Designation: ~~F269 – 60 (Reapproved 2009)~~ F269 – 60 (Reapproved 2014)

Standard Test Method for Sag of Tungsten Wire[1]

This standard is issued under the fixed designation F269; 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 test method covers a determination of the sag properties of tungsten wire 0.030 in. (0.76 mm) and over in diameter.

1.2 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.

1.3 *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 consult and establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Apparatus

2.1 *Bell Jar Envelope*—A suitable envelope surrounding the test apparatus. The envelope may consist of a glass bell jar, preferably of a heat resistant glass (**Warning—**A protective medium shall be provided over an exposed glass to prevent injury by flying glass in the event of an explosion), or may be constructed of metal, in which case a transparent window shall be provided in order that the behavior of the specimen under test may be observed. The envelope may be rigidly supported in a fixed position or may by suspended in such a manner that it can be raised or lowered into position over the test apparatus. A means shall be provided for maintaining within the envelope an atmosphere and steady supply flow of hydrogen. A flow meter shall be incorporated in the hydrogen line so that measurement and control of the gas flow may be maintained. The hydrogen line shall discharge at the upper levels of the envelope and shall be baffled by a suitable diffusing device so that no direct stream of the gas will play upon the test specimens.

2.2 *Specimen Support*—A suitably designed support and clamping device for holding the specimen within the envelope during testing. This support, which may be rigidly fixed or capable of being raised into or lowered from the envelope, shall be made from a suitable metallic conductor so that electrical current from the power supply may be used to heat the test specimen. An insulated clamping fixture shall be provided at the top of the support so that the hairpin test specimen will be firmly held. This clamping device shall be capable of rotating 90° on its axis in order that the test specimen may be heated both in a vertical-position with its apex down and in a horizontal position. A means shall be provided for accomplishing this rotation without requiring the removal of the test specimen from the clamping fixture.

2.3 *Weights*—A set of weights comprising loads of 3, 4, 6, 7, 9, 10, and 13 lb (1.4, 1.8, 2.7, 3.2, 4.1, 4.5, and 5.9 kg). A hook shall be provided for attaching the required weight to the apex of the test specimen. This hook should be made from tungsten wire and should be capable of supporting the heaviest weight at the elevated temperature of testing, without fear of breaking.

NOTE 1—A tungsten wire with a diameter of 0.080 in. is recommended for use as a hook.

2.4 *Cathetometer* or any other suitable instrument for measurement of the vertical displacement of the test specimen that results from the sag test. This instrument shall have a suitable scale so that movement of the specimen of as little as 0.5 mm may be read.

2.5 *Power Supply*—A supply of electric current sufficient to heat the test specimen to the required test temperatures. A meter shall be provided in this supply to permit measurement of the current to an accuracy of ±2 %.

3. Materials

3.1 Hydrogen used for the test atmosphere shall have a purity meeting the following requirements:

3.1.1 *Moisture* (water), not more than 2.5 g/1000 ft^3 (2.5 g/28 m^3) as indicated by a dew point of – 65°C or below.

3.1.2 *Oxygen,* not more than 10 ppm.

[1] This test method is under the jurisdiction of ASTM Committee F01 on Electronics and is the direct responsibility of Subcommittee F01.03 on Metallic Materials.

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