

SOLDERS

Foreword—This Document has not changed other than to put it into the new SAE Technical Standards Board Format.

1. **Scope**—The choice of the type and grade of solder for any specific purpose will depend on the materials to be joined and the method of applying. Those with higher amounts of tin usually wet and bond more readily and have a narrower semi-molten range than lower amounts of tin.

For strictly economic reasons, it is recommended that the grade of solder metal be selected that contains least amount of tin required to give suitable flowing and adhesive qualities for application.

All the lead-tin solders, with or without antimony, are usually suitable for joining steel and copper base alloys. For galvanized steel or zinc, only Class A solders should be used. Class B solders, containing antimony usually as a substitute for some of the tin or to increase strength and hardness of the filler metal, form intermetallic antimony-zinc compounds, causing the joint to become embrittled. Lead-tin solders are not recommended for joining aluminum, magnesium, or stainless steel.

Permissible impurity levels are shown:

MAX IMPURITIES, %			
Bismuth.....	0.25	Zinc.....	0.005
Copper.....	0.08	Aluminum.....	0.005
Iron.....	0.02	Other elements, total.....	0.08

In dipping solders, 0.5% max copper is permissible because of pickup in bath.

Compositions, temperatures, and similar specifications of these SAE solders are shown in Table 1.

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TABLE 1—COMPOSITIONS, TEMPERATURES, AND SIMILAR SPECIFICATIONS

SAE No.	Sn	Pb	Sb	Temperature, F		Similar ASTM Grades in Specification B 32-58T
				Solidus	Liquidus	
1A	45.0, -1.0	Remainder	0.4 max	360	440	Alloy 45B
1B	43.0, +0.5	Remainder	1.5-2.00	365	435	
2A	40.0, -1.0	Remainder	0.4 max	360	455	Alloy 40B
2B	38.0, +0.5	Remainder	1.5-2.00	365	450	
3A	30.0, -1.0	Remainder	0.5 max	360	490	Alloy 30B
3B	30.0, -1.0	Remainder	0.75-1.25	365	485	
4A	25.0, -1.0	Remainder	0.4 max	360	510	Alloy 25B
4B	25.0, -1.0	Remainder	1.25-1.75	365	500	
5A	20.0, -1.0	Remainder	0.4 max	360	535	Alloy 20B
5B	20.0, -1.0	Remainder	1.25-1.75	365	510	
6A	15.0, -1.0	Remainder	0.4 max	435	555	Alloy 15B
6B	15.0, -1.0	Remainder	As specified ⁽¹⁾	435-445	530-555	
7A	51.0, -2.0	Remainder	0.4 max	360	420	Alloy 50B
8A	35.0, -1.0	Remainder	0.4 max	360	475	Alloy 35B
9B	2.75, -0.25	Remainder	4.90-5.40 ⁽²⁾	465	555	

1. Maximum, 2.75%.

2. Also contains 0.40-0.60 arsenic; this solder should be used only with previously tinned base metal. Pure tin or higher tin-lead alloys may be used.

2. **References**—There are no referenced publications specified herein.

PREPARED BY THE SAE NONFERROUS METALS COMMITTEE