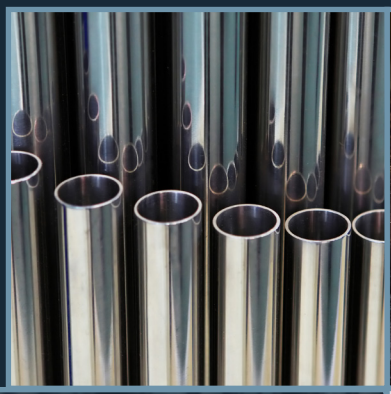
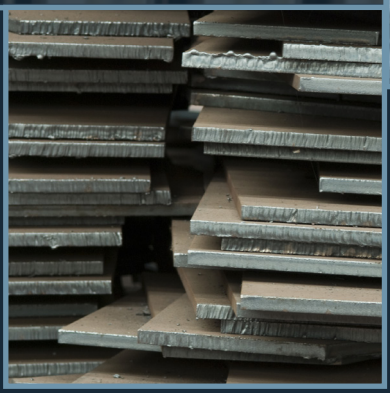




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Handbook of Comparative World Steel Standards

5th Edition
John E. Bringas, Editor

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ASTM INTERNATIONAL

John E. Bringas, Editor

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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 as a 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 and that created many surprises, including the Chinese GB steel standards, which were translated into English by the metallurgical engineers of CASTI Publishing, Inc.

Comparing steel standards is not an exact science, so the biggest challenge in 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 was not until the last chapter and the 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 that made yet another review of the book necessary.

My writing of this fifth edition (DS67D) was greatly assisted by using the ASTM Passport to Steel database. Without it, 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 have. 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 for improving this handbook and encourage you to send your feedback directly to ASTM.

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Several colleagues from ASTM, Society of Automotive Engineers (SAE), and International Standards Organization (ISO) committees were contacted for their input during the progress of this handbook, including ASTM committee members Ralph Davison, Frank Christensen, and John Mahaney; Günter Briefs and Baoshi Liu from the ISO; and Mel Head of the SAE. 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 very supportive of my requests to obtain access to the hundreds of standards needed to write this handbook. Their patience and confidence in my ability to complete the work is appreciated. Thank you all.

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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.

Getting Started With This Book

The intent of this handbook is to allow the user to identify comparable steels that are found in standards from around the world and then to evaluate each complete standard on its own merit to ensure that the selected steel is suited for the intended application. This handbook 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 handbook, 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 handbook, it is strongly recommended that you read Chapter 1, which includes a detailed explanation of the "rules of comparison" used in this handbook.

Because there was often 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 gray. Black lines separate groups of steels that are more closely comparable to each other; whereas gray lines separate steel data within a comparative group.

Caution: The pages of this handbook 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 placed 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").

Appendix 2 and Appendix 4 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 and founder of Codes and Standards Training Institute (CASTI), headquartered in Edmonton, Alberta, Canada. A metallurgical and materials engineer, he is an engineering codes and standards information specialist with over 40 years of experience. He understands the needs of the users of this handbook because he is one himself. Mr. Bringas also authored the *ASTM Handbook of Steel Data: American and European* and is the principle developer of the *ASTM Passport to Steel Online Database.* Mr. Bringas has been teaching codes and standards related courses worldwide through CASTI (www.casti.ca) since 1989. Mr. Bringas has been a codes and standards committee member since 1982 and currently serves on:

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- ISO TC17/SC4 Steels, Canadian delegate; and
- NACE Oil and Gas Corrosion and Metallurgy, Petroleum Refining and Gas Processing, Pipelines, Tanks, and Well Casings, and Process Industries—Materials.

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