



POSITION STATEMENT ON LEAD-FREE PRODUCTS AND RoHS COMPLIANCE

March 25, 2004

Introduction

In anticipation to International Laws and Regulations related to the elimination of lead in electronic components/products, Pulse initiated in 1999, a project to investigate, evaluate, qualify and implement the use of *Lead-free* solder on all its products and processes. As a result of this investigation, Pulse is currently in a position to provide *Lead-free* and RoHS-compliant products based on the European Union's Law on Waste Electrical and Electronic Equipment (WEEE), and, Restriction of Hazardous Substances (RoHS). Compliance includes other international regulations restricting the use of lead in electronic components mainly those applicable in Japan. In addition to compliance to the WEEE/RoHS law, Pulse actively supports and participates in related customer "green-partner" initiatives.

Background

The European Directives WEEE/RoHS became European law February 13, 2003; member states must implement the law by August 13, 2004. Member states must ensure that by July 1, 2006, new electrical and electronic equipment placed on the market does not contain Lead (Pb) or any of the restricted hazardous materials identified in the legislation such as Mercury (Hg), Cadmium (Cd), Hexavalent Chromium (Cr VI), Polybrominated Biphenyls (PBB), and Polybrominated Diphenyl Ethers (PBDE). To achieve compliance to *Lead-free* product requirements, Pulse has adopted the use of *Lead-free* alloys using tin with greater than 95% content including 100% Tin (Sn), Tin-Silver (Sn-Ag), Tin-Copper (Sn-Cu), and Tin-Silver-Copper (Sn-Ag-Cu) solder chemistries. Some of the Pulse product materials have been upgraded in order for the product to sustain the higher melting temperatures of *Lead-free* solder alloys. Depending on the product type and application, Pulse has adopted solder alloys 96.5Sn3.0Ag0.5Cu, 96.5Sn3.5Ag, 97.0Sn3.0Cu, and Sn100.

Certain types of Pulse products traditionally using high melting temperature solder containing more than 85% lead, are exempted per the WEEE/RoHS regulation because of the lack of viable *Lead-free* replacement materials. This primarily affects internal product solder connections. External pin plating for these component types use one of the above mentioned *Lead-free* alloys.



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Implementation

All of Pulse products can be manufactured in a *Lead-free* configuration. To protect customers not yet in a *Lead-free* process environment from receiving product with *Lead-free* alloys, customers on a product by product basis, may request and direct the change to a *Lead-free* configuration. Once customer agreement and coordination takes place, Pulse will then provide a schedule to satisfy customer delivery requirements. Pulse lead-free products adopting the Sn100 configuration for final lead tinning are forewords and backwards compatible to any SnPb soldering process at the customer's board.

Studies conducted by numerous organizations including the National Electronics Manufacturing Initiative (NEMI), and the National Institute of Standards and Technology (NIST), suggest a reliability concern with solder fillet lifting when *Lead-free* solder is mixed with a lead solder alloy. This may be caused when *Lead-free* components are soldered to a printed circuit board with SnPb plating.

Qualification

Pulse has qualified products using *Lead-free* alloys on a family basis. This qualification approach provided the necessary process, reliability, environmental and solderability information to validate the change in all Pulse product configurations. Details of the test plan and specific data are available upon request from all Pulse sales account managers and sales representatives. Pulse uses a solder profile with a peak temperature of 260C +0/-5 C. Higher temperature profiles may be used but these may require additional enhancements of some of the product materials or process, which may increase product cost. Pulse continues to evaluate new solder alloys as these become available.

Pulse encourages customers to stay within the solder alloys recommended by NEMI in the US, by the National Physical Laboratory (NPL), and, the International Tin Research Institute (ITRI) in the UK. NEMI and NPL/ITRI recommend for reflow applications the use of 96.5Sn3.0Ag0.5Cu. For wave solder 99.3Sn0.7Cu is recommended or an alternative 96.5Sn3.5Ag. Industry standardization on these solder alloys will increase market availability and the reduction in cost while reducing the risk of mixing different solder alloys in the manufacturing process.



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Contacts

If you have a need for Pulse products in *Lead-free* configurations or for questions on product availability, and pricing information, please contact your sales account manager, customer service, or distributor representative.

For technical questions regarding the materials used, qualifications, profiles or other technical issues, please contact the Pulse Product Quality Organizations in the local regions.