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CEMENT

Publications by Members of the Staff of the National Bureau of Standards, together with a list of Federal Specifications.

	<u>CONTENTS</u>	Page
Part I	- Technologic Papers (T).....	2
Part II	- Research Papers (RP).....	3
Part III	- Circulars (C).....	7
Part IV	- Letter Circulars (LC).....	7
Part V	- Federal Specifications (FS).....	7
Part VI	- Outside Publications.....	8

GENERAL INFORMATION

Some of the publications in this list have appeared in the regular series of publications of the Bureau and others in various scientific and technical journals. Unless specifically stated, papers are not obtainable from the National Bureau of Standards.

Where the price is stated, the publication can be purchased from the Superintendent of Documents, Government Printing Office, Washington, D. C. The prices quoted are for delivery to addresses in the United States and its territories and possessions and in certain countries which extend the franking privilege. In the case of all other countries, one-third the cost of the publication should be added to cover postage. Remittances should be made either by coupons (obtainable from the Superintendent of Documents in sets of 20 for \$1.00 and good until used), or by check or money order payable to the "Superintendent of Documents, Government Printing Office," and sent to him with order. Letter Circulars are obtainable, without charge, from the Bureau. Publications marked "OP" are out of print, but, in general, may be consulted at technical libraries.

For papers in other scientific or technical journals, the name of the journal or of the organization publishing the article is given in abbreviated form with the volume number (underscored), page, and year of publication, in the order named.

Serial letters are used to designate the several series of Bureau publications:

T = "Technologic Paper." T1 to T370. This series was superseded by the "Bureau of Standards Journal of Research" in 1928.

RP = "Research Paper." These are reprints of articles appearing in the "Bureau of Standards Journal of Research" and the "Journal of Research of the National Bureau of Standards," the latter being the title of this periodical since July 1934 (volume 13, number 1).

C = "Circular."

LC = "Letter Circular."

Circular C24 and supplements, the complete list of the Bureau's publications (1901-1936), is sold by the Superintendent of Documents for 55 cents. Announcement of new publications is made each month in the Technical News Bulletin which is obtainable by subscription at 50 cents per year.

PART I. - TECHNOLOGIC PAPERS

	<u>Series</u>	<u>Price</u>
Tests of the absorptive and permeable properties of portland cement mortars and concretes, together with tests of dampproofing and waterproofing compounds and materials. R. J. Wig and P.H. Bates. Tech. Pap. BS <u>1</u> , (1910-12).	T3	OP
The effect of high-pressure steam on the crushing strength of portland cement and concrete. R. J. Wig. Tech. Pap. BS <u>1</u> , (1910-12).	T5	OP
Action of the salts in alkali water and sea water on cement. P. H. Bates, A. J. Phillips and R. J. Wig. Tech. Pap. BS <u>2</u> , (1912-14).	T12	OP
Variation in results of sieving with standard cement sieves. R. J. Wig and J. C. Pearson. Tech. Pap. BS <u>3</u> , (1911-13).	T29	OP
Standardization of No. 200 cement sieves. R. J. Wig and J. C. Pearson. Tech. Pap. BS <u>4</u> , (1913-14).	T42	OP
Hydration of portland cement. A. A. Klein and A. J. Phillips. Tech. Pap. BS <u>5</u> , (1914-15).	T43	OP

PART I. - TECHNOLOGIC PAPERS (Cont'd)

	<u>Series</u>	<u>Price</u>
Value of the high pressure steam tests of portland cement. R. J. Wig and H. A. Davis. Tech. Pap. BS <u>5</u> , (1914-15).	T47	OP
An air analyzer for determining the fineness of cement. J. C. Pearson and W. H. Sligh. Tech. Pap. BS <u>5</u> , (1914-15).	T48	OP
Properties of the calcium silicates and calcium aluminate occurring in normal portland cement. P. H. Bates and A. A. Klein. Tech. Pap. BS <u>8</u> , (1916-17).	T78	OP
The properties of portland cement having a high magnesia content. P. H. Bates. Tech. Pap. BS <u>9</u> , (1916-17).	T102	OP
Effect of Cal as an accelerator of the hardening of portland cement mixtures. R. N. Young. Tech. Pap. BS <u>14</u> , (1920-21).	T174	OP
Cementing qualities of the calcium aluminates. P. H. Bates. Tech. Pap. BS <u>15</u> , (1921).	T197	OP
Tests of caustic magnesia made from magnesite from several sources. P. H. Bates, R. N. Young and P. Rapp. Tech. Pap. BS 17, 529 (1922-24).	T239	OP

