7	16.8	.70	.10	
8	1545	4070	11.9	16.4	.73	.00	
9	1800	3610	12.0	16.5	.73	.10	
10	1265	3570	11.9	15.9	.75	.20	
11	1470	3810	12.7	18.5	.69	.11	
12	1410	3910	12.8	18.2	.70	.20	
13	1540	3570	14.3	18.8	.76	.20	
14	905	3390	15.0	19.2	.78	.10	
15	930	2700	16.7	20.7	.81	.40	
Avg	1380	3710	12.8	17.3	0.74	0.18	

TABLE 25.—*Properties of bricks produced in Virginia and the District of Columbia*

[The samples from Virginia and the District of Columbia represent bricks made from surface clay or shale and formed by the soft-mud, dry-press or the stiff-mud, side-cut process. The report by Whittemore and Dear [11] gives a quite complete survey of the properties of Virginia brick, including freezing and thawing results at 10 cycles]

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
Plant 71, grade 1 ("All hard red common," 100 percent of kiln, SC, C)							
	*lb/in.*²	*lb/in.*²	%	%		%	
1	1750	6920	8.3	10.8	0.77	0.25 (B)	
2	1570	5610	9.3	11.7	.80	.08 (B)	
3	1570	4660	11.2	13.3	.84	.16 (B)	
4	1190	4660	12.1	14.2	.85	.25 (B)	
5	1920	5290	10.1	12.1	.83	.08 (B)	
Avg	1600	5430	10.2	12.4	0.82	0.16 (B)	
Plant 72, grade 1 ("Common," 98 percent of kiln, SC, C)							
1	1720	12550	6.2	8.9	0.70	0.18 (B)	
2	1900	16000	6.0	9.2	.65	.08 (B)	
3	1525	10750	7.8	10.4	.75	.09 (B)	
4	850	6630	10.1	13.4	.75	.19 (B)	
5	680	4100	18.2	20.2	.90	F 12c (B)	
Avg	1335	8810	9.7	12.4	0.75		
Plant 72, grade 2 ("Sand finish face," 98 percent of kiln, SC, S)							
Avg (5)	1705	14840	6.4	9.1	0.69	Not tested	
Plant 72, grade 3 ("Wire cut face," 98 percent of kiln, SC, C)							
Avg (5)	1620	11240	7.8	10.8	0.71	Not tested	
Plant 93, grade 1 ("Clinkers," 5 percent of kiln, SC, S)							
1	3240	17400	0.7	1.9	0.37	0.15	
2	1840	17350	.8	1.6	.50	.16	
3	2570	11200	2.1	4.5	.47	.21	
4	2760	13000	1.9	3.9	.49	.31	
5	2700	19800	2.0	4.5	.44	.24	
6	3370	16000	1.5	3.1	.48	.08	
Avg	2745	15790	1.5	3.2	0.46	0.23	
Plant 93, grade 2 ("Hard," 60 percent of kiln, SC, S)							
1	2770	16000	1.9	3.8	0.50	0.76	
2	2780	15500	2.7	4.3	.63	.23	
3	3050	17200	2.6	4.5	.58	.07	
4	2870	12200	3.3	5.5	.60	.07	
5	2510	13000	4.1	6.1	.67	Not tested	
6	2420	12150	4.4	6.3	.70	0.00	
Avg	2735	14340	3.2	5.1	0.61	0.23	
Plant 93, grade 3 ("Medium," 30 percent of kiln, SC, S)							
Avg (6)	2190	11300	5.4	7.2	0.75	Not tested	
Plant 93, grade 4 ("Salmon," 5 percent of kiln, SC, S)							
							%
1	1340	6810	12.1	14.1	0.86	F 49c	
2	1370	5800	12.2	14.1	.87	0.38	0.46 (54c)
3	1415	5850	12.4	14.1	.88	.75	1.05 (54c)
4	1510	7290	12.3	14.2	.87	.63	4.27 (54c)
5	1710	6540	10.8	12.8	.84	.56	0.63 (54c)
6	1265	7100	11.6	13.3	.87	.96	7.24 (54c)
Avg	1435	6560	11.9	13.8	0.86		2.73 (54c)

