



Standard Guide for Specifying the Chemical Compositions for Electrical Contact Materials (Arcing and Nonarcing)¹

This standard is issued under the fixed designation B 772; 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 guide provides suggested methods for users and producers of electrical contact materials to specify the chemical compositions of these materials.

1.2 *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) 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

E 1282 Guide for Specifying the Chemical Compositions and Selecting Sampling Practices and Quantitative Analysis Methods for Metals, Ores, and Related Materials

3. Significance and Use

3.1 This guide should be used by committees or individuals in specifying the chemical composition of electrical contact materials.

4. Procedure

4.1 *For Basic Alloy Element(s) and Component(s):*

4.1.1 Specify the numerical limits of the elements as follows:

4.1.1.1 Major fractions of the alloy,

4.1.1.2 Tighter tolerances, or

4.1.1.3 Higher unit cost(s) or combination thereof.

4.1.2 One of these elements may be chosen to be specified by “report by difference.” List the minimum value of this element in a pair of parentheses before the clause “report by difference.” Select this element or component according to one or more of the following considerations:

4.1.2.1 Least precious,

4.1.2.2 Widest tolerance, and

4.1.2.3 Requiring the least precise or most costly method to analyze.

4.2 *For Impurities:*

4.2.1 Specify only the tolerance limits of the elements commonly occurring with the major elements (for example, copper in silver); and the tolerance limits of the detrimental elements (as recognized by the industry) which may be a residue after fabrication (for example, sodium in Ag-CdO material by the coprecipitation method).

4.2.2 Specify the tolerance limits for total impurities of all the impurity elements.

4.3 Place the following note under the Table of Chemical Compositions (see **Table 1** for example) in the text of each specification:

NOTE 1—Analysis is regularly made for the elements for which specific limits are listed. If, however, the presence of “other” elements is suspected or indicated in the course of routine analysis, further analysis shall be made to determine that the total of these “other” elements and the listed impurities is not in excess of the total impurities limit.

4.4 State under the section of Chemical Composition in the text of each specification a clause as follows:

4.4.1 These specification limits do not preclude the possible presence of other unnamed elements, impurities, or additives. Analysis shall be regularly made only for the minor elements listed in the table. However if a user knows of elements that might be detrimental to their application or has other reasons for requiring analysis for specific elements, then agreement between manufacturer and purchaser for both limits and methods of analysis should be required for elements not specified.

4.5 Additional guidelines for specifying the chemical compositions and selecting sampling practices are covered in Guide **E 1282**.

¹ This guide 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.

Current edition approved May 1, 2008. Published May 2008. Originally approved in 1987. Last previous edition approved in 2003 as B 772 – 97 (2003).

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.



TABLE 1 Table of Chemical Compositions

NOTE 1—Analysis is regularly made for the elements for which specific limits are listed. If, however, the presence of “other” elements is suspected or indicated in the course of routine analysis, further analysis shall be made to determine that the total of these “other” elements and the listed impurities is not in excess of the total impurities limit.

Chemical Composition Limits	Impurities
A = 74–76	d = 0.06 max
B = (23.5 Min.) Report by difference	e = 0.05 max
	f = 0.05 max
C = 0.35–0.65	g = 0.01 max
Total: 0.15 max	

4.6 Example (For a hypothetical alloy):

75A-24.5B-0.5C

where:

A = precious metal,

B = base metal,

C = base metal, and

d, e, f, g = typical or detrimental impurities.

5. Keywords

5.1 analysis; chemical composition; contacts; electrical contact materials; impurities; tolerance limits

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