PART II. - RESEARCH PAPERS

	<u>Series</u>	<u>Price</u>
Reaction of water on calcium aluminates. L. S. Wells. BS J. Research <u>1</u> , 951(1928)	RP34	OP
The sulphoaluminates of calcium. W. Lerch, F. W. Ashton and R. H. Bogue. BS J. Research <u>2</u> , 715(1929).	RP54	10¢
Influence of magnesia, ferric oxide, and soda upon the temperature of liquid formation in certain portland cement mixtures. W. C. Hansen. BS J. Research <u>4</u> , 55(1930).	RP132	OP
The X-ray method applied to a study of the constitution of portland cement. L. T. Brownmiller and R. H. Bogue. BS J. Research <u>5</u> , 813(1930).	RP233	10¢
Determination of magnesium in portland cement and similar materials by the use of 8-hydroxyquinoline. J. C. Redmond and H. A. Bright. BS J. Research <u>6</u> , 113(1931).	RP265	5¢

PART II. - RESEARCH PAPERS (Cont'd) Series Price

The decomposition of tricalcium silicate in the temperature range, 1,000-1,300°C. E. T. Carlson. BS J. Research <u>7</u> , 893(1931).	RP381	5¢
The system $\text{CaO-Na}_2\text{O-Al}_2\text{O}_3$. L. T. Brownmiller and R. H. Boeue. BS J. Research <u>8</u> , 289(1932)	RP414	5¢
The system: $\text{CaO-B}_2\text{O}_3$. E. T. Carlson. BS J. Research <u>9</u> , 825(1932).	RP510	5¢
The precipitation and titration of magnesium oxyquinolate in the presence of calcium oxalate, and its application in the analysis of portland cement and similar silicates. J. C. Redmond. BS J. Research <u>10</u> , 823(1933).	RP569	5¢
The activity coefficients of hydroxyl ion in solutions of calcium hydroxide at 30°C. E. P. Flint and L. S. Wells. BS J. Research <u>11</u> , 163(1933).	RP584	5¢
Heat of hydration of portland cement pastes. W. Lerch and R. H. Bogue. J. Research NBS <u>12</u> , 645(1934).	RP684	OP
Study of the system $\text{CaO-SiO}_2\text{-H}_2\text{O}$ at 30°C and the reaction of water on the anhydrous calcium silicates. E. P. Flint and L. S. Wells. J. Research NBS <u>12</u> , 751(1934).	RP687	5¢
Investigation of commercial masonry cements. J. S. Rogers and R. L. Blaine. J. Research NBS <u>13</u> , 811(1934).	RP746	OP
Effect of granulometric composition of cement on the properties of pastes, mortars, and concretes. J. Arthur Swenson, Lacey A. Wagner, and George L. Pigman. J. Research NBS <u>14</u> , 419(1935).	RP777	OP
Effect of calcium chloride on portland cements and concretes. Paul Rapp. J. Research NBS <u>14</u> , 499(1935).	RP782	OP
Behavior of high-early-strength cement concretes and mortars under various temperature and humidity conditions. Louis Schuman and Edward A. Pisapia. J. Research NBS <u>14</u> , 723(1935).	RP799	OP
A study for the preparation of a specification for high-early-strength portland cement. G. Rupert Gause. J. Research NBS <u>15</u> , 421(1935).	RP839	OP

PART II. - RESEARCH PAPERS (Cont'd)

