



# Thermal Radiation Heat Transfer, 5th Edition

By John R. Howell, M. Pinar Mengüç, Robert Siegel

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**Thermal Radiation Heat Transfer, 5th Edition** By John R. Howell, M. Pinar Mengüç, Robert Siegel

Providing a comprehensive overview of the radiative behavior and properties of materials, the fifth edition of this classic textbook describes the physics of radiative heat transfer, development of relevant analysis methods, and associated mathematical and numerical techniques. Retaining the salient features and fundamental coverage that have made it popular, **Thermal Radiation Heat Transfer, Fifth Edition** has been carefully streamlined to omit superfluous material, yet enhanced to update information with extensive references.

**Includes four new chapters on *Inverse Methods, Electromagnetic Theory, Scattering and Absorption by Particles, and Near-Field Radiative Transfer***

Keeping pace with significant developments, this book begins by addressing the radiative properties of blackbody and opaque materials, and how they are predicted using electromagnetic theory and obtained through measurements. It discusses radiative exchange in enclosures without any radiating medium between the surfaces?and where heat conduction is included within the boundaries. The book also covers the radiative properties of gases and addresses energy exchange when gases and other materials interact with radiative energy, as occurs in furnaces.

To make this challenging subject matter easily understandable for students, the authors have revised and reorganized this textbook to produce a streamlined, practical learning tool that:

- Applies the common nomenclature adopted by the major heat transfer journals
- Consolidates past material, reincorporating much of the previous text into appendices
- Provides an updated, expanded, and alphabetized collection of references, assembling them in one appendix
- Offers a helpful list of symbols

With worked-out examples, chapter-end homework problems, and other useful

learning features, such as concluding remarks and historical notes, this new edition continues its tradition of serving both as a comprehensive textbook for those studying and applying radiative transfer, and as a repository of vital literary references for the serious researcher.

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### Review

"The book is primarily a textbook with all the topics needed in a typical graduate-level course on thermal radiation. However, the subject is so well presented and comprehensive that it may also serve as an independent-reading reference for those interested in thermal radiation..."

*?Heat Transfer Engineering, 2015*

### About the Author

**John R. Howell** is presently Research Professor at the University of Texas-Austin. He previously was a heat transfer researcher at the NASA Lewis Research Center, and a professor at the University of Houston. Dr. Howell served as Program Director of the Thermal Transport and Thermal Processing Program with the National Science Foundation from 1994-1995. He is a member of the National Academy of Engineering, a Foreign Member of the Russian Academy of Science, as well as being a Fellow of ASME and AIAA. He has received numerous achievement awards.

**M. Pinar Mengüç** received his Ph.D from Purdue University and has been Engineering Alumni Association Professor of Mechanical Engineering at the University of Kentucky. He has made significant contributions to the field of thermal radiation heat transfer, particularly in the areas of radiative transfer modeling in multidimensional geometries, inverse radiation problems, laser diagnostics in combustion systems, particle characterization, and nano-scale thermal transport including near-field radiation transfer. Dr. Mengüç was elected as an Honorary Professor, ESPOL, Guayaquil, Ecuador and is a Fellow of both ASME and ICHMT. He presently serves as Editor-in-Chief for the Journal of Quantitative Spectroscopy and Radiative Transfer. Currently he is the Director of Center for Energy, Environment and Economy at Ozyegin University in Istanbul, Turkey.

**Robert Siegel, Sc.D.** is presently a heat transfer consultant. Prior to this he was a Senior Research Scientist at NASA Lewis Research Center, where he worked on heat transfer research for 44 years. Dr. Siegel is a Fellow of both ASME and AIAA. He has received numerous achievement awards, authored 185 technical papers, and taught graduate level courses as an adjunct professor at three universities.

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