



Designation: F73 – 96 (Reapproved 2017)

Standard Specification for Tungsten-Rhenium Alloy Wire for Electron Devices and Lamps¹

This standard is issued under the fixed designation F73; 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 specification covers tungsten-rhenium alloy wire suitable for use in electron devices and lamps. The material is known as UNS R07031.

1.2 The term *wire* as used in this specification applies to all material 0.020 in. (0.51 mm) or less in diameter that is spooled or coiled.

1.3 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.

1.4 *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.*

1.5 *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

F205 Test Method for Measuring Diameter of Fine Wire by Weighing

F219 Test Methods of Testing Fine Round and Flat Wire for Electron Devices and Lamps

3. Ordering Information

3.1 Orders for wire furnished to this specification shall include the following information:

¹ This specification is under the jurisdiction of ASTM Committee F01 on Electronics and is the direct responsibility of Subcommittee F01.03 on Metallic Materials, Wire Bonding, and Flip Chip.

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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.

- 3.1.1 Length in metres,
- 3.1.2 Name of material,
- 3.1.3 Straightness (see 6.2),
- 3.1.4 Finish (see 7.2),
- 3.1.5 Weight or size (see 6.1) and tolerance, and
- 3.1.6 Specification number and UNS number.

NOTE 1—A typical ordering description for straight chemically cleaned wire is as follows: xxxx metres tungsten-rhenium alloy wire, straightened, Finish 2; 280.8 mg/200 mm ($\pm 3\%$), per ASTM F73 – XX (UNS R07031).

4. Chemical Composition

4.1 This wire shall conform to the requirements as to chemical composition prescribed in Table 1.

5. Physical Properties

5.1 *Tensile Strength*—The tensile strength of a 10-in. (250-mm) gage length of wire in grams-force per milligram per 200 mm shall be within the limits prescribed in Table 2, when tested in accordance with 8.2.

5.2 *General Ductility Requirements*—The ductility of wire shall be sufficient to meet the following requirements:

5.2.1 *Wire Sizes up to 75 mg/200 mm, incl*—Six 1-m lengths shall be tested in accordance with 8.3.1. The wire shall not break more than two times in the six tests. Where required, a lower limit may be negotiated between purchaser and seller.

5.2.2 *Wire Sizes over 75 mg/200 mm*—Thirty successive close-wound turns completely around mandrels shall be free from splitting or cracking when tested in accordance with 8.3.2 and examined at a magnification of 30 \times .

5.3 *Special Ductility Requirements*—Wire for certain applications requires a special ductility as agreed upon between the purchaser and the seller.

6. Size, Straightness, and Tolerances

6.1 Dimensional tolerances for wire for use as incandescent filaments shall conform to the requirements prescribed in Table 3.

NOTE 2—Tolerances are industry standards; closer tolerances may be obtained in certain instances, usually at a premium.

6.2 *Straightness*—Straightness of wire 3.00 mg/200 mm and larger shall be specified as the radius of curvature or camber of