	<u>Series</u>	<u>Price</u>
Studies of the quaternary system $\text{CaO-MgO-2CaO-SiO}_2\text{-5CaO.3Al}_2\text{O}_3$. H. F. McMurdie and Herbert Insley. J. Research NBS <u>16</u> , 467(1936).	RP884	5¢
Effects of partial prehydration and different curing temperatures on some of the properties of cement and concrete. F. B. Hornibrook, G. L. Kalousek, and C. H. Jumper. J. Research NBS <u>16</u> , 487(1936).	RP887	5¢
A rapid method for the determination of silica in portland cement. Edwin E. Maczkowske. J. Research NBS <u>16</u> , 549(1936).	RP891	5¢
Determination of sulphuric anhydride in portland cement by means of the Wagner turbidimeter. Robert B. Rudy. J. Research NBS <u>16</u> , 555(1936).	RP893	5¢
Distribution of compounds in portland cement. J. Arthur Swenson and F. P. Flint. J. Research NBS <u>17</u> , 261(1936).	RP910	5¢
Structural characteristics of some constituents of portland cement clinker. Herbert Insley. J. Research NBS <u>17</u> , 353(1936).	RP917	5¢
The system lime-boric oxide-silica. E. P. Flint and Lansing S. Wells. J. Research NBS <u>17</u> , 727(1936).	RP941	5¢
Determination of sulphur occurring as sulphide in portland cement. Harry A. Bright. J. Research NBS <u>18</u> , 137(1937).	RP968	5¢
Studies on a portion of the system: $\text{CaO-Al}_2\text{O}_3\text{-Fe}_2\text{O}_3$. Howard F. McMurdie. J. Research NBS <u>18</u> , 475(1937).	RP987	5¢
Method for approximating the glass content of portland cement clinker. William Lerch and Lorrin T. Brownmiller. J. Research NBS <u>18</u> , 609(1937).	RP997	10¢
Hydration of magnesia in dolomitic hydrated limes and putties. L. S. Wells and K. Taylor. J. Research NBS <u>19</u> , 215(1937).	RP1022	5¢
Approximate glass content of commercial cement clinker. Wm. Lerch. J. Research NBS <u>20</u> , 77(1938).	RP1066	5¢

PART II - RESEARCH PAPERS (Continued)

	<u>Series</u>	<u>Price</u>
Minor constituents in portland cement clinker. H. Insley and H. F. McMurdie. J. Research NBS <u>20</u> , 173(1938).	RP1074	10¢
Heats of hydration and transition of calcium sulfate. E. S. Newman and L. S. Wells. J. Research NBS <u>20</u> , 825(1938).	RP1107	5¢
Studies of heat of solution of calcium and magnesium oxides and hydroxides. E. Taylor and L. S. Wells. J. Research NBS <u>21</u> , 133(1938).	RP1121	5¢
Effect of glass content upon the heat of hydration of portland cements. Wm. Lerch. J. Research NBS <u>21</u> , 235(1938).	RP1127	10¢
Phase equilibria studies on mixtures of the compounds $4\text{CaO} \cdot \text{Al}_2\text{O}_3 \cdot \text{Fe}_2\text{O}_3 - 2\text{CaO} \cdot \text{Fe}_2\text{O}_3 - \text{K}_2\text{O} \cdot \text{Al}_2\text{O}_3$. Wm. C. Taylor. J. Research NBS <u>21</u> , 315(1938).	RP1131	5¢
Relation of composition and heats of solution of portland cement clinker. Herbert Insley, Einar P. Flint, Edwin S. Newman and J. Arthur Swenson. J. Research NBS <u>21</u> , 355(1938).	RP1135	10¢
Formation of hydrated calcium silicates at elevated temperatures and pressures. E. P. Flint, L. S. Wells and H. F. McMurdie. J. Research NBS <u>21</u> , 617(1938).	RP1147	10¢
Wear resistance of portland cement floors. L. Schuman and John Tucker, Jr. J. Research NBS <u>23</u> , 549(1939).	RP1252	OP
Application of vibrators for measuring mortar consistency and fabricating mortar cubes. R. L. Blaine and J. Tucker, Jr. J. Research NBS <u>24</u> , (1940).	RP1273	10¢
The nature of the glass in portland cement clinker. H. Insley. J. Research NBS <u>25</u> , 295(1940).	RP1324	10¢
Studies on the system lime-ferrous oxide-silica. M. D. Burdick. J. Research NBS <u>25</u> , 395(1940).	RP1340	5¢

