

## Lead-Free Control Plan

A commercial systems manufacturer working on a major defense program contacted the Helpline for urgent assistance with an issue of failed parts during reliability testing.

They were attempting to incorporate commercial off-the-shelf (COTS) computer-related hardware into a battlefield system and were experiencing reliability issues. It was noted that the parts were labeled by the vendor as “compliant to military (or MIL) standards” but not clearly identified as tin-lead or lead-free. ACI Technologies has supported a number of customers with lead-free issues and we assisted the customer in developing a short term and long-term solution to their problem.

For the short term, immediate support was provided in the form of an analysis of COTS components using both X-ray fluorescence (XRF) and scanning electron microscopy (SEM) with energy dispersive X-ray spectroscopy (EDS) techniques for chemical identification of lead containing parts. The lead-free components were clearly identified and assessed on the associated failure

risk based on its intended application environment. This risk analysis allowed for a cost trade-off consideration to determine whether the parts be refinished with tin-lead or used with a modified process for mixed lead and lead-free components. This allowed the minimum amount of program delay and resulted in improved reliability testing performance.

The recommended longer-term solution was a more proactive approach in development of a lead-free control plan both internally and through their vendors, so that risk associated with particular COTS components is more clearly identified in the future. A prohibited material flow chart was created (similar to that shown in Figure 1), to ensure the proper implementation of components throughout the process — from parts receiving to final assembly. It was recommended that a lead-free control plan be developed in advance of the upcoming Department of Defense (DoD) requirement in accordance to guidelines provided by the AIA and the Pb-free Electronics Risk Management consortium (per GEIA-STD-0005-1 and GEIA-HB-0005-1).

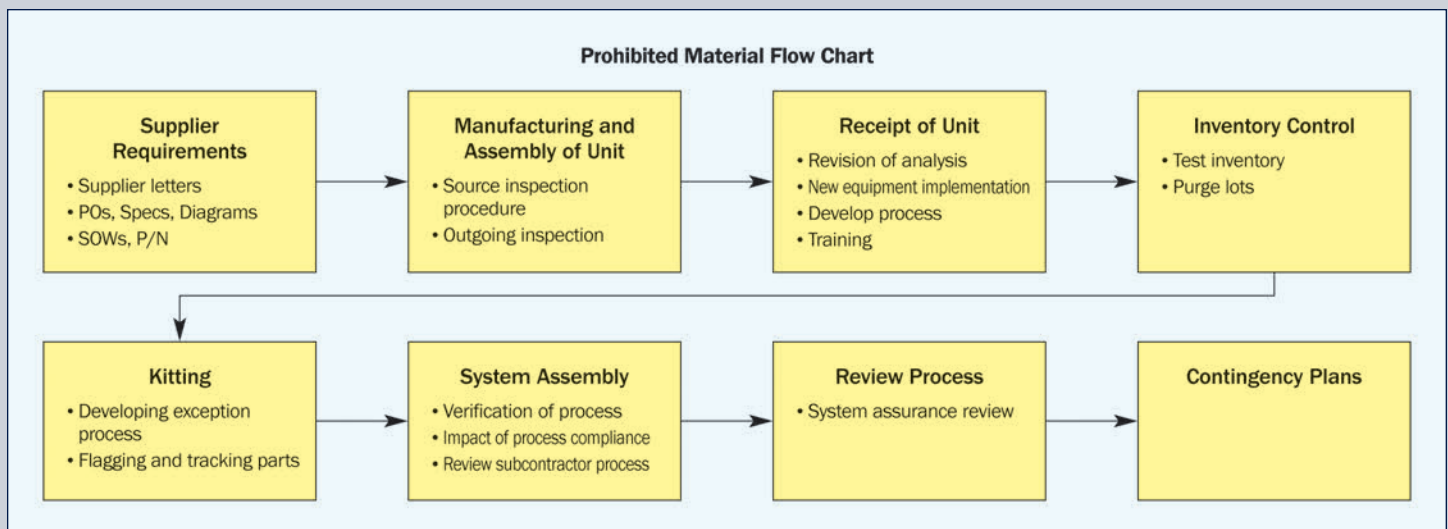
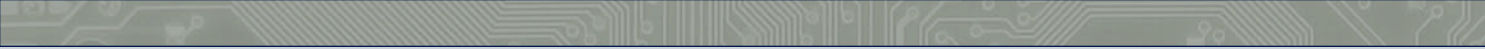


Figure 1: Example of a prohibited material flow chart which can be used to track implementation of COTS parts in adherence with a lead-free control plan.



In this case, ACI Technologies was able to successfully support the customer by developing short-term parts identification, assembly method improvements, and a longer-term focus on an improved lead-free control plan. It is important to note that many COTS parts which are supposed to be compliant to tin-lead manufacturing applications may in fact result in a high risk of failure. The best way to prevent unanticipated risk is through thorough parts identification and tracking, internally and externally, throughout the supply chain. Also, ensure that each vendor is aware that implementation of the Lead-Free Control Plan will soon be a requirement for parts associated with DoD programs in order to simultaneously support supply chain transition and improve program reliability.

ACI Technologies has both R&D and Manufacturing support staff equipped with the knowledge and experience to support your lead-free manufacturing related questions. ACI Technologies also offers several training classes which focus on lead-free manufacturing and reliability. For more information, contact the Helpline at 610.362.1320, via email to [helpline@aciusa.org](mailto:helpline@aciusa.org) or visit the website at [www.aciusa.org](http://www.aciusa.org).

ACI Technologies, Inc.



**ACI Technologies, Inc.** 1 International Plaza, Suite 600 Philadelphia, PA 19113 *phone:* 610.362.1200 *web:* [www.aciusa.org](http://www.aciusa.org)

**Training Center** *phone:* 610.362.1295 *email:* [registrar@aciusa.org](mailto:registrar@aciusa.org)

**Helpline** *phone:* 610.362.1320 *email:* [helpline@aciusa.org](mailto:helpline@aciusa.org)