A "ready-reference-digest" for everyone involved in design, manufacturing, and application of molds for plastics processing.

The Mold-Making Handbook has proven to be an essential resource for the plastics engineer who handles the design and construction of tools for different processing methods, from injection molding and blow molding, to prototyping tools, including their computer-aided design.

The present edition has been completely updated with new chapters including micro injection molds, molds for the rubber industry, and rapid prototyping. Separate sections describe the tool materials and various manufacturing and processing methods. Each chapter is self-contained; the proposed synergistic effect is achieved especially when the reader not only reads »his« chapter, but is willing to »look outside the box« of his own specialist field.

This handbook is for both the reader who is looking for an introduction to a key area of plastics processing as well as the pronounced specialist to enable quick reading into related technical areas. Written by experts from the industry, the book captures the current state of the technique. The Mold-Making Handbook will prove extremely useful for engineers, designers, processors, technical salesmen, and students interested in all aspects of mold construction.

Contents
Molds for Various Processing Methods
Mold Design
Materials for Tool Making
Manufacturing and Machining Methods
Ordering and Operation of Molds
Prior extrusion books are based on barrel rotation physics - this is the first book that focuses on the actual physics of the process - screw rotation physics. In the first nine chapters, theories and math models are developed. Then, these models are used to solve actual commercial problems in the remainder of the book. Realistic case studies are presented that are unique in that they describe the problem as viewed by a typical plant engineer and provide the actual dimensions of the screws. Overall, there is not a book on the market with this level of detail and disclosure. The new knowledge in this book will be highly useful for production engineers, technical service engineers working with customers, consultants specializing in troubleshooting and process design, and process researchers and designers that are responsible for processes that running at maximum rates and maximum profitability.

Contents:

- Introduction & Troubleshooting
- Polymer Materials
- Introduction to Polymer Rheology for Extrusion
- Resin Physical Properties Related to Processing
- Solids Conveying
- The Melting Process
- Fluid Flow in Metering Channels
- Mixing Processes for Single-Screw Extruders
- Scaling of Single-Screw Extrusion Processes
- Introduction to Troubleshooting the Extrusion Process
- Contaminations in the Finished Product
- Flow Surging
- Rate-Limited Extrusion Processes
- Barrier and High-Performance Screws
- Melt-Fed Extruders

This book will be highly desired by production engineers, technical service engineers working with customers, consultants specializing in troubleshooting and process design, and process researchers and designers that are responsible for processes that running at maximum rates and maximum profitability.
Processors and users of plastics often need to determine the chemical nature of a plastics specimen. This highly practical and useful manual, now in a fifth revised and supplemented edition, will enable you to determine the class of plastic of a particular specimen. No extensive knowledge of chemistry is required and yet it is more complex than a simple tabular compilation. This manual is a handy and highly effective tool for many practical situations. An additional supplement is a chapter that shows strategies for identifying historical plastic objects; this is of particular interest for assemblers and collectors, and conservators.

Contents:
- Plastics and its manifestations
- General information on plastic analysis
- Screening tests
- Testing for heteroelements
- Specific evidence of individual plastics
- Instructions for recognition of historical plastic objects
- Further analysis
- Infrared spectra
- Appendix: Plastic ID chart

The author:
Professor Dietrich Braun was the director of the plastics institute (Deutschen Kunststoff-Instituts (DKI)) in Darmstadt until 2000. He is also the author of many reference books and textbooks. For years, Dr. Braun has chaired workshops in plastics technology for business people as well as for first-time users, which is the basis for this book.

Sales to Foreign Countries: China (CIP)
This book opens up the entire subject of injection mold technology, including numerous special procedures, in an established and practical way. It is specifically intended for beginners, young professionals, business owners, as well as engineering students.

The chapters are clearly structured and easy to understand. The textbook is designed so that it provides a complete basic knowledge of injection molds in chronological order as well as daily guidance and advice. The numerous colored figures allow a rapid understanding of the content, which is especially helpful to the beginner who wants to learn about injection molds quickly.

In the foreground of the description are thermoplastic molds. Divergent processes for thermoset or elastomer molds are explained at the end of each chapter. The book captures the current state of the art and is written by authors from the field.

Written by experts in the field, *Understanding Injection Molds* is the essential short course for newcomers to plastics engineering.

**The authors:**

*Harry Pruner*, a degreed engineer, is the CEO of Pruner Marketing Services GmbH.

