Kester Solder Analysis Program

Control Reliability	The solder used in processes such as wave soldering, selective soldering and dip soldering may become contaminated with other metals dissolved during the process. These impurities can affect the surface tension and wetting ability of the solder, resulting in defects such as icicling, bridging, pin-holing, webbing and dull joints. A program of scheduled analyses of the solder can increase reliability and reduce rework of soldered assemblies.
Analysis Report	The Kester Solder Analysis Program is designed to provide the control required for a quality soldering process. Sample-mailer envelopes include documentation and instructions for sending the solder sample to the Kester Analytical Laboratories. Most soldering applications are required to be monitored for composition and impurities in the solder. Kester Option C analysis includes all metals specified in J-STD-001. This includes Tin, Lead, Silver, Copper, Bismuth, Antimony, Aluminum, Arsenic, Gold, Cadmium, Iron, Nickel and Zinc. Lead is measured and reported when at the impurity level but reported as “Balance” in traditional leaded alloys. Each analytical report is reviewed by the Analytical Laboratory to determine the quality of the solder. The analytical report is e-mailed within 7 working days after receipt of the solder sample.
Recommended Analysis Frequency	When initially performing solder pot analysis, it is recommended to collect data monthly for at least six months to gain a thorough understanding of the changes that take place within the solder pot over time. Once you have a good collection of solder pot data over several months, you may determine the most appropriate testing frequency for your specific application. Many users of traditional leaded alloys verify pot compliance to industry requirements every 3-6 months, depending on the application. When converting to a lead-free alloy in a wave or selective soldering process, the solder pot may need to be analyzed more frequently because high Tin alloys have a higher tendency to dissolve other metals that may contact them during the soldering process. Lead-free alloys may dissolve Copper, Iron and other metals faster than leaded alloys, so close attention should be paid to these areas during the solder pot analysis. Many users of lead-free alloys are testing their solder pots every 1-2 months. A minimum of 150g solder should be sampled after removal of the dross and stirring of the pot to ensure a homogenous and representative pot sample.

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Solder	A combination of metals which have been alloyed to melt at a low temperature (100-700°F), bonds to higher melting metals, fills the gap or space between metal surfaces. Solder preconditioning refers to preparing components for soldering or testing, for example by exposing the components to baking, temperature/humidity soak, and/or thermal shock. Assembly refers to soldering components onto and into printed boards or boards which will be wave soldered.

Symbol	Metal	Comments
Sn	Tin	Main elements used to make most solder alloys.
Pb	Lead	
Sb	Antimony	
Ag	Silver	
Cu	Copper	
Bi	Bismuth	Used in low temperature and some lead-free alloys.
Cd	Cadmium	Cadmium is an impurity in tin-lead alloys.
Au Al Zn	Gold Aluminum Zinc	Impurities which poison a solder bath decreased wetting and spread decreased capillary action
Fe	Iron	Causes oxidation or drossing.
As	Arsenic	Causes dewetting - found in poor grade tin.
Ni	Nickel	May be present in some alloys as a grain refiner.