

Preface to the First Edition

Over the past fifty years, a significant amount of fundamental and applied research has been carried out in the field of contact heat transfer. In this book, I have attempted to synthesise the information generated and present it in a form that is, I hope, interesting to the practising engineer, scientist or student. For this reason, many applications are enumerated in the Introduction and emphasised in the later chapters. It is also hoped that the material presented is readily understandable. To this end, I have explained in some detail the steps involved in developing the basic concepts in Chapters 2 and 3. Although, written mainly for the generalist engineer or physicist, I believe there is sufficient detail, especially in Chapters 4, 6 and 7 to be of interest to the specialist or the advanced student in the field. Chapter 5 should be of particular interest to those contemplating experimental determination of thermal contact conductance and associated problems.

Although more than 500 references were consulted during the preparation of the manuscript, only a few representative ones in each category have been cited, so that the actual number of references listed is approximately half the number consulted. For the sake of systematic and chronological development of each particular theme, however, early pioneering work in that area has necessarily been cited. In general, reference has not been made to internal reports, theses or other work that is not readily available in open literature. Because of language limitations, references in English or English translations of references in other languages, have been used.

Some graphs and diagrams from original sources have been modified and redrawn to suit the format of this work. These have been identified by the words “after” or “based on” followed by the reference to the source.

Since the subject of contact heat transfer has a broad range, it is likely that some topics have been omitted in a work of this size. I hope, however, that the majority of topics, both basic and applied, have received some airing.

It is a pleasure to acknowledge my debt of gratitude to Dr. Arthur Williams who introduced me to contact heat transfer at Monash University. I sincerely appreciate the help and cooperation that I received from Professor Skip Fletcher and Professor Bud Peterson during my sabbaticals at Texas A&M University. Particular mention must be made of the vast source of references that I had access to during those periods. I am grateful to Professor Brian Milton and Professor Mark Wainwright of the University of New South Wales for “reassigning my duties” in lieu of a

sabbatical during the first half of 1993. This helped me in gathering, collating and updating the material for this work. Finally, my thanks go to my wife Nagu for her support and understanding.

C. V. Madhusudana

Preface to the Second Edition

More than 17 years have passed since the first edition of *Thermal Contact Conductance* appeared in print. I have taken this opportunity to revise the book in order to reflect the developments in contact heat transfer that have taken place during the intervening years. This revision has also involved reading, reviewing and abstracting from over 150 recent technical papers, reports and theses.

A main feature of this edition is that several new and relevant topics have been added. These include:

Thermal boundary resistance, gap liquid conductance, transient experimental techniques, periodic contacts, heat transfer in sliding friction, carbon nano tubes and other recently developed thermal interstitial materials, finned tube heat exchangers, manufacturing processes, contact heat transfer at low temperatures and non-metallic materials.

About 75 % (96 out of 129) of the diagrams have been specially drawn for this edition.

While the revision has been extensive, it is hoped that the spirit and the format of this edition remain the same as in the first.

My sincere thanks go to Prof. Tomasz Wisniewski for helpful correspondence regarding periodic contacts and permission to use Fig. 6.25.

It is a pleasure to acknowledge the help and support of Springer editorial staff, especially Alex Greene, Ania Levinson and Jessica Lauffer.

As in the previous edition, I wish to thank my wife Nagu for her continuous encouragement and understanding during the preparation of the manuscript.

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