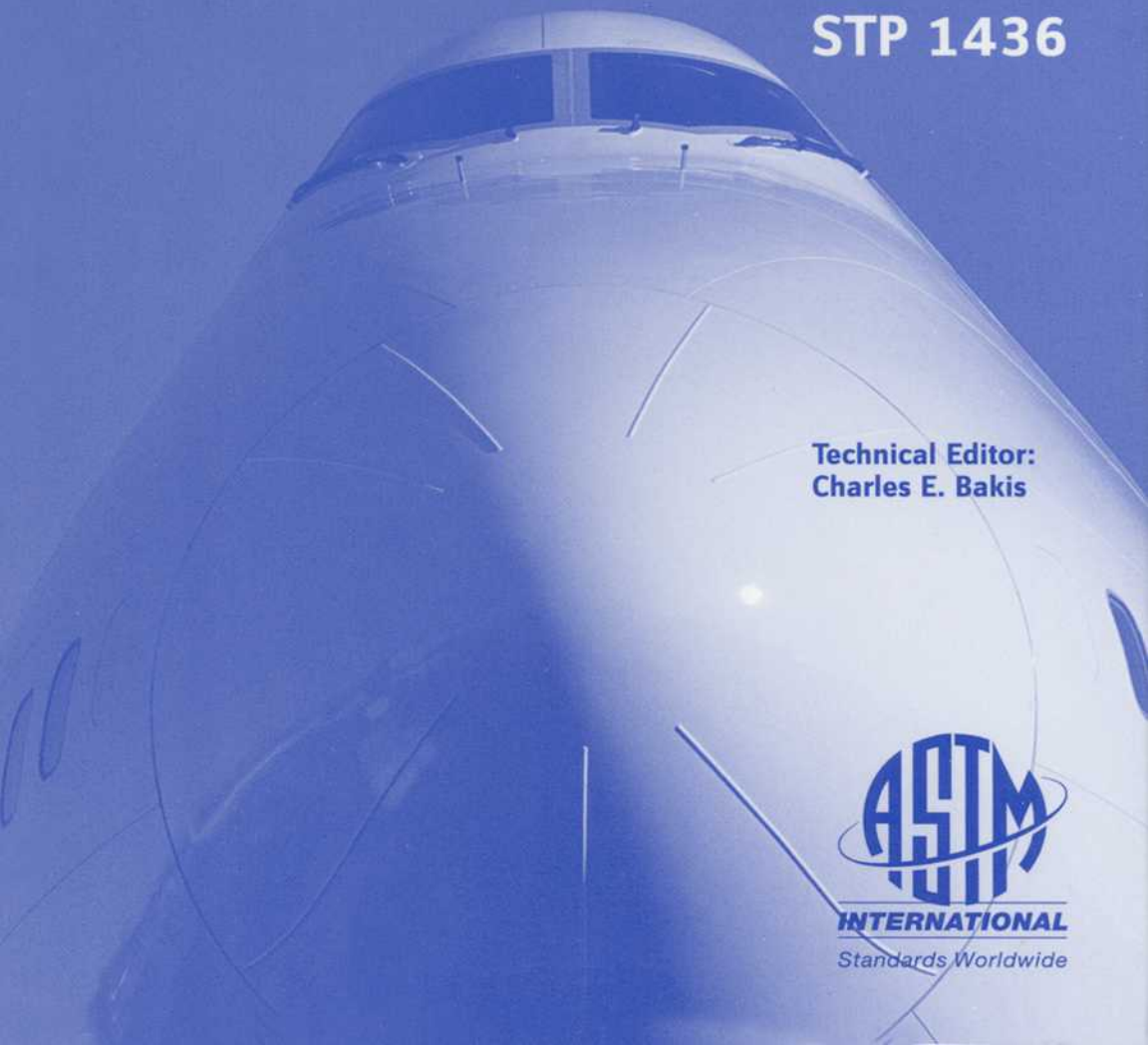
Composite Materials:

Testing and Design

Fourteenth Volume

STP 1436



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Foreword

The 14th ASTM International *Symposium on Composite Materials: Testing and Design*, was held March 11–12, 2002 in Pittsburgh, PA. The *Testing and Design* symposia was sponsored by Committee D30 on Composite Materials. The symposium chairman and editor of this publication was Charles E. Bakis, Penn State University, University Park, PA.

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Overview

The 14th ASTM *Symposium on Composite Materials: Testing and Design,* was held March 11–12, 2002 in Pittsburgh, PA. The *Testing and Design* symposia, sponsored by Committee D30 on Composite Materials, aim to provide a forum for researchers and practitioners to meet and exchange their latest methods and findings related to the testing and design of composite materials and structures.

The 14th Symposium was co-located with a two-day meeting of the Flywheel Rotor Safety and Longevity Working Group, sponsored by the US Air Force and NASA, wherein testing and design methods related to high speed fiber reinforced composite rotors for energy storage in space applications are of utmost current interest. Fiber reinforced polymer composite rotors are attractive for light weight flywheel energy storage devices on account of their high strength to density ratio. Two sessions focusing on composite flywheels were held at the Symposium. The presentations covered a broad array of topics including: state-of-the-art review, material properties testing, nondestructive evaluation, manufacturing, time dependent deformation, burst testing, and containment. A second focus area of the Symposium concerned computational simulation as it relates to composite material behavior and verification testing strategies. Two sessions and a panel discussion were devoted to computational simulation. Three other sessions covered infrastructure applications and general topics in testing and design. In total, 28 papers were presented at the Symposium.

Included in this publication are 22 papers, 20 of which were presented at the Symposium. The papers are organized by topic in five sections: Composite Flywheels for Energy Storage, Construction and Industrial Applications, Computational Simulation Methods for Composite Behavior and Verification Testing Strategies, Metal Matrix Composites, and Polymer Matrix Composites.

The Symposium Chair thanks the numerous session organizers, session chairs, and paper reviewers, whose diligent, volunteer work ensured the quality of the symposium and this publication. Special thanks are due to Jerry Fausz (AFRL) and Kerry L. McLallin (NASA GRC) for co-organizing the flywheel sessions and to Christos C. Chamis (NASA GRC) and Levon Minnetyan (Clarkson Univ.) for organizing the computational simulation sessions and panel discussion. Finally, the Chair acknowledges the tireless and highly professional help of the staff at ASTM International, notably Crystal Kemp (Acquisitions and Review), Dorothy A. Fitzpatrick (Symposia Operations), Jim Olshefsky (Committee D30 Staff Manager), and Holly Stupak (Books and Journals) as well as the valuable guidance by the ASTM Committee on Publications Representative, Stephen J. Watson (DuPont).

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