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**DEPARTMENT OF DEFENSE
HANDBOOK**

COMPOSITE MATERIALS HANDBOOK

**VOLUME 3. POLYMER MATRIX COMPOSITES
MATERIALS USAGE, DESIGN, AND ANALYSIS**



This handbook is for guidance only. Do not cite this document as a requirement.

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FOREWORD

1. This Composite Materials Handbook Series, MIL-HDBK-17, are approved for use by all Departments and Agencies of the Department of Defense.
2. This handbook is for guidance only. This handbook cannot be cited as a requirement. If it is, the contractor does not have to comply. This mandate is a DoD requirement only; it is not applicable to the Federal Aviation Administration (FAA) or other government agencies.
3. Every effort has been made to reflect the latest information on polymer (organic), metal, and ceramic composites. The handbook is continually reviewed and revised to ensure its completeness and currentness. Documentation for the secretariat should be directed to: Materials Sciences Corporation, MIL-HDBK-17 Secretariat, 500 Office Center Drive, Suite 250, Fort Washington, PA 19034.
4. MIL-HDBK-17 provides guidelines and material properties for polymer (organic), metal, and ceramic matrix composite materials. The first three volumes of this handbook currently focus on, but are not limited to, polymeric composites intended for aircraft and aerospace vehicles. Metal matrix composites (MMC) and ceramic matrix composites (CMC), including carbon-carbon composites (C-C) are covered in Volume 4 and Volume 5 , respectively.
5. This standardization handbook has been developed and is being maintained as a joint effort of the Department of Defense and the Federal Aviation Administration.
6. The information contained in this handbook was obtained from materials producers, industry, reports on Government sponsored research, the open literature, and by contact with research laboratories and those who participate in the MIL-HDBK-17 coordination activity.
7. All information and data contained in this handbook have been coordinated with industry and the U.S. Army, Navy, Air Force, NASA, and Federal Aviation Administration prior to publication.
8. Copies of this document and revisions thereto may be obtained from the Document Automation and Production Service (DAPS), Bldg. 4D (DODSSP/ASSIST), 700 Robbins Avenue, Philadelphia, PA 19111-5094.
9. Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: U.S. Army Research Laboratory, Weapons and Materials Research Directorate, Attn: AMSRL-WM-MA, Aberdeen Proving Ground, MD 21005-5069, by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

SUMMARY OF CHANGES

Chapter	Section	Title	Change type
All	All	The entire volume has been reorganized	revision
1	1.1	Introduction	revision
2	2.4.1.1.	Carbon Fibers	new
2	2.4.1.8	Ultrahigh Molecular Weight Polyethylene	new
2	2.7.1	Automated Tape Placement	new
2	2.7.2	Fiber Placement/Automated Tow Placement	new
2	2.7.8	Adhesive Bonding	revision
2	2.8.7	Resin Transfer molding	revision
3	3.4	Statistical Process Control	revision
	3.5	Managing Change in Materials and Processes	new
4	All sections	Design and Analysis (Rev E), Building Block Approach for Composite Structures (Rev F)	Now is Chapter 5, with new and revised material
5	All sections	Structural Behavior of Joints (Rev E) Design and Analysis (Rev F)	Now is Chapter 6, with new and revised material
6	All sections	Structural Reliability (Rev E) Structural Behavior of Joints (Rev F)	Now is Chapter 9, with new and revised material
7	All sections	Thick Section Composites(Rev E) Damage Resistance, Durability, and Damage Tolerance (Rev F)	Now is Chapter 10, with new and revised material
8	All sections	Supportability	revised
9	All sections	Lessons Learned (Rev E) Structural Reliability (Rev F)	Now is Chapter 12, with new and revised material
10	All sections	Thick Section Composites	Refer to Chap 7 entry
11	All sections	Environmental Management	new
12	All sections	Lessons Learned	Refer to Chap 9 entry