



Designation: E139 – 11 (Reapproved 2018)

Standard Test Methods for Conducting Creep, Creep-Rupture, and Stress-Rupture Tests of Metallic Materials¹

This standard is issued under the fixed designation E139; 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.

This standard has been approved for use by agencies of the U.S. Department of Defense.

1. Scope*

1.1 These test methods cover the determination of the amount of deformation as a function of time (creep test) and the measurement of the time for fracture to occur when sufficient force is present (rupture test) for materials when under constant tensile forces at constant temperature. It also includes the essential requirements for testing equipment. For information of assistance in determining the desirable number and duration of tests, reference should be made to the product specification.

1.2 These test methods list the information which should be included in reports of tests. The intention is to ensure that all useful and readily available information is transmitted to interested parties. Reports receive special attention for the following reasons: (1) results from different, recognized procedures vary significantly; therefore, identification of methods used is important; (2) later studies to establish important variables are often hampered by the lack of detailed information in published reports; (3) the nature of prolonged tests often makes retest impractical, and at the same time makes it difficult to remain within the recommended variations of some controlled variables. A detailed report permits transmittal of test results without implying a degree of control which was not achieved.

1.3 Tests on notched specimens are not included. These tests are addressed in Practice [E292](#).

1.4 Tests under conditions of short times are not included. These test methods are addressed in Test Methods [E21](#).

1.5 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.6 *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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.

1.7 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 ASTM Standards:²

- [E4 Practices for Force Verification of Testing Machines](#)
- [E6 Terminology Relating to Methods of Mechanical Testing](#)
- [E8/E8M Test Methods for Tension Testing of Metallic Materials](#)
- [E21 Test Methods for Elevated Temperature Tension Tests of Metallic Materials](#)
- [E29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications](#)
- [E74 Practices for Calibration and Verification for Force-Measuring Instruments](#)
- [E83 Practice for Verification and Classification of Extensometer Systems](#)
- [E177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods](#)
- [E220 Test Method for Calibration of Thermocouples By Comparison Techniques](#)
- [E292 Test Methods for Conducting Time-for-Rupture Notch Tension Tests of Materials](#)
- [E633 Guide for Use of Thermocouples in Creep and Stress-Rupture Testing to 1800°F \(1000°C\) in Air](#)
- [E1012 Practice for Verification of Testing Frame and Specimen Alignment Under Tensile and Compressive Axial Force Application](#)

¹ These test methods are under the jurisdiction of the ASTM Committee [E28](#) on Mechanical Testing

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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.

*A Summary of Changes section appears at the end of this standard