Testing of Polymers, Vol. 3, J. V. Schmitz and W. E. Brown, Eds., Interscience, New York, 1967. 379 pp., $19.50.

This volume, the third in a series of four, includes 11 separate contributions emphasizing the application of various test procedures in evaluating end-use performance. In this series, it was not the editors intention to establish standard test procedures but rather to review the usefulness and characteristics of test methods. Seven of the chapters are nominally concerned with surface properties but are actually more precisely identified with bulk viscoelastic behavior as, for instance, hardness testing. Other chapters on surface property testing are to be found in the first two volumes.

The opening chapter by K. A. Kaufman and J. H. Meyers contains a brief description of general laboratory "Facilities for Testing Polymers" but makes few specific recommendations with regard to choice of test apparatus. Manpower, laboratory layout, and other requirements are considered. A useful and well-prepared chapter on the "Influence on Properties of Specimen Shape and Preparation" is presented by L. Cohen. It is unfortunate that such an important aspect of testing is not treated more comprehensively. The discussion on dynamic testing is restricted, for instance, to the freely oscillating torsion pendulum but contains no discussion of the errors involved in analyzing noncylindrical shapes. The vibrating reed and end-effects in this measurement are completely neglected.

The effect of temperature in a variety of tests is discussed more fully by P. I. Roth and P. Mahoodi in "Special Tests for Temperature Effects on Physical Properties and Dimensions." This contribution, a broad survey, is marred by an excess of misleading and incomplete statements. The assertion, p. 53, that "generally, there is an inverse relationship between the mechanical properties of polymers and temperature" clearly neglects to mention the positive temperature coefficient of the modulus of elastomers. The authors preference, p. 54, for production material as a source of test specimens overlooks the frequent need to eliminate or control orientation, frozen-in stresses and other factors in material evaluation, and so on.

"Introduction to Surface Property Testing" by L. Boor is a list of references on surface property testing. D. Livingston's contribution on "Indentation Hardness Testing" contains a very good discussion of testing methods nicely presented within the context of basic principles of polymer physics. F. M. Gavan's chapter on "Wear Testing" is largely a compendium of types and sources of wear test devices.

R. B. Lewis discusses "Rubbing Contact Evaluation of Polymers" in Chapter 7. While no attention is given to wear mechanisms, this work is nevertheless an informative and satisfying discussion of unlubricated wear of polymers in such applications as seals, rings, guides, etc.

An interesting and expert review of "Wear Properties of Plastics as Ship Bearings" is presented by W. V. Smith but this contribution seems more appropriate to those interested in bearing design and performance than to the general worker in polymer testing.

Finally, chapters on "Cavitation Erosion Resistance" by K. K. Chatten and A. Thiruvengadam and "Surface Properties of Plastics for Sound Recording" by A. M. Max complete the discussion portion of the text. Some 82 pages follow which include selected references on sources of standards and tests, appendices, indexes, and errata for Volumes 1 and 2.

Overall, the book represents a useful contribution to the field of polymer testing. Its all too frequent lack of depth and completeness does not permit this reviewer to characterize it as an important technical source book for the advanced worker concerned with materials testing and evaluation. The survey nature of the presentations and useful references should provide some assistance to those wishing to initiate programs in polymer testing. For these reasons, it is not recommended for the shelf of the general reader.

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