Springer Handbook of Mechanical Engineering (Springer Handbooks)

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This resource covers all areas of interest for the practicing engineer as well as for the student at various levels and educational institutions. It features the work of authors from all over the world who have contributed their expertise and support the globally working engineer in finding a solution for today‘s mechanical engineering problems. Each subject is discussed in detail and supported by numerous figures and tables.

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Editorial Review

Review

From the reviews:

"This handbook has been conveniently structured into three parts: A. Fundamentals, B. Applications, and C. Complementary Material. … this handbook a truly unique and indispensable information source, a ‘must-have’ for any engineer’s book shelf. The book is of particular help for materials engineers in showing the cross-links to all important key-topics of mechanical engineering." (Materialprüfung Materials Testing, Vol. 51 (3), 2009)

"This massive volume, edited by Grote … and Antonsson (Caltech), and including 92 contributors, is the most up-to-date and most representative of the state-of-the-art in many broad areas encompassed by the field of mechanical engineering. The book contains three parts … . The usefulness of this handbook is hampered by its skimpy index … it has many attributes that make it an important addition to the reference shelf of any library serving a mechanical engineering department. Summing Up: Highly recommended. Upper-division undergraduate through professional collections." (A. M. Strauss, Choice, Vol. 47 (1), September, 2009)

“This handbook on mechanical engineering provides details on … fundamental building blocks of mechanical engineering. … It is broken down into three parts. … Since quite a wide variety of topics is covered in this handbook, it will give students an idea of what is involved in a number of different areas of mechanical engineering and in some electrical engineering specialties. Those not specializing in mechanical engineering but needing to learn the basics as part of their job will also find it useful.” (John S. Shea, IEEE Electrical Insulation Magazine, Vol. 26 (3), May/June, 2010)

From the Back Cover

Mechanical Engineering is a professional engineering discipline which involves the application of principles of physics, design, manufacturing and maintenance of mechanical systems. It requires a solid understanding of the key concepts including mechanics, kinematics, thermodynamics and energy. Mechanical engineers use these principles and others in the design and analysis of automobiles, aircrafts, heating and cooling systems, industrial equipment and machinery. In addition to these main areas, specialized fields are necessary to prepare future engineers for their positions in industry, such as mechatronics and robotics, transportation and logistics, fuel technology, automotive engineering, biomechanics, vibration, optics and others. Accordingly, the **Springer Handbook of Mechanical Engineering** devotes its contents to all areas of interest for the practicing engineer as well as for the student at various levels and educational institutions. Authors from all over the world have contributed with their expertise and support the globally working engineer in finding a solution for today‘s mechanical engineering problems.
Each subject is discussed in detail and supported by numerous figures and tables. DIN standards are retained throughout and ISO equivalents are given where possible. The text offers a concise but detailed and authoritative treatment of the topics with full references.

Key Topics

- Engineering Mathematics
- Mechanics
- Materials Science and Tribology
- Thermodynamics
- Design of Machine Elements
- Manufacturing Engineering
- Measuring and Quality Control
- Engineering Design
- Pressure Vessels and Heat Exchangers
- Turbomachinery
- Transportation Systems
- Construction and Earth Moving Equipment
- Power Generation
- Electrical Engineering
- Enterprise Organization and Operation

Features

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- Fully searchable DVD for quick access to data
- A resource for higher-level students
- Written for every-day use by the globally working engineer