*Wolfgang Nesch* was a master toolmaker with the Ferromatik Milacron Company for more than 30 years. He worked in the application technology department for injection mold tools.
The manufacturing process for preparing very thin polymer products has developed into what is arguably the largest outlet for synthetic polymers. The central theme of this volume is the developments in process hardware and operating techniques that permit increasingly high production rates, optimum property development, unusual degrees of molecular orientation, and the coextrusion of multi-layer, multi-component film and sheet. The strong relationships and the interdependence of these developments on the achievements in polymer design, such as rheology and mechanical and optical properties, are also discussed.

Extruder and Screw Design for Film Processing
Dynamics, Heat Transfer and Structure Development in Film Blowing
Kinematics, Dynamics, Crystallization and Physical Properties of Blown Film
Mathematical Modeling of Film Blowing and Die Analysis
Casting Film and Multi-Layer Film Machines
Analysis of Draw Resonance Instability in the Film Casting Process
Multi-Layer Film Machine, Die Structure
Flow Analysis of Thickness Uniformity and Flow Instability in Multi-Layer Dies
Theoretical and Experimental Analyses of Film Deformation Behavior, Die Flow Instability,
Necking Behavior during Melt Casting
Biaxially Oriented Film Machines??
Structure Development during Biaxially Oriented Film Processing and Polymer Design
Theoretical Analysis of Biaxially Oriented Film Processing and Winding
Processing?Structure Development?Film Physical Properties of Biaxially Oriented Film
Super Structure Development of Biaxially Oriented Film
Double Bubble Tubular Film Process, Polymer Design and its Application ?
Optical Film for LCD
Ultra Thin Film for Capacitor of EV and Hybrid Cars
Separator Film for Li-ion Battery
Biaxially Oriented Back Sheet for Solar Batteries
PLA and Bio-degradable Film
The stability and resistance of polymeric materials determine whether they can be utilized in a given application. Authoritative and reliable material information is needed during the material selection process and this information must consider the influences of material manufacturing, compounding and stabilization, processing, part design, use and subsequent disposal/recycling. This book is based on the review of more than 1,200 literature sources and represents a comprehensive overview of the current know-how regarding the stability and resistance of thermoplastics, thermosets, elastomers as well as the most commonly used reinforcements and additives. Extensive tables document material resistance to given media, facilitating appropriate material selection or stabilization for a given application.

Contents Volume 1:
- Principles of Aging
- Testing Methods
- Stabilization
- Influence of Processing and Use
- Resistance to Thermal and Thermal-Oxidative Loads, Weathering, Chemicals, Ionizing Radiation, Microorganisms, Biological Influences, and Mechanical Loads
- Creep and Fatigue of Reinforced Polymers

Contents Volume 2:
- Chemical Resistance Tables
- White Lists of Media Influence (According to DIBt)
- References
- Index

There is no other single resource that combines such extensive data on the behavior of polymeric materials together with exposure to countless chemicals and environments as Resistance and Stability of Polymers. Drs Ehrenstein and Pongratz have successfully compiled many decades of their collective research into a comprehensive treatise that is invaluable to every engineer, designer and processor of polymers. This single source is a must have for anyone who uses, specifies or produces polymeric materials. Paul Gramann
Plastics failure, to a certain extent, is the result of a phenomenal increase in the number and variety of applications in relatively few years. The focus of this book is on actual field and product failures. The treatment is comprehensive, emphasizing cause and prevention. The concept of the interdependence of material, design, and processing is applied to all examples and cases. The "how to" of prevention is brought out as a logical extension of the cause of failure.


**Dr. Myer Ezrin.** Yale 1953 Chemistry, retired from the University of Connecticut-Institute of Materials Science (UCONN-IMS) in 2006. He directed an industrial failure analysis and support program for metals, ceramics, and polymers. He specializes in plastics failure analysis and plastics compositional analysis. At retirement he had 55 years experience in industry and academia, including patent infringement litigation, solar panels, and electrical insulation. Industrial employment was at DuPont, Monsanto, and Springborn Laboratories (plastics consulting).
Given the importance of injection molding as a process as well as the simulation industry that supports it, there was a need for a book that deals solely with the modeling and simulation of injection molding. This book meets that need. The modeling and simulation details of filling, packing, residual stress, shrinkage, and warpage of amorphous, semi-crystalline, and fiber-filled materials are described. This book is essential for simulation software users, as well as for graduate students and researchers who are interested in enhancing simulation. And for the specialist, numerous appendices provide detailed information on the topics discussed in the chapters.

**Contents:**


**Peter Kennedy** studied Mathematics and Education at Melbourne and La Trobe Universities and has a Doctorate in Mechanical Engineering from the Technical University of Eindhoven. After teaching high school mathematics Peter joined Moldflow, the first commercial company to provide simulation software for injection molding. During a total time of 22 years at Moldflow he worked in various positions related to molding simulation and the development of the company’s key technologies through internally directed research programs and cooperative projects with academic and industrial research organizations.

