Injection molding for professionals

2nd edition
ISBN: 978-3-446-47960-9
Pages : 240
Publication date: **May 2024**

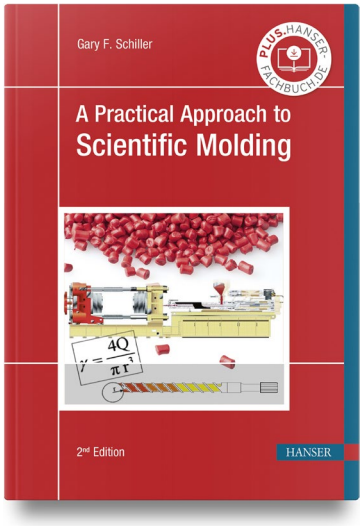
The complete injection molding process explained in a practical and easy-to-understand way

Practical and easy to understand, this fifth edition of the book describes the injection molding process, the settings of the injection molding machine and the production of high-quality injection molded parts.

The book is intended as a guide for machine setters and provides clear instructions for process optimization. Experienced setters are familiar with the problem that a decisive improvement in the process is not necessarily achieved even with targeted changes to the machine settings. Nevertheless, it is possible to test the process with standard settings on the machine and optimize it by changing the process parameters.

The common special processes are described in detail and the necessary additional physical principles are explained. The chapter "The final steps to quality" describes how quality can be documented and which tools are available for quality optimization. This also includes artificial intelligence (SPC, EVOP).
How does injection molding work, how d
o you set up the machine, how do you produce a high-quality injection molded part? - The book conveys all this in a simple form.

New in the 5th edition are the use of recyclates and necessary measures to ensure quality in the event of inevitable material batch changes as well as measures to reduce energy consumption during injection molding, especially with regard to process settings.



A Practical Approach to Scientific Molding

2nd Edition

ISBN: 978-1-56990-203-5
Pages: 191
Publication date: **January 2024**

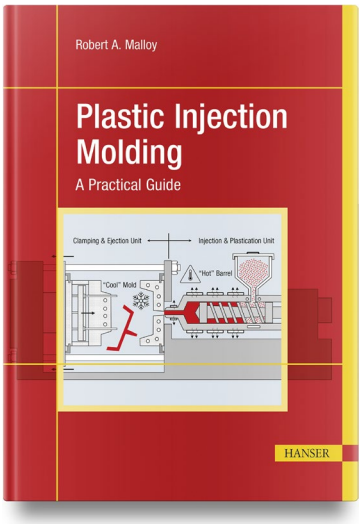
All information needed to implement a scientific molding program in an easy-to-understand guide

It is a hands-on reference for people on the molding floor, including those previously lacking theoretical background or formal education. The book covers how the injection molding machine prepares the plastic and understanding of plastic flow. The functions of the main machine components are explained and understanding of correct procedures and testing is developed. Each step of the process is clearly explained in a step-by-step manner, and simple examples of important calculations are provided. The practical approach is augmented by useful guides for troubleshooting and machine set-up.

The 2nd edition has a new chapter covering the effects of making specific changes to the process, as well as a number of other improvements throughout. Bonus download included: Excel spreadsheet with tests for process and machine performance.

Contents

- Injection Unit: Screw, Injection Unit: Barrel
- Clamping Unit
- Ejectors/Controllers, Human Machine Interface (HMI)
- Machine Performance Testing
- Process Development Test
- Plastic Temperature
- Plastic Flow, Plastic Pressure (Pack/Hold)
- Cooling, Benchmarking the Injection Molding Process
- Process Troubleshooting
- What is Important on a Set-Up Sheet?, Commonly Used Conversion Factors and Formulas, Machine Set-Up, Things That Hurt the Bottom Line of a Company
- Terms and Definitions



