THE BOOK EDITOR, John E. Bringas, P. Eng., is president of CASTI Group of Companies – Engineering Information Inc., Edmonton, Alberta, Canada. A metallurgical and materials engineer, he is an engineering codes and standards information specialist with over 30 years of engineering experience. He understands the needs of the users of the handbook because he is one himself. Mr. Bringas also authored his own series of metals data books including the CASTI Metals Black Book - Ferrous Metals (North American and European Ferrous Data), and the CASTI Metals Red Book - Nonferrous Metals, (available at www.casti.ca). He has over 25 years of experience teaching codes and standards related courses worldwide. Mr. Bringas has been a member of ASTM since 1982 and he is a committee member of A01 Steels (including Chair of A01.92 on Steel Terminology), A05 Coated Steels, B02 Nonferrous Alloys, and E28 Mechanical Testing. He is also a standards committee member of: ISO TC17/SC4 Heat Treatable and Alloy Steels (Canadian Voting Delegate), SAE MTEC Carbon and Alloy Steels, NACE STG 32 Oil and Gas Production—Metallurgy, STG 34 Petroleum Refining and Gas Processing, and STG 36 Process Industry—Materials Performance in Chemicals. Mr. Bringas is also a long-time member of the American Welding Society (AWS), ASME International, ASM International, and is a registered professional engineer in the province of Alberta, Canada.
Acknowledgements

The author gratefully acknowledges the assistance of Michael Ling, P.Eng. and Toan Huynh, EIT who assisted with this handbook. Their work in compiling and organizing the data was of particular importance. A special acknowledgement is made to Yin Huang, PhD, who was the lead metallurgical engineering translator of the Chinese GB steel standards. Without his dedicated work, the GB data in this handbook would not have obtained the highest quality standard that has made this handbook renowned worldwide. Their advice when difficult technical decisions had to be made is appreciated.

Several colleagues from ASTM, SAE and ISO committees were contacted for their input during the progress of this handbook, including Ralph Davison, Frank Christensen, John Mahaney (ASTM committee members), Günter Briefs and Baoshi Liu (ISO committee members), and Mel Head (SAE committee member). They added valuable insights into the history and technical aspects of the standards data found in this handbook.

The ASTM publishing staff, most notably John Pace, David Von Glahn, Kathy Dernoga and Monica Siperko, were most supportive of my requests to obtain access to the hundreds of standards needed to write this handbook. Their patience and confidence in the author to complete the work is appreciated. Thank you all.

The author also acknowledges the dedicated assistance of Patrick Law and Dan Chow who assisted in the research and entered much of the data in the book with care and diligence.

A special thanks is extended to IHS Engineering Products for use of their Engineering Resource Center (ERC).

One person could not have produced this handbook. It took a dedicated team of professionals. These acknowledgments cannot adequately express the author’s sincere appreciation and gratitude for everyone’s assistance. Without it, this handbook would never have been completed.
Preface

This is the book I never wanted to write, but always wanted to own. As a metallurgical engineer and long time user of steel standards, author of the four CASTI Metals Data Books, and member of ASTM, ISO, and SAE steel standard committees, I knew all too well the many pitfalls and challenges of writing such a handbook. There were many steel standards from around the world that were new to me, which created many surprises, including the Chinese GB steel standards that were translate into English by the CASTI Publishing Inc. staff of metallurgical engineers.

Comparing steel standards is not an exact science, so the biggest challenge of preparing such a book was deciding on the "rules of comparison." Of the similar books on the market today, none explain in detail why one steel is comparable to another. They simply appear together in a list of steels. I kept a daily diary to help construct a workable set of comparison rules that I could share with other users to assist them in understanding how and why one steel is comparable to another.

When writing the first edition of this book (DS67A), these rules changed from chapter to chapter while the book was being written. It wasn't until the last chapter and appendix were completed that I was able to finalize the rules of comparison. In the end, a complete review of the book was performed resulting in the reorganization of some chapters and the fine-tuning of others. There were too many occasions when I thought the book was finished, only to have to change, add, or delete a rule which made yet another review of the book necessary.

Writing this third edition (DS67C) was greatly assisted by using the ASTM Passport to Steel Database. Without this database, the handbook would be much smaller. The addition of data from Chinese GB and ASME steel standards has significantly improved this edition. With the use of the ASTM Passport to Steel Database many new comparable steels were also added to this edition.

I hope you enjoy using this handbook as much as I will. Tie a chain to it and anchor it to your desk, because once others see it, you may never see the book again.

I am interested in your comments and suggestions to improve this handbook, so I encourage you to send your feedback directly to ASTM.

John E. Bringas, P.Eng.
Getting Started With This Book

The intent of this book is to allow the user to identify comparable steels that are found in standards from around the world, then to evaluate each complete standard on its own merit to ensure that the selected steel is suited for the intended application. It is not designed to be the sole source of information for selecting a comparative steel and is not intended to be used as a replacement for steel standards. This handbook is one tool in the process of comparing steel standards from around the world.

Comparing steel standards is not an exact science and there is no foolproof method. When you begin to use this book, you will quickly discover that there is no such thing as "equivalent" steel standards. The user must also be aware that not all steels have comparative counterparts. Before proceeding directly to the contents of this book, it is strongly recommended that you read Chapter 1, which includes a detailed explanation of the "rules of comparison" used in this book.

Since there was insufficient space on one page to place both the chemical composition and mechanical properties tables, they were split into two separate tables. To assist the user in keeping track of which comparison criteria were used for a given steel, each table within a chapter was sequentially numbered and appended with either the letter A or B. Table numbers ending in the letter A designate that the table was the main criterion used for comparison; whereas table numbers ending with the letter B were "mirrored" from the A table.

Each group of steel data in the tables is separated by two types of horizontal lines: black and grey. Black lines separate groups of steels that are more closely comparable to each other, whereas grey lines separate steel data within a comparative group.

Caution: the pages of this book are formatted to keep comparative groups together as much as possible. However, when a group of comparative steels extends to more than one page, a note is place at the bottom of the page to indicate that the comparative group continues on the following page, i.e., "NOTE: This section continues on the next page."

The appendices include lists of withdrawn and replaced standards that should always be checked when trying to find comparable steels. This handbook, unlike many others, includes the year-date of each standard which is critical when trying to identify the status of a standard.
THE BOOK EDITOR, John E. Bringas, P. Eng., is president of CASTI Group of Companies – Engineering Information Inc., Edmonton, Alberta, Canada. A metallurgical and materials engineer, he is an engineering codes and standards information specialist with over 30 years of engineering experience. He understands the needs of the users of the handbook because he is one himself. Mr. Bringas also authored his own series of metals data books including the CASTI Metals Black Book - Ferrous Metals (North American and European Ferrous Data), and the CASTI Metals Red Book - Nonferrous Metals, (available at www.casti.ca). He has over 25 years of experience teaching codes and standards related courses worldwide. Mr. Bringas has been a member of ASTM since 1982 and he is a committee member of A01 Steels (including Chair of A01.92 on Steel Terminology), A05 Coated Steels, B02 Nonferrous Alloys, and E28 Mechanical Testing. He is also a standards committee member of: ISO TC17/SC4 Heat Treatable and Alloy Steels (Canadian Voting Delegate), SAE MTEC Carbon and Alloy Steels, NACE STG 32 Oil and Gas Production—Metallurgy, STG 34 Petroleum Refining and Gas Processing, and STG 36 Process Industry—Materials Performance in Chemicals. Mr. Bringas is also a long-time member of the American Welding Society (AWS), ASME International, ASM International, and is a registered professional engineer in the province of Alberta, Canada.