

**ELEVATED TEMPERATURE PROPERTIES
AS INFLUENCED BY NITROGEN
ADDITIONS TO TYPES 304 AND 316
AUSTENITIC STAINLESS STEELS**

STP 522



AMERICAN SOCIETY FOR TESTING AND MATERIALS

ELEVATED TEMPERATURE PROPERTIES AS INFLUENCED BY NITROGEN ADDITIONS TO TYPES 304 AND 316 AUSTENITIC STAINLESS STEELS

A symposium
presented at the
Seventy-second Annual Meeting
AMERICAN SOCIETY FOR
TESTING AND MATERIALS
Atlantic City, N. J., 22-27 June 1969

ASTM SPECIAL TECHNICAL PUBLICATION 522
J. J. Heger and G. V. Smith, co-chairmen

List price \$10.50
04-522000-40



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

© BY AMERICAN SOCIETY FOR TESTING AND MATERIALS 1973
Library of Congress Catalog Card Number: 72-88610

NOTE

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

Printed in Baltimore, Md.
February 1973

Foreword

The Symposium on Elevated Temperature Properties as Influenced by Nitrogen Additions to Types 304 and 316 Austenitic Stainless Steels was presented at an informal workshop session held at the 72nd Annual Meeting of the Society, in Atlantic City, N. J., 22-27 June 1969. The sponsors of this symposium included the Joint Committee on Effect of Temperature on the Properties of Metals, Metals Properties Council, American Society for Testing and Materials, and American Society of Mechanical Engineers. J. J. Heger, U. S. Steel Corporation, and G. V. Smith, consultant, served as co-chairmen.

Related ASTM Publications

Report on Elevated-Temperature Properties of Selected Superalloys, DS 7-S1 (1970), \$11.00

Evaluation of the Elevated Temperature Tensile and Creep-Rupture Properties of C-Mo, Mn-Mo, and Mn-Mo-Ni Steels, DS 47 (1971), \$6.50

Elevated Temperature Static Properties of Wrought Carbon Steel, STP 503 (1972), \$3.00

Contents

Introduction	1
Mechanical Properties of Hot-Extruded 304N and 316N Stainless Steel Pipe—PHILIP KADLECEK	3
High-Nitrogen Austenitic Stainless Steels—C. E. SPAEDER, W. F. DOMIS, AND K. G. BRICKNER	35
Elevated Temperature Properties of Nitrogen-Containing Type 304L Austenitic Stainless Steel—P. D. GOODELL AND J. W. FREEMAN	46
Influence of Nitrogen on the Creep-Rupture Properties of Type 316 Steel—T. M. CULLEN AND M. W. DAVIS	60
A Nitrogen Grade of Types 304 and 316 Austenitic Stainless Steels; Specification and Code Considerations—I. A. ROHRIG	79
Creep and Creep-Rupture Properties of Types 304N and 316N Stainless Steels—W. F. DOMIS	86
Service Experience with H Grades of Austenitic Steel—G. J. SCHNABEL	100
Effect of Elevated Temperatures on the Properties of Nitrogen-Bearing Type 216 Steel—J. A. CHIVINSKY	105

