Symposium on ELEVATED TEMPERATURE STRAIN GAGES



Published by the AMERICAN SOCIETY FOR TESTING MATERIALS 1916 Race St., Philadelphia 3, Pa.

ASTM Special Technical Publication No. 230

SYMPOSIUM ON ELEVATED TEMPERATURE STRAIN GAGES

Sponsored by AERONAUTICAL STRUCTURES LABORATORY, NAVAL AIR MATERIAL CENTER Philadelphia, Pa., December 4-5, 1957



Reg. U. S. Pat. Off.

ASTM Special Technical Publication No. 230

Price \$4.50; to Members \$3.60

Published by the AMERICAN SOCIETY FOR TESTING MATERIALS 1916 Race St., Philadelphia 3, Pa. Note.—The Society is not responsible, as a body, for the statements and opinions advanced in this publication.

© by American Society for Testing Materials 1958

Printed in Lancaster, Pa. June, 1958

CONTENTS

PAGE

Introduction—D. E. Weiss	1
Recent Laboratory Evaluation of High-Temperature Strain Gages to 900 F—Emmett E. Day	3
Progress on Metalfilm Strain Gages—William T. Bean, Jr	12
Advances in Static and Dynamic High Temperature Strain Gage Research— Richard H. Kemp	18
Temperature Compensation of High-Temperature Strain Gages—Edward I. Gray, Arthur Grossman, and Melvin R. Rubin	34
Laboratory Evaluation of Nichrome-Foil Strain Gage Installations up to 1200 F—William R. Forlifer	42
Optical Strain Gages for Use at Elevated Temperatures—H. K. Howerton	51
A Facility for the Evaluation of Resistance Strain Gages at Elevated Tem- peratures—R. L. Bloss	57
Resistance Measurement of Ceramic-Type Strain Gage Cements—J. W. Pitts, E. Buzzard, and D. G. Moore	67
Development of High-Temperature Strain Gage Wire-W. H. Graft	7 6
Evaluation of Several Gage Configurations Fabricated with Armour Alloy "D"—Jack J. Shrager	87
Ceramic Coatings for Experimental Stress Analysis-F. B. Stern, Jr	97

Panel Discussion

Bonding Agents for High-Temperature Strain Gages-Dwight G. Moore	106
The Stability of Strain Gage Alloy Wires-Arthur G. Metcalfe	109
Foil Gages for High-Temperature Applications-Frank F. Hines	113
Temperature Compensation Techniques-Richard Friedman	116
Problems in Thermal Stress Measurements-D. J. DeMichele	121
Elevated Temperature Strain-Gage Investigations at Grumman Aircraft Engi- neering Corporation—Robert J. Stewart	127
High Temperature Strain Gage Evaluator-C. K. Martina	131
Bakelite Strain Gages for Temperatures between	133
Investigation of Strain Gages for Long-Time Static Testing to 650 F- Herbert Yanowitz, Irwin Berman, and Alfred Bleiweis	142
High-Temperature Strain Gage Testing at Rolls-Royce-D. A. Drew	151

Additional Papers

Development and Application of High-Temperature Strain Gages for Stress	
Measurements in Jet Engines-B. R. Anderson	153
The Synthetic Mica Gage—G. A. Brewer	162

FOREWORD

The subject covered in this Symposium is of considerable concern to the ASTM-ASME Joint Committee on Effect of Temperature on the Properties of Metals. In view of this, the Administrative Committee on Papers and Publications is pleased to sponsor its publication.