About the Author

Professor K.-H. Grote

Dr. Karl-Heinrich Grote is Professor and Chair of the Department of Mechanical Engineering – Engineering Design at the Otto-von-Guericke University in Magdeburg, Germany.
He received his "Diplom in Engineering" (Masters of Science in Mechanical Engineering) in 1979 and his "Dr.-Ing." (Ph.D. in Engineering) in 1984, both from the Technical University in Berlin, Germany. From 1984 to 1986 his was Visiting Professor in the Department of Mechanical Engineering at the California State University, Long Beach, USA and returned to Germany to become the Technical Chief Manager for Engineering Design at the "Ingenieurgesellschaft für Auto und Verkehr, IAV" in Berlin. (Engineering Group for Automotive and Transportation, Berlin), and jointly from 1987 to 1990 the Chief Engineer at the Technical University, Berlin, Department of Mechanical Engineering. In 1990 he joined the Mechanical Engineering Department at the California State University, Long Beach, USA again where he stayed on as a Full tenured Professor. Since June 1995 he holds his current position in Magdeburg, where he was also Vice - President for Academic Affairs from 1989 to 2001. Since 1997 he also serves as Chair of the Scientific Advisory Board of the Experimental Factory in Magdeburg.
From October 2002 to September 2004 he took a leave to become Visiting Professor of Mechanical Engineering at the California Institute of Technology, (Caltech), Pasadena, USA in Prof. Antonsson´s Department. Since April 2005 Prof. Grote is the Dean of the College of Mechanical Engineering at the Otto-von-Guericke University, Magdeburg, Germany. The College has 19 Chairs/Departments.
In 1995 Dr. Grote became one of the two editors of the "DUBBEL- Taschenbuch für den Maschinenbau" (Handbook of Mechanical Engineering) – the standard Handbook for the German speaking Engineering community.

Dr. Grote is the 1993 recipient of the Ring of Honor (Young Engineers Award) from the German Professional Engineering Society (VDI) the 1993 "TRW Excellnece in Teaching Award". Professor Grote was Principal Advisor of many Master Thesis' and 25 Dissertations on 12 of which as Co-Advisor and has over 150 publications and is co-author of the book "Pahl/Beitz:Engineering Design" and editor of many other books.

Professor E. Antonsson

Dr. Erik Antonsson is a Professor of Mechanical Engineering at the California Institute of Technology in Pasadena, CA, U.S.A., where he organized the Engineering Design Research Laboratory and has conducted research and taught since 1984. He earned a B.S. degree in Mechanical Engineering with distinction from Cornell University in 1976, and a Ph.D. in Mechanical Engineering from the Massachusetts Institute of Technology in 1982.

In 1984 he joined the Mechanical Engineering faculty at the California Institute of Technology, where he served as the EXecutive Officer (Chair) from 1998 to 2002. From September, 2002 through January, 2006 Dr. Antonsson was on leave from Caltech and served as the Chief Technologist at NASA's Jet Propulsion Laboratory (JPL). He was an NSF Presidential Young Investigator (1986-1992), and won the 1995 Richard P. Feynman Prize for Excellence in Teaching, and is a co-winner of the 2001 TRW Distinguished Patent Award.

Dr. Antonsson is a Fellow of the ASME, and a member of the IEEE, AIAA, SME, ACM, and ASEE. He teaches courses in engineering design, computer aided engineering design, machine design, mechanical systems, and kinematics. His research accomplishments include the development of formal methods for engineering decisions and trade-offs and for representing and manipulating imprecision and preferences in engineering design, set-based engineering design (research on these topics was initiated in 1984), automated methods for synthesis of engineering designs, structured engineering design synthesis of micro-electro-mechanical systems (MEMS) using evolutionary methods (including genetic algorithms), and the invention and development of digital micropropulsion microthrusters.

Dr. Antonsson is currently on the editorial board of the International Journal: Research in Engineering Design, and from 1998 to 2004 served on the editorial board of the International Journal: Fuzzy Sets and Systems, and from 1989 to 1993 served as an Associate Technical Editor of the ASME Journal of Mechanical Design, (formerly the Journal of Mechanisms, Transmissions and Automation in Design), with responsibility for the Design Research and the Design Theory and Methodology area.

He has published over 110 scholarly papers in the engineering design research literature, has edited two books, and holds eight U.S. Patents.

Users Review

From reader reviews:

Paulette Cantu:

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