Plastic Injection Molding

A Practical Guide

ISBN: 978-1-56990-879-2
Pages: 350
Publication date: **September 2024**

A practical guide to injection molding based on sound engineering fundamentals

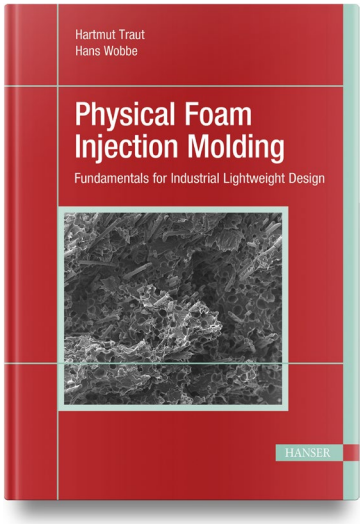
It is an ideal course book for mechanical engineers with limited plastic material and injection molding experience, but is also well applicable to self-study or reference.

It starts with an overview of plastic material fundamentals. Each section includes material considerations associated with the injection molding process. For example, the molecular weight section shows that use of lower molecular weight plastics are commonly used for the injection molding to minimize orientation, reduce fill time, improve knit line strength. Then, the basics of the injection molding machine, tooling, auxiliary equipment and molding process are introduced. The machine components and component selection for a given application are next considered in more detail.

The process/procedure for establishing optimum process conditions for a “new” mold and material (not run previously by the reader) are next described. Finally, a range of other more specialized injection molding processes that are still of practical importance are covered.

From a leading author and educator in the area of injection molding, this book gives engineers and process technicians the knowledge and confidence they need to produce high-quality parts reliably and efficiently.

Contents:



Physical Foam Injection Molding

Fundamentals for Industrial Lightweight Design

ISBN: 978-1-56990-941-6
Pages: 240
Publication date: **May 2024**

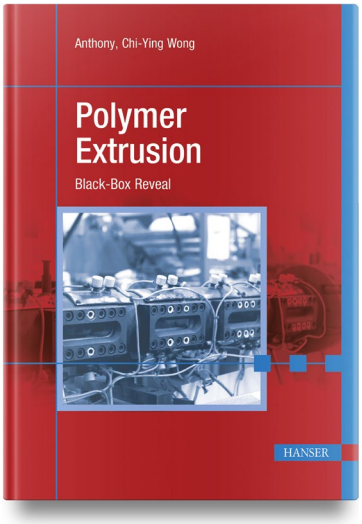
Foam injection molding is an important process for economic production of plastic parts for lightweight design

For the part designer, the focus is on the functionality of the molded part, not on the plastic-compatible design, which is precisely what compact injection molding requires. This book describes the necessary fundamentals of physical foam injection molding, clearly illustrated by means of detailed, industrially proven examples to show the technology's potential. Machine and mold technology are also explained in detail, and polymers suitable for the process are discussed. The focus is always on the question of whether the potential of physical foam injection molding has already been exhausted or whether it is emerging as a second standard process alongside compact injection molding.

The experienced authors make it possible to look beyond the end of one's nose. The reader can see which plastic parts can be converted from compact to foam injection molding, and is encouraged to rethink the part design. With this book, specialists are able to examine an application for their own company and analyze it with regard to its economic implementation. However, the book also shows the clear limitations of this technology.

Content:

Foam Injection Molding and its Different Process Variants
Definition and Characteristics of Physical Foam Injection Molding
Design Guidelines for Foamed Components
Polymers for Foam Injection Molding
Process Simulation, Mechanical Fundamentals of the Foam Injection Molding System
Mold Technology
Application Examples: Automotive/Household/Packaging/Medical



Polymer Extrusion

Black-Box Reveal

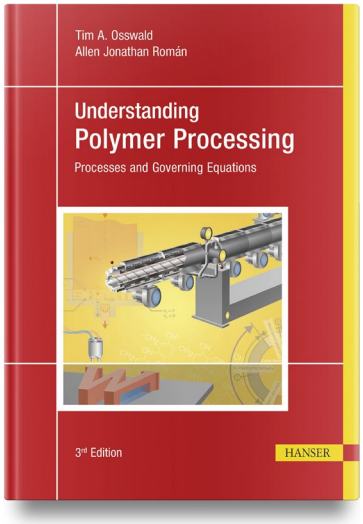
ISBN: 978-1-56990-917-1
Pages : 194
Publication date: **April 2024**

