Tech Article

Modern Electronics Require Updated Cleaning Methods

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