



Designation: **B684 – 97 (Reapproved 2012) B684/B684M – 16**

Standard Specification for Platinum-Iridium Electrical Contact Materials¹

This standard is issued under the fixed designation ~~B684~~B684/B684M; 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 U.S. Department of Defense.

1. Scope-~~Scope~~*

1.1 This specification covers an 85 % platinum—15 % iridium alloy, and a 90 % platinum—10 % iridium alloy, in the form of rod, wire, strip, and sheet material for electrical contacts.

1.2 The values stated in either SI units or inch-pound units are to be regarded separately as standard. ~~The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the standard.~~

1.3 ~~The original specification, B684 – 81, covered the 85 % platinum 15 % iridium alloy. The 1997 revision of this specification added the 90 % platinum 10 % iridium alloy.~~

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 become familiar with all hazards including those identified in the appropriate **Material Safety Data Sheet (MSDS)**(**SDS**) for this product/material as provided by the manufacturer, to establish appropriate safety and health practices, and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*²

[B277 Test Method for Hardness of Electrical Contact Materials](#)

[B476 Specification for General Requirements for Wrought Precious Metal Electrical Contact Materials](#)

[B542 Terminology Relating to Electrical Contacts and Their Use](#)

[E8E8/E8M Test Methods for Tension Testing of Metallic Materials](#)

[E384 Test Method for Microindentation Hardness of Materials](#) [B684M-16](#)

3. Terminology

3.1 For definitions of terms related to electrical contact materials, refer to Terminology [B542](#).

4. General Requirements

4.1 The requirements of Specification [B476](#) shall apply to all materials produced to this specification.

4.2 In addition, when a section with a title identical to that referenced in [4.1](#) appears in this specification, it contains additional requirements which supplement those appearing in Specification [B476](#).

5. Ordering Information

5.1 Include the following information when placing orders for product under this specification, as applicable:

5.1.1 ASTM designation and year of issue,

5.1.2 Grade of material (see [Table 1](#)),

5.1.3 Temper (annealed or work hardened, see [Table 2](#) and [Table 3](#)),

¹ This specification is under the jurisdiction of ASTM Committee [B02](#) on Nonferrous Metals and Alloys and is the direct responsibility of Subcommittee [B02.05](#) on Precious Metals and Electrical Contact Materials.

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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.

*A Summary of Changes section appears at the end of this standard



TABLE 1 Chemical Requirements

Element	85 Pt/15 Ir		90 Pt/10 Ir	
	Weight %			
	Weight %		Weight %	
Pt	balance		balance	
Ir	14.50-15.50		9.50-10.50	
Total Impurities	0.2 max.		0.2 max.	
Total Platinum Group (Pd, Rh, Os, Ru), Au	0.1 max.		0.1 max.	
Total Other Impurities (including the elements below)	0.1 max.		0.1 max.	
Pb, Sb, Bi, Sn, As, Cd, Zn	0.01 max each		0.01 max each	
Fe	0.015 max each		0.015 max each	
Other elements	0.02 max each		0.02 max each	

5.1.4 Form (rod, wire, sheet, or strip),

5.1.5 Dimensions and tolerances,

5.1.6 Quantity, total weight or total length or number of pieces of each size,

5.1.7 Heat identification or traceability details, if required,

5.1.8 Certification and/or Test Report, if required.

6. ~~Manufacture~~ Materials and Manufacture

6.1 Raw materials shall be of such quality and purity that the finished product will have the properties and characteristics prescribed in this specification.

6.2 The material shall be finished by such operations (cold working, annealing, turning, grinding, or pickling) as are required to produce the prescribed properties.

4. General Requirements

4.1 The provisions of Specification B476 shall apply to all materials produced to this specification.

7. Chemical Requirements ~~Composition~~

7.1 Material produced under the specification shall meet the requirements of chemical composition prescribed in Table 1.

7.2 By agreement between purchaser and manufacturer, analysis may be required and limits established for elements or compounds not specified in the table of chemical composition.

ASTM B684/B684M-16

<https://standards.iteh.ai/catalog/standards/sist/14c8755a-e4cf-4358-9943-58fa088c2f70/astm-b684-b684m-16>

TABLE 2 Mechanical Properties of Wire and Rod

Property	85 Pt/15 Ir		90 Pt/10 Ir	
	Annealed	Work Hardened	Annealed	Work Hardened
Ultimate Tensile	75—85	90—120	35—60	70 minimum
Ultimate Tensile	75 - 85	90 - 120	35 - 60	70 min
Strength, ksi (MPa)	(520-590)	(620-830)	(240-410)	(480 minimum)
Strength, ksi [MPa]	[520-590]	[620-830]	[240-410]	[480 min]
Elongation, % in	30 minimum	1—10	30 minimum	1—10
Elongation, % in	30 min	1 - 10	30 min	1 min
— 2 in. gage length (51 mm)				
— 2 in. gage length [51 mm]				
Microhardness, HK	—	—	—	—