

Journal of ASTM International
Special Technical Publication



STP 1502

Small. Specimen

Test Techniques:

5th Volume

Mikhail A. Sokolov
Guest Editor

Journal of ASTM International
Special Technical Publication STP1502
**Small Specimen Test Techniques:
5th Volume**

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100 Barr Harbor Drive
PO Box C700
West Conshohocken, PA 19428-2959

Printed in the U.S.A.
ASTM Stock #: STP1502

Library of Congress Cataloging-in-Publication Data

ISBN: 978-0-8031-4506-1

ISSN: 1949-4572

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Printed in Dayton, OH
September, 2009

Foreword

THIS SPECIAL ISSUE OF *JAI*, Special Technical Publication STP 1502, *Small Specimen Test Techniques: 5th Volume*, contains papers presented at the symposium with the same name held January 31–February 1, 2007 in Anaheim, California. The symposium was sponsored by ASTM International Committee E10 on Nuclear Technology and Applications. The symposium chairman and editor was Mikhail A. Sokolov, Oak Ridge National Laboratory, Oak Ridge, Tennessee, USA.

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Overview

The 5th Symposium on Small Specimen Test Techniques was held January 31–February 1, 2007 in Anaheim, California. This is the fifth in a series that commenced in 1983 in Albuquerque, New Mexico, and focused on test techniques for fusion reactors. The second was held in New Orleans, Louisiana, in 1992 and focused on test techniques and their applications to reactor pressure vessel annealing and life extension. The third was held in New Orleans, Louisiana, in 1997 and focused on the use of reconstituted specimens. The fourth was held in Reno, Nevada, in 2001 and focused on fracture toughness measurements using subsize specimens as well as correlations between subsize specimens results and those from standard test techniques. It has served as an important international forum for the exchange of ideas and techniques for extracting mechanical property information from relatively small volume specimens. This effort has largely been driven by the limited volumes of material afforded in irradiation experiments for the developments of fusion reactor materials, as well as the need to improve the information obtainable from specimens in existing light water power reactor surveillance programs. Hence, there has been a cross-fertilization of ideas from the fission and fusion communities, and techniques thus obtained have spawned interest in non-nuclear applications.

The papers presented in this 2-day symposium have been collected in a single volume of this Special Technical Publication. Most of the papers deal with use of small size specimens for fracture toughness characterization of irradiated materials. This has been the area of major increase in small specimen applications because of advances in the Master Curve methodology. However, it is gratifying to see successful attempts to apply small size specimens for ductile fracture processes, dynamic fracture toughness, and even crack arrest toughness characterizations. One of these papers deals with microstructural features that might be related to scatter of fracture toughness in the transition region. Three papers provide a very broad description of current use of small specimens for assessment of the first as well as the newest generations of VVER-type reactors. Two papers are dedicated to expand applicability of small punch testing for fracture toughness evaluation of irradiated materials. One paper looks at application of digital marker extensometry to determine the true stress-strain behavior of irradiated materials. Miniaturized hourglass-type fatigue specimens are used for creep-fatigue characterization of F82H-IEA heat in combination with microstructural observations of fractured surfaces. Finally, one paper looks at application of ball indentation testing for evaluation of fatigue properties of irradiated materials.

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www.astm.org
ISBN: 978-0-8031-4506-1
Stock #: STP1502