

DEPARTMENT OF COMMERCE  
NATIONAL BUREAU OF STANDARDS  
WASHINGTON

Letter  
Circular  
LC 417

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PUBLICATIONS ON THERMAL EXPANSION

This letter circular gives a list of publications of the Thermal Expansion Laboratory of the National Bureau of Standards. The publications for which prices are indicated may be purchased from the Superintendent of Documents, Government Printing Office, Washington, D. C. Remittance should be made by coupons (which may be purchased from the Superintendent of Documents in sets of 20 for \$1.00), postal money order, express order, or New York draft payable to the "Superintendent of Documents, Government Printing Office, Washington, D.C." Currency may be sent at the sender's risk. Postage stamps, defaced coins, or foreign money will not be accepted. Publications marked with a star (\*) are out of print, but they may be consulted at most large libraries.

"Outside publications" are not for distribution or sale by the Government. These publications may be consulted at most large libraries or in some cases may be purchased directly from the publishers.

The index at the end of the letter circular will assist the reader in locating the publications on the subjects in which he is interested.

Engineering Societies, 29 West 39th Street, New York City, maintain a duplicating service and are prepared to supply photostat copies of technical articles that are available in libraries of New York City.

New publications of the National Bureau of Standards are listed each month in Technical News Bulletin of the Bureau of Standards, obtainable from the Superintendent of Documents, Government Printing Office, Washington, D. C. The subscription price is 50 cents per year (United States, its territories and possessions; Canada, Cuba, Mexico, Newfoundland, and Republic of Panama); 70 cents in other countries.

PUBLICATIONS FROM THE NATIONAL BUREAU OF STANDARDS

The numbers assigned (for example, S215, T335, RP29) are the actual reprint numbers by which the Bureau and the Government Printing Office lists and sells, respectively, the separate papers (reprints).

Scientific Papers

Number

- S215\* Gray, A. W., Micrometer microscopes, B.S. Bull., vol.10, p. 375, 1914.
- S219\* Gray, A. W., Production of temperature uniformity in an electric furnace, B.S. Bull., vol. 10, p. 451, 1914.
- S276\* Gray, A. W., Protected thermoelements, B.S. Bull., vol. 13, p. 283, 1916.
- S321 Merica, P. D., and Schad, L.W., Thermal expansion of alpha and of beta brass between 0 and 600°C, in relation to the mechanical properties of heterogeneous brasses of the Muntz metal type, B.S. Bull., vol. 14, p. 571, 1919. (Price 10¢)
- S332 Schad, L. W., and Hidnert, P., Preliminary determination of the thermal expansion of molybdenum, B.S. Sci. Papers, vol. 15, p. 31, 1919. (Price 5¢)
- S352 Souder, W. H., and Hidnert, P., Thermal expansion of insulating materials, B.S. Sci. Papers, vol. 15, p. 387, 1919-20. (Price 10¢)
- S410 Hidnert, P., Thermal expansion of copper and some of its important industrial alloys, B.S. Sci. Papers, vol. 17, p. 91, 1922. (Price 25¢)
- S426 Souder, W.H., and Hidnert, P., Thermal expansion of nickel, Monel metal, stellite, stainless steel, and aluminum, B.S. Sci. Papers, vol. 17, p. 497, 1922. (Price 10¢)
- S433\* Souder, W., and Hidnert, P., Thermal expansion of a few steels, B.S. Sci. Papers, vol. 17, p. 611, 1922.
- S488 Hidnert, P., and Gero, W.B., Thermal expansion of molybdenum, B.S. Sci. Papers, vol. 19, p. 429, 1923-24. (Price 10¢)
- S497 Hidnert, P., Thermal expansion of aluminum and various important aluminum alloys, B.S. Sci. Papers, vol. 19, p. 697, 1923-24. (Price 15¢)

