

6. MAGNETIC PROPERTIES AND TESTING OF IRON

MAGNETIC RELUCTANCE

A. E. Kennelly

Vol. viii—1891, pp. 485-517

Account of the development of the theory of magnetism, the polar, the vein and the circuit theories. Review of experiments made by Rowland, Ewing, Low and others. Typical magnetization curves for different grades of iron and steel and of nickel and cobalt at different temperatures. Reference to original articles and full data tabulated for all curves.

Discussion, pp. 518-532, by Messrs. A. E. Kennelly, Carl Hering, J. Stanford Brown, Louis Bell, Chas. E. Emery, M. I. Pupin, Charles P. Steinmetz and Thos. D. Lockwood.

Analogy between magnetic circuit and electric circuit and between magnetism and elasticity. Hysteresis in gases. General remarks on engineering formulas.

ON THE LAW OF HYSTERESIS

Charles P. Steinmetz

Vol. ix—1892, pp. 3-51

Account of experimental investigation of magnetic hysteresis. Description of apparatus used and results of tests on different types of magnetic circuits and different qualities of material. Hysteretic constants for various classes of iron and steel.

Discussion, pp. 51-60, by Messrs. Thomas D. Lockwood, C. P. Steinmetz, Charles S. Bradley, Joseph Wetzler, A. E. Kennelly and M. I. Pupin.

General remarks on law of hysteresis.

RATIONAL AND EMPIRICAL FORMULAE SHOWING THE RELATION BETWEEN THE MAGNETOMOTIVE FORCE (H) AND THE RESULTING MAGNETIZATION (B)

Charles E. Emery

Vol. ix—1892, pp. 192-222

Development of a rational method of calculating the magnetization of iron, based on analogy to the laws of mechanics.

No discussion.

THE MAGNETIC PERMEABILITY OF SPECIAL IRONS FOR ELECTRICAL PURPOSES

Milton E. Thompson, Percy H. Knight and Geo. W. Bacon.

Vol. ix—1892, pp. 250-259

Magnetization curves of different qualities of iron and steel.

Discussion, pp. 259-262, by Messrs. H. S. Carhart, E. L. Nichols, C. E. Emery, D. C. Jackson and C. S. Bradley.

Magnetization curves of open hearth steel.

ON THE LAW OF HYSTERESIS. PART II

Charles P. Steinmetz

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Investigation of hysteresis between any two limits of flux density, either of opposite or of equal sign. Description of apparatus, method of measurement and development of equations relative to the quantities

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involved. Hysteresis with pulsating magnetism. Magnetic constants for different types of irons and steels. Magnetic characteristics of wire and laminations magnetized transversely. Meaning of the area of the hysteresis loop. Theory of molecular magnets.

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Relative Merits of Different Methods of Measuring Flux Density.

Appendix II, pp. 745-747.

Efficiency of Electro-magnetic Conversion of Energy. Limits of the Law of 1.6th Power.

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Limits of Linear Law of Metallic Reluctivity.

Discussion, pp. 730-744 and 748-755, by Messrs. W. J. Hammer, A. E. Kennelly and Wm. Stanley, Jr.

ON THE LAW OF HYSTERESIS, PART III, AND THE THEORY OF FERRIC
INDUCTANCES

Charles P. Steinmetz

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Theory and laws of hysteresis. Mathematical treatment of the losses in iron by hysteresis and eddy currents. Distortion of exciting current at different flux densities.

Discussion, pp. 609-616, by Messrs. Frederick Bedell, C. P. Steinmetz, A. E. Kennelly and M. I. Pupin.

General remarks on hysteresis and exciting current wave distortion.

THE BEST METAL FOR FIELD MAGNET FRAMES

Alton D. Adams

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Discussion, pp. 20-33, by Messrs. Francis B. Crocker, Richard Fleming, Samuel Sheldon, A. E. Kennelly, Gano S. Dunn, James Burke, W. L. Bliss, Alton D. Adams, Mr. Edson, B. J. Arnold, L. L. Summers and C. A. Pratt.

Relative advantages of cast steel and wrought iron for field pole construction.

THE INFLUENCE OF HEAT TREATMENT UPON THE MAGNETIC PROPERTIES
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K. E. Guthe

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Theory of the constitution of steel. Specification for magnet steel.