



# **CEMENT STANDARDS**

**EVOLUTION  
AND TRENDS**

P. K. Mehta, *editor*

 **STP 663**

**AMERICAN SOCIETY FOR TESTING AND MATERIALS**

# **CEMENT STANDARDS— EVOLUTION AND TRENDS**

A symposium  
sponsored by ASTM  
Committee C-1 on  
Cement  
AMERICAN SOCIETY FOR  
TESTING AND MATERIALS  
St. Louis, Mo., 7 Dec. 1977

ASTM SPECIAL TECHNICAL PUBLICATION 663  
P. K. Mehta, University of  
California, Berkeley  
editor

04-663000-07



AMERICAN SOCIETY FOR TESTING AND MATERIALS  
1916 Race Street, Philadelphia, Pa. 19103

Copyright© by AMERICAN SOCIETY FOR TESTING AND MATERIALS 1978  
Library of Congress Catalog Card Number 78-68433  
ISBN 0-8031-0298-4

NOTE

The Society is not responsible, as a body,  
for the statements and opinions  
advanced in this publication.

Printed in Baltimore, Md.  
November 1978  
Second Printing, Philadelphia, Pa.  
October 1986

# Dedication

This publication is dedicated to the chairmen of ASTM  
Committee C-1 on Cement:

*G. F. Swain (1903–1916)*

*R. S. Greenman (1916–1926)*

*P. H. Bates (1926–1945)*

*F. H. Jackson (1945–1950)*

*R. R. Litchiser (1950–1963)*

*W. J. Halstead (1963–1968)*

*B. Mather (1968–1974)*

*H. H. Newlon (1974– )*

By the members of Subcommittee C01.93  
on Papers and Symposia

E. Farkas  
G.J. Frohnsdorff  
A. Isberner  
J. Mander  
P.K. Mehta, Chairman

# Foreword

The symposium on Cement Standards – Evolution and Trends was held in St. Louis, Mo., on 7 Dec. 1977. Committee C-1 on Cement of the American Society for Testing and Materials sponsored the event. P. K. Mehta, University of California, Berkeley, presided as chairman of the symposium and served as editor of this publication.

## **Related ASTM Publications**

1978 Annual Book of ASTM Standards, Part 13, Cement, Lime, Ceilings and  
Walls (Including Manual of Cement Testing), 01-013078-07

Fineness of Cement, STP 473 (1970), 04-473000-07

Living with Marginal Aggregates, STP 597 (1976), 04-597000-07

## A Note of Appreciation to Reviewers

This publication is made possible by the authors and, also, the unheralded efforts of the reviewers. This body of technical experts whose dedication, sacrifice of time and effort, and collective wisdom in reviewing the papers must be acknowledged. The quality level of ASTM publications is a direct function of their respected opinions. On behalf of ASTM we acknowledge with appreciation their contribution.

*ASTM Committee on Publications*

## Editorial Staff

Jane B. Wheeler, *Managing Editor*  
Helen M. Hoersch, *Associate Editor*  
Ellen J. McGlinchey, *Senior Assistant Editor*  
Helen Mahy, *Assistant Editor*

# Contents

<b>Introduction</b>	<b>1</b>
<b>Committee C-1 on Cement – Seventy-Five Years of Achievement – W. S. WEAVER</b>	<b>3</b>
<b>History and Status of Standards Relating to Alkalies in Hydraulic Cements – GEOFFREY FROHNSDORFF, J. R. CLIFTON, AND P. W. BROWN</b>	<b>16</b>
<b>History and Status of Performance Tests for Evaluation of Soundness of Cements – P. K. MEHTA</b>	<b>35</b>
<b>History and Status of Specifications and Tests for Strength – A. W. ISBERNER AND PAUL KLIEGER</b>	<b>61</b>
<b>Tests and Evaluation of Portland and Blended Cements for Resistance to Sulfate Attack – KATHARINE MATHER</b>	<b>74</b>
<b>Specifications and Tests for New Structural Cements – R. E. PRICE</b>	<b>87</b>
<b>Summary</b>	<b>99</b>
<b>Index</b>	<b>105</b>

ISBN 0-8031-0298-4