Scientific Papers Cont'd

Number

- S515 Hidnert, P., and Sweeney, W.T., Thermal expansion of tungsten, B.S. Sci. Papers, vol. 20, p. 483, 1924-26. (Price 5¢)
- S524 Souder, W., and Hidnert, P., Measurements on the thermal expansion of fused silica, B.S. Sci. Papers, vol. 21, p. 1, 1926-27. (Price 10¢)
- S565 Hidnert, P., and Sweeney, W.T., Thermal expansion of beryllium and aluminum-beryllium alloys, B.S. Sci. Papers, vol. 22, p. 533, 1927-28. (Price 10¢)
- S570 Hidnert, P., and Sweeney, W.T., Thermal expansion of alloys of the "stainless iron" type, B.S. Sci. Papers, vol. 22, p. 639, 1927-28. (Price 10¢)

Technologic Papers

Number

- T335 Hidnert, P., and Sweeney, W.T., Thermal expansion of graphite, B.S. Tech. Papers, vol. 21, p. 223, 1926-27. (Price 5¢)

Research Papers

Number

- RP29 Hidnert, P., and Sweeney, W.T., Thermal expansion of magnesium and some of its alloys, B.S. Jour. Research, vol. 1, p. 771, 1928. (Price 10¢)
- RP62 Hidnert, P., Thermal expansion of tantalum, B.S. Jour. Research, vol. 2, p. 887, 1929. (Price 5¢)
- RP388 Hidnert, P., Thermal expansion of heat-resisting alloys: Nickel-chromium, iron-chromium, and nickel-chromium-iron alloys, B.S. Jour. Research, vol. 7, p. 1031, 1931. (Price 25¢)
- RP500 Hidnert, P., and Sweeney, W.T., Thermal expansion of lead, B.S. Jour. Research, vol. 9, p. 703, 1932. (Price 5¢)
- RP590 Hidnert, P., and Krider, H.S., Thermal expansion of columbium, B.S. Jour. Research, vol. 11, p. 279, 1933. (Price 5¢)
- RP665 Hidnert, P., Thermal expansion of bearing bronzes, B.S. Jour. Research, vol. 12, p. 391, 1934. (Price 5¢)

Research Papers Cont'd

Number

- RP693 Hidnert, P., Thermal expansion of artificial graphite and carbon, B.S. Jour. Research, vol. 13, p. 37, 1934 (Price 5¢)
- RP\_\_\_\_\_ Souder, W., Hidnert, P. and Fox, J. F., Autographic thermal expansion apparatus, B.S. Jour. Research (In preparation).

ARTICLES PUBLISHED IN OUTSIDE JOURNALS

The numbers (for example, WAS-2, ACS-1, SST-1, PR-15) in the following lists of outside publications, are merely arbitrary numbers assigned here to indicate sequence in this letter circular. They do not represent the designating numbers of the reprints.

Journal of the Washington Academy of Sciences  
(450 Ahnaip St., Menasha, Wis.)

Number

- WAS-1 Gray, A. W., New methods for displacement measurements and temperature uniformity applied to the determination of linear expansivity, Jour. Wash. Acad. Sciences, vol. 2, p. 248, 1912.
- WAS-2 Gray, A. W., Micrometer microscopes, Jour. Wash. Acad. Sciences, vol. 4, p. 45, 1914.
- WAS-3 Gray, A. W., The production of temperature uniformity in an electric furnace, Jour. Wash. Acad. Sciences, vol. 4, p. 134, 1914.

Journal of the American Ceramic Society  
(2525 North High St., Columbus, Ohio)

Number

- ACS-1 Danielson, R.R., and Souder, W.H., The causes and control of fish scaling of enamels for sheet iron and steel, Jour. Amer. Ceram. Soc., vol. 4, p. 620, 1921.

Transactions of the American Society for Steel Treating (7016 Euclid Ave., Cleveland, Ohio)

Number

- SST-1 Rawdon, H.S., Hidnert, P., and Tucker, W.A., Some effects of hydrogen on iron and their bearing on a reported transformation at 370 degrees Cent. (698 degrees Fahr.); Trans. Amer. Soc. Steel Treating, vol. 10, p. 233, 1926.