Plastics extrusion is one of the most important industrial processes worldwide

Over past decades, understanding of extrusion technologies has advanced by the global research efforts, but, due to the fact that the metal barrel hinders direct visualizations to be made by the naked eye, the "true" dynamic processing characteristics of extrusion processes remain unclear. Analytical attempts have thus been carried out either by indirect, static empirical approaches or theoretical mathematical analyses. None of them offer a realistic depiction of what takes place inside the barrel during an extrusion process. As such, the barrel can be considered as a "black-box".

This book reveals the "true" dynamic extrusion processing characteristics, accumulated from years of research experience based on the novel visualization technique developed by Professor Zhu of the Beijing University of Chemical Technology. The qualitative discussions within provide not only insight into the scientific aspects of the subject, but also information of practical significance for those in the industry who need to perform process and hardware designs and optimizations.

Included are conventional mathematical representations of the single- and twin-screw extrusion technologies. This provides a comprehensive foundation for undergraduate courses in, e.g., plastics processing engineering. Other topics covered are specifically selected to provide a comprehensive technical and market-trend background to readers at all levels. The current status and future potential of sustainable and biodegradable polymers are also emphasized.



Understanding Polymer Processing

Processes and Governing Equations
3th edition
ISBN: 978-1-56990-922-5
Pages: 416
Publication date: **June 2024**

Popular introductory book on polymer processing, covering polymeric materials, polymer processing, and modeling

This book provides the background needed to understand not only the wide field of polymer processing, but also the emerging technologies associated with the plastics industry in the 21st century. It combines practical engineering concepts with modeling of realistic polymer processes. Divided into three sections, it provides the reader with a solid knowledge base in polymer materials, polymer processing, and modeling. "**Understanding Polymer Processing**" is intended for the person who is entering the plastics manufacturing industry and as a textbook for students taking an introductory course in polymer processing. It also serves as a guide to the practicing engineer when choosing a process, determining important parameters and factors during the early stages of process design, and when optimizing such a process. Practical examples illustrating basic concepts are presented throughout the book. **New in the third edition** are chapters on data-driven modeling and physics-driven modeling, as well as new sections on manufacturing and dimentional analysis. In addition to a number of other smaller improvements and corrections throughout the book, bonus code downloads are also providided.

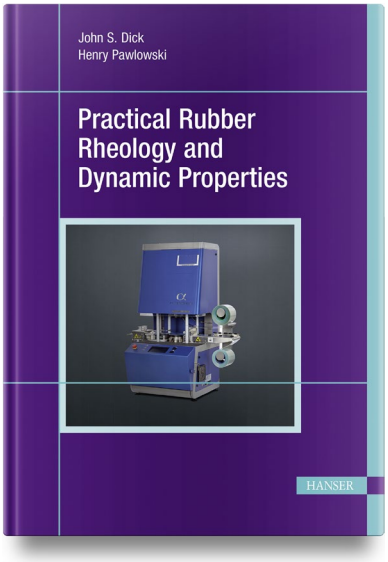
Contents:

Part I: Polymeric Materials
This section gives a general introduction to polymers, including mechanical behavior of polymers and melt rheology.

Part II: Polymer Processing
The major polymer processes are introduced in this section, including extrusion, mixing, injection molding, thermoforming, blow molding, film blowing, and many others.

Part III: Modeling
This last section delivers the tools to allow the engineer to solve back-of-the-envelope polymer processing models. It includes dimensional analysis and scaling, transport phenomena in polymer processing, and modeling polymer processes.

