
PREFACE TO THE 3rd EDITION

The 3rd edition of this Handbook is augmented with the most important results of investigations carried out in recent years. Some of the sections in the book have been refined and changed.

The Handbook has been composed on the basis of processing, systematization, and classification of the results of a great number of investigations published at different times. The essential part of the book is the outcome of investigations carried out by the author.

The results of investigations (the accuracy with which the models and fittings of pipelines were created, the accuracy of measurements, etc.) carried out by different specialists could differ among themselves. This might also be possible because the majority of local fluid resistances experience the influence of not only the mode of flow, but also the flow "prehistory" (the conditions of its supply to the given section, the velocity profile, and the degree of flow agitation at the inlet, etc.) and in some cases also the subsequent "history" of a flow (flow discharge from the section). All these conditions could be different in the studies undertaken by various authors.

In many complex elements of pipeline systems, a great instability of flow is observed due to the periodicity of flow separation from the walls, periodic variation of the place, and magnitude of the zone of flow separation and eddy formation. This results in different values of hydraulic resistances.

The author was faced with a difficult problem: when selecting most variegated information on hydraulic resistances, it was necessary to reveal and discard the questionable results of experiments to get a deeper understanding in which cases the great difference between the resistance coefficients of sections is regular, corresponding to the essence of the phenomena that occur during the motion of streams through them, and in which they are not regular; to select the most reliable data and find the most pertinent form of the presentation of information to make it accessible and understandable for engineers and technicians.

The configuration of sections and obstacles in pipeline systems, their geometric parameters, conditions of supply and removal, and of the modes of flow are so diverse that one often fails to find out from literature the necessary experimental data

for the calculation of their hydraulic resistances. Therefore, the author incorporated not only the data thoroughly verified by laboratory investigations, but also those which were obtained theoretically or by approximate calculations based on separate experimental studies, and in some cases tentative data (specified in the text). This is permissible because the accuracy of fabrication and mounting of the systems of pipes and equipments in industrial conditions and, consequently, the conditions for the flow of streams may greatly differ between separate installations and differ from laboratory conditions at which the majority of fluid resistance coefficients were obtained, and also because of the fact that for many complex elements these coefficients cannot be constant quantities.

The present edition of this Handbook should assist in increasing the quality and efficiency of the design and usage of industrial power engineering and other constructions and also of the devices and apparatus through which liquids and gases move.