

# HANSER

## Plastics Technology

### Books for Industry, Science and Education



**Processing & Manufacturing**  
**Design**  
**Materials**

## RIGHTS GUIDE

### June – December 2017



### Introduction to Plastics Processing (in German language)

8<sup>th</sup> revised edition

ISBN: [978-3-446-45355-5](https://www.hanser.de/978-3-446-45355-5)

338 pages, paperback

Publication date: May 2017

#### Successful for over 40 years

This is the 8th edition of the textbook for professionals in industry and trades, but it is also well suited for self-study. The book provides a comprehensive overview of the essential plastic application processes, how they function and their process-technological backgrounds. The text uses many examples and images in order to create a basic understanding. It generates a fascination of the potential of plastics technology.

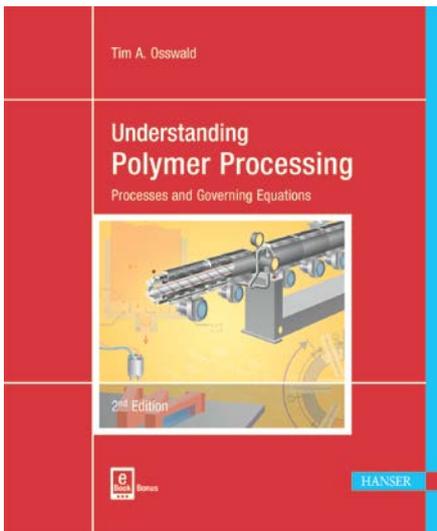
**The new edition incorporates new developments and some subjects have been newly organized.** One new chapter is devoted to the important subject of elastomer processing in a compact and comprehensive form. Another new chapter deals with the processing of polyurethanes.

#### Contents:

- Composition and Classification of Plastics
- Physical Properties
- Material Science
- Conditioning
- Processing Applications
- Refinement Technologies
- Recycling

**Professor Christian Hopmann** is the chairman of the Institute for Plastics Processing (IKV) in Industry and Trade at the RWTH Aachen since April 2011.

**Professor Walter Michaeli** held this position at the IKV for 23 very successful years. He left in 2011 when he reached retirement age.



### Understanding Polymer Processing Processes and Governing Equations

2<sup>nd</sup> edition

ISBN: [978-1-56990-647-7](https://www.hanser.de/978-1-56990-647-7)

320 pages, Paperback, full color

Publication date: **October 2017**

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 second edition** is a chapter on additive manufacturing, together with associated examples, as well as improvements and corrections throughout the book.

#### Contents:

##### **Part I - Polymeric Materials**

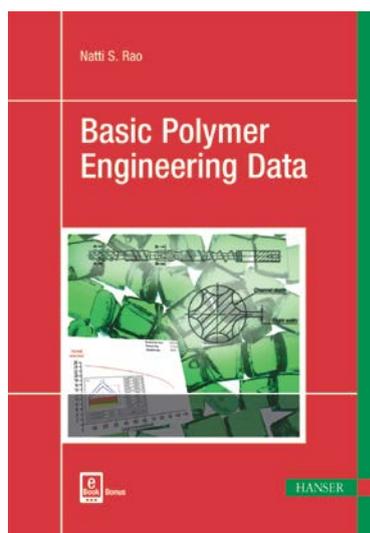
This section gives a general introduction to polymers, including mechanical behavior of polymers and melt rheology

##### **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



### Basic Polymer Engineering Data

1st edition

ISBN: [978-1-56990-649-1](https://www.hanser.de/978-1-56990-649-1)