TABLE 25.—*Properties of bricks produced in Virginia and the District of Columbia*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
Plant 113, grade 1 ("Clinker," 5 percent of kiln, SC, C)							
	*lb/in.*²	*lb/in.*²	%	%		%	
Avg (5)	1640	9050	5.6	8.9	0.62	Not tested	
Plant 113, grade 2 ("Hard," 80 percent of kiln, SC, C)							
Avg (5)	1105	7610	11.1	14.1	0.79	Not tested	
Plant 113, grade 3 ("Salmon," 15 percent of kiln, SC, C)							
1	780	5150	14.6	17.7	0.82	0.31	
2	655	3860	15.4	17.8	.87	.58	
3	650	3980	15.0	17.9	.84	.38	
4	875	5990	14.4	16.8	.86	.29	
5	405	3720	15.2	17.1	.89	F 6c	
Avg	675	4540	14.9	17.5	0.86		
Plant 123, grade 1 ("Arch," 10 percent of kiln, SC, C)							
1	830	7240	4.2	6.6	0.64	0.48 (B)	
2	930	7290	6.1	8.4	.73	.62 (B)	
3	1405	7250	4.9	7.3	.67	.49 (B)	
4	1060	7270	5.0	7.1	.70	.14 (B)	
5	1515	7070	6.1	9.2	.66	.41 (B)	
Avg	1150	7220	5.3	7.7	0.68	0.43 (B)	
Plant 123, grade 2 ("Hard," 70 percent of kiln, SC, C)							
Avg (5)	1045	7220	9.8	12.1	0.80	Not tested	
Plant 123, grade 3 ("Salmon," 20 percent of kiln, SC, C)							
1	405	2170	21.2	22.9	0.93	F 2c	
2	215	1470	21.5	22.8	.94	F 2c	
3	865	3850	15.0	17.0	.88	F 29c	
4	700	4830	14.2	16.5	.86	8.90	
5	415	2040	20.7	22.7	.91	F 2c	
Avg	520	2870	18.5	20.4	0.90		
Plant 123, grade 4 ("Hand made—small," percentage of kiln unknown, SM, C)							
1	1005	3780	10.7	15.0	0.71	0.43 (B)	
2	805	2950	11.8	16.2	.73	1.19 (B)	
3	585	3340	9.9	14.6	.68	0.67 (B)	
4	640	3070	11.1	15.4	.72	.74 (B)	
5	485	3430	10.8	15.9	.68	.64 (B)	
Avg	705	3310	10.9	15.4	0.70	0.73 (B)	
Plant 123, grade 5 ("Hand made—large," percentage of kiln unknown, SM, C)							
1	700	2800	15.1	19.5	0.77	1.35 (B)	
2	500	2950	14.8	18.7	.79	0.46 (B)	
3	500	2510	15.7	20.0	.79	.76 (B)	
4	610	2500	15.8	20.1	.79	.87 (B)	
5	745	2720	14.9	19.9	.75	.50 (B)	
Avg	610	2700	15.3	19.6	0.78	0.79 (B)	

TABLE 25.—*Properties of bricks produced in Virginia and the District of Columbia*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption: 48-hr cold immersion	Water absorption: 5-hr boiling	Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
	lb/in.²	*lb/in.²*	%	%		%	
Plant 135, grade 1 ("Arch," 20 percent of kiln, SM, C)							
1	1010	8890	6.3	9.8	0.64	0.08 (B)	
2	1175	9600	6.2	10.0	.62	.08 (B)	
3	1175	12280	5.7	9.0	.63	.09 (B)	
4	1270	10450	5.8	9.4	.62	.12 (B)	
5	1560	9550	6.1	9.1	.67	.00 (B)	
Avg	1240	10150	6.0	9.5	0.64	0.07 (B)	
Plant 135, grade 2 ("Red," 70 percent of kiln, SM, C)							
Avg (5)	1335	10160	7.8	10.8	0.73	Not tested	
Plant 135, grade 3 ("Salmon," 10 percent of kiln, SM, C)							
1	1115	6940	11.1	14.0	0.79	0.00	
2	1025	6940	11.1	13.6	.82	.10	
3	775	6570	11.7	14.2	.82	.10	
4	935	6520	12.2	15.0	.81	.28	
5	935	6430	12.3	14.7	.84	.29	
Avg	955	6680	11.7	14.3	0.82	0.15	
Plant 158, grade 1 ("Hard," 95 percent of kiln, SC, C)							
1	805	9400	6.7	9.4	0.71	0.22	
2	930	6720	5.0	7.7	.65	.27	
3	925	5200	9.0	11.2	.80	.32	
4	1030	6450	5.5	8.6	.64	.30	
5	1160	6120	9.6	12.0	.80	.48	
Avg	970	6780	7.2	9.8	0.72	0.32	
Plant 158, grade 2 ("Salmon," 5 percent of kiln, SC, C)							
1	520	2580	16.3	17.7	0.92	F 18c	
2	495	2230	16.3	18.2	.90	F 12c	
3	465	2620	16.1	18.3	.88	1.94	
4	395	3230	16.3	18.2	.89	0.87	
5	435	2920	16.6	17.6	.94	.88	
Avg	460	2720	16.3	18.0	0.91		
Plant 159, grade 1 ("Sand finished face," 90 percent of kiln, SM, C)							
1	480	2460	12.1	17.8	0.68	0.19	
2	390	3160	12.8	18.0	.71	.51	
3	235	3100	12.1	18.1	.67	.32	
4	475	2240	11.2	18.0	.62	.39	
5	515	1655	13.1	18.5	.71	.45	
6	410	1665	13.7	19.1	.72	.78	
7	700	2690	11.4	17.2	.66	.25	
8	565	2750	12.9	18.3	.71	.39	
9	745	2760	11.6	17.3	.67	.09	
10	620	2500	12.0	17.5	.69	.37	
11	750	2600	11.5	17.5	.66	.18	
12	435	2770	13.7	19.0	.72	.39	
13	220	1180	14.5	19.6	.74	.60	
14	285	2540	13.4	19.3	.69	.40	
15	180	1105	14.9	20.1	.74	1.50	
Avg	465	2340	12.7	18.4	0.69	0.47	

