

*Science and  
Technology of*

*Building Seals,  
Sealants,  
Glazing, and  
Waterproofing*

*Fourth  
Volume*

*David H. Nicastro  
editor*



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***Science and Technology of  
Building Seals, Sealants, Glazing,  
and Waterproofing: Fourth  
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#### **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 editors, 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.

# Foreword

This publication, Science and Technology of Building Seals, Sealants, Glazing and Waterproofing: Fourth Volume contains papers presented at the symposium of the same name held in Fort Lauderdale, FL on 2–3 February 1994. The symposium was sponsored by ASTM Committee C-24 on Building Seals and Sealants. David H. Nicastro presided as chair is the editor of the resulting publication.

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# Overview

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The papers published in this book were presented during the Fourth Symposium on the Science and Technology of Building Seals, Sealants, Glazing, and Waterproofing held 2–3 February, 1994 in Fort Lauderdale, FL. The symposium is held annually in conjunction with the winter meeting of ASTM Committee C-24 on Building Seals and Sealants.

This continuing series of symposia provides the best scientific forum in this industry for peer-reviewed research papers. As with most scientific disciplines, significant advances are made by baby steps, and not often by giant leaps. Many of the papers reflect progress reports on on-going research. The open, non-proprietary dialogue between the attendees is instrumental in the continuing betterment of the sealant industry. The questions from the audience during the presentations and the peer-review process of the submitted manuscripts provide some of the input for future adjustments to the direction of the research being conducted.

The eleven papers in this volume represent a good balance of the various membership classes required to participate on ASTM committees: four were contributed by producers, one by a user, and six by general interest members.

The first four papers relate to the durability of sealants, one of the key parameters for selecting a sealant product. Gorman's paper presents data collected from actual field experience by a waterproofing contractor. This rare practical and empirical data can be compared to the various theoretical and laboratory durability evaluation procedures discussed in the next three papers.

Although not correlated with field data, Lacasse and Paroli present interesting and insightful comparisons of the accelerated weathering of five silicone sealants. In the next paper, Lacasse, Margeson, and Bryce evaluate cyclic deformation testing in the laboratory as a means of estimating the fatigue life of another five silicone sealants. This work will be continued on other types of sealant, and the results will be published in a subsequent volume.

The final durability paper, by Beech and Beasley, is an update on their continuing work comparing field weathering and artificial (accelerated) weathering. Their data have been instrumental in "calibrating" the industry's understanding of the acceleration factor that standard weathering tests represent.

Next are presented five papers related to sealant products and applications. The paper by O'Neil, Klosowski, Altes, and Bergman is first not only in order of publication, but represents the first research addressed solely at sealant aesthetic issues. In addition to the excellent experimental program discussed, the paper is also a useful resource because it presents a nearly comprehensive discussion on sealant aesthetic issues. The only common aesthetic problems not covered by their paper are sealant color change and substrate water staining near joints (which often resembles one of the four mechanisms discussed in their paper). More importantly, their paper should cause specifiers great concern: some specimens developed latent staining which were not predicted by the standardized tests currently employed.

Myers' paper on the performance of "Band-Aid" (or Bridge Seal) joints provides qualitative and quantitative recommendations for designing seals in this configuration. Furthermore, the stresses developed in "band-aid" joints are compared to his previous findings on butt and fillet joints.

Although Abo-Qaidis and Al-Qadi were unable to present their paper at the symposium, we are fortunate to have their published manuscript. Their elegant test program authori-

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tatively indicates the relative performance of several joint types in reducing corrosion in reinforced concrete pavements.

Awareness of the need to protect the environment continuously increases. Lee's paper is therefore a landmark because it is the first to specifically address the use of a construction sealant to benefit the environment.

Polysulfide-based sealants are generally recognized as having been the first type to be classified as "high-performance"—that is, high movement capability and long durability in exterior construction joints. Fiorillo and Harding present new developments in polysulfide technology, which indicate that these formulations can be effective even without primer. Although not discussed in their paper, priming is still a valuable step in promoting the durability of a sealant joint. Nevertheless, good unprimed performance is essential because many projects still do not employ primer, even when it is specified.

The last two papers relate to glazing. Wilson discusses a case history of reglazing a building with defective structural sealant design and installation. Considering that sealant adheres the glass lites to the frames in four-sided structural glazing, this type of failure represents a real hazard. Wilson's methodology can be applied to other projects to evaluate their existing condition and remedy them if necessary.

Finally, Lowe's paper on Insulated Glass Unit (IGU) testing in Europe is mandatory reading for anyone planning to sell IGUs in the world market after 1998. As international standards gain acceptance, those who are involved in their development will have a distinct comprehensive advantage.

Even as we publish this volume, I look forward to the next series of papers in this dynamic industry. I encourage all readers to participate in the standards development process, to attend the symposia, and to contribute new papers. By your participation and feedback, the industry is advanced and we all benefit from improvements to our constructed environment.

*David H. Nicastro*

Nicastro Enterprises  
Houston, TX: symposium  
chair and editor.

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