

NEW EDITION

Handbook of Composites

2nd Edition

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This new edition of the *Handbook of Composites* follows its predecessor in providing up-to-date information on materials, processes, and applications of composite materials. In addition to describing current developments in the industry, it provides readily accessible information on test methodology and design analysis techniques. Coverage has been expanded to include the new material forms of metal-matrix, carbon-carbon and ceramic composites as well as polymeric-based composites. This second edition covers technologies for all new materials as well as modelling, characterization and testing techniques. All resin systems in current use are covered as well as speciality resins such as BMI's and cyanates, newer high-temperature resins and thermoplastics. The fibers section has been updated and a new section on particulate reinforcements has also been added.

All traditional processing methods involving autoclaves, filament winding, pultrusion, table rolling and textile preforming are included along with the newer processes of resin transfer molding, fiber placement, and thermoplastic processing. An extensive discussion of composite surface treatment, mechanical fastening and adhesive bonding has been added. The design and analysis section has been expanded with chapters dealing with laminate and composite structure design, analysis methods and the important new subject of design allowables substantiation. There are new chapters on damage tolerance, repair, safety and reuse of composites as well as applications of composites to medical, construction and sporting goods.

With contributions from an international team of experts, the *Handbook of Composites* will continue to be the primary reference in the composites field.

Contents: Overview of composite materials. **BASIC MATERIALS.** Polymeric matrix systems. Polyester and vinyl ester resin. Epoxy resins. High temperature resins. Speciality matrix resins. Thermoplastic resins. Reinforcements and composites. Fiberglass reinforcement. Boron, high silica, quartz and ceramic fibres. Carbon fibers. Organic fibers. Particulate fillers. Sandwich construction. Metal matrix composites. Ceramic composites. Carbon-carbon composites. **PROCESSING METHODS.** General composites and reinforced plastics. Hand lay-up and bag molding. Matched metal compression molding of polymer composites. Textile performing. Table rolling of composite tubes. Resin transfer molding. Filament winding. Fiber placement. Pultrusion. Processing thermoplastic composites. **Advanced composites.** Tooling for composites. Consolidation techniques and cure control. Composite machining. Mechanical fastening and adhesive bonding. Surface preparations for ensuring that glue will stick in bonded composite structures. **DESIGN AND ANALYSIS.** Laminate design. Design of structure with composites. Analysis methods. Design allowables substantiation. Mechanical tests. **ENVIRONMENTAL EFFECTS.** Durability and damage tolerance of fibrous composite systems. Environmental effects on composites. Safety and health issues. Nondestructive evaluation methods for composites. Repair aspects of composite and adhesively bonded aircraft structures. Reuse and disposal. **APPLICATIONS.** Land transportation applications. Marine applications. Commercial and industrial applications of composites. Composite biomaterials. Scientific applications of composites. Construction. Aerospace equipment and instrument structures. Aircraft applications. Composites in the sporting goods industry. **Appendices:** Typical properties advanced composites. Specifications and standards for polymer composites. **Index.**

December 1997: 246x189: 1104pp: 680 line illus, 210 halftone illus
Hardback: 0-412-54020-7: \$149.95