

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. All contributions are peer reviewed prior to publication.

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

- 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.

# Technical Editor

# Donald R. Petersen

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

# **Editorial Board**

George V. Aseff, Sr.

Law Engineering Testing Company 396 Plasters Ave., N.E. Atlanta, GA 30324

#### Ray Bartnikas

Institut de Recherche d'Hydro-Quebec 1800 Descente, Ste-Julie, Varennes, Quebec, Canada JOL 2PO

#### James P. Bell

Chemical Engineering and Materials Science Dept University of Connecticut Stors, CT 06269

## Gary Burnell

GEC Turbine Generators Ltd 3 Hawthorne Dr Ibstock, Leicester U K LE6 1 JB

#### **Brigitte Decamps**

Universite de Paris Sud Institut de Sciences des Materiaux (ISMA) Laboratoire de Metallurgie Structurale Bâtiment 413 91405' Orsay, France

#### Harvey P. Hack

Marine Corrosion Branch David Taylor Research Center Code 2813 Annapolis, MD 21402

# Gerald M. Hodgson

752 Westbrook Dr N Tonawanda, NY 14120

## Lyle R. Jenkins

Ductile from Society 4525 Williamsburg Dr Decatur, IL 62521

## Arthur H. Landrock

285 East Shore Trail Sparta, NJ 07871

## Richard E. Link

Department of the Navy David Taylor Research Center Bethesda, MD 20084

#### Theodore J. Louzon

AT&T Beil Laboratories Wynnewood, PA 19096

#### Robert Megargle

Department of Chemistry Creveland State University Euclid Ave. at East 24th St Creveland. OH 44115

#### M. S. Paterson

The Australian National University Research School of Earth Sciences GPO Box 4 Canberra, ACT 261 Australia

#### Raymond D. Pavlovich

Exxon Chemical Americas Polybilt 13501 Katy Freeway Houston TX 77079

#### Alan Riga

The Eubrizol Corp 29400 Lakeland Blvd Wickliffe OH 44092

#### Robert S. Shane

Shane Associates, Inc. 238 Hemiock Rd. Wynnewood, PA 19096

#### Richard L. Sheehan, Jr.

3M Co Packaging Systems Division 3M Center 230-1E-03 St Paul MN 55144

## Fraser Smith

SARCOS 261 E 300 S Suite 150 Sait Lake City, UT 84111

# Ulf Wickstrom

Statens Provingsanstalt P.O. Box 857, S-501 15, Botas, Sweden

## Alan Wolfenden

Mechanical Engineering Department Texas A&M University College Station TX 77843

Journal of Teeting and Evaluation (ISSN 0090-3973) is published bimonthly by ASTM as part of the Testing and Evaluation Series, which includes the Geotechnical Teeting Journal (published quarterly), Journal of Composites Technology & Research (published quarterly), and Germent, Concrete, and Aggregates (published semi-annually). Publication and editorial offices are located at ASTM Headquatters, 1916 Race St., Philadelphia, PA 19103.

Subscriptions. United States and Canada for 1 year \$103.09 (members \$83.00), for 2 years \$175.00 (members \$158.00), and for 3 years \$232.00 (members \$209.00). Foreign for 1 year \$113.00 (members \$102.00), for 2 years \$193.00 (members \$174.00), and for 3 years \$255.00 (members \$230.80). Single copies are \$35.00. To subscribe, please send prepaid order to ASTIM, Subscription Dept.—JTE, 1916 Race St., Philadelphia, PA 19163. Journal of Testing and Evaluation is indexed regularly by Engineering Index, Inc., and is available on microfilm from University Microfilms, A Xerox Co., Ann Artor, Mt. Second class postane neid at Philadelphia. PA

Dept.—JTe, 1910 Hace St., Philadesphia, PA 19103. Journal of Fesing and Evaluation is inflamed regularly by Engineering Index, Inc., and is available on microfilm from University Microfilms, A Xerox Co., Ann Arbor, Mil. Second class postage paid at Philadelphia, PA.

Copyright © 1983 by the American Society for Testing and Materials, Philadelphia, 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 or personal use, or the internal or personal use of specific clients, is granted by the American Society for Testing and Materials for users registered with the Copyright Clearance Center (CCC) Transactional Reporting Service, provided that the base fee of \$2.50 per copy, plus \$0.50 per page, is paid directly to CCC, 27 Congress St., Salem, MA 01970; Tel. (508) 744-3350. For those organizations that have been granted a photocopy Itemse by CCC, a separate system of payment has been arranged. The fee code for users of the Transactional Reporting Service is 0090-3973/09-92 \$2.50 + .50.

Postmaster, Send Form 3579 to ASTM Headquarters, Subscription Dept., 1916. Race St., Philadelphia, PA 19103.

Change of Address. Please return entire addressing label on wrapper to ASTM, Subscription Dept. —JTE, 1916 Race St., Philadelphia, PA 19103, along with new address. Printed in the U.S.A.

# **Editorial Staff**

Thea R Clark, Editor, Books and Periodical Publications

Barbara Stafford, Administrative Assistant, Acquisition & Review

Kathy Dernoga, *Manager, Acquisition & Review*Susan L. Gebremedhin, *Managér, Books and Periodical Publications* 

Roberta Storer, Director, Editorial Services

M. Bruce Vieth, Director, Production and Graphic Arts

# **ASTM Officers**

Nancy M. Trahey, *Chairman*George C. Moran, *Vice-Chairman*C. Ross Thomson, *Vice-Chairman*Arthur Cohen, *Treasurer*James A. Thomas, *President* 

# Directors

Donald S. Abelson Allen W. Grobin, Jr. Cyrus P. Henry, Jr. James E Bihr David C. Jeanes Norma L. Bottone John E. Kean Gilbert F Bourcier Guy T Castino Richard S. Ladd Betty I. Dunbar James J. Lichtenberg Michael M. O'Mara William M. Edmunds James S. Pierce Jon A Epps Garland W Steele Rodolfo I Godinez

#### Past Chairmen

Emery Farkas . John A. Millane

# Committee on Publications

Leonard Mordfin, Chairman Kenneth R St John, Vice-Chairman Nancy M Trahey, Ex officio George Beestman Victor Chaker Robert J Goode R. D. Hooton
Paul H. Langer
Mark F. Marcus
John E. Masters
Thomas F. O'Connor
Howard J. Pincus
Kurt H. Strauss
Roger E. Stoller
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 Onginal 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 thro**ughout**, if data were not measured in SI units, a note should appear to that effect and the original units should be included in **parenth**eses 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, 1916 Race St., Philadelphia, PA 19103