



SURFACE VEHICLE STANDARD

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Standard Rainflow File Format

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1. **Scope**—This SAE Standard provides a definition of a rainflow file format. This type of simple text file would contain all relevant information about the rainflow cycle content of a time history. Included information are Comments, Signal Range, Signal Mean, Number of Cycles, Signal Maximum, Signal Minimum.

Rainflow cycle counting has become the most accepted procedure for identifying material fatigue relevant cycles in complex variable amplitude load time histories. The cycle counting methods account for the effects of material plasticity and material memory of prior deformation, and the resulting compressed history information is used by durability analysts to estimate the effects of a given service or test history. Standardization of the rainflow counting methods output files, which is the format addressed by the present standard, is important for reliable information transfer between test and design groups, or different calculation software packages, and thus forms a critical step in the evaluation of components and vehicles. Further background information can be found in the SAE publication AE-10 cited in 2.1.1.

2. References

- 2.1 **Applicable Publications**—The following publications form a part of the specification to the extent specified herein. Unless otherwise indicated, the latest version of SAE publications shall apply.

- 2.1.1 SAE PUBLICATION—Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

The following publication lists a computer program for rainflow cycle counting.

SAE AE-10—"Fatigue Design Handbook," 2nd edition 1988 pages 126-132.

- 2.1.2 ASTM PUBLICATION—Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

The following publication defines how rainflow cycles are counted.

ASTM E 1049, 1996—Standard Practices for Cycle, Counting in Fatigue Analysis

3. **Definitions**—See ASTM E 1045.