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Standard Method for X-Ray Stress Measurement

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Preface

Residual stress is one of the key factors which influence the mechanical properties of products. The X-ray diffraction method is the most powerful nondestructive method to measure the residual stress in materials. The establishment of a standard method for X-ray stress measurement was requested by researchers and engineers in Japan working in the fields of industry.

The Committee on X-ray Study of Mechanical Behavior of Materials in the Society of Materials Science, Japan, (JSMS), first published the standard method for X-ray stress measurement in 1973, and have revised it several times to cope with the developments of instrumentation and data processing techniques. Its standard method deals with the X-ray stress measurement of ferritic and martensitic steels and austenitic stainless steel. In 2000, a new standard method was published for a stress measurement in two kinds of sintered ceramics: alumina and silicon nitride. In addition to the main text, each standard includes detailed instruction. These standards were based on cooperative work by the members of JSMS Committee on X-ray Study of Mechanical Behavior of Materials in industry and universities for more than 30 years. Our standards have been revised through many round robin experiments, lively discussions and rich experiences.

This standard was published as the English edition with the aim of spreading the Japanese X-ray stress measurement. This standard is composed of the main texts of our standards for the steel and the ceramics editions. We hope that this standard is useful as a stress measurement.

This standard was edited by Prof. T. Hanabusa (Tokushima University), Prof. K. Suzuki (Niigata University) and Prof. K. Akita (Musashi Institute of Technology) and was carefully polished and checked by Prof. C. Hannah (Niigata University). On behalf of JSMS Committee on X-ray Study of Mechanical Behavior of Materials, I acknowledge their great efforts to realize this publication.

February 2005

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of Mechanical Behavior of Materials

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