PART II - RESEARCH PAPERS (Continued)

	<u>Series</u>	<u>Price</u>
Hydrothermal and X-ray studies of the garnet-hydrogarnet series and the relationship of the series to hydration products of portland cement. E. P. Flint, Howard F. McMurdie, and Lansing S. Wells. J. Research NBS <u>26</u> , 13(1941).	RP1355	10¢
Effect of heat treatment and cooling rate on the microscopic structure of portland cement clinker. George W. Ward. J. Research NBS <u>26</u> , 49(1941).	RP1358	10¢

PART III.- CIRCULARS

	<u>Series</u>	<u>Price</u>
Materials for the household (nontechnical information on use of cement). Cir. BS (1917).	C70	50¢
Caustic magnesia cement. Cir. BS (1922).	C135	OP
Stucco investigations at the Bureau of Standards with recommendations for portland cement stucco construction. Cir. BS (1926).	C311	OP

PART IV. - LETTER CIRCULARS
(Free on application to the Bureau)

The development of standard sieve specifications in the United States. (1931).	LC311
Policy of the National Bureau of Standards with regard to tests for outside agencies. (1939).	LC544
Standard specifications for sieves. (1940).	LC584
Building materials, building standards, home building: Publications of the National Bureau of Standards (list). (1940).	LC592

PART V. - FEDERAL SPECIFICATIONS

The specifications listed below are issued by the Federal Specifications Executive Committee, Procurement Division Building, Washington, D. C. Copies may be secured from the Superintendent of Documents, Government Printing Office, this city, at the prices indicated:

PART V. - FEDERAL SPECIFICATIONS (Cont'd)

	<u>Series</u>	<u>Price</u>
Cement; magnesite	HH-II-61	5¢
Cement; pipe-covering	HH-P-386a	5¢
Cements, hydraulic; general specifications (Methods for sampling, inspection, and testing)	SS-C-158	10¢
Cement; masonry	SS-C-181b	5¢
Cement; portland.	SS-C-191a	5¢
Cement; portland, high-early-strength.	SS-C-201	5¢
Cement; portland, moderate-heat-of-hardening.	SS-C-206	5¢
Cement; portland, pozzolana	SS-C-208	5¢
Cement; portland, sulphate-resisting	SS-C-211	5¢
Sieves; standard, testing	RR-S-366	5¢

PART VI. - OUTSIDE PUBLICATIONS

The articles listed below are not for distribution or sale by the Government, but may be consulted at most large libraries or in some cases may be purchased directly from the publishers.

The effect of high pressure steam on the crushing strength of portland cement mortar and concrete. R. J. Wig. Proc. Am. Soc. Testing Materials (American Society for Testing Materials, 260 S. Broad St., Philadelphia, Pa.), 11, 580(1911); also Tech. Pap. BS, T5, 1, (1910-12).

Present status of iron ore cement. P. H. Bates. J. Nat. Assn. Cement Users (American Concrete Institute, 7400 Second Boulevard, Detroit, Mich.), 566(1912).

Acting of the salts in alkali water and sea water on cement. R. J. Wig and P. H. Bates. J. Franklin Inst. (Journal of the Franklin Institute, 20th and Parkway, Phila., Pa.), 175, 68(1913); also Tech. Pap. BS, T12, 2, (1912-14).

The constitution of portland cement. P. H. Bates. J. Nat. Assn. Cement Users, 368 (1913).

PART VI. - OUTSIDE PUBLICATIONS (Continued)

Errors in the methods of determining the time of setting of cement. G. M. Williams. Proc. Am. Soc. Testing Materials, 14, Part II, 172(1914).

Time of setting of cement. G. M. Williams. Proc. Am. Soc. Testing Materials, 14, Part II, 200(1914).

Properties of portland cement having a high MgO content. P. H. Bates. Proc. Am. Concrete Inst. (American Concrete Institute, 7400 Second Blvd., Detroit, Mich.), 10, 470(1914).

