

Science and
Technology of

Building Seals, Sealants, Glazing, and Waterproofing

Sixth Volume
James C. Myers
editor



STP 1286

STP 1286

Science and Technology of Building Seals, Sealants, Glazing, and Waterproofing: Sixth Volume

James C. Myers, editor

ASTM Publication Code Number (PCN):
04-012860-10



ASTM
100 Barr Harbor Drive
West Conshohocken, PA 19428-2959
Printed in the U.S.A.

ISBN: 0-8031-2044-3
ISSN: 1062-967X
PCN: 04-012860-10

Copyright © 1996 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 Dr., Danvers, MA 01923, Tel: 508-750-8400; online: <http://www.copyright.com/>

Peer Review Policy

Each paper published in this volume was evaluated by three peer reviewers. The authors addressed all of the reviewers' comments to the satisfaction of both the technical editor(s) and the ASTM Committee on Publications.

To make technical information available as quickly as possible, the peer-reviewed papers in this publication were prepared "camera-ready" as submitted by the authors.

The quality of the papers in this publication reflects not only the obvious efforts of the authors and the technical editor(s), but also the work of these peer reviewers. The ASTM Committee on Publications acknowledges with appreciation their dedication and contribution to time and effort on behalf of ASTM.

Printed in Philadelphia, PA
July 1996

Foreword

This publication, *Science and Technology of Building Seals, Sealants, Glazing, and Waterproofing: Sixth Volume*, contains papers presented at the Charles J. Parise Sixth Annual Symposium of the same title held in Fort Lauderdale, Florida, 31 January 1996. The symposium was sponsored by ASTM Committee C24 on Building Seals and Sealants. James C. Myers, Simpson, Gumpertz & Heger, Inc., presided as symposium chairman and is editor of this publication.

Contents

Overview	vii
 STRUCTURAL SILICONE GLAZING	
Structural Silicone Glazing: In-Service Reliability Evaluation—T. A. SCHWARTZ, M. S. ZARGHAMEE, AND F. W. KAN	3
Structural Silicone Performance on 2 cm Polished Granite—L. D. CARBARY AND J. R. FULTON	15
Effects of Accelerated Weathering on Architectural Laminated Glass in a Windstorm Environment—R. A. BEHR, J. E. MINOR, AND P. A. KREMER	27
Seismic Behavior of Structural Silicone Glazing—M. S. ZARGHAMEE, T. A. SCHWARTZ, AND M. E. GLADSTONE	46
 SEALANT DESIGN	
Design Considerations for Sealants When Used at Horizontal Expansion Joints in Masonry Cavity Walls—T. A. O'CONNOR AND H. L. DROZ	63
A Case Study of the Use of Preformed Surface Applied Silicone Sealant Joints—R. S. PIPER AND R. J. KENNEY	84
 SEALANT RESEARCH	
The Relative Effects of Deformation and Aging on Sealant Behavior—J. L. MARGESON, M. A. LACASSE, AND J. C. MARGESON	97
Adhesion Properties of Sealants in Resealed Joints—A. PAGLIUCA AND A. R. HUTCHINSON	109
Movement During Cure of High Performance Building Joint Sealants—M. A. LACASSE AND J. C. MARGESON	129
Effect of Cross-Sectional Shapes of Polysulfide Sealant on Fatigue Resistance to Joint Movement—K. TANAKA, T. HIRAI, AND M. KOIKE	146

Overview

This Special Technical Publication (STP), based on ASTM C24's January 1996 symposium in Ft. Lauderdale, Florida, continues the committee's goal of disseminating current knowledge on all aspects of sealant technology. C24 has held annual symposia since 1988 to meet this goal. The resulting STPs remain the best collection of current sealant industry information and published data. C24 plans to skip a year (1997) in our symposia series and will hold our next symposium in San Diego, California, in January 1998. Hopefully this will give all of you additional time to conduct research and make a contribution to the next symposium. This publication contains ten peer-reviewed papers on structural silicone glazing (SSG), sealant design, and recent sealant research.

Structural Silicone Glazing

Interest in SSG, as measured by attendance at C24's SSG task groups, dropped off somewhat in the early 1990s, in part due to the decrease in new building construction during that time. As construction picks up, interest in SSG is growing again. Much of the new interest is shifting from principles and standards for new design to field evaluations of early designs, some of which are becoming twenty-years old. The Schwartz et al. paper is the first published attempt in the industry to develop a methodology for in situ evaluation of existing SSG systems. C24 is in the process of developing a test method based on this paper (task group C24.35.14). The Carbary and Fulton paper is one of the first published sources of test data on a naturally weathered SSG system on granite. The Behr et al. paper examines the effect of accelerated weathering on a SSG system with laminated glass. The Zarghamee et al. paper provides details of the behavior of a SSG system during an earthquake. All of the papers will be useful to SSG designers, as well as to task group C24.35.43 which is developing a guide to in situ evaluation of SSG.

Sealant Design

O'Connor and Droz provide useful sealant design guidance for soft joints in masonry cavity walls. This is a problem-prone area of wall design. As curtain wall systems evolved, predictable water leakage problems developed because some designers failed to incorporate adequate waterproofing systems, such as through-wall flashings with drip edges and properly designed expansion joints. Piper and Kenney provide a review of the use of preformed bridge joints, which are becoming more popular.

Sealant Research

The Margeson et al. paper on sealant deformation and aging continues the on-going contributions to C24's symposia from the National Research Council of Canada relative to long-term sealant performance and durability. The Pagliuca and Hutchinson paper on resealed joints will

be of interest to remedial sealant designers and installers. The Lacasse and Margeson paper on movement during sealant cure adds to other papers on this important topic presented in previous symposia. The Tanaka et al. paper on the relation between cross-sectional shape and fatigue will be of interest to sealant designers.

Collectively, these papers help answer some recent questions in sealant technology and provide the foundation for additional research and ASTM standards development. ASTM welcomes your comments on our symposia series and looks forward to your future contribution. I thank the authors, peer reviewers, and ASTM staff whose help and persistence made this publication possible.

James C. Myers

Simpson Gumpertz & Heger Inc., 297 Broadway,
Arlington, MA 02174; Symposium chairperson and
editor.

ISBN 0-8031-2044-3