

CONTENTS

SECTION I: OVERVIEW

Introduction to Titanium and Titanium Alloys (<i>Matthew J. Donachie, Jr.</i>)	3
Titanium and Its Alloys	10

SECTION II: PHYSICAL METALLURGY

Physical Metallurgy and Metallography of Titanium Alloys <i>(S. R. Seagle and L. J. Bartlo)</i>	23
Microstructure of Titanium and Titanium Alloys <i>(ASM Committee on Metallography of Titanium and Titanium Alloys)</i>	33
Effect of Thermal Treatment on Microstructure of Ti-6Al-4V	43

SECTION III: PROPERTIES AND MICROSTRUCTURE

Terminology for Titanium Microstructures	47
Effect of Chemistry and Heat Treatment on the Fracture Properties of Ti-6Al-4V Alloy (<i>M. J. Harrigan, M. P. Kaplan and A. W. Sommer</i>)	50
Effect of Cooling Rate on Fracture Behavior of Mill-Annealed Ti-6Al-4V <i>(R. E. Lewis, J. G. Bjeletich, T. M. Morton and F. A. Crossley)</i>	80
Relationship Between Mechanical Properties, Microstructure, and Fracture Topography in $\alpha + \beta$ Titanium Alloys <i>(J. C. Chesnutt, C. G. Rhodes and J. C. Williams)</i>	100
Metallurgical Aspects of Fatigue and Fracture in Titanium Alloys <i>(C. A. Stubbington)</i>	140

SECTION IV: CORROSION

The General Corrosion Resistance of Titanium (<i>H. B. Bomberger</i>)	161
Hot-Salt Stress-Corrosion of Titanium (<i>V. C. Petersen</i>)	167
Aqueous Stress Corrosion in Titanium Alloys (<i>R. J. H. Wanhill</i>)	175
Effect of Hydrogen on Titanium and Its Alloys (<i>N. E. Paton and J. C. Williams</i>)	185

SECTION V: PROCESSING

Relation of Properties to Processing for Wrought Titanium Alloys <i>(ASM Committee on Titanium and Titanium Alloys)</i>	211
Forging Materials: Titanium Alloys (<i>Forging Industry Association</i>)	222
Titanium and Titanium Alloys	226
The Isothermal Forging of Titanium Alloys for Aerospace Applications <i>(G. W. Greenwood, W. E. Seeds and S. Yue)</i>	249
Less Materials Used via Isothermal Forging (<i>Jerry D. Snow and Charles R. Cook</i>)	260
Microstructural Control of Ti-6Al-4V forgings (<i>G. K. Turnbull and T. B. Gurganus</i>)	265
Forming of Titanium Alloys (<i>ASM Committee on Fabrication of Titanium</i>)	270
Titanium Powder Metallurgy — A Perspective <i>(C. A. Kelto, B. A. Kosmal, D. Eylon and F. H. Froes)</i>	280

Titanium Castings (<i>J. R. Newman</i>)	289
Large Structural Titanium Castings (<i>W. J. Barice</i>)	295
Weldability and Quality of Titanium Alloy Weldments (<i>R. Witt, A. Flescher and O. Paul</i>)	301
Hints for Welding Titanium (<i>Ward Abbott</i>)	315
Low Cost Advanced Titanium Airframe Structures via Welding (<i>Robert W. Messler, Jr., and Carlos A. Paez</i>)	318
Superplastic Forming/Diffusion Bonding (<i>Edward D. Weisert</i>)	323
Heat Treating of Titanium and Titanium Alloys (<i>ASM Committee on Titanium and Titanium Alloys</i>)	330
Procedures and Precautions in Machining Titanium Alloys (<i>Norman Zlatin and Michael Field</i>)	342

SECTION VI: APPLICATIONS

Selection of Titanium for Petroleum Refinery Components (<i>James A. McMaster</i>)	361
Titanium for Chemical Processing Equipment (<i>Ward W. Minkler</i>)	368
Three Recent Developments in Titanium Alloys (<i>Wayne A. Reinsch and Harry W. Rosenberg</i>)	373

APPENDIX: REFERENCE LIST FOR ADDITIONAL READING 381

INDEX 385