Foreword

The demands made on the energy-efficiency and pollutant emissions of industrial furnaces are rising continuously and have, following the recent increases in energy prices and in view of the discussion concerning the climate changes for which CO_2 emissions are, at least in great part, responsible, attained a new high priority. In numerous companies, including many in the steel industry, and in enterprises operating heat-treatment installations, the saving of energy is now a top-ranking consideration. For this reason, this work focuses unequivocally on the fields of energy-efficiency and emissions reduction.

This book is intended to assist in bridging the gap between theory and practice and thus to be of use both to the committed practitioner and to those in the fields of research and teaching.

The opening chapters of the Handbook of Burner Technology for Industrial Furnaces examine the fundamental theoretical principles of combustion theory, fluid mechanics and heat transfer, focusing only on those aspects of significance for burner systems. Subsequent chapters then deal in more detail with this technology, discussing combustion concepts, pollutant generation and reduction, and the recovery of heat for use in preheating of combustion air, the minimum requirement for enhancement of energy-efficiency. The "Industrial burners" chapter then examines, citing examples, the more important types of industrial burner and their integration into the furnace-system concept. This is followed by chapters on standardization and regulatory legislation, suggestions for further reading, relevant research institutions and an annex containing pertinent physical data.

A large range of tasks will need to be solved in the coming decades to enable mankind to maintain high production levels as resources become ever scarcer. The rational requirement for the lowest possible environmental impact from industrial combustion processes will constitute one of the most important of these challenges. Developments in the field of combustion technology are striding forward extremely rapidly at present, and many of the technical solutions advanced in this book will, without doubt, have been augmented by further developments and innovations within a few years; the underlying principles will remain valid, however. It is therefore vital to remain informed on new developments at all times, and the book thus closes with an attempt to highlight some of the potential sources of further information.

I am particularly grateful, in completing this work, to my two mentors from my period of study in Aachen. The essays on combustion theory (Prof. G. Woelk) and heat transfer (Prof. U. Renz) treat the essential principles of combustion systems in depth. A large range of individuals and companies contributed text and illustrations for Chapter 8, and to them I also extend my most sincere thanks. I also wish to thank Dr. Beneke for the whole of Chapter 9, on Standardization. My gratitude is also due to my co-editor, Dr. Milani, whose ever positive approach and untiring industriousness again and again contributed to making the drafting of this title less strenuous work, and more a pleasure.

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