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**Dr. Steve Tait's book on electrochemical testing can be ordered by calling 608 441 2792 or by email at [whitworth-tait@pairodocspro.com](mailto:whitworth-tait@pairodocspro.com) Please also visit our web site at [www.pairodocspro.com](http://www.pairodocspro.com) for more information on other Pair O Docs® products and services.**

The book's table of contents are provided below.

## **AN INTRODUCTION TO ELECTROCHEMICAL CORROSION TESTING FOR PRACTICING ENGINEERS AND SCIENTISTS**

### **PREFACE**

Electrochemical corrosion testing provides the means for predicting long term corrosion behavior and service lifetime of metallic structures, such as storage tanks, as well as monitoring of equipment to prevent catastrophic failure.

There are numerous technical papers that discuss electrochemical corrosion testing on a wide variety of metals and corrosive environments. The majority of these papers are written for peers in electrochemistry and corrosion engineering; few are written for those who use (or want to use) electrochemical corrosion testing without the benefit of having had graduate course work in electrochemistry or corrosion.

This book was written with the objective of providing engineers and scientists how-to-knowledge on the use of electrochemical corrosion testing to: a) solve corrosion problems, b) specify materials of construction for corrosive environments, c) determine service lifetime for a metallic structures without having the luxury of conducting long-term exposure tests, or d) monitor corrosion to prevent catastrophic failures from occurring.

It is not possible to discuss all types of corrosion data; nor will reading this book make one a corrosion expert. There will be situations in which one is confronted with data that are beyond the guidelines contained in this book. However, experience coupled with the principles covered in this book will provide you with the knowledge needed to make electrochemical corrosion testing a powerful tool for corrosion monitoring and prevention.

The text begins with a review of corrosion engineering and science basics, then applies these basics to electrochemical corrosion measurement methods. Mathematical equations are used only for purpose of instruction, leaving detailed derivations to the numerous corrosion textbooks that are available in book stores.

Chapters 1 through 3 provide background knowledge for why electrochemical corrosion measurement methods work and how to obtain the most reliable data from these measurements. While it is not necessary to read these chapters, You are encouraged to do so.

The topics in Chapters 4 through 6 follow an increasing direct current potential spectra sequence ranging from  $\pm 10$  to 20 mV from OCP used for linear polarization; to  $\pm 250$  mV from OCP for Tafel plots; -250 mV from OCP to approximately 1000 mV from OCP for potentiodynamic scanning; and finally from -250 mV from OCP, to 1000 mV from OCP and then back to OCP for cyclic polarization.

Chapters 7 and 8 discuss electrochemical impedance spectroscopy (EIS), an alternating current voltage corrosion measurement method.

I hope you enjoy reading this book and that it meets your objectives for learning more about electrochemical corrosion testing.

I would like to thank my editors, W. J. Eggers from EG&G Princeton Applied Research and E. Goldstien from G. E. Medical Systems, who helped to ensure that this book was both technically and grammatically correct. I would also like to thank the participants in my various continuing education courses whose questions provided much appreciated feedback on clarity (or the need for) of discussions in this book.

W. Stephen Tait, Ph.D. (October, 1994)

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