



Standard Specification for Tungsten Plate, Sheet, and Foil¹

This standard is issued under the fixed designation B 760; 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 approval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This specification covers unalloyed tungsten plate, sheet, and foil.

1.2 The values stated in inch-pound units are to be regarded as the standard.

2. Terminology

2.1 *Definitions of Terms Specific to This Standard:*

2.1.1 *foil*—any product less than 0.005 in. (0.13 mm) in thickness.

2.1.2 *plate*—any product $\frac{3}{16}$ in. (4.75 mm) or more in thickness.

2.1.3 *sheet*—any product 0.187 in. (4.75 mm) or less in thickness, to a minimum of 0.005 in. (0.13 mm) in thickness.

3. Ordering Information

3.1 Orders for material under this specification shall include the following information:

- 3.1.1 Material identification and temper designation,
- 3.1.2 Product form (Section 2),
- 3.1.3 Chemical requirements (Table 1),
- 3.1.4 Tolerances (Section 6, Table 2, and Fig. 1),
- 3.1.5 Workmanship and quality level requirements (Section 7),
- 3.1.6 Packaging (Section 13),
- 3.1.7 Marking (Section 12),
- 3.1.8 Certification and reports (Section 11), and
- 3.1.9 Disposition of rejected material (Section 10).

4. Materials and Manufacture

4.1 The various tungsten flat products covered by this specification shall be produced using common rolling, forging, or extrusion equipment, as normally found in primary mill product plants. The ingot metal is consolidated employing either the powder metallurgy or vacuum-arc-casting process.

5. Chemical Composition

5.1 The tungsten ingots or billets for conversion to finished products covered by this specification shall conform to the

TABLE 1 Chemical Composition/Check Analysis

Element	Composition, max, %	Permissible Variations in Check Analysis, %
C	0.010	±0.002
O	0.010	+ 10 % relative
N	0.010	+ 0.0005
Fe	0.010	+ 0.001
Ni	0.010	+ 0.001
Si	0.010	+ 0.001

requirements of the chemical composition prescribed in Table 1.

5.2 Check Analysis:

5.2.1 Check analysis is an analysis made by the purchaser or the manufacturer of the metal after it has been processed into finished mill forms, and is either for the purpose of verifying the composition of a heat or lot, or to determine variations in the composition within a heat or lot.

5.2.2 Check analysis tolerances do not broaden the specified heat analysis requirements but cover variations between laboratories in the measurement of chemical content.

5.2.3 The manufacturer shall not ship material that is outside the limits specified in Table 1, with the exception of oxygen and nitrogen, whose percentage may vary with the method of manufacture.

5.2.4 Check analysis limits shall be as specified in Table 1.

6. Permissible Variations in Dimensions

6.1 The thickness tolerances on tungsten products covered by this specification shall be as specified in Table 2.

6.2 The width tolerances shall be as agreed upon between the manufacturer and the purchaser. In general, shearing tolerance will be $\pm \frac{1}{16}$ in. (± 1.6 mm) and slitting tolerance will be $\pm \frac{1}{32}$ in. (± 0.8 mm).

6.3 The length and camber tolerances shall be as agreed upon between the manufacturer and the purchaser. In general, length and camber tolerances will show a maximum deviation of $+\frac{1}{16}$ in., $-0/ft$ (1.6 mm/m) of length.

6.4 Flatness tolerances on tungsten flat products shall be as follows:

Thickness, in.(mm)	Flatness Deviation, max,%
0.005–0.187 (0.13–4.75)	4
$\frac{3}{16}$ – $\frac{5}{8}$ (4.75–15.9)	5

6.4.1 Determine flatness deviation (Fig. 1) as follows:

$$\text{Flatness deviation, \%} = (H/L) \times 100$$

¹ This specification is under the jurisdiction of ASTM Committee B-10 on Reactive and Refractory Metals and Alloys and is the direct responsibility of Subcommittee B10.04 on Molybdenum and Tungsten.

Current edition approved Feb. 28, 1986. Published April 1986.