Introduction

This symposium attempts to update our knowledge of hydrogen embrittlement by presenting new test methods in comparison to those which have been in use for years. The old test methods have been used to evaluate the classic sources of internal hydrogen embrittlement (IHE), such as pickling and plating. New test methods have been devised to evaluate materials susceptibility to high-pressure gaseous hydrogen environments (HEE), such as found in storage tanks, turbine engines, and power units.

The purpose of the first part of this book dealing with IHE is to present a wide range of methods for measuring, detecting, and testing for the phenomena of hydrogen attack. This portion of the book illustrates the lack of a standardized approach resulting from various philosophies and personal preferences as to test methods. This initial effort should point the way for development of long-needed ASTM methods on the subject of IHE.

The second part of this symposium deals with HEE and also clearly shows the need for test methods to produce design data. A review of the methods, analyses, and ideas of the experts presented during this symposium leads to the question of whether IHE and HEE are only different manifestations of the same thing. The closing comments at the end of the text discuss this possibility. Although it is not possible to present all the information available or to answer every question, this symposium volume fulfills the purpose of its organization. The symposium presents many approaches, illustrates the complexity of the subject, the wide interest in hydrogen embrittlement, and, most of all, the need to standardize testing.

Because the book is relevant to present and future problems in two areas of hydrogen embrittlement, it will be useful to metallurgists, researchers, plating and process engineers, testing laboratories, and designers. Everyone interested in the phenomena of hydrogen embrittlement, the causes, methods of controlling, detecting, and testing, will find this book of interest. F. P. Brennan of Douglas Aircraft, the Chairman of Committee F-7 on Aerospace Industry Methods ASTM, and Craig Susskind of the Aerospace Corporation were most helpful in the work involved in creating this symposium, and their efforts are gratefully acknowledged.

Finally, a word of gratitude must be expressed to the late Dr. J. K. Stanley of The Aerospace Corporation, to whom this publication is dedicated. He initiated the action required to organize the symposium, worked

to bring the interested members together, but did not live to see the proceedings published.

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