



Thomas W. Dakin

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1915–1990

By Lee A. Kilgore

Tom Dakin, world-renowned specialist on insulation for electric machinery, died April 1, 1990. He was born in Minneapolis on May 5, 1915. After graduating from the University of Minnesota, he received a Ph.D. in physical chemistry in 1941 from Harvard.

He made his career with the Research Department of Westing-house Electric. From 1946 he directed the company's electrical insulation development, making many individual contributions. In 1948 he proposed a method whereby insulation deterioration with aging at elevated temperatures could be treated as a chemical rate phenomenon in accordance with the Arrhenius equation. This method is widely used because it has more validity than other methods that have been proposed and because of its relative simplicity.

He pioneered investigations into the effects of electric discharges on the breakdown of solid insulation, a method of estimating the magnitude of internal electric discharges and discharging void volume in high-voltage apparatus by measuring capacitance increase with increasingly high voltages. He confirmed and applied the concept that alternating-current voltage endurance (useful life of insulation under voltage stress) is proportional to the number of cycles applied. Bushings for high-voltage applications are made with cycloaliphatic epoxy resins. Under his guidance, cycloaliphatic epoxy bushings have been

field tested in contaminated atmospheres under high-voltage stress for more than eight years with excellent results. In addition to field testing, weathering stations were established in areas that were typical of the types of environment bushings might encounter in service. He devised a laboratory-accelerated test that appears to duplicate, in less than a week, a year of exposure in the weathering stations. He investigated the voltage endurance of cast epoxy resins with microcavity type defects. The study indicated that care must be exercised so as not to apply too high an average voltage stress to cast epoxy insulators, even when no internal corona can be detected.

He was a major contributor over a period of many years in the field of power capacitor development. A key to the dramatic progress made in size and cost reduction per kilovolt-ampere was, again, the development of an accelerated life test based on power factor increases with time at several temperatures. These studies, which permitted the selection of the best low-loss materials, were carried out with the paper-askarel and polypropylene-paper-askarel systems, and also the latter where the askarel was replaced by liquids free of polychlorinated biphenyls (e.g., isopropylbiphenyl).

A fellow of the Institute of Electrical and Electronics Engineers (IEEE), he received IEEE's Electrical Insulation Society Award for Technical Achievement in 1978 and its Westinghouse Order of Merit and Lamme Medal. He served on the National Research Council's Conference on Electrical Insulation and Dielectric Phenomena and was the U.S. representative to the International Conference on High Voltage Electric Systems (chairman of the Committee on Solid Insulation). He was elected a member of the National Academy of Engineering in 1981.

Dr. Dakin was active in civic affairs, serving for many years as secretary of the local School Building Authority, and he was an active member of the local Rotary Club. His wife Theodora was a medical doctor, and they were known among friends as Dr. Tom and Dr. Ted.

