EDITOR'S PREFACE

The first edition of the *Handbook of Hydraulic Resistance* has been used by knowledgeable engineers in English-speaking countries since 1966, when an English translation sponsored by the U.S. Atomic Energy Commission became available. Although the book was not readily available or publicized, its extensive coverage and usefulness became known through citation, reference, and personal recommendations to a limited body of engineering practitioners in the Western world.

Because there exists no English-language counterpart to Professor Idelchik's book, the translation and publication of the revised and augmented second edition of the Handbook of Hydraulic Resistance has been undertaken. The extensive coverage provided by this book becomes self-evident when one reviews the hundreds of illustrations of flow passages contained herein. Most of these are sufficiently basic to allow application to nearly any shape of flow passage encountered in engineering practice.

The editor of this translation has had extensive experience in using the first edition and has learned to appreciate not only the extent of coverage of this book but also its limitations. Based on this experience, the editor has tried to utilize American terminology whenever necessary for clarity while trying to preserve the original manuscript as faithfully as possible. Sometimes this resulted in overly detailed description, and the temptation always existed to rewrite or condense some of the explanatory chapters and sections. However, since this is a translation, the original was followed as faithfully as possible in order to maintain the author's style and approach. In the text the flow passages of interest are variously described as pipelines, ducts, conduits, or channels — all denoting an internal flow passage or pipe. Similarly, there are references to gas, air, steam, and water, when the term *fluid* would have been quite adequate in most cases. Since retaining the original translated terms did not affect the technical correctness of the text, changes were made only in isolated cases.

Section 1.1 provides general directions for using the book, allowing readers to make their own interpretation. The majority of readers may wish to use this handbook primarily as a source book for pressure loss or hydraulic resistance coefficients, applying these coefficients in their own accustomed way. The editor believes that these users may benefit from the few observations that follow.

The many sketches, diagrams, and graphs are self-explanatory, with flow directions and areas indicated. The values of pressure loss coefficients may be used over the limits indicated for the particular graph. The nondimensionality of the parameters of most graphs allows them to be used in the English system as well as the metric system. This permits interchangeable use of this book with other sources of pressure loss coefficients.

It should be noted that, unless otherwise stated, the data apply to Newtonian fluids considered as incompressible. It is also assumed, unless otherwise stated, that the inlet conditions and exit conditions are ideal; that is, there are no distortions. Very few experimental data exist on the effect of inlet flow distortion on the pressure loss coefficient for most flow devices.

Where friction factors are required to find the overall pressure loss coefficient of a component, the values obtained by the favored sources most familiar to the reader may be used in place of the data shown herein. Particular attention should be paid to the limits of applicability of the data provided as well as to the reference flow area used, when there is a flow area change. Much of the data are shown in tabular as well as graphical form. The former allows use of computers in the interpolation of intermediate values.

In any compilation of empirical data, the accuracy decreases with increasing complexity of the component, due to analytical and experimental uncertainties. This book is no exception. A good rule to follow is to check more than one source, if possible.

Although there will be many flow configurations for which no explicit resistance values are given in this book, it is entirely possible to make up combinations of simple shapes to simulate a complex component, provided suitable engineering judgment is applied. The latter, of course, requires familiarity with the way the data are presented and with the effect of exit conditions from one component on the inlet conditions of the adjacent component.

The editor of this translation would be remiss if he did not acknowledge that differences in engineering practice, nomenclature, engineering standards, and training may have an effect on the ability to fully utilize all that is presented in this work. One example is the difficulty in understanding the descriptive terms for some flow system components. However, the graphical presentations of much of the material in this book will help the reader overcome most such difficulties.

In a work of this nature, it is very probable that errors of translation or data reporting have occurred. The editor and the publisher would be most grateful to the readers and users of this handbook for information on such items.

Erwin Fried