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Blow Molding Handbook

Technology, Performance, Markets, Economics. The Complete Blow Molding Operation.

3-446-22017-8

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Preface

This second edition has been written to update the subject of blow molding (BM) in the plastics industry. Many examples are provided of the BM processes using different plastics and relating them to critical factors, ranging from product designs to meeting performance requirements to reducing costs to zero defect targets. Detailed explanations and interpretations of individual topics are provided that include the operation of the basic extrusion and injection molding machines that are vital to successful BM products. Throughout the book there is comprehensive information on problems and solutions as well as extensive cross-referencing.

This book provides important details on fabricating the different types of BM products that includes the newer techniques. In addition it provides information and details (including operation and troubleshooting) on the basic extruders and injection molding machines that are required and important to successfully BM products.

In the manufacture of BM products there is always a challenge to utilize advanced techniques that includes, as reviewed in this book, understanding the different plastic melt flow behaviors, operational monitoring and control systems, testing and quality control, statistical analysis, and so on. However, these techniques are helpful only if the basic operations of molding are understood and characterized, to ensure the elimination or significant reduction of potential problems.

The book provides an understanding on the subject of BM for either the technical or nontechnical reader that is concise, practical, and comprehensive, starting with the plastic's melt flow behavior during processing. It is useful to different people including the fabricator, mold maker, designer, engineer, maintenance person, accountant, plant manager, testing and quality control individual, statistician, cost estimator, sales and marketing personnel, new venture individual, buyer, vendor, educator/trainer, workshop leader, librarian/information provider, lawyer, consultant, and others. People with different interests can focus on and interrelate across subjects with which they have limited or no familiarity. As explained throughout this book, understanding the BM process is required to be successful in the design, prototype, and manufacture of the many different, marketable BM products worldwide.

What makes this book unique is that the reader will have a useful reference of pertinent information readily available. As reviewers have commented, the information contained in the book is of value to even the most experienced fabricators,

designers, and engineers; it also provides a firm basis for the beginner. The intent is to provide a complete review of the important aspects of the BM process that goes from the practical to the theoretical, and from the elementary to the advanced.

This book can provide people not familiar with BM with an understanding of how to fabricate products in order to obtain its benefits and advantages. It also provides information on the usual costly pitfalls or problems that can develop, resulting in poor product performances or failures. Accompanying the extensive problems listed are solutions. This information will enhance the intuitive skills of those people who are already working in plastics. The emphasis in this book is in providing a guide to understanding this worldwide technology and profitable business of BM products.

From a pragmatic standpoint, any theoretical aspect that is presented has been prepared so that it is understood and useful. The theorist, for example, will gain an insight into the limitations that exist relative to other materials such as steel, wood, and so on. Based on almost a century of worldwide production of all kinds of BM products, they can be processed successfully, meeting high quality, consistency, and profitability standards. One can apply the correct performance factors based on an intelligent understanding of the subject.

This book has been prepared with the awareness that its usefulness will depend on its simplicity and its ability to provide essential information. With the experience gained in working in the BM industry worldwide and in preparing the first edition as well as 23 other books on different aspects of plastics, we are able to provide a useful book. The book meets the criteria of providing a uniquely useful, practical reference work.

Note that the BM industry comprises about 10 wt% of all plastics. In turn the total plastic industry is ranked as the fourth largest industry in the United States. To a greater extent than with other materials, an opportunity will always exist to optimize the use of plastics, as new and useful developments in materials and processing continually are on the horizon. Examples of these developments are in this book, providing past to future trends in BM.

The limited plastics material properties information and data presented are provided as comparative guides; readers can obtain the latest information from material suppliers, industry software and/or as reviewed in this book's reference section. Our focus in the book is to present, interpret, analyze, and interrelate the basic elements of BM to processing plastic products. As explained in this book, even though there are over 35,000 plastic materials worldwide, selecting the right plastic requires applying certain factors. They include defining all product performance requirements, properly setting up or controlling the extrusion and injection molding processes to be used, and intelligently preparing a material specification purchase document and work order to produce the BM product.

New developments in plastic materials and equipment are always on the horizon, requiring updates. With the many varying properties of the different plastics, there are those that meet high performance requirements such as long time creep resistance, fatigue endurance, toughness, and so on. Conversely, the use of other plastics is

driven by volume and low cost. Each of the different materials requires their specific BM operating procedures.

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In preparing this book to ensure its completeness and the correctness of the subjects reviewed, use was made of the authors' worldwide personal, industrial, and teaching experiences totaling over a century, as well as worldwide information from industry (personal contacts, material and equipment suppliers, conferences, books, articles, etc.) and trade associations.

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