

ASM Handbook: Volume 7: Powder Metal Technologies and Applications (Asm Handbook) (Asm Handbook)

By Asm International Handbook Committee



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Covers all areas of powder production, sampling, characterization, shaping, consolidation, sintering, quality control, machining, heat treating, and PM applications. For practical engineering information on sintering practices, tool design, P/M metallography, dimensional control, part design, powders, binders, lubricants, and the processing, properties, and performance of P/M materials in different production technologies and applications.



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Editorial Review

Review

On behalf of the ASM Handbook Committee, it is a pleasure to introduce this fully revised and updated edition of Volume 7, Powder Metal Technologies and Applications as part of the ASM Handbook series. Since the first publication of Volume 7 in 1984 as part of the 9th Edition Metals Handbook, substantial new methods, technologies, and applications have occurred in powder metallurgy. These developments reflect the continuing growth of powder metallurgy (P/M) as a technology for net-shape fabrication, new materials, and innovative manufacturing processes and engineering practices.

Net-shape or near-net-shape fabrication is a key objective in many P/M applications. Many factors influence the economics and performance of P/M fabrication, and new methods and process improvements are constantly considered and developed. In this regard, the new Volume 7 provides completely updated information on several emerging technologies for powder shaping and consolidation. Examples include all new articles on powder injection molding, binder assisted extrusion, warm compaction, spray forming, powder extrusion, pneumatic isostatic forging, field activated sintering, cold sintering, and the consolidation of ultrafine and nanocrystalline materials. New articles also cover process modeling of injection molding, isostatic pressing, and rigid die compaction.

Traditional press-and-sinter fabrication and high-density consolidation remain the major topic areas in the new Volume 7. This coverage includes new articles in several practical areas such as resin impregnation, dimensional control, machining, welding, heat treatment, and metallography of P/M materials. The traditional processes of rigid die compaction and sintering are also covered extensively with several updated articles on major production factors such as tooling, die design, compressibility and compaction, sintering practices, and atmosphere control. An overview article, "Powder Shaping and Consolidation Technologies," also compares and summarizes the alternatives and factors that can influence the selection of a P/M manufacturing method. Coverage is also expanded on high-density consolidation and high-performance P/M materials such as powder forged steels.

Multiple articles on powder production and characterization methods have also been revised or updated in several key areas. The article on atomization is fully revised from the previous edition, and several new articles have been added to the Section "Metal Powder Production and Characterization." In particular, the new article by T. Allen, "Powder Sampling and Classification," is a key addition that provides essential information for accurate characterization of particle size distributions. The variability of sieve analysis is also covered in more detail in this new Volume.

The new Volume 7 also provides detailed performance and processing information on a wide range of advanced and conventional P/M materials. Ferrous P/M materials are covered in several separate articles, and more detailed information on corrosion, wear, fatigue, and mechanical properties are discussed in separate articles. New articles also provide information on several advanced materials such as aluminum-base composites and reactive-sintered intermetallics. --ASM International

From the Publisher Published: 1998

About the Author

In recognition of the ongoing development and growth of powder metallurgy (P/M) materials, methods, and applications, ASM International offers the new Volume 7 of ASM Handbook. Powder Metal Technologies and Applications is a completely revised and updated edition of Powder Metallurgy, Volume 7 of the 9th Edition Metals Handbook, published in 1984. This new volume provides comprehensive updates that reflect the continuing improvements in traditional P/M technologies as well as significant new coverage of emerging P/M materials and manufacturing methods.

Users Review

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