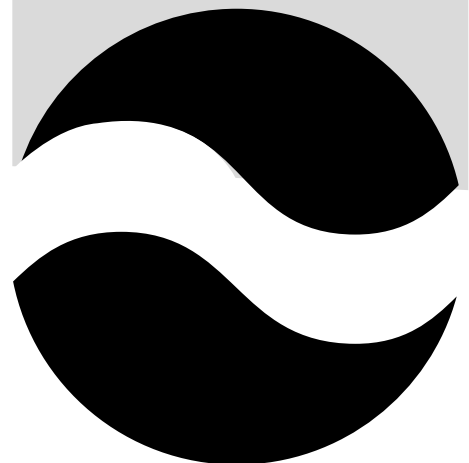


AMERICAN NATIONAL  
STANDARD

ANSI/J-STD-006  
JANUARY 1995

*JOINT  
INDUSTRY  
STANDARD*

Requirements for  
Electronic Grade  
Solder Alloys  
and Fluxed and  
Non-Fluxed Solid  
Solders for Electronic  
Soldering Applications



# Table of Contents

<b>1.0 SCOPE AND CLASSIFICATION</b> .....	1		
1.1 Scope .....	1		
1.2 Classification .....	1		
<b>2.0 APPLICABLE DOCUMENTS</b> .....	1		
2.1 Joint Industry Standards .....	2		
2.2 Government .....	2		
2.3 International Standards Organization (ISO) .....	2		
2.4 Institute for Interconnecting and Packaging Electronic Circuits (IPC) .....	2		
2.5 American Society for Testing and Materials (ASTM).....	2		
2.6 Order of Precedence .....	2		
2.7 Terms and Definitions.....	3		
<b>3.0 REQUIREMENTS</b> .....	3		
3.1 Materials.....	3		
3.2 Alloys .....	3		
3.3 Solder Forms.....	4		
3.4 Flux Type and Form .....	5		
3.5 Flux Residue Dryness.....	5		
3.6 Spitting.....	5		
3.7 Solder Pool.....	5		
3.8 Labeling for Product Identification .....	5		
3.9 Workmanship .....	5		
<b>4.0 QUALITY ASSURANCE PROVISIONS</b> .....	5		
4.1 Responsibility for Inspection and Compliance...	5		
4.2 Classification of Inspections.....	6		
4.3 Materials Inspection.....	6		
4.4 Qualification Inspections .....	6		
4.5 Quality Conformance.....	6		
4.6 Preparation of Solder Alloy for Test .....	11		
<b>5.0 PREPARATION FOR DELIVERY</b> .....	11		
5.1 Preservation, Packing, and Packaging.....	11		
<b>6.0 NOTES</b> .....	11		
6.1 Intended Use .....	11		
6.2 Acquisition Requirements.....	12		
6.3 Standard Solder Product Packages.....	12		
6.4 Protocol for Establishing Short Names for J-STD-006 Alloys .....	12		
<b>Appendix A Solder Alloys</b> .....	13		

		<b>Figures</b>	
Figure 1	Report form for solder alloy tests.....		7
Figure 2	Report form for solder powder tests .....		8
Figure 3	Report form for non-fluxed solder tests .....		9
Figure 4	Report form for fluxed wire/ribbon solder tests .....		10

		<b>Tables</b>	
Table 1	Solder Forms.....		1
Table 2	Flux Types and Designating Symbols.....		2
Table 3	Flux Percentage .....		2
Table 4	Standard Solder Powders .....		4
Table 5	Solder Inspections.....		6
Table A-1	Composition, Short Names, Former Names, and Temperature Characteristics of Solder Alloys .....		13
Table A-2	Cross Reference from Solidus and Liquidus Temperatures to Alloy Names .....		15
Table A-3	Cross-Reference from Alloy Short Names to Alloy Names .....		16
Table A-4	Cross-reference from ISO 9453 Alloy Numbers and Designations to J-STD-006 Alloy Names .....		17

# Requirements for Electronic Grade Solder Alloys and Fluxed and Non-Fluxed Solid Solders for Electronic Soldering Applications

## 1.0 SCOPE AND CLASSIFICATION

**1.1 Scope** This standard prescribes the requirements and test methods for electronic grade solder alloys; for fluxed and non-fluxed bar, ribbon, and powder solders, other than solder paste, for electronic soldering applications; and for “special” electronic grade solders. This standard is a quality control document and is not intended to relate directly to the material’s performance in the manufacturing process. Solders for applications other than electronics should be procured using ASTM B-32.

This document is one of a set of three joint industry standards which prescribe the requirements and test methods for soldering materials for use in the electronics industry and, when adopted by a Government, for use on that Government’s high reliability electronic hardware: J-STD-004 covering soldering fluxes, J-STD-005 covering solder paste, and J-STD-006 (this document) covering solder alloys and solid solder forms.

Special electronic grade solders include all solders which do not fully comply with the requirements of standard solder alloys and solder materials listed herein. Some examples of special solders are anodes, ingots, preforms, bars with hook and eye ends, multiple-alloy solder powders, etc.

**1.2 Classification** Soldering materials covered by this standard shall be classified by alloy composition, solder form, flux type, flux percentage, and by other characteristics peculiar to the solder material form.

**1.2.1 Alloy Composition** The solder alloys covered by this standard are the alloys listed in Appendix A, Table A-1, and include pure tin and pure indium. Each alloy is identified by an alloy name, which is composed of a series of alphanumeric characters that identify the component elements in the alloy by chemical symbol and nominal percentage by mass, and ending with an arbitrarily assigned alloy variation letter (A, B, C, D, E). Alloys are also identified by an alloy short name, which is a five-character alphanumeric designation composed of the chemical symbol for the key element in the alloy (see 6.6), the nominal percentage of that element in the alloy, and the arbitrarily assigned alloy variation letter. Appendix A, Table A-1, identifies alloy composition, the alloy short name, and

alloy temperature characteristics. Appendix A, Table A-2, cross references solidus and liquidus temperatures to alloy names. Appendix A, Table A-3, cross references alloy short names to alloy names. Appendix A, Table A-4, cross references ISO alloy numbers and designations from ISO 9453 to J-STD-006 alloy names.

**1.2.2 Solder Form** The forms of solder materials covered by this set of standards are listed with their single-letter designating symbols in Table 1.

Table 1 Solder Forms

Identifying Symbol	Solder Form	Identifying Symbol	Solder Form	Identifying Symbol	Solder Form
F	Flux (only)	B	Bar	R	Ribbon
P	Paste (Cream)	D	Powder	W	Wire
				S	Special

**1.2.3 Flux Type** The flux types used in/on solders covered by this set of standards are listed in Table 2. The requirements for fluxes are covered by J-STD-004.

**1.2.4 Flux Percentage and Metal Content** The nominal percentage of flux by mass in solid-form solder products is identified as the flux percentage. The flux percentage in/on solid solders is identified by a single alphanumeric character in accordance with Table 3. “Metal content” refers to the percentage of metal in solder paste (see J-STD-005).

**1.2.5 Other Characteristics** Standard bar solders are further classified by unit mass. Wire solders are further classified by wire size (outside diameter) and unit mass. Ribbon solders are further classified by thickness, width and unit mass. Powder solders are further classified by powder particle size distribution and unit mass.

## 2.0 APPLICABLE DOCUMENTS

The following documents form a part of this standard to the extent specified herein. Unless a specific issue is cited herein or in the contract or purchase order, the issue in effect on the date of invitation for bids or request for proposal shall apply.