Physical Review  
(11 East 38th St., New York, N. Y.)

Number

- PR-1 Gray, A. W., A new type of apparatus for measuring linear expansion, Phys. Rev., vol. 34, p. 139, 1912.
- PR-2 Gray, A. W., Sweet, D.H., and Schad, L.W., Some effects of magnetization on the length of a 35.25 percent nickel steel, Phys. Rev., vol. 7, series 2, p. 684, 1916.
- PR-3 Gray, A. W., Sweet, D.H., and Schad, L. W., American nickel steels of low thermal expansivity, Phys. Rev., vol. 7, series 2, p. 685, 1916.
- PR-4 Schad, L.W., Thermal expansion of marble, Phys. Rev., vol. 10, series 2, p. 74, 1917.
- PR-5 Schad, L. W., and Hidnert, P., Preliminary determination of the thermal expansion of molybdenum, Phys. Rev., vol. 13, series 2, p. 148, 1919.
- PR-6 Souder, W., and Hidnert, P., The thermal expansion of nickel, Monel metal, stellite and stainless steel, Phys. Rev., vol. 17, series 2, p. 372, 1921.
- PR-7 Rawdon, H.S., and Hidnert, P., Observations on the "hydrogen point" in iron, Phys. Rev., vol. 25, series 2, p. 898, 1925.
- PR-8 Souder, W. and Hidnert, P., Measurements on the thermal expansion of fused silica, Phys. Rev., vol. 27, series 2, p. 253, 1926.
- PR-9 Hidnert, P., and Sweeney, W.T., Thermal expansion of tungsten, Phys. Rev., vol. 27, series 2, p. 519, 1926.
- PR-10 Hidnert, P., and Sweeney, W.T., Thermal expansion of graphite, Phys. Rev., vol. 29, series 2, p. 371, 1927.
- PR-11 Hidnert, P., and Sweeney, W.T., Thermal expansion of beryllium, Phys. Rev., vol. 29, series 2, p. 616, 1927.
- PR-12 Hidnert, P., and Sweeney, W.T., Thermal expansion of some nickel steels, Phys. Rev., vol. 29, series 2, p. 911, 1927.
- PR-13 Hidnert, P., Thermal expansion of tantalum, Phys. Rev., vol. 34, series 2, p. 544, 1929.

Physical Review Cont'd.

Number

- PR-14 Hidnert, P., Thermal expansion of "Carboloy", Phys. Rev., vol. 35, series 2, p. 120, 1930.
- PR-15 Hidnert, P., and Sweeney, W.T., Thermal expansion of lead, Phys. Rev., vol. 35, series 2, p. 296, 1930.
- PR-16 Hidnert, P., and Sweeney, W.T., Thermal expansion of copper-nickel-tin alloy, Phys. Rev., vol. 35, series 2, p. 667, 1930.
- PR-17 Hidnert, P., and Sweeney, W.T., Thermal expansion of M-M-M alloy, Phys. Rev., vol. 36, series 2, p. 787, 1930.
- PR-18 Hidnert, P., Thermal expansion of electrolytic chromium, Phys. Rev., vol. 39, series 2, p. 186, 1932.
- PR-19 Hidnert, P., Thermal expansion of copper alloys, Phys. Rev., vol. 39, series 2, p. 551, 1932.
- PR-20 Hidnert, P., Thermal expansion of heat-resisting alloys, Phys. Rev., vol. 39, series 2, p. 856, 1932.
- PR-21 Hidnert, P., and Krider, H.S., Thermal expansion of nickel steels, Phys. Rev., vol. 40, series 2, p. 131, 1932.
- PR-22 Hidnert, P., and Krider, H.S., Thermal expansion of antimony, Phys. Rev., vol. 42, series 2, p. 911, 1932.

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