



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

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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 the standard. The values given in parentheses are for information only.

2. Referenced Documents

2.1 ASTM Standards:

F 205 Test Method for Measuring Diameter of Fine Wire by Weighing²

F 219 Methods of Testing Fine Round and Flat Wire for Electron Devices and Lamps²

3. Ordering Information

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

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-

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² *Annual Book of ASTM Standards*, Vol 10.04.

TABLE 1 Chemical Requirements

Element	Composition
Tungsten	remainder
Rhenium, %	2.5 to 3.5
Other elements (each), ppm, max	100
Total other elements, ppm, max	500

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 a given length of wire as agreed upon between the purchaser and supplier. For wire under 3.00 mg/200 mm, alternative methods may be used as agreed upon between the purchaser and supplier.

7. Workmanship, Finish, and Appearance

7.1 *General Requirements*:

7.1.1 The material shall be as smooth, as free of twists, bends, curls, kinks, and as free, when examined at 30 \times , from dents, swaging marks, scratches, swaging die marks, laps, seams, splits, slivers, inclusions, bumps, pits, grooves, cracks, and other physical defects as best commercial practice will permit.