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DEPARTMENT OF DEFENSE HANDBOOK

COMPOSITE MATERIALS HANDBOOK

VOLUME 1. POLYMER MATRIX COMPOSITES GUIDELINES FOR CHARACTERIZATION OF STRUCTURAL MATERIALS



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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
1	1.2	Purpose	revision
	1.7	Definitions	revision
	1.4.1	Roadmaps for use of Volumes 1-3	new
2	2.1.2.2	Data application categories	revision
	2.2.12	Data documentation	new
	2.3.7	Data substantiation for use of MIL-HDBK-17 Basis Values	revision
	2.4.4	Disposition of outlier data	new
	2.5	Material testing for submission of data for MIL-HDBK-17	revision
	2.5.1	Introduction	new
	2.5.3	Sampling Requirements	revision
	2.5.6	Data documentation requirements	revision
4	4.6.1	Introduction	new
	4.6.2	Tension	revision
	4.6.2.1	Introduction	new
	4.6.2.2	Specimen preparation	
	4.6.2.3	Test apparatus	
	4.6.2.4	Tensile test methods for MIL HDBK 17	
	4.6.3	Compression	revision
	4.6.3.1	Introduction	new
	4.6.3.2	Specimen preparation	
	4.6.3.3	Test apparatus	
	4.6.3.4	Compressive test methods for MIL HDBK 17	
	4.6.5	Flexure	revision
	4.6.5.1	Introduction	new
	4.6.5.2	Specimen preparation	
	4.6.5.3	Test apparatus	
	4.6.5.4	Flexural test methods for MIL HDBK 17	
	4.5.6	Volatiles content	revision
	4.5.7	Moisture content	revision
6	Outline	Refer to chapter outline	revision
	6.2	Specimen preparation	revision
	6.4 (to include all subsections)	Instrumentation and calibration	new-incorporates Section 6.7.2 Instrumentation from Rev E
	6.5 (to include all subsections)	Testing environments	new-incorporates Section 6.7.3 Non-ambient testing from Rev E
	6.6.4	Density	revision

Chapter	Section	Title	Change type
	6.6.5	Cured ply thickness	
	6.6.6	Fiber volume fraction	revision
	6.6.6.5	Determination of fiber volume using image analysis	new
	6.6.7	Void volume fraction	revision
	6.6.7.3	Determination of void volume using image analysis	new
	6.6.8	Moisture/fluid diffusivity and equilibrium content	revision
	6.6.9.1	Dimensional Stability (Thermal)	revision-incorporates Section 6.4.9 Dimensional stability from Rev E
	6.6.9.2	Dimensional Stability (Moisture)	revision-incorporates Section 6.4.9 Dimensional stability from Rev E
	6.6.10	Thermal Conductivity	new
	6.6.11	Specific heat	new
	6.6.12	Thermal Diffusivity	new
	6.6.13	Outgassing of composites for spacecraft	new
	6.6.18	Flammability and smoke generation	new
	6.12.2 (to include all subsections)	Tests unique to textile composites	new
7	7.2 (to include all subsections)	Specimen preparation	new
	7.4 (to include all subsections)	Notched laminate tests	new
	7.7	Damage Characterization	New-incorporates Section 7.4 Other Topics from Rev E
8	Chapter 8	Statistical Methods	revision
	8.3.1	Guide to Computational Procedures	new
	8.4	reorganized	revision
	8.5.17	Constants for Test on Mean and Minimum Individual values (Values for Mean)	new
	8.5.18	Constants for Test on Mean and Minimum Individual values (Values for Minimum Individual)	new
	8.5.19	Upper and Lower Tail Quantiles for Two-Sided t-Distribution	new