

CLAIMS

1. A lead-free solder alloy comprising:
3.1 to 3.8 wt. % silver;
0.5 to 0.8 wt. % copper;
0.0 to 3.2 wt. % bismuth;
0.03 to 1.0 wt. % cobalt;
0.005 to 0.02 wt. % titanium; and
balance tin, together with any unavoidable impurities.
2. The lead-free solder alloy of claim 1, further comprising 0.01 to 0.1 wt. % nickel.
3. The lead-free solder alloy of claim 2, comprising 0.05 wt. % nickel.
4. The lead-free solder alloy of claim 1, comprising 3.8 wt. % silver.
5. The lead-free solder alloy of claim 1, comprising 0.7 wt. % copper.
6. The lead-free solder alloy of claim 1, comprising 1.5 to 3.2 wt. % bismuth.
7. The lead-free solder alloy of claim 6, comprising 1.5 wt. % bismuth.
8. The lead-free solder alloy of claim 6, comprising 3.0 wt. % bismuth.
9. The lead-free solder alloy of claim 1, comprising 0.03 to 0.05 wt. % cobalt.
10. The lead-free solder alloy of claim 9, comprising 0.05 wt. % cobalt.
11. The lead-free solder alloy of claim 1, comprising 0.008 wt. % titanium.
12. A lead-free solder alloy comprising:
3.1 to 3.8 wt. % silver;
0.5 to 0.8 wt. % copper;
0.0 to 3.2 wt. % bismuth;
0.05 to 1.0 wt. % cobalt;
1.0 to 3.0 wt. % antimony;
0.005 to 0.02 wt. % titanium; and
balance tin, together with any unavoidable impurities.
13. The lead-free solder alloy of claim 12, further comprising 0.01 to 0.1 wt. % nickel.
14. The lead-free solder alloy of claim 13, comprising 0.05 wt. % nickel.
15. The lead-free solder alloy of claim 12, comprising 3.8 wt. % silver.
16. The lead-free solder alloy of claim 12, comprising 0.8 wt. % copper.
17. The lead-free solder alloy of claim 12, comprising 1.5 to 3.2 wt. % bismuth.
18. The lead-free solder alloy of claim 17, comprising 1.5 wt. % bismuth.

19. The lead-free solder alloy of claim 17, comprising 3.0 wt. % bismuth.
20. The lead-free solder alloy of claim 12, comprising 0.05 wt. % cobalt.
21. The lead-free solder alloy of claim 12, comprising 1.0 wt. % antimony.
22. The lead-free solder alloy of claim 12, comprising 1.5 wt. % antimony.
23. The lead-free solder alloy of claim 12, comprising 0.008 wt. % titanium.