**Rong Zheng** is an Australian citizen and was born in Xiamen, China. He obtained a BSc in Mechanical Engineering in 1982 and a Master degree in Polymer Processing in 1985 at South China University of Technology and a PhD in Computational Rheology in 1991 at The University of Sydney, where he continued as a Post-doctoral Fellow from 1991-1993. From 1993 to 2009, he was working in Moldflow Pty. Ltd. (now Autodesk) on research and development of science-based technology for modeling and simulation of injection molding, and was involved as a Chief/Partner Investigator in several collaborative research projects between Moldflow and Universities. He is currently an Adjunct Associate Professor of Mechanical Engineering at the University of Sydney.
Rapid growth and development in plastics production and application created a demand for meaningful measuring and analysis methods in polymer testing. Advances in electronic measuring techniques led to further developments in classic testing methods as well as to completely new methods, for which the first edition of Polymer Testing was written.

Considerable advances in the evaluation of structure-property correlations and standardization have taken place since the first edition of Polymer Testing, so the book has been comprehensively revised. This updated edition covers the latest developments in the field, including amendments to the most important polymer testing standards.

Included in this edition is essential information about damage processes and deformation mechanisms that can be discovered with the help of coupled non-destructive polymer testing methods and hybrid methods of polymer diagnostics, respectively. Numerous examples for the optimization of polymers and their composites and the assessment of component properties provide a material science focused insight into modern polymer testing.

Contents:
- Preparation of Specimens
- Determining Process-Related Properties
- Mechanical Properties of Polymers
- Fracture Toughness Measurements in Engineering Plastics
- Testing of Physical Properties
- Evaluating Environmental Stress Cracking Resistance
- Non-Destructive Polymer Testing
- Hybrid Methods of Polymer Diagnostics
- Testing of Composite Materials
- Technological Testing Methods
- Testing of Microcomponents
Initially published "to bridge the gap between theory and practice in extrusion," this 5th edition of Polymer Extrusion continues to serve the practicing polymer engineer and chemist, providing the theoretical and the practical tools for successful extrusion operations. In its revised and expanded form, it also incorporates the many new developments in extrusion theory and machinery over the last years.

Contents
Different Types of Extruders
Extruder Hardware
Instrumentation and Control
Fundamental Principles
Important Polymer Properties
Functional Process Analysis
Extruder Screw Design
Die Design
Twin Screw Extruders
Troubleshooting Extruders
Modeling and Simulation of the Extrusion Process
Many challenges confront the rubber technologist in the development, manufacture, and use of rubber products. These challenges include selecting and combining materials to form rubber compounds suitable for processing, successfully operating a range of manufacturing equipment, and meeting product performance in difficult and diverse environments. Case studies and literature references relate problem solutions to the everyday experience of the rubber technologist. From materials to processes to products, this book identifies many different rubber-related problems and suggests approaches to solve them.

Contents:
• TSE and TPE Materials, Compounds, Processes, and Products
• TSE Materials and Compounds
• TSE Processes and Equipment
• TSE Products
• TPE Materials and Compounds
• TPE Processes and Equipment
• TPE Products
Three-dimensional molded interconnect devices (MIDs) enable mechanical, electronic, optical, thermal and fluidic functions to be integrated into injection-molded components. Function integration on this scale goes hand in hand with a high level of geometrical design freedom and opportunities for miniaturization, plus the associated reduction in weight and savings on product costs. MIDs are made primarily of recyclable thermoplastics, so they are more environmentally compatible than alternatives produced using other available technologies.

MIDs are used in virtually every sector of electronics. The many standard applications for MIDs in the automotive industry in particular also drive for further development and research into MID technology. The significance of MID technology is also increasing in medical engineering, IT and telecommunications and in industrial automation, with numerous applications now successfully implemented in all these various fields.

This book offers a comprehensive insight into the state of the art in 3D-MID technology along the entire process chain. Individual chapters, moreover, deal with systematics of targeted development of MID parts and explore, with a dozen and more successful series-production applications as examples, the widely diverse fields of application for MID technology.
Hook and loop fasteners, widely known by the trade name Velcro, belong to the group of solvable connections; the connection can be tied or untied in seconds.

The fastening can be accomplished by a combination of ribbons, where one ribbon has the hooks and the other the loops, or of pressure caps. Pressure caps make the connection by undercutting mushroom heads or similar geometries. The fasteners are made with synthetic materials with distinct flexibility that, in turn, influences the force that holds the components together and allows the separation. The various forms and combinations of the materials also determine the applications. Hook and loop fasteners are widely used for permanent and temporary connections, locking items into position, securing in the textile and shoe industry, in medicine, and transportation applications.

