



Standard Practice for Verification of Constant Amplitude Dynamic Forces in an Axial Fatigue Testing System¹

This standard is issued under the fixed designation E467; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This practice covers procedures for the dynamic verification of cyclic force amplitude control or measurement accuracy during constant amplitude testing in an axial fatigue testing system. It is based on the premise that force verification can be done with the use of a strain gaged elastic element. Use of this practice gives assurance that the accuracies of forces applied by the machine or dynamic force readings from the test machine, at the time of the test, after any user applied correction factors, fall within the limits recommended in Section 9. It does not address static accuracy which must first be addressed using Practices E4 or equivalent.

1.2 Verification is specific to a particular test machine configuration and specimen. This standard is recommended to be used for each configuration of testing machine and specimen. Where dynamic correction factors are to be applied to test machine force readings in order to meet the accuracy recommended in Section 9, the verification is also specific to the correction process used. Finally, if the correction process is triggered or performed by a person, or both, then the verification is specific to that individual as well.

1.3 It is recognized that performance of a full verification for each configuration of testing machine and specimen configuration could be prohibitively time consuming and/or expensive. Annex A1 provides methods for estimating the dynamic accuracy impact of test machine and specimen configuration changes that may occur between full verifications. Where test machine dynamic accuracy is influenced by a person, estimating the dynamic accuracy impact of all individuals involved in the correction process is recommended. This practice does not specify how that assessment will be done due to the strong dependence on owner/operators of the test machine.

1.4 This practice is intended to be used periodically. Consistent results between verifications is expected. Failure to

obtain consistent results between verifications using the same machine configuration implies uncertain accuracy for dynamic tests performed during that time period.

1.5 This practice addresses the accuracy of the testing machine's force control or indicated forces, or both, as compared to a dynamometer's indicated dynamic forces. Force control verification is only applicable for test systems that have some form of indicated force peak/valley monitoring or amplitude control. For the purposes of this verification, the dynamometer's indicated dynamic forces will be considered the true forces. Phase lag between dynamometer and force transducer indicated forces is not within the scope of this practice.

1.6 The results of either the Annex A1 calculation or the full experimental verification must be reported per Section 10 of this standard.

1.7 This practice provides no assurance that the shape of the actual waveform conforms to the intended waveform within any specified tolerance.

1.8 This standard is principally focused at room temperature operation. It is believed there are additional issues that must be addressed when testing at high temperatures. At the present time, this standard practice must be viewed as only a partial solution for high temperature testing.

1.9 The values stated in inch-pound units are to be regarded as standard. No other units of measurement are included in this standard.

1.10 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

- 2.1 *ASTM Standards:*²
E4 Practices for Force Verification of Testing Machines

¹ This practice is under the jurisdiction of ASTM Committee E08 on Fatigue and Fracture and is the direct responsibility of Subcommittee E08.03 on Advanced Apparatus and Techniques.

Current edition approved May 1, 2014. Published September 2014. Originally approved in 1972. Last previous edition approved in 2008 as E467–08^{ε1}. DOI: 10.1520/E0467-08R14.

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.