



Standard Test Methods for Creep Relaxation of a Gasket Material¹

This standard is issued under the fixed designation F 38; 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 Department of Defense.

1. Scope

1.1 These test methods provide a means of measuring the amount of creep relaxation of a gasket material at a predetermined time after a compressive stress has been applied.

1.1.1 *Test Method A*—Creep relaxation measured by means of a calibrated strain gage on a bolt.

1.1.2 *Test Method B*—Creep relaxation measured by means of a calibrated bolt with dial indicator.

1.2 The values stated in SI units are to be regarded as the standard.

1.3 *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:

A 193 Specification for Alloy Steel and Stainless Steel Bolting Materials for High-Temperature Service²

B 637 Specification for Precipitation-Hardening Nickel Alloy Bars, Forgings, and Forging Stock for High Temperature Services³

D 3040 Practice for Preparing Precision Statements for Standards Related to Rubber and Rubber Testing⁴

F 104 Classification System for Nonmetallic Gasket Materials⁵

2.2 ASTM Adjuncts:

Relaxometer, Method A (F 38)⁶

Relaxometer, Method B (F 38)⁷

3. Summary of Test Methods

3.1 In both test methods the specimen is subjected to a compressive stress between two platens, with the stress applied by a nut and bolt.

3.2 In Test Method A, normally run at room temperature, the stress is measured by a calibrated strain gage on the bolt. In running the test, strain indicator readings are taken at intervals of time, beginning at the loading time, to the end of the test. The strain indicator readings are converted to percentages of the initial stress which are then plotted against the log of time in hours. The percentage of initial stress loss or relaxation can be read off the curve at any given time, within the limits of the total test time.

3.3 In Test Method B, run at room or elevated temperatures, the stress is determined by measuring the change in length of the calibrated bolt with a dial indicator. The bolt length is measured at the beginning of the test and at the end of the test; from this the percentage of relaxation is calculated.

4. Significance and Use

4.1 These test methods are designed to compare related materials under controlled conditions and their ability to maintain a given compressive stress as a function of time. A portion of the torque loss on the bolted flange is a result of creep relaxation. Torque loss can also be caused by elongation of the bolts, distortion of the flanges, and vibration; therefore, the results obtained should be correlated with field results. These test methods may be used as a routine test when agreed upon between the consumer and the producer.

NOTE 1—Test Method B was developed using asbestos gasket materials and at issuance substantiating data were not available for other gasket materials.

5. Apparatus

5.1 Test Method A:

5.1.1 Strain Indicator.⁸

5.1.2 Timer.

⁷ Detailed working drawings of this apparatus are available from ASTM. Order Adjunct No. ADJF003802.

¹ These test methods are under the jurisdiction of ASTM Committee F03 on Gaskets and are the direct responsibility of Subcommittee F03.20 on Methods of Test.

Current edition approved Apr. 10, 2000. Published May 2000. Originally issued 1962 as D 2139. Redesignated in 1963. Last previous edition F 38 – 95.

² Annual Book of ASTM Standards, Vol 01.01.

³ Annual Book of ASTM Standards, Vol 02.04.

⁴ Discontinued—see 1986 Annual Book of ASTM Standards, Vols 09.01 and 09.02.

⁵ Annual Book of ASTM Standards, Vol 09.02.

⁶ A print of this apparatus is available at a nominal cost from ASTM, 100 Barr Harbor Drive, Conshohocken, PA 19428. Request Adjunct No. ADJF003801.