

NEW REFERENCES FOR 1948-1954

No. 12650. W. E. Campbell and Rose Kozak, "Wear of Carbon Brushes in Dry Atmospheres," *Trans. Am. Soc. Mechanical Engrs.*, Vol. 70 (July, 1948), pp. 491-498.

The dusting of carbon brushes is studied in dry nitrogen at atmospheric pressure. The effect of water, oxygen, and carbon dioxide on dusting wear is under partial vacuum conditions. No effect of current, up to 114 amp per sq in. is found under the conditions studied. It is shown that a highly oriented natural graphite specimen or an oriented graphite brush, operated so that the faces of the cleavage planes rub on a plane rotating copper surface, neither dusts nor produces wear on the copper surface in dry nitrogen. When operated so that the edges of the cleavage planes rub against the plate, rapid dusting wear takes place and the copper surface is deeply scored. The dusting rate of carbon brushes in dry nitrogen against several metals is given. The rate is shown to decrease as the hardness of the metal increases, the behavior of brass being exceptional. It is found to be zero on smooth chromium and rhodium surfaces. On the assumption that an adsorbed lubricant film prevents scoring of the plate by the edges of the graphite crystals, allowing them to be oriented, the results are shown to be consistent with recent theories of solid friction.

No. 1463a. A. Keil, "A Graphical Method for Evaluating Spectroscopic Records of Trimetal Alloys," *Spectrochimica Acta*, Vol. 4 (1950), p. 165.

No. 2188a. E. Dürrwächter, "Technique of Printed Circuits," *ETZ*, B, Vol. 6 (1954), p. 73.

No. 2188b. A. Keil and E. Merkle, "Hardness Measurements on Coatings Produced by Means of Electroplating. II," *Metallüberfläche*, Vol. 8 (1954), p. 129.

This paper discusses two additional examples of hardness measurements on plated materials. In the first case it is concerned with the variation of measured values of hardness on the thickness of rhodium plated, and in the second case the throwing power of the electrolyte containing two different metal ions is considered.

No. 2188c. A. Keil and G. Offner, "Testing of Thin Metal Coating by Means of an Electrical Method," *Sprechsaal*, Vol. 87 (1954), p. 345.

Measurements with a special developed eddy current measuring device give results

concerning the amount of the product of conductivity and thickness of metal films. The testing is limited to nonmagnetic materials. Several examples of the method in practice are discussed.

No. 2188d. A. Keil and G. Offner, "Testing of Thin Metal Coatings on Dielectric Material by Means of Eddy Currents," *Zeits. f. Metallkunde*, Vol. 45 (1954), p. 200.

Noble metal surface properties and conducting lacquers for electrical technical operations are considered. The electrical conductivity of a deposited surface and equivalent silver thickness and its measurements are discussed.

No. 2188e. W. M. Buttler and W. Muscheid, "Die Bedeutung des elektrischen Kontaktes bei Untersuchungen an Kadmiumsulfid-Einkristallen. II, (Significance of Electric Contacts During Investigation of Cadmium Sulfide Monocrystals)" (German), *Ann. Der Physik*, Vol. 15, No. 2 (1954), pp. 82-111.

Includes diagrams, graphs, table, and 33 references. (*Battelle Technical Review*)

No. 2188f. E. Hugentobler and K. Brandenberg, "The Brown Boveri Single-Pole Air Blast Circuit Breaker for A.C. Traction Vehicles," *Brown Boveri Rev.*, Vol. 41, No. 7 (July, 1954), pp. 247-256. (*Science Abstracts*)

No. 2188g. A. Gantenbein, "The New (Oerlikon) High Power Testing Plant," *Bull. Oerlikon*, Vol. 34 (Aug., 1954), pp. 55-68.

Describes the layout of the plant with particulars of the alternators, impulse excitation, and other system units and instrumentation. The maximum rated voltage of the two alternators is 14 kv, speed 3000 rpm and rated current of each 3500 a. The making capacity of each is 1500 mva and breaking capacity is not significantly lower. Two 1-ph transformers each of 1300 mva short-circuit rating provide test voltages of 28 to 190 kv per transformer and circuit breakers can be tested at 380 kv, the highest transmission voltage in use today. Provision is also made for d-c short-circuit tests up to 3 kv, or 80 ka at 600 v. (*Science Abstracts*)

No. 2188h. J. Christie, H. Leyburn, and J. F. Bird, "Proving the Performance of Circuit Breakers, With Particular Reference to Those of Large Breaking Capacity," *Proc. Inst. Elect. Engrs.*, Vol. 102A (Aug., 1954), Paper No. 1707S, pp. 697-709, 716-728.

Republication, with discussion, of the paper abstracted in Abstract 2129 (1955). (*Science Abstracts*)

No. 2188i. J. Christie, H. Leyburn, and R. W. Fenn, "A New Testing Station for High Power Circuit Breakers," *Proc. Inst. Elect. Engrs.*, Vol. 102A, Paper No. 1736S (Dec., 1954), pp. 709-716.

Republication, with discussion, of the paper abstracted in 2160 (1955). (*Science Abstracts*)

No. 2188j. G. F. Peirson, A. H. Pollard, and N. Care, "Automatic Circuit Reclosers," *Proc. Inst. Elect. Engrs.*, Vol. 102A, Paper No. 1717S (Dec., 1954), pp. 749-771.

Republication, with discussion, of the paper abstracted in Abstract 2162 (1955). (*Science Abstracts*)

No. 2188k. K. Nakanishi, "Fundamental Considerations of the Controlling Effects of Voltage Distribution in Multi-Break Circuit Breakers with Non-Linear Parallel Resistors,"

J. Inst. Elect. Engrs., Japan, Vol. 74, No. 12 (Dec., 1954), pp. 1493-1499. (In Japanese.)

In the commonly used h.v. oil or oil-blast circuit breaker of multi-breaking type, the control of recovery voltage distribution across the contacts has an important bearing on the rupturing capacity of such breakers. When nonlinear parallel resistors are equipped with contacts to control the voltage distribution, the dynamic characteristics must be established in order to decide the resistor characteristics. Graphical analyses under conductive or capacitive unbalanced-circuit conditions show the relationships between the resistor characteristics, the maximum recovery voltage, and the recovery rate under each circuit condition. When the resistor characteristic is nonlinear, good distribution characteristics are obtained for the same I^2R loss under steady-state conditions. With a recovery voltage insufficiently high to reduce the resistance values, the characteristics are not so good. To control capacitive unbalance, the frequency characteristics as well as the efforts due to the unbalance of parallel resistor characteristics were studied. (*Science Abstracts*)