AMPP TM21510-2022
Approved January 18, 2022

Potentiodynamic Scans: Material Preparation, Data Acquisition and Analysis

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Document History
2021-12-17: Approved by AMPP Standards Committee (SC) 07, Defense & Aerospace

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Foreword

This standard provides a method for collecting reproducible potentiodynamic data, enabling the comparison of data across various experiments and laboratories. This method is intended for those with experience in potentiodynamic data collection across all of industry and academia. This method has been adapted from Appendix B of MIL-STD-889. Users interested in submitting data for acceptance into MIL-STD-889 shall refer to the latest version of MIL-STD-889.

Scope

This standard provides a procedure that ensures, to the best extent possible, the uniform collection of electrochemical data. This standard aims to reduce variability between measurements and allow for comparisons between laboratories and samples. This standard also includes information and discussion of the reason for stringency in the procedures and lessons learned to help laboratories troubleshoot potential issues with data collection.

Rationale

The collection of potentiodynamic data is a highly sensitive process that must have strict bounds such that comparisons between samples can be made. Bounds in previous standards were too wide, causing large variations in the resulting data. Large deviations between data of the same material type, treatment, and electrolyte chemistry hinders the ability of researchers to compare data as two materials can have widely varying results. This document serves to standardize the material preparation, data collection, and data analysis procedures for potentiodynamic data, ensuring future comparisons of polarization curve data is achievable.

Referenced Standards

The latest edition, revision, or amendment of the referenced standards in effect shall govern unless otherwise dated.

ASTM, www.astm.org	
ASTM E691	Standard Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method
ASTM G193	Standard Terminology and Acronyms Relating to Corrosion
ASTM E178	Standard Practice for Dealing with Outlying Observations
ASTM D1141	Standard Practice for Preparation of Substitute Ocean Water
Department of Defense, www.defense.gov	
MIL-STD-889D	Galvanic Compatibility of Electrically Conductive Materials