TABLE 25.—*Properties of bricks produced in Virginia and the District of Columbia*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption: 48-hr cold immersion	Water absorption: 5-hr boiling	Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
	lb/in.²	*lb/in.²*	%	%		%	
Plant 159, grade 2 ("Kiln run common," 95 percent of kiln, SC, C)							
1	1410	9100	3.5	6.7	0.52	0.14	
2	1525	14950	1.6	3.2	.50	.11	
3	1975	13600	1.8	3.2	.56	.07	
4	1815	10000	3.1	6.3	.49	.07	
5	1420	9390	4.8	7.6	.63	.14	
6	1560	7120	4.9	7.5	.65	.23	
7	1745	8540	5.5	8.5	.65	.14	
8	1315	9790	7.3	10.4	.70	.14	
9	1335	8610	6.9	10.0	.69	.21	
10	1215	8160	6.8	10.4	.65	.22	
11	1130	11200	6.7	10.0	.67	.32	
12	1500	7260	6.1	9.3	.66	.06	
13	930	8960	9.8	12.5	.78	.28	
14	1220	7530	9.4	12.3	.76	.13	
15	520	4450	12.8	15.2	.84	1.22	
Avg	1375	9240	6.1	8.9	0.65	0.23	
Plant 159, grade 2A ("Second sample (1936) of grade 2")							
			(24-hr)				
1	445	3050	11.7	15.1	0.78	0.99	
2	595	7900	8.2	11.0	.75	.36	
3	460	3960	9.8	12.9	.76	.48	
4	280	4450	9.4	12.5	.75	.88	
5	415	3650	10.2	13.5	.76	1.30	
6	355	3360	10.7	13.7	.78	2.63	
7	560	3450	9.7	12.9	.75	0.76	
8	485	3420	9.9	13.0	.76	.58	
9	315	2650	12.2	15.3	.80	1.51	
10	525	3280	10.8	13.7	.78	0.97	
11	510	4200	10.2	13.0	.78	.90	
12	665	5370	7.4	10.7	.68	.32	
13	465	4310	10.2	12.9	.79	.46	
14	410	4100	10.3	13.1	.78	.59	
15	380	4240	10.3	13.2	.78	1.09	
16	515	4550	10.3	13.2	.78	0.66	
17	510	4440	8.5	12.1	.70	.97	
18	520	5270	7.8	11.8	66	.32	
19	365	3220	10.8	13.9	.78	1.16	
20	430	3630	10.2	13.1	.78	0.53	
Avg	460	4120	9.9	13.0	0.76	0.87	
Plant 159, grade 3 ("Salmon," 5 percent of kiln, SC, C)							
1	505	4070	12.6	14.4	0.87	2.08	
2	480	3240	13.0	15.4	.84	0.95	
3	535	3840	13.3	15.8	.84	1.17	
4	685	4340	13.3	15.8	.84	0.94	
5	760	4550	13.8	15.6	.88	F 15c	
Avg	595	4010	13.2	15.4	0.85		
Plant 162, grade 1 ("Arch," 20 percent of kiln, SDP, C)							
1	1600	10000	3.3	5.7	0.58	0.19	
2	720	5170	7.8	9.7	.80	.39	
3	780	6000	7.1	9.3	.76	.32	
4	725	5020	8.8	10.8	.82	.40	
5	700	5140	9.0	11.0	.82	.33	
Avg	905	6270	7.2	9.3	0.76	0.33	
Plant 162, grade 2 ("Body," 60 percent of kiln, SDP, C)							
1	995	5720	10.2	12.4	0.82	0.18	
2	715	4980	10.2	12.1	.84	.56	
3	725	5360	10.0	11.9	.84	.70	
4	320	4500	11.1	13.3	.83	.62	
5	650	4040	10.7	12.9	.83	.80	
Avg	680	4920	10.4	12.5	0.83	0.57	

TABLE 25.—*Properties of bricks produced in Virginia and the District of Columbia*—Continued