Contact: Gabriele.Josiger@hanser.de



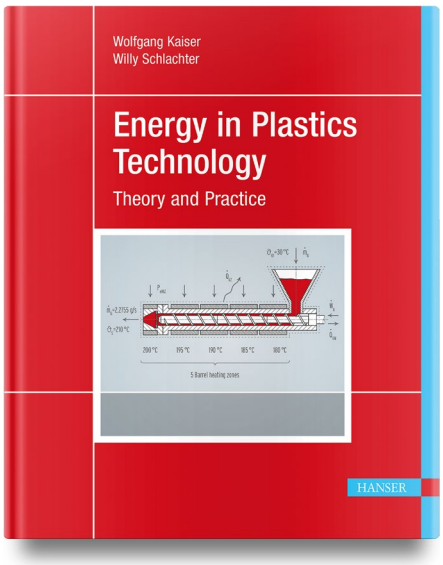
Practical Rubber Rheology and Dynamic Properties

ISBN: 978-1-56990-617-0
Pages: 368
Publication date: **October 2023**

Unique overview of rubber rheology from a practical viewpoint

"Practical Rubber Rheology and Dynamic Properties" provides a unique overview of rubber rheology from a practical perspective. Written by expert authors with many years of experience in the rubber industry, it focuses on applications of rubber rheology testing to solving industrial problems, rubber compound development, predicting changes in processability in the plant, quality assurance, and research and development. However, basic principles are also covered.

Aimed at practitioners in the rubber industry, this book promotes understanding of the material to support efficient production of the high-quality rubber products demanded in today's market. It is also suitable for students and their instructors on rubber courses taught in universities.



Energy in Plastics Technology

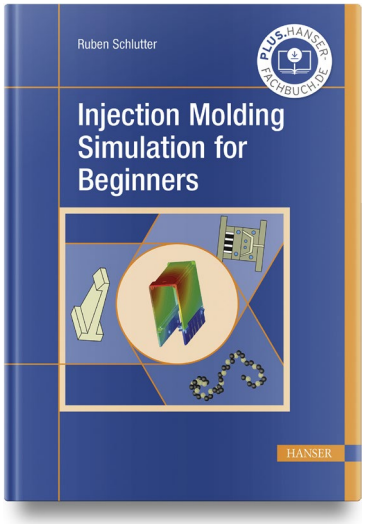
Fundamentals and Applications for Engineers

ISBN: 978-1-56990-898-3

Unique coverage of this topic from highly experienced experts

Energy in Plastics Technology provides, unlike any other book, the necessary fundamentals for dealing with thermotechnical issues in the processing of plastics, leading to efficient, robust, reliable, economical, and environmentally friendly processes for high-quality products.

Contents:
Part 1 – Introductory Fundamentals: Introduction, Material Behavior of Plastics, Thermodynamics, Fluid Mechanics I, Heat Transfer
Part 2 – Advanced Fundamentals: Steady-State Heat Conduction, Transient Heat Conduction, Thermodynamics of Air-Drying, Fluid Mechanics II, Recycling of Plastics
Part 3 – Practical Examples

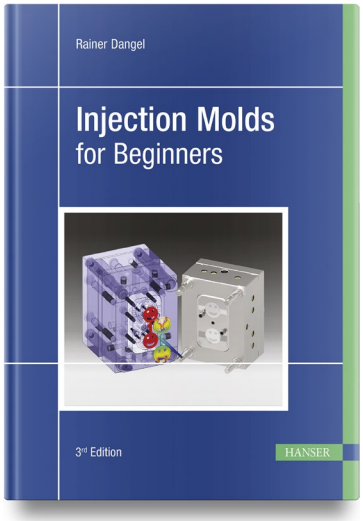


Injection Molding Simulation for Beginners

ISBN: 978-1-56990-926-3

up-to-date, platform-independent introduction to injection molding simulation

The content is structured and conveyed within an engineering framework. Complicated mathematical derivations are avoided as far as possible.
The necessary environment of the injection molding simulation is illuminated alongside, so that the creation of a suitable simulation model, the knowledge of the model-specific limits, and the interpretation of the results are possible. Guidance is also provided regarding the interpretation of results so that they can be better evaluated quantitatively.
The book is designed as a textbook and thus is suitable to accompany courses covering injection molding simulation.