Some properties of white portland cement. P. H. Bates. J. Am. Ceram. Soc. (American Ceramic Society, 2525 N. High St., Columbus, Ohio), 16, 551(1914).

Some further results obtained in investigations of the properties of portland cement having a high MgO content. P. H. Bates. Proc. Am. Concrete Inst. (American Concrete Institute, 7400 Second Blvd., Detroit, Mich.), 11, (1915).

The effect of fine grinding and a higher SO₃ content upon the physical properties of portland cement. P. H. Bates. Proc. Am. Soc. Testing Materials (American Society for Testing Materials, 260 S. Broad St., Phila., Pa.), 15, Part II, 126(1915).

Process and apparatus for separating and analyzing granular materials. Patent 1,186,525. U. S. Patent Office, Washington, D. C., June 8, 1916. (Price 10 cents).

What is the trouble with concrete in seawater? R. J. Wig and Lewis R. Ferguson. Eng. News-Record - Series of five articles (McGraw-Hill Publishing Co., Inc., 330 W. 42d St., New York, N. Y.), Sept. 1917.

The hydraulic properties of the calcium aluminates. P. H. Bates. J. Am. Ceram. Soc., 1, 679(Oct. 1918).

Cements producing quick hardening concretes. P. H. Bates. Proc. Am. Soc. Testing Materials, 19, Part II, 429(1919).

Specifications for the U. S. Standard sieve series. J. C. Pearson. Proc. Am. Concrete Inst., 16, 49(1920).

Effect of age of test pieces in soundness tests of portland cement. J. R. Dwyer. Concrete - Cement Mill Edition (Concrete Publishing Co., 400 W. Madison St., Chicago, Ill.), 17, 87(Dec. 1920).

Shrinkage of cement mortars and its importance in stucco construction. J. C. Pearson. Proc. Am. Concrete Inst., 17, 133(1921).

PART VI. - OUTSIDE PUBLICATIONS (Continued)

Time of set of concrete. Watson Davis. Proc. Am. Soc. Testing Materials, 21, Part II, 995(1921).

Relation between tensile and compressive strengths of cement mortars. J. R. Dwyer. Concrete - Cement Mill Edition, 18, 123(June, 1921).

Plastic magnesia cements. P. H. Bates and Roy N. Young. J. Am. Ceram. Soc., 4, 570(July 1921).

The application of the fundamental knowledge of portland cement to its manufacture and use. P. H. Bates. J. Franklin Inst. (Franklin Institute, 20th and Parkway, Phila., Pa.), 193, 289(Mar. 1922).

Inspection of portland cement. J. R. Dwyer and Roy N. Young. Concrete (Concrete Publishing Co., 400 W. Madison St., Chicago, Ill.), 21, Aug. and Sept. 1922.

Need of research in the portland cement industry. P. H. Bates. Chem. & Met. Eng. (Chemical and Metallurgical Engineering, McGraw-Hill Publishing Co., 330 W. 42d St., New York, N. Y.), 29, 462(Aug. 30, 1922).

What properties and methods of making portland cement need further investigation? P. H. Bates. Proc. Am. Soc. Testing Materials, (American Society for Testing Materials, 260 S. Broad St., Philadelphia, Pa.), 23, Part II, 160(1923).

Late data on fine grinding and additional SO_3 to cements. P. H. Bates. Proc. Am. Soc. Testing Materials, 23, Part II, 248(1923).

Discussion on the "Meaning and microscopic measurement of average particle size." J. C. Pearson. J. Am. Ceram. Soc. (American Ceramic Society, 2525 N. High St., Columbus, Ohio), 6, 121(May 1923).

The possibility of improving hydraulic cements. P. H. Bates. Proc. Portland Cement Assn. (Portland Cement Association, 33 West Grand Ave., Chicago, Ill.), May 21, 1923.

Discussion of aluminat cement-portland cement. P. H. Bates. Proc. Am. Concrete Inst. (American Concrete Institute, 7400 Second Blvd., Detroit, Mich.), 20, 355(1924).

New process of making high alumina cement. P. H. Bates. Rock Products (Trade Press Publishing Corp., 205 W. Wacker Drive, Chicago, Ill.), May 30, 1925.