Specimen number	Modulus of rupture	Compressive strength	Water absorption		Saturation coefficient	Weight loss at 51 cycles or number of cycles at failure	Results beyond 51 cycles
			48-hr cold immersion	5-hr boiling			
Plant 162, grade 3 ("Salmon," 20 percent of kiln, SDP, C)							
	lb/in.²	*lb/in.²*	%	%		%	
1	295	3400	16.1	17.6	0.92	F 10c	
2	405	3410	15.9	17.8	.89	F 48c	
3	395	3980	14.1	15.7	.90	1.08	
4	365	3250	17.0	17.9	.95	F 3c	
5	185	2850	16.4	17.8	.92	F 3c	
Avg	330	3380	15.9	17.4	0.92		
Plant 192, grade 1 ("Rough," 20 percent of kiln, SC, C)							
Avg (5)	1730	11470	5.0	8.9	0.56	Not tested	
Plant 192, grade 2 ("Common red," 50 percent of kiln, SC, C)							
Avg (5)	1340	9450	9.8	12.8	0.76	Not tested	
Plant 192, grade 3 ("Textured face," 30 percent of kiln, SC, C)							
Avg (5)	1000	9050	8.4	12.1	0.68	Not tested	
Plant 228, grade 1 ("Common," (1936) percentage of kiln unknown, DP, C)							
			(24-hr)				
1	465	4450	10.9	13.7	0.80	0.52	
2	445	3790	10.9	13.8	.78	.27	
3	275	3050	13.5	16.8	.80	.63	
4	470	4870	11.2	14.5	.78	.34	
5	380	3550	12.8	15.4	.83	.81	
6	425	3550	11.0	13.9	.80	.51	
7	450	4520	10.8	13.7	.79	.45	
8	365	3260	12.9	15.6	.83	1.24	
9	355	3150	12.6	16.2	.78	0.57	
10	275	4330	12.3	15.3	.81	.51	
11	390	4550	12.3	14.6	.84	.58	
12	475	4360	10.5	13.5	.78	.26	
13	410	3400	11.7	14.4	.81	.36	
14	460	3480	11.5	14.5	.79	.38	
15	380	4620	11.2	13.9	.80	.36	
16	480	4280	12.2	15.1	.80	.38	
17	380	3360	13.7	16.4	.84	.88	
18	315	4000	12.2	14.3	.86	.47	
19	520	5200	10.7	13.6	.79	.21	
20	415	4860	10.9	13.9	.78	.37	
Avg	410	4030	11.8	14.6	0.81	0.50	
Plant 228, grade 2 ("Salmon," (1936) percentage of kiln unknown, DP, C)							
			(24-hr)				%
1	300	2940	14.5	17.2	0.84	0.89	1.28 (75c)
2	310	2940	14.4	17.3	.84	.64	0.92 (75c)
3	280	2890	14.5	17.2	.84	.54	.63 (75c)
4	180	4000	12.6	14.9	.84	.56	.75 (75c)
5	285	2980	15.0	17.7	.85	.81	.99 (75c)
6	180	1620	16.8	20.2	.84	1.55	1.99 (75c)
7	305	3280	13.8	16.2	.85	0.70	0.87 (75c)
8	400	3240	14.1	16.6	.85	.45	.54 (75c)
9	280	2500	15.7	18.4	.86	1.54	1.91 (75c)
10	275	2650	15.4	18.0	.86	0.76	1.04 (75c)
11	270	2880	15.2	17.8	.86	1.12	1.36 (75c)
12	225	2180	16.7	19.5	.86	2.93	3.50 (75c)
13	225	3060	15.1	17.6	.86	0.87	1.01 (75c)
14	415	3550	14.1	16.4	.86	.47	0.61 (75c)
15	415	3530	14.3	16.5	.86	.63	.72 (75c)
16	320	3460	14.4	16.7	.86	.69	.82 (75c)
17	275	2900	15.5	17.9	.86	.79	.89 (75c)
18	200	2460	16.7	19.3	.86	1.37	1.74 (75c)
19	240	2920	15.9	18.1	.88	1.43	1.86 (75c)
20	475	3720	13.7	15.8	.87	0.64	0.68 (75c)
Avg	295	2980	14.9	17.5	0.86	0.97	1.21 (75c)

C. E. Lovewell, W. W. Harrison, Gifford Earnest, D. A. Parsons, E. E. W. Bowen, G. P. Ransom, C. B. Affleck, A. R. Eberle, R. H. Brink, I. Bachman, H. Dollar, and E. C. Patrick assisted in the laboratory work and in making calculations at various times. Special acknowledgment is made to the staff of the Common Brick Manufacturers Association of America and to the staff of its successor, The Structural Clay Products Institute, for their aid in collecting samples and securing information from the industry.

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