264 pages, Hardcover

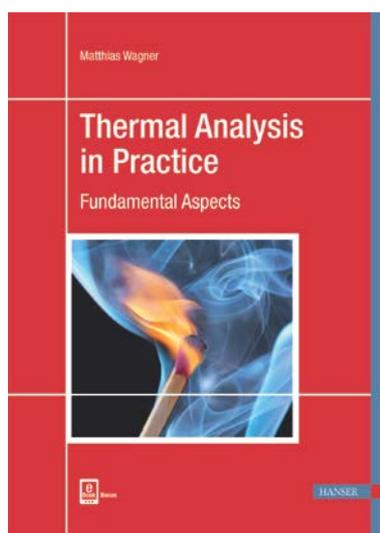
Publication date: August 2017

**Much more than a data reference**, this book shows how to apply basic design data to solve practical problems in polymer engineering, via numerous examples. It uniquely offers both resin and up-to-date machine design data in a concise format, and shows how resin-compatible polymer processing equipment can be designed by using easily understandable computational procedures based on thermodynamics and rheology.

Basic design data for resins (mechanical, thermal, rheological, electrical, and optical properties), machines, parts, and processes is complemented by demonstrations of how to apply this data for application in extrusion, blown film, thermoforming, and injection molding. It is designed for simplicity, and all calculations can be carried out with a handheld calculator.

With a practical and time-saving approach to problem-solving in plastics processing, which in many cases negates the need for complex and expensive software or databases, this book is a handy tool for beginners, practicing engineers, students, and instructors in the field of plastics technology, and scientists from other fields with an interest in polymer engineering.

**Natti S. Rao** has published over 70 papers and authored six books on designing polymer machinery with the help of computer programs. He holds a Ph.D. in Chemical Engineering from the University of Karlsruhe, Germany, and worked for many years as a senior research assistant with BASF AG. Prior to starting his consulting company in 1987, he worked as a visiting professor at the Indian Institute of Technology, Madras. Besides consulting, he conducts seminars on the computer-aided design of polymer machinery. Dr. Rao has given lectures on polymer engineering at the University of Texas, Austin, and he is presently involved in the Continuing Education Department of UMass Lowell, MA.



**Thermal Analysis in Practice**  
Fundamental Aspects

1st edition

ISBN: [978-1-56990-643-9](https://www.hanser.de/978-1-56990-643-9)

350 pages, Paperback, full color

Publication date: **October 2017**

Thermal analysis comprises a group of techniques used to determine the physical or chemical properties of a substance as it is heated, cooled, or held at constant temperature. It is particularly important for polymer characterization, but also has major application in analysis of pharmaceuticals and foodstuffs.

This comprehensive handbook presents practical and theoretical aspects of the key techniques of DSC, TGA, TMA, DMA, and related methods. It also includes separate chapters on the glass transition, polymers, polymorphism, purity determination, and method development. The large number of practical examples included should inspire readers toward new ideas for applications in their own fields of work. The chapters are independent of one another and can be read individually in any desired order.

Based on years of experience in thermal analysis of users, application specialists, consultants, and course instructors, this book provides practical help to newcomers, inexperienced users, and anyone else interested in the practical aspects of thermal analysis.

**Dr. Matthias Wagner** is product manager in thermal analysis at Mettler-Toledo in Switzerland. He was formerly an applications chemist for material characterization/thermal analysis at Mettler-Toledo. He received his Ph.D. in inorganic chemistry from the University of Zürich.

## Design



**Introduction to Plastics Testing**  
Test, Methods and Applications  
(in German language)  
1<sup>st</sup> edition

ISBN: [978-3-446-44351-8](https://www.hanser.de/978-3-446-44351-8)  
270 pages, paperback  
Publication date: March 2017

### Holistic View of Plastics Testing

Plastics' testing is necessary to qualify polymeric materials and products. It is a stand-alone field within the field of plastics technology. This book explains the most important processes of plastics testing; it describes and explains both, application and procedure.

