



# Transformer Design Principles: With Applications to Core-Form Power Transformers, Second Edition

By Robert M. Del Vecchio, Bertrand Poulin, Pierre T. Feghali, Dilipkumar M. Shah, Rajendra Ahuja

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**Transformer Design Principles: With Applications to Core-Form Power Transformers, Second Edition** By Robert M. Del Vecchio, Bertrand Poulin, Pierre T. Feghali, Dilipkumar M. Shah, Rajendra Ahuja

Updating and reorganizing the valuable information in the first edition to enhance logical development, *Transformer Design Principles: With Applications to Core-Form Power Transformers, Second Edition* remains focused on the basic physical concepts behind transformer design and operation. Starting with first principles, this book develops the reader's understanding of the rationale behind design practices by illustrating how basic formulae and modeling procedures are derived and used.

*Simplifies presentation and emphasizes fundamentals, making it easy to apply presented results to your own designs*

The models, formulae, and methods illustrated in this book cover the crucial electrical, mechanical, and thermal aspects that must be satisfied in transformer design. The text also provides detailed mathematical techniques that enable users to implement these models on a computer. The authors take advantage of the increased availability of electromagnetic 2D and 3D finite element programs, using them to make calculations, especially in conjunction with the impedance boundary method for dealing with eddy current losses in high-permeability materials such as tank walls.

**Includes new or updated material on:**

Fault type and fault current analyses Although the book's focus is on power

transformers, the transformer circuit models presented can be used in electrical circuits, including large power grids. In addition to the standard transformer types, the book explores multi-terminal transformer models, which allow complicated winding interconnections and are often used in phase shifting and rectifying applications. With its versatile coverage of transformers, this book can be used by practicing design and utility engineers, students, and anyone else who requires knowledge of design and operational characteristics.

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Editorial Review About the Author

**Robert M. Del Vecchio** received the BS degree in physics from the Carnegie Institute of Technology, Pittsburgh, Pennsylvania, the MS degree in electrical engineering, and the Ph.D. degree in physics from the University of Pittsburgh in 1972. He was a Lecturer in physics at Princeton University, New Jersey, from 1972 to 1976, and an Assistant Professor at the University of Pittsburgh from 1976 to 1978. He then joined the Westinghouse R&D Center, Pittsburgh, where he worked on modeling magnetic materials and electrical devices. He joined North American Transformer (now Waukesha Electric Systems) in 1989, where he developed computer models and transformer design tools. He is a member of the IEEE Power and Energy Society and Magnetics Society. He has served on the IEEE Transformers Committee, the IEC, and a Cigre committee. Currently, he is a consultant.

**Bertrand Poulin** received his Bachelor of Engineering degree in Electrical Engineering from École Polytechnique Université de Montréal in 1978 and his MS degree in High Voltage Engineering in 1988 from the same University. Bertrand started his career in a small repair facility for motors, generators and transformers in Montréal in 1978 as a technical advisor. In 1980, he joined the transformer division of ASEA in Varennes, Canada as a test engineer and later as a design and R&D engineer. In 1992, he joined North American Transformer where he was involved in testing and R&D and finally manager of R&D and testing. In 1999, he went back to ABB in Varennes where he holds currently the position of Technical Manager for the Varennes facility and Senior Principal Engineer for the Power Transformer Division of ABB worldwide. He is a member of IEEE Power and Energy Society, an active member of the Transformers Committee, and a registered Professional Engineer in Québec, Canada.

**Pierre Feghali**, PE, MS received his bachelor's degree in Electrical Engineering from Cleveland State University in 1985 and his Master's degree in Engineering Management in 1996 from San Jose State University. He has worked in the transformer industry for over 23 years. He started his career in distribution transformer design at Cooper Power Systems in Zanesville, Ohio. In 1989, he joined North American Transformer in Milpitas, CA where he was a Senior Design Engineer. Between 1997 and 2002, he held multiple positions at the plant including: production control manager, quality and test manager, and plant manager. He is currently Vice President of Business Development and Engineering at North American Substation Services, Inc. He is a Professional Engineer in the state of California and an active member of the IEEE and PES.

**Dilipkumar M. Shah** received his BSEE degree from the M.S. University of Baroda (India) in 1964 and his MSEE degree in Power Systems from the Illinois Institute of Technology (Chicago, Illinois) in 1967. Since 1967 until 1977, he worked as a transformer design engineer at Westinghouse Electric, Delta Star, and Aydin Energy Systems. He joined North American Transformer in 1977 as a senior design engineer and then the engineering manager. He left in 2002 and has been working as a transformer consultant for utilities world wide, covering areas such as design reviews, diagnosing transformer failures, and advising transformer manufacturers on improving their designs and manufacturing practices.

**Rajendra Ahuja** graduated from the Univ. of Indore in India where he received a B.Engg. Hons. (Electrical) degree in 1975. He worked at B.H.E.L. and GEC Alstom India and was involved in design and development of EHV transformers and in the development of wound-in-shield type windings. He also has experience in the design of special transformers for traction, furnace, phase shifting, and rectifier applications. He joined North American Transformer (now Waukesha Electric Systems) in 1994 as a principal design engineer and became the manager of the testing and development departments. He is currently the vice president of engineering. He is an active member of the Power and Energy Society, the IEEE Transformers Committee, and the IEC.

**Users Review**

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