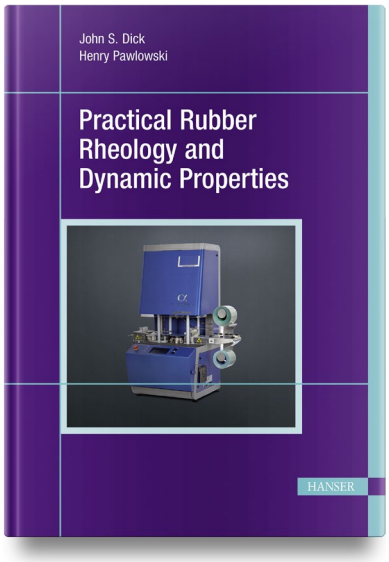


Injection Molds for Beginners, 3rd Ed.

ISBN: 978-1-56990-911-9

A unique work for beginners in mold-making

This applications-oriented book describes the construction of an injection mold from the ground up. Included are explanations of the individual types of molds, components, and technical terms; design procedures; techniques, tips, and tricks in the construction of an injection mold; and pros and cons of various solutions.
Based on a plastic part ("bowl with lid") specially developed for this book, easily understandable text and many illustrative pictures and drawings provide the necessary knowledge for practical implementation. Step by step, the plastic part is modified and enhanced. The technologies and designs that are additionally needed for an injection mold are described by engineering drawings. Maintenance and repair, and essential manufacturing techniques are also discussed.



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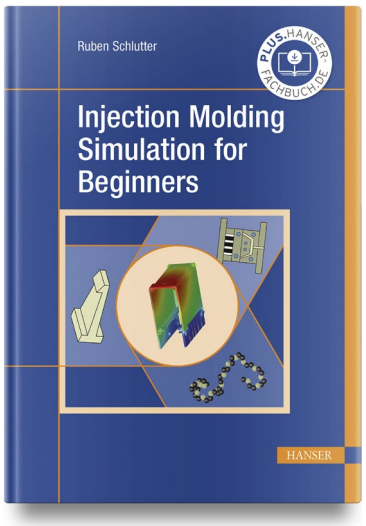

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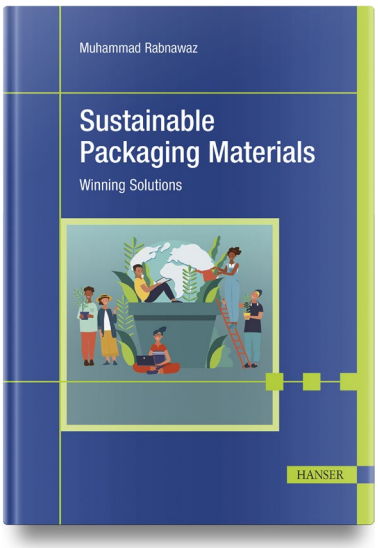

Sustainable Packaging Materials Winning Solutions

ISBN: 978-1-56990-162-5

A unique work for beginners in mold-making

This applications-oriented book describes the construction of an injection mold from the ground up. Included are explanations of the individual types of molds, components, and technical terms; design procedures; techniques, tips, and tricks in the construction of an injection mold; and pros and cons of various solutions.
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Plastics chemistry for engineers

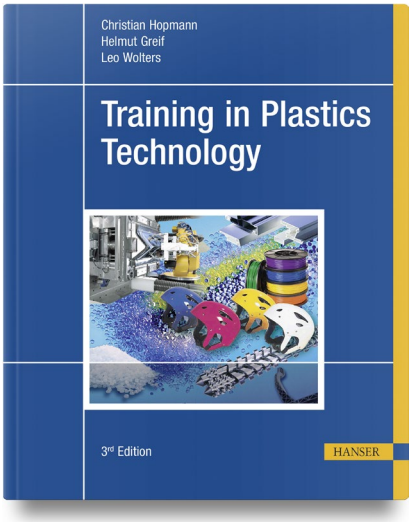
From synthesis to application

ISBN: 978-3-446-47798-8

The standard work

If you want to understand plastics, their properties, processing and applications from the ground up, you have to get to grips with their chemistry. This reference book, which has been tried and tested for years, makes it easy for engineers to get to grips with this exciting subject. It is clearly written, technically sound and fundamental.

