

A Multidisciplinary Forum for Applied Sciences and Engineering

## Editorial Objectives

#### The Journal of Testing and Evaluation is published bimonthly by ASTM, a nonprofit technical organization that develops and publishes voluntary consensus standards and related information for materials, products, systems, and services. Contributions are peer reviewed prior to publication.

The editorial objectives of this journal are to serve a broad-based audience by:

- 1. Publishing new technical information derived from the field and laboratory testing, performance, quantitative characterization, and evaluation of these materials, products, systems, and services
- 2. Presenting new methods and data and critical evaluations of these methods and data
- 3. Reporting the users' experience with test methods and the results of interlaboratory testing and analysis.
- 4. Providing the scientific basis for both new and improved ASTM standards
- 5. Stimulating new ideas in the fields of testing and evaluation.

## Editor-in-Chief

### Donald R. Petersen

Greenleaf Associates P.O. Box 1785 Midland, MI 48641-1785

Journal of Testing and Evaluation (ISSN 0090-3973) is published bimonthly by ASTM as part of the Testing and Evaluation Series, which includes the Geotechni-cal Testing Journal (published quarterly), Journal of Composites Technology & Research (published quarterly), and Cernent, Concrete, and Aggregates (pub-lished semi-annually). Publication and editorial offices are located at ASTM Headquarters, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

Subscriptions. United States and Canada for 1 year \$129.00 (members \$116.00), for 2 years \$219.00 (members \$197.00), and for 3 years \$290.00 (members \$261.00). Foreign for 1 year \$142.00 (members \$128.00), for 2 years \$241.00 (members \$217.00), and for 3 years \$319.00 (members \$287.00). Single copies are \$35.00. To subscribe, please send prepaid order to ASTM, Subscrip-tion Dept.—JTE, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959. Journal of Testing and Evaluation is indexed regularly by Engineering Index, Inc. and Applied Science & Technology Index. The Journal is abstracted by Wilson Applied Science & Technology Abstracts and is available on microfilm from University Microfilms, a Xerox Co., Ann Arbor, MI. Periodicals postage paid at West Conshohocken, PA and additional mailing offices.

# **Editorial Board**

#### **Ray Bartnikas**

Institut de Recherche d'Hydro-Quebec 1800 Descente, Ste-Julie, P.O. Box 1000 Varennes, Quebec, Canada 121 XEL

#### Susan Butts

The Dow Chemical Company Analytical Sciences Laboratory 1897 B Building Midland, MI 48667

#### **Brigitte Decamps**

Universite de Paris Sud LIRA 1107 Laboratoire de Metallurgie Structurale Bâtiment 413 91405 Orsay Cedex, France

#### Harvey P. Hack

Naval Surface Warfare Center Marine Corrosion Branch Code 613 Annapolis, MD 21402

### Marcelo M. Hirschler

2 Friar's Lane Mill Valley, CA 94941

#### Edward J. Kikta, Jr.

FMC Corporation Agricultural Products Group Analytical Sciences, Box 8 Princeton, NJ 08543

#### Arthur H. Landrock

285 E. Shore Trail Sparta, NJ 07871

#### Theodore J. Louzon AT&T Bell Laboratories

67 Whippany Rd. Whippany, NJ 07981

## Associate Editor

### **Richard E. Link**

US Naval Academy Mechanical Engineering Department 590 Holloway Road Annapolis, MD 21402-5042

Copyright © 1997 by the American Society for Testing and Materials, West Conshohocken, PA. All rights reserved. This material may not be reproduced or copied, in whole or in part, in any printed, mechanical, electronic, film, or other distribution and storage media without the written consent of the publisher. Photocopy Rights. Authorization to photocopy items for internal, personal, or educational classroom use, or the internal, personal, or educational classroom use of specific clients, is granted by the American Society for Testing and Materials (ASTM) provided that the appropriate fee is paid to the Copyright Clearance Center, 222 Rosewood Drive, Darvers, MA 01923, Tel. (508) 750-8400; online: http://www.copyright.com/.

Postmaster. Send Form 3579 to ASTM Headquarters, Subscription Dept., 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

**Change of Address.** Please return entire addressing label on wrapper to ASTM, Subscription Dept.—JTE, 100 Barr Harbor Drive, West Conshchocken, PA 19428-2959, along with new address. Printed in the U.S.A.

