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(R) DEFINITIONS FOR MACROSTRAIN AND MICROSTRAIN

***Foreword*—**This Document has also changed other to comply with the new SAE Technical Standards Board Format. References were added as Section 2.

***1. Scope*—**In the analysis and measurement of residual stresses of materials, it has been noted that there are frequently differences in interpretation of the terms "macrostrain" and "microstrain." To assist communication among research personnel in this area, definitions for these two terms are suggested by the Fatigue Design and Evaluation Committee of SAE. Since "macrostress" is commonly computed from "macrostrain" in residual stress analysis, to be consistent, the definitions given are for "macrostrain" and "microstrain."

***2. References*—**There are no referenced publications specified herein.

3. Definitions

3.1 Macrostrain—The mean or average strain measured from a finite control volume of material with a gage length or characteristic lineal dimension that is several orders of magnitude greater than the interatomic dimensions (or characteristic length of the material microstructure).

NOTE—Macrostrain can be measured by several methods, including electrical resistance strain gages and mechanical or optical extensometers. Elastic macrostrain can be measured by X-ray diffraction or other nondestructive techniques.

3.2 Microstrain—The strain measured from a finite control volume of material with a characteristic lineal dimension that is of the same order of magnitude as the materials interatomic distance.

NOTE—These are the strains that are "averaged" by the macrostrain measurement. Microstrain is not measurable with the commonly employed techniques used for macrostrain measurement, such as finite length foil resistant strain gages. Microstrain distribution is typically measured with x-ray diffraction techniques. The term "microstrain" is often used to signify the macrostrain multiplied by 10^6.

4. Notes

4.1 Marginal Indicia—The change bar (l) located in the left margin is for the convenience of the user in locating areas where technical revisions have been made to the previous issue of the report. An (R) symbol to the left of the document title indicates a complete revision of the report.

PREPARED BY THE SAE FATIGUE DESIGN AND EVALUATION COMMITTEE

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