PART VI.- OUTSIDE PUBLICATIONS (Continued)

- Fine grinding of cement increases strength of concrete.
Morris Temin and W. H. Sligh. Concrete, 27, 47(Sept. 1925).
- Portland cement research. R. H. Bogue. Proc. Am. Soc. Testing Materials, 26, Part II, 403(1926).
- High alumina hydraulic cements. P. H. Bates. Ind. & Eng. Chem. (Industrial and Engineering Chemistry, Mills Bldg., Washington, D. C.), 18, 554(June 1926).
- A digest of the literature on the constitution of portland cement clinker. R. H. Bogue. Concrete, July 1926 to Feb. 1927.
- Studies on the system $\text{CaO-Fe}_2\text{O}_3\text{-SiO}_2$. W. C. Hansen and R. H. Bogue. J. Am. Chem. Soc. (American Chemical Society, The Ohio State University, Columbus, Ohio), 48, 1261(1926).
- The determination of uncombined lime in portland cement. W. Lerch and R. H. Bogue. Ind. & Eng. Chem. (Industrial and Engineering Chemistry, Mills Bldg., Washington, D. C.), 18, 739(1926).
- Long time tests of high magnesia cements. P. H. Bates. Proc. Am. Soc. Testing Materials (American Society for Testing Materials, 260 S. Broad St., Philadelphia, Pa.), 27, Part II, 324(1927).
- Portland cement in concrete engineering. R. H. Bogue. Proc. Am. Concrete Inst. (American Concrete Institute, 7400 Second Blvd., Detroit, Mich.), 23, 355(1927).
- Why time is a factor in the study and use of cement. P. H. Bates. Proc. Am. Concrete Inst., 23, 436(1927).
- The preparation and optical properties of calcium hydroxide crystals. F. W. Ashton and Raymond Wilson. Am. J. Sci. (American Journal of Science, New Haven, Conn.), 13, 209(1927).
- Studies on the system $\text{CaO-Al}_2\text{O}_3\text{-SiO}_2$: The composition of $8\text{CaO}+\text{Al}_2\text{O}_3+2\text{SiO}_2$. W. C. Hansen, W. Dyckerhoff, F. W. Ashton, and R. H. Bogue. J. Phys. Chem. (Journal of Physical Chemistry, William & Wilkins Co., Baltimore, Md.), 31, 607(1927); Rock Products (Trade Press Publishing Corp., 205 W. Wacker Drive, Chicago, Ill.), 30, April 16, 1927.

PART VI. - OUTSIDE PUBLICATIONS (Continued)

- The preparation of optically clear selenium for use in index media. L. T. Brownmiller. Am. Mineral. (American Mineralogical Society of America, U. S. Geological Survey, Washington, D. C.), 12, 43(1927).
- X-ray diffraction measurements on some of the pure compounds concerned in the study of portland cement. E. A. Harrington. Am. J. Sci., 13, 467(1927).
- The present status of portland cement and the possibilities of super cements. P. H. Bates. Rock Products, 30, 77(Dec.1927).
- The combination of lime in portland cement compounds. - Preliminary investigation. W. C. Hansen and R. H. Bogue. Ind. & Eng. Chem., 19, 1260(1927).
- Studies on the hydrolysis of compounds which may occur in portland cement. W. Lerch and R. H. Bogue. J. Phys. Chem., 31, 1627(1927).
- Cement as a factor in the workability of concrete. P. H. Bates and J. R. Dwyer. Proc. Am. Concrete Inst., 24, 43(1928).
- Notes on the progress of some studies of the crazing of portland cement mortars. P. H. Bates and C. H. Jumper. Proc. Am. Concrete Inst., 24, 179(1928).
- Limes, structural cements, and plasters. P. H. Bates and J. M. Porter. Survey Am. Chem. (Survey of American Chemistry, National Research Council, Washington, D. C.), Third Annual, (1928).
- Further studies on portland cement compounds by the X-ray diffraction method. W. C. Hansen. J. Am. Ceram. Soc. (American Ceramic Society, 2525 N. High St., Columbus, Ohio), 11, 68(Feb. 1928).
- A digest of the literature on the nature of the setting and hardening processes of portland cement. R. H. Bogue. Rock Products (Tradepress Publishing Corp., 205 W. Wacker Drive, Chicago, Ill.), May to Sept. 1928).
- Modern cements - A study of the characteristics of the hydraulic cements of today. P. H. Bates. Eng. News-Record (Engineering News-Record, McGraw-Hill Publishing Co., 330 W. 42nd St., New York, N. Y.), 100, 887 (June 7, 1928); 932 (June 14, 1928).

