Aluminum Extrusion Technology

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This book is dedicated to the memory of my parents, Sushil K. Saha and Debrani Saha, and my mother-in-law, Hemnalini Saha.
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Preface

Aluminum extrusion technology in modern industries, both in the United States and elsewhere, continues to be a subject of discussion and evaluation concerning its application to the working environment. The demand for and application of aluminum extrusion in architecture and in the manufacture of automobiles, small machine components, structural components and especially aircraft, have increased tremendously, and competition in this industry is intense. The extrusion industry is now more than 100 years old. Continuing education is needed to upgrade knowledge about aluminum extrusion technology, both in the academic and industrial communities. Therefore, this book was written to provide many developed ideas, more practical and useful theoretical concepts based on knowledge acquired from research and academic work, industrial working experience, and the review of research and technical papers related to aluminum extrusion technology.

This book provides a comprehensive introduction to the explosion of information that has become available in the field of aluminum extrusion technology during the last fifteen or twenty years. The topics are designed in such a way that this book provides adequate information for the newcomer without boring the expert. Topics are presented with a balanced coverage of the relevant fundamentals and real-world practices so that the relevant person in the aluminum extrusion industry develops a good understanding of the important interrelationships among the many technical and physical factors involved and how engineering science impacts on practical considerations. The ten chapters cover almost all the branches of aluminum extrusion technology:

1. Fundamentals of Extrusion
2. Thermodynamics in Extrusion
3. Extrusion Presses and Auxiliary Equipment
4. Extrusion Die and Tooling
5. Billet Casting Principles and Practice
6. Extrusion of Soft- and Medium-Grade Alloys
7. Extrusion of Hard Alloys
8. Process Control in the Aluminum Extrusion Plant
9. Statistical Process and Quality Control
10. Research and Development
The book *Extrusion*, by Laue and Stenger in German, was revised and translated to English by Castle and Lang and published by ASM International in 1981. In this book, the authors concentrated on process, machinery, and tooling, based on general extrusion technology. *Extrusion* provides a comprehensive and detailed survey of extrusion data, including general principles, extrusion processes, special technology for extruding various materials, design and construction of extrusion presses, extrusion tooling, economics of extrusion, and future developments. In general, there has been no updated information published since 1981.

In the past 18 years, a tremendous amount of technological advancement in aluminum extrusion technology has taken place worldwide, and this information is included in this book, *Aluminum Extrusion Technology*. Furthermore, certain new topics with updated information have been added and described in some detail. This book also provides the key to further information and emphasizes important research and technical papers that are worthy of further study.

*Aluminum Extrusion Technology* is primarily designed to be used by technical and engineering personnel such as plant managers, process and quality control managers, corporate managers, cast house managers, die shop managers, and research and development managers. The text was written for research students in manufacturing who are working on extrusion technology. It is hoped that by studying this book, the engineering personnel in the aluminum extrusion industry and research students in extrusion will appreciate the current and more detailed information and references.

I would like to express thanks to my wife for her assistance with computer work and to my two lovely daughters for their constant encouragement to accomplish this big effort. I would also like to thank friends and family, especially my father-in-law, Dr. Durgadas Saha.

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