The chemical equations used to describe polymer syntheses are based on the industrial processes used by raw material producers. The resulting insight into the chemistry of polymers therefore remains practical despite all the theory. This helps engineers to better understand the special features of plastics as a class of materials in their own right. **The sixth edition** has been updated, particularly in the areas of sustainability, recycling and environmental protection, and a new chapter has been added,as these topics will shape all future developments.



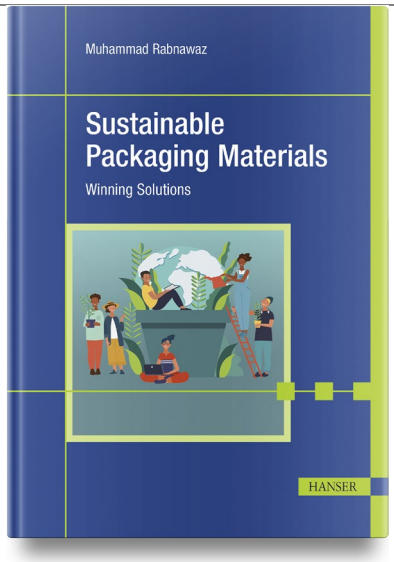
Training in Plastics Technology

ISBN: 978-1-56990-910-2

The definitive entry-level plastics technology textbook

This text- and workbook provides a clearly written, comprehensive introduction to the major topics associated with plastics technology, from basic chemistry and processing methods to the problem of waste and the issue of recycling plastics.

Guiding questions at the beginning of each lesson help the reader to work through the material in a targeted manner; success checks at the end of each lesson enable the reader to review what he/she has learned. It thus facilitates independent, self-paced learning, meeting the requirements of modern vocational training.



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Sampling of injection molds

Structured and analytical approach

ISBN: 978-3-446-47564-9

The only book on the subject of injection mold sampling

Everything you need to know for a sample inspection
The book accompanies you from the placing of an order for a sampling up to the handover to series production. The complete sequence of the individual sampling steps, lots of background information, notes, practical examples, practical tips and the colorful design convey the sampling procedure in a simple way. The main topics covered are the structured procedure of a mold sampling, taking into account energy efficiency, documentation and communication, a mold sampling analysis, optimum machine setup using strategic procedures and methods on the injection molding machine, process optimization with subsequent investigation of process capability, and a Run@Rate process.

Location advantage clean room technology

With know-how from today to the technologies of tomorrow

ISBN: 978-3-446-47682-0

General overview of modern cleanroom technology

This book provides a general overview of modern cleanroom technology. Written by a leading expert and pioneer in the field, it is intended as a reader-friendly introduction for newcomers and an inspiration for experienced practitioners.
The book covers historical development as well as key aspects of planning, personnel, and training. It then discusses a wide range of applications, including those where microbiological exclusion is required (hospital, medical, pharmaceutical, food) and those where particle exclusion is required (automotive, semiconductor, plastics processing, aerospace).

Disruptive 3D Printing

ISBN: 978-1-56990-918-8

New Business Models through Industrial 3D Printing

This book unites the two sides of additive manufacturing: 1) the technical aspect of 3D printing of very different materials and 2) the disruptive consequences for value chains between producers, intermediaries, and customers due to modern business models. This is because 3D printing breaks with many existing business models: companies take over functions from their previous suppliers (following the "do-it-yourself" trend), intermediaries lose their livelihood (so-called "disintermediation"), manufacturers move their production to decentralized locations (e.g., retailers, car dealerships, or hospitals, so-called "decentralized production"), and (end) customers become much more intensive "prosumers" than marketing (as creator of this term) could ever imagine.