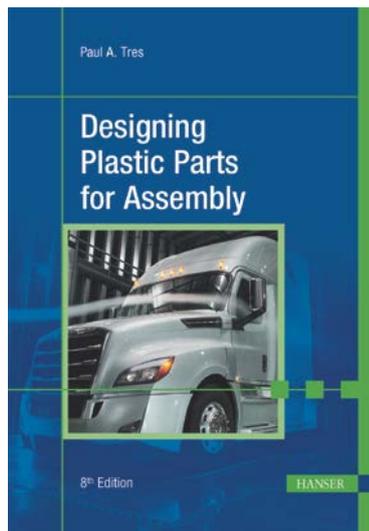
#### To-The-Point and Concise

The text provides the technical knowledge of the most important testing methods, guides for the process of tests and formatting of the test results. The presented information should put the reader in a position to acquire, quantify and solve quality related questions of plastics technology.

#### Written by a Practitioner for the Practitioner

The book has been written for students and practitioners involved in the development, manufacture and quality control of plastic products. It acquaints these groups with the relevant testing methods of plastics.

**Professor Achim Frick** teaches plastics technology at the Aalen University.  
**Claudia Stern, PhD**, has been with the ElringKlinger Kunststofftechnik GmbH in Bietigheim since 2006. She is in charge of development, manufacture and distribution of high-strength thermoplastic materials.



### Designing Plastic Parts for Assembly

8th edition

ISBN: [978-1-56990-668-2](https://www.hanser.de/978-1-56990-668-2)

438 pages, hardcover

Publication date: April 2017

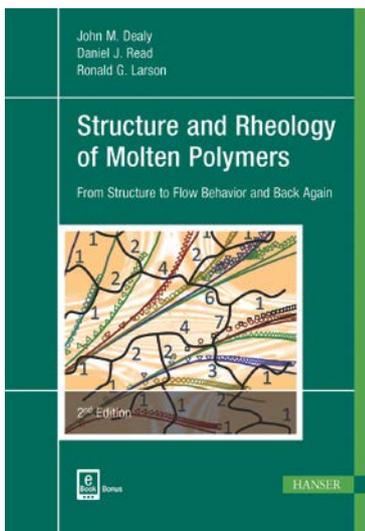
For 23 years, *Designing Plastic Parts for Assembly* has been the definitive guide for both seasoned part designers and novices to the field, facilitating cost-effective design decisions and ensuring that the plastic parts and products will stand up under use.

The detailed yet simplified discussion of material selection, manufacturing techniques, and assembly procedures enables the reader to evaluate plastic materials and design plastic parts with confidence. Good joint design and implementation, the geometry and nature of the component parts, the types of load involved, and other fundamental information necessary for a successful outcome are all included. Throughout, the treatment is practice-oriented and focused on everyday problems and situations.

**The 8th edition** introduces a completely new chapter on fasteners, including discussion and evaluation of thread forming and thread cutting screws, with accompanying examples. New case histories in the fields of elasticity and annular snap fits that illustrate the hazardous consequences of inadequate part design are also included.

#### Contents:

- Understanding Plastic Materials
- Understanding Safety Factors
- Strength of Material for Plastics
- Nonlinear Considerations
- Welding Techniques for Plastics
- Press Fitting
- Living Hinges
- Snap Fitting
- Bonding
- In-Mold Assembly
- Fasteners



## Structure and Rheology of Molten Polymers From Structure to Flow Behavior and Back Again

2nd edition

ISBN: [978-1-56990-611-8](https://www.hanser.de/978-1-56990-611-8)

566 pages, hardcover

Publication date: **October 2017**

Recent advances in polymer science have made it possible to relate quantitatively molecular structure to rheological behavior. At the same time, new methods of synthesis and characterization allow the preparation and structural verification of samples having a range of branched polymeric structures. This book unites this knowledge to enable production of polymers with prescribed processability and end-product properties. Methods of polymer synthesis and characterization are described, starting from fundamentals. The foundations of linear viscoelasticity are introduced, and then the linear behavior of entangled polymers is described in detail. This is followed by a discussion of the molecular modeling of linear behavior. Tube models for both linear and branched polymers are presented. The final two chapters deal with nonlinear rheological behavior and tube models to describe nonlinearity.

