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Les Hymes

How Low Can You Go?

Les offers tips to achieve a zero-defect line.

Q: *Our plant has three lines producing printed wiring assemblies with many small surface-mount components. We place approximately 500,000 components per month. Our current goal is to have zero defects. As supervisor of the surface-mount technology department, I have been given the task of reducing the current defect level to meet this goal. I would appreciate some helpful suggestions.*

A: The quality, cleanliness and solderability of your incoming printed wiring boards (PWBs) and components play a major role in achieving success. Your vendors and your in-house operations must use adequately defined purchased component specifications and must enforce your specified engineering and quality requirements. Compliance in both cases is critical to your success.

Get Backup

You may have been given the leadership role for achieving your stated goal, but you cannot do it alone. All of the employees in every department of your operation must be involved. This includes design, purchasing, vendor quality control, production and test operations, maintenance operations, test engineering and the in-house quality control operation. Management support for your company's effort is critical to success.

The First Time's a Charm

Total process management requires a mindset focused on prevention of defects and an operating mantra of *do it right the first time*, rather than an operational philosophy based on detection and repair of defects. To do it right the first time, you must have knowledgeable, concerned and trained personnel, manufacturable designs, solderable terminations and PWBs, controlled process parameters and reproducible equipment functions. Losing control of any part of the process will lead to process complexity because of the extra steps required to deal with errors.

Take Control of the Stockroom

Good stockroom procedures are essential. Control of your stockroom environment includes rigidly enforcing humidity control, cleanliness and electrostat-

ic discharge (ESD) protection. Overall stockroom orderliness is also beneficial. Mixed and outdated parts can lead to assembly errors and defective product.

Excessive humidity in the stockroom and contamination on components and PWBs may accelerate surface finish degradation and negatively affect solderability. Establish shelf life rules and adhere to them. Good packaging of components and adequate environmental controls in the stockroom are also necessary for a high-yield process.

Component Performance and Solderability Testing

Check component solderability at incoming and periodically on components purchased and stocked in large quantities. When design changes occur or changes in production output schedules result in component requirement changes, excessively long shelf life issues can result in inadequate solderability of components. Component vendors should provide results of solderability testing on each lot of components. However, merely accepting the results of the vendor's test is not adequate; periodic lot checks should be carried out in your shop regularly.

Perform component performance and solderability tests as a regular part of incoming inspections to reduce failures at final assembly test. Solderability testing on each lot of purchased components and PWBs is necessary to achieve a low defect rate.

Get Back to the Basics

Educate and train your personnel well and often. Knowledgeable personnel are critical to a high-grade, high-yield operation. Assign ownership and accountability, define goals, prioritize tasks, measure and reward results. Address concerns and provide support and help when required. Consider rewarding high performance and continuous improvement in all operations.

Implementing these suggestions can help you to promote pride in the organization's operating philosophy and assist the company in achieving its goals. ■

Send your process, technology or training question to lhymes@cox.net. Please type "ASK LES" in the subject line and indicate your name and company or institute affiliation. All questions may not be answered.

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