PART VI.- OUTSIDE PUBLICATIONS (Continued)

Studies on the system calcium oxide-alumina-ferric oxide.

W. C. Hansen, L. T. Brownmiller, and R. H. Bogue. J. Am. Chem. Soc. (American Chemical Society, The Ohio State University, Columbus, Ohio), 50, 396(1928).

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Phase equilibria in the system $2\text{CaO} \cdot \text{SiO}_2 \cdot \text{MgO} - 5\text{CaO} \cdot 3\text{Al}_2\text{O}_3$.

W. C. Hansen. J. Am. Chem. Soc., 50, 3081(1928).

The cause of unsoundness in portland cement. W. Lerch. Concrete - Cement Mill Edition (Concrete Publishing Co., 400 W. Madison St., Chicago, Ill.), 35, 109(July 1929); 115 (Aug. 1929).

Calculation of compounds in portland cement. R. H. Bogue. Ind. & Eng. Chem. (Anal. Edition) (Industrial and Engineering Chemistry, Mills Bldg., Washington, D.C.), 1, 192(Oct. 1929).

High strength, high early strength, and waterproof concrete. P. H. Bates. Engrs. and Eng. (Engineers and Engineering - Ceased publication with vol. 49, Mar. 1932), 46, 177(July 1929).

Variations in standard portland cements. P. H. Bates. Proc. Am. Concrete Inst. (American Concrete Institute, 7400 Second Blvd., Detroit, Mich.), 26, 65(1930).

The relation between the strengths of cements developed by mortar specimens and concrete specimens. J. R. Dwyer and P. H. Bates. Proc. Am. Soc. Testing Materials (American Society for Testing Materials, 260 S. Broad St., Philadelphia, Pa.), 30, Part II, 598(1930).

Some properties of high alumina cement from six countries. P. H. Bates. Proc. New Intern. Assoc. Testing Materials (New International Association for Testing Materials, Leonhardstrasse 27, Zurich, Switzerland, Group B, 210(1930)).

Revised procedure for the determination of uncombined lime in portland cement. Wm. Lerch and R. H. Bogue. Ind. and Eng. Chem. (Anal. Edition) - (Industrial and Engineering Chemistry, Mills Bldg., Washington, D. C.), 2, 296 (July 15, 1930).

PART VI. - OUTSIDE PUBLICATIONS (Continued)

- The X-ray method applied to a study of the constitution of portland cement. L. T. Brownmiller and R. H. Bogue. Am. J. Sci. (American Journal of Science, New Haven, Conn.), 20, 241(1930); also BS J. Research 5, 813(1930), RP233.
- Suggested investigations of high alumina cements. P. H. Bates. Proc. New Intern. Assoc. Testing Materials, (1931).
- Cement and concrete. (Chapter XXVIII, Annual Survey of American Chemistry, 1930). John Tucker, jr. Annual Survey Am. Chem. (National Research Council, Washington, D.C.), May 1931.
- Can cement durability be predicted? E. T. Carlson and P. H. Bates. Eng. News-Record (Engineering News-Record, McGraw-Hill Publishing Co., 330 W. 42d St., New York, N. Y.), 107, 130(July 23, 1931).
- The decomposition of tricalcium silicate in the temperature range 1000°-1300°C. E. T. Carlson. Rock Products (Trade-press Publishing Corp., 205 W. Wacker Drive, Chicago, Ill.), XXXIV, 52, Dec. 5, 1931; also BS J. Research 7, 893(1931), RP381.
- Natural cement mortar found strong after half a century. P. H. Bates. Eng. News-Record, 108, 96(Jan. 21, 1932).
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