

**GAS TURBINE COMBUSTION—Alternative Fuels and Emissions**, by Arthur H. Lefebvre and Dillip R. Ballal. CRC Press, Taylor and Francis Group, New York, NY, 2010, ISSN: 978-1-4200-8604-1

**REVIEWED BY: DONALD W. BAHR<sup>1</sup>**

This newly published version of *GAS TURBINE COMBUSTION* is the third edition of the landmark book. The initial edition was authored by Professor Lefebvre and published in 1983. An updated paperback edition was subsequently prepared by Professor Lefebvre and published in 1999. The major new feature of this second edition was the addition of much new information on the design and development of low pollutant emission combustors.

For more than twenty-five years, this book has been and continues to be an invaluable reference. It is extensively used by engineers and scientists concerned with all aspects of gas turbine combustion. It is used as a graduate-level text book by many universities. It is also employed throughout the gas turbine industry both as a research guide and a design and development manual.

Professor Lefebvre passed away in 2003. This third edition, which is a further updated version, was prepared by Professor Dilip R. Ballal. Professor Ballal enjoyed a long association with Professor Lefebvre, originally as one of Professor Lefebvre's students and later as a co-researcher. Professor Ballal has been in-

<sup>1</sup>Retired Manager—Combustion Technology, GE Aircraft Engines, ASME Fellow, Member, National Academy of Engineering.

involved for many years in conducting and directing a variety of research and development efforts concerned with gas turbine combustors and fuels.

The primary new aspect of this third edition is the addition of an entirely new chapter—Chapter 10—on gas turbine fuels. Both petroleum-derived and alternative liquid fuels, as well as the various gaseous fuels of interest, are addressed. As such, this addition covers a technology area of ever-growing significance. Valuable and detailed compilations of the physical and combustion properties of these various fuel types are presented. Information on the production and processing of these fuels is also included. Of special usefulness are the discussions of the alternative fuels—both synthetic liquid fuels and biofuels—which are currently of great interest.

Also, some new information has been added to the chapter—Chapter 9—on emissions. These updates outline the progress being made in the ongoing and extensive efforts being conducted throughout the gas turbine world to evolve engines with ultra-low pollutant emission levels. For the most part, the other eight chapters of the second edition are unchanged. These chapters contain thorough and well-presented discussions of the many significant technical elements that must be considered in the design and development of gas turbine combustors. The design technologies and methodologies described in these chapters continue to be both useful and relevant.

Accordingly, this new edition of *GAS TURBINE COMBUSTION* is an excellent enhancement of this classic reference book. The addition of comprehensive and timely information on gas turbine fuels further expands its usefulness as a reference on all aspects of gas turbine combustion design technology.