

Introduction

The symposium on “Physical Testing of Plastics—Correlation with End-Use Performance” from which this volume was taken was organized to provide a forum for the discussion of the types of physical tests necessary to obtain data that are relevant to the intended application. Subcommittee D-20.10 on Mechanical Properties (of Plastics), under whose direction this symposium was organized, believed that such discussions were necessary because the concept of physical testing has been oversimplified in materials supplier’s typical value tables. A major theme of the symposium and this volume is that physical properties needed for end-use applications must be relevant and cannot be presented as simple unchanging values that universally describe material behavior or component performance. Predictive testing rationale must consider both how properties change with time, temperature, and environment and how the boundary conditions and input excitations influence observed behavior. The evaluation of physical properties from the viewpoint of obtaining critical engineering data needs to be understood. This volume is a compilation of papers describing several types of procedures that exemplify how one analyzes the end-use requirements and correctly chooses tests and conditions.

Moreover, this volume is unique because emphasis is placed on the special rationale and philosophy required in making such measurements compared to testing employed for quality assurance, basic property studies and typical value data. Although the areas discussed are clearly not complete, the papers should describe for the reader the kind of considerations necessary to measure physical properties that govern the selection of any particular plastic for a specific application. The papers presented here have been successful both in illustrating various problems and in presenting some potential solutions. This book should be useful to both the physical testing experimentalist in developing meaningful physical data and the designer in requesting and selecting data relevant to the end-use application. Hopefully, it will serve to stimulate both groups and encourage closer liaison between the two disciplines. In addition, polymer chemists and physicists, materials scientists and engineers as well as applications engineers and any others who need to understand and apply test data should benefit from this volume. If the philosophy and methodology presented in this book are accepted, relevant data necessary to establish suitability of a material for a given end-use application will result. It is hoped that

this volume will initiate the first step required for the adoption of an interdisciplinary approach to the development of guidelines necessary for the successful application of plastics as principal end-use materials for products in many different industries.

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