This the first book that describes the various materials and forms, the fabrication, the achievable forces for shear, scalping, tensile stresses, the testing methods, and typical applications of these modern fasteners.
"Short History of Plastics" is a great book for all who are interested in the emergence of plastics and their present significance. It strikes the exact balance of non-fiction and textbook and is relevant for the engineer as well as the art student.

The entire history of plastics, the most recent family of materials, is told in its progression from the Old Age to the present. It starts with a short introduction of the technical terms and the development of plastics. Next it goes through the periods of the history of plastics and describes the developed and technically used products, considering the social and technical development of the time. A timetable with important years and names pertinent to the history of plastics provides a great amount of information at a glance.

The Author:
Professor Dietrich Braun was the leader of the German Plastics Institute (DKI) in Darmstadt until the year 2000. For many years he conducted classes for business people and professional starters about plastics technology; he wrote many technical books and textbooks. Presently Professor Braun is the president of the Plastics Museum Society in Düsseldorf.
The compact and appealing design of the 31st edition of the plastics pocketbook does it again. It gives the reader the complete and updated knowledge of plastics: its properties, processing, and applications. It is a best-seller in the German literature of plastics. It is useful for the novice in the industry and the pro in the field. The book delivers the latest news and developments in the plastics technology.

Contents:

- Makeup of Plastics
- Properties and Testing
- Plastics Processing
- Material and Processing Oriented Construction
- Description of Plastics
- Comparison of Plastics (Benchmark Tables, Diagrams)
- Application of Semi-finished Plastics
The book presents the reader with a complete sequence of the individual dressing steps of a molding tool and with many other pieces of background information, advice, practical examples, and tips. It spans from the placement of an order of a molding tool to the commissioning of serial production.

The main topics are the structured approach of mold dressing and conditioning. It takes into account energy efficiency, documentation and communication, dressing analysis, and finding optimal machine settings through a strategic approach. It also addresses other methods to control the injection molding machine, process optimization with subsequent investigation of the process capability, and a process "run & rate."

The author, Andreas Schötz, a degreed engineer, worked several years in the areas of molding tool preparation and process optimization. He then studied plastics technology at the department of Engineering Sciences of the University of Rosenheim. Since August 2010 Andreas Schötz has been with the Gentner Plastics Processing GmbH as a process and development engineer.
This book is in its 3rd printing and gives a practical and easy-to-understand account of the injection molding process, the settings on the machine, and the production of high-quality injection molded parts.

The updated and expanded text gives know-how to the set-up person on the machine and clear advice for the optimization of the process. Each experienced machine operator is aware that a targeted manipulation of the machine data does not necessarily lead to a decisive process improvement. Yet it is advisable to use standard machine settings in order to make test runs and then to manipulate the process parameters to optimize the result.

The author goes into great detail in his description of special processes and the applicable relevant physical basics. The chapter "The Leap For Quality" describes how to document all pertinent information that lead to a quality result and what tools are available to optimize the quality of the product. These include artificial intelligence (SPC, EVOP).

The book gives easy-to-understand answers to the questions, "How does injection molding work, how must the machine be set up, and how does one yield a high-quality injection molded part?"

The Author: Professor Jaroschek worked for 10 years as the head of the department "Application Technology and Process Development" of a well known manufacturer of injection molding machines. Today he teaches at the department Mechanical Engineering at the University of Applied Science Bielefeld.


Comprehensive Handbook and Reference Book for Caoutchouc Technology

"Caoutchouc Technology" describes the manufacturing, processing, and application of caoutchouc and elastomers and additionally gives an account for the behavior of viscous-elastic materials. The unique properties of these materials require the combined knowledge of the chemist, physicist, and engineer.

This is the 3rd printing of the industry standard with an updated and expanded content. It is a comprehensive work that combines all aspects of this versatile, multi-discipline subject and the immanent interdependencies. The added chapters relate to: numeric simulation, blend analysis, and products.

The book has been written by specialists in the field; it is useful for starters in the industry and for continuous education. It helps with problems in daily work and is a great reference.

The authors:
Prof. Fritz Röthemayer has worked as an engineer for two large polymer manufacturers. In his last job he was the head of combined process technology at the ContiTech/Continental AG.

Prof. Franz Sommer worked from 1970 until 2000 in multiple functions for the Semperit AG in Traiskirchen and Wimpassing. His last function was as the leader of research and development for the Semperit Technical Products GmbH. Since 2000 Prof. Sommer has worked as a forensic expert in caoutchouc and rubber.