#### Golam M. Newaz

Mechanical Engineering Department Wayne State University Detroit, MI 48202

Thomas F. O'Connor Smith Hinchman & Grylls

Associates, Inc. 150 W. Jefferson Avenue Detroit, MI 48226

#### Andrew W. Phelps

University of Dayton Research Institute 300 College Park Dayton, ÕH 45469-0130

#### Alan Riga

Lubrizol Corporation 29400 Lakeland Blvd Wickliffe, OH 44092

#### Christopher G. Scott

Lubrizol Corporation 29400 Lakeland Blvd Wickliffe, OH 44092

#### Richard L. Sheehan, Jr.

3M Company Masking and Packaging Systems Division 3M Center 230-1E-04 St. Paul, MN 55144

#### **Thomas Varga**

Technische Versuchs-und Forschungsanstalt Technische Universität Wien Karlsplatz 13 A-1040 Wien Austria

#### **Ulf Wickström**

Statens Provingsanstalt P.O. Box 857 S-50115 Borås Sweden

# **Editorial Staff**

Beverly Hamill, *Editor, Books and Periodical Publications* Barbara Stafford, *Administrative Assistant*,

Acquisitions & Review

Shannon Wainwright, *Secretary, Acquisitions & Review* Kathy Dernoga, *Manager, Acquisitions & Review* Susan L. Gebremedhin, *Manager, Books and* 

Periodical Publications

Roberta Storer, Director, Editorial Services

M. Bruce Vieth, Director, Production and Graphic Arts

# ASTM Officers

Arthur Cohen, *Chairman* James E. Bihr, *Vice-Chairman* William M. Edmunds, *Vice-Chairman* James S. Pierce, *Chairman of Finance and Audit Committee* James A. Thomas, *President* 

## Directors

Gilbert F. Bourcier Lawrence C. Bradbury Jr. G. Thomas Castino James D. Converse Frances R. Duffey David E. Edgerly John L. Ferrante Harvey P. Hack James L. Hazen Michael L. Italiano Gary M. Kralik Richard S. Ladd Paul H. Langer Hugh C. MacDonald Donald E. Marlowe Scott Nushart Richard M. Park James S. Pierce Charles H. Piersall Jr. Maria Dennison Stefan Don M. von Schriltz Richard J. Schulte

## Past Chairmen

George C. Moran

C. Ross Thomson

## Committee on Publications

Kenneth R. St. John, *Chairman* Robert J. Goode, *Vice-Chairman* Arthur Cohen, *Ex officio* Wayne G. Landis Mark F. Marcus John E. Masters Joseph D. Ritchey Roger E. Stoller Thomas J. Wallace Mona B. Wolf

# Information for Authors

The **Journal of Testing and Evaluation** publishes original articles of the following types:

### Full-Length Papers (3000-5000 words)

- Reports of Original Investigations (research and field applications papers).
- Review Articles (state-of-the-art or literature reviews).
- Interlaboratory Research Reports (including data and statistical analysis).
- New Procedures (currently under development by a committee or authored by an individual).
- Case Studies (reports and analyses of noteworthy events or situations).

Shorter Technical Communications (500–1500 words)

- Technical Notes (brief papers on specific topics).
- Research Briefs (advance communications that will be followed by full-length papers).
- Conference Reports (extended abstracts).

### Commentary (500-1000 words)

- Discussions of Previously Published Papers.
- Letters to the Editor.
- Invited Editorials.
- Reviews of Books and Standards.

The subject matter must not be of a speculative nature and the contents must not include materials of an advertising nature. The paper must not be seriously defective as to literary form and structure, continuity of thought, and clarity of expression. The substance of the paper should not have been published previously in the open literature.

Authors preparing papers for submittal should observe the conventions of style explained in the ASTM Style Manual. Since the journal does not request page charges, the author is expected to conform to these standard conventions for style. SI units are to be used throughout; if data were not measured in SI units, a note should appear to that effect and the original units should be included in parentheses after the SI units.

The original manuscript and four clear copies, including original illustrations, should be submitted to Kathy Dernoga, Manager, Acquisitions and Review, ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428–2959.