

Fracture Resistance of Aluminum Alloys

Notch Toughness, Tear Resistance, and Fracture Toughness

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ASM International
The Materials Information Society

Materials Park, Ohio 44073-0002
www.asminternational.org

First printing, September 2001

Comments, criticisms, and suggestions are invited, and should be forwarded to ASM International.

ASM International staff who worked on this project included Veronica Flint, Manager of Book Acquisitions; Bonnie Sanders, Manager of Production; Nancy Hrivnak, Copy Editor; Kathleen Dragolich, Production Editor; and Scott Henry, Assistant Director of Reference Publications.

Library of Congress Cataloging-in-Publication Data

Kaufman, J.G. (John Gilbert), 1931-
Fracture resistance of aluminum alloys/J. Gilbert Kaufman.
p.cm.
1. Aluminum alloys—Mechanical properties. 2. Fracture mechanics I. Title.
TA480.A6 K355 2000 620.1'866—dc21 2001022228

ISBN: 0-87170-732-2
SAN: 204-7586

ASM International®
Materials Park, OH 44073-0002
www.asminternational.org

Printed in the United States of America

Preface

On behalf of the Aluminum Association, Inc., Alcoa, Inc., and ASM International, we are pleased to provide this summary of data on the fracture characteristics of aluminum alloys. It is broadly based on a publication produced by Alcoa in 1964, called *Fracture Characteristics of Aluminum Alloys*, and we want to acknowledge the support of Alcoa, Inc., notably Dr. Robert J. Bucci and Dr. William G. Truckner, in arranging to have the copyright to that publication transferred to the Aluminum Association, Inc. Further, we acknowledge the support of Dr. John A.S. Green of the Aluminum Association, Inc. in making it available for a joint publication with ASM International.

In particular, we note the contributions of the members of the Aluminum Association Engineering and Design Task Force, Dr. Andrew J. Hinkle, Chair, through their review of and input to the organization and content of the book.

This book is unique in the degree to which it presents individual test results for many individual lots of a wide range of aluminum alloys, tempers, and products, rather than simply broad summaries of data; it is also unique for the breadth of types of fracture parameters presented. This combination provides not only the ability to dig out specific data needed to evaluate alloy and temper selections for individual applications, but also the ability to check the degree to which the various fracture parameters provide consistent relative ratings for specific alloys and tempers. We believe these capabilities will benefit a wide range of needs, from alloy evaluation and selections to design.

A word is needed about the inclusion in the book of data for a number of alloys and tempers that are considered obsolete today. Such alloys are included because they may have been used in fracture-critical structures in years past, and specialists dealing with maintenance and retrofit of those structures may be looking for data on the old alloys, even though it is unlikely that new structures will be made of them.

An explanation is also needed about the treatment of units in this book. Because all of these data were generated in an environment of the usage of English/engineering units, and because of the mass of data involved, almost the entire book is presented in those units. While this is contrary to the normal ASM International and Aluminum Association, Inc. policies to present engineering and scientific data in both Standard International (SI) and English/engineering units, it saves a prodigious amount of expense related to both time for conversion and to the space required for dual presentation. Further, it avoids the inevitable compromises surrounding rounding techniques for such conversions in a multitude of units. Additional help for those interested in SI conversion is provided in Appendix 2.

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ASM International Technical Books Committee (2000–2001)

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