**In this second edition**, each chapter has been significantly rewritten to account for recent advances in experimental methods and theoretical modeling. It includes new and updated material on developments in polymer synthesis and characterization, computational algorithms for linear and nonlinear rheology prediction, measurement of nonlinear viscoelasticity, entanglement detection algorithms in molecular dynamics, nonlinear constitutive equations, and instabilities.

### Contents:

- Structure of Polymers
- Polymerization Reactions and Processes
- Linear Viscoelasticity – Fundamentals /- Linear Viscoelasticity - Behavior of Molten Polymers
- Tube Models for Linear Polymers – Fundamentals / Advanced Topics
- Determination of Molecular Weight Distribution Using Rheology
- Tube Models for Branched Polymers
- Nonlinear Viscoelasticity
- Tube Models for Nonlinear Viscoelasticity of Linear and Branched Polymers



### Short History of Plastics (In German language)

2nd edition

ISBN: [978-3-446-44832-2](https://www.hanser.de/978-3-446-44832-2)

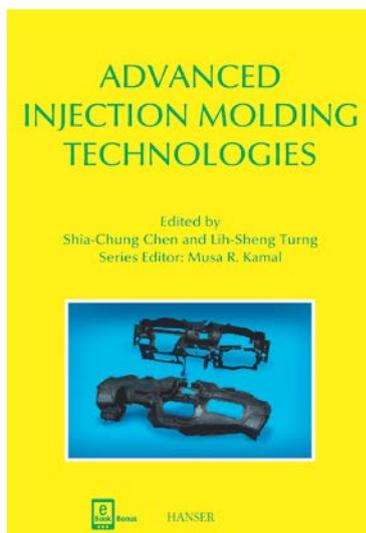
360 pages, hardcover, with Illustrations

Publication date: **August 2017**

"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.

**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.



## Advanced Injection Molding Technologies

1<sup>st</sup> edition

ISBN: [978-1-56990-603-3](https://www.hanser.de/978-1-56990-603-3)

500 pages, hardcover

Publication date: May 2017

### State-of-the-art molding technologies and processes developed in the last decade

In this important work, leading international experts cover the most recent and significant developments in advanced injection molding technologies, such as intelligent process control, emerging special injection molding processes, process visualization, variable mold temperature technologies, and computer-aided engineering (CAE). Also included are applications in optics, micromolding, and medical devices, and integrated knowledge guidance and management systems. It is intended to be used as a must-have reference for professional engineers and engineering managers who want to keep abreast of the latest technological developments and applications, a textbook for both introductory and advanced injection molding courses, and in libraries to serve interested readers from both academic and industrial communities as well as the general public.

**Contents:** ■ Developments of injection molding equipment and processes (Shia-Chung Chen) ■ Intelligent process control of injection molding machines (Furong Gao) ■ Water-assisted injection molding (Shih-Jung Liu) ■ Special injection molding processes (Lih-Sheng Turng) ■ Microcellular injection molding (Chul Park) ■ Water-assisted foaming (Jose Castro) ■ Micro molding (R. D. Chien) ■ Visualization of injection molding (Hide-toshi Yokoi) ■ Measuring technologies of temperature and pressure distributions (Hide-toshi Yokoi) ■ Variable mold temperature technologies (Shia-Chung Chen) ■ Advanced CAE technology (Rong-yeu Chang) ■ Injection molding of optical products (Pei-Jen Wang) ■ Micro and nano injection molded medical devices (L. James Lee) ■ Integrated knowledge guidance and management system for plastics injection mold design and manufacturing (Wen-Ren Jong)

**Professor Shia-Chung Chen** is currently the Vice Chancellor, Chief Executive Officer of Executive Operation Center for Industry-Academia Cooperation, and Professor at Chuang Yuan Christian University in Taiwan.

**Professor Lih-Sheng (Tom) Turng** is Co-Director of the Polymer Engineering Center at University of Wisconsin–Madison.