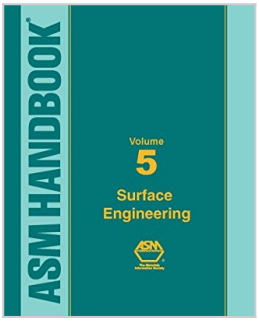

ASM Handbook: Volume 5: Surface Engineering (Asm Handbook) (Asm Handbook)

By Faith Reidenbach

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This volume provides all the detailed information about surface cleaning, finishing, and coating that you ll find absolutely vital. Includes published articles on testing of coatings and thin films, environmental concerns, and surface engineering of nonmetallic structural materials. There s also expanded analysis of advanced processes such as chemical vapor deposition, physical vapor deposition, and diffusion coating, plus additional information in the areas of continuous coatings, electroplating, and finishing methods.

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Editorial Review

Review
In the 9th Edition of Metals Handbook, the title of this Volume was Surface Cleaning, Finishing, and Coating; for the new ASM Handbook edition, the title has been changed to Surface Engineering. A useful working definition of the term surface engineering is "treatment of the surface and near-surface regions of a material to allow the surface to perform functions that are distinct from those functions demanded from the bulk of the material." These surface-specific functions include protecting the bulk material from hostile environments, providing low- or high-friction contacts with other materials, serving as electronic circuit elements, and providing a particular desired appearance.

Although the surface normally cannot be made totally independent from the bulk, the demands on surface and bulk properties are often quite different. For example, in the case of a turbine blade for a high-performance jet engine, the bulk of the material must have sufficient creep resistance and fatigue strength at the service temperature to provide an acceptably safe service life. The surface of the material, on the other hand, must possess sufficient resistance to oxidation and hot corrosion under the conditions of service to achieve that same component life. In many instances, it is either more economical or absolutely necessary to select a material with the required bulk properties and specifically engineer the surface to create the required interface with the environment, rather than to find one material that has both the bulk and surface properties required to do the job. It is the purpose of this Volume to guide engineers and scientists in the selection and application of surface treatments that address a wide range of requirements.

Scope of Coverage. This Volume describes surface modifications for applications such as structural components, in which the bulk material properties are the primary consideration and the surface properties must be modified for aesthetics, oxidation resistance, hardness, or other considerations. It also provides some limited information on surface modifications for applications such as microelectronic components, in which the near-surface properties are paramount and the bulk serves mainly as a substrate for the surface material.

The techniques covered may be divided broadly into three categories:
Techniques to prepare a surface for subsequent treatment (e.g., cleaning and descaling)
Techniques to cover a surface with a material of different composition or structure (e.g., plating, painting, and coating)
Techniques to modify an existing surface topographically, chemically, or microstructurally to enhance its properties (e.g., glazing, abrasive finishing, and ion implantation) --ASM International

Organization. Depending on the specific problem confronting an engineer or scientist, the most useful organization of a handbook on surface engineering can be by technique, by material being applied to the surface, or by substrate material being treated. The choice of an appropriate technique may be limited by such factors as chemical or thermal stability, geometrical constraints, and cost. The choice of material applied to a surface is typically dictated by the service environment in which the material will be used, the desired physical appearance of the surface, or, in the case of materials for microelectronic devices, the electrical or magnetic properties of the material. The substrate material being treated is usually chosen for its mechanical properties. Although the surface modification technique and the material being applied to the surface can be changed, in many cases, to take advantage of benefits provided by alternative techniques or coatings, the choice of a substrate material is generally inflexible. --ASM International

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To serve as wide a range of needs as possible, this Volume is organized by both treatment technique and base material. Wherever possible, efforts have been made to cross-reference the technique and material sections to provide the reader with a comprehensive treatment of the subject. --ASM International

From the Publisher
Published: 1994

About the Author
Improving the performance, extending the life, and enhancing the appearance of materials used for engineering components are fundamental--and increasingly important--concerns of ASM members. As the performance demands placed on materials in engineering applications have increased, the importance of surface engineering (cleaning, finishing, and coating) technologies have increased along with them.

Evidence of the growing interest in (and complexity of) surface engineering processes can be found in the expansion of their coverage in ASM handbooks through the years. The classic 1948 Edition of Metals Handbook featured a total of 39 pages in three separate sections on surface treating and coating. In the 8th Edition, surface technologies shared a volume with heat treating, and the number of pages jumped to over 350. The 9th Edition of Metals Handbook saw even further expansion, with a separate 715-page volume devoted to cleaning, finishing, and coating.

Surface Engineering, the completely revised and expanded Volume 5 of ASM Handbook, builds on the proud history of its predecessors, and it also reflects the latest technological advancements and issues. It includes new coverage of testing and analysis of surfaces and coatings, environmental regulation and compliance, surface engineering of nonmetallic materials, and many other topics.

Users Review

From reader reviews:

Patricia White:

This book untitled ASM Handbook: Volume 5: Surface Engineering (Asm Handbook) (Asm Handbook) to be one of several books which best seller in this year, that is because when you read this e-book you can get a lot of benefit upon it. You will easily to buy this book in the book retail store or you can order it via online. The publisher on this book sells the e-book too. It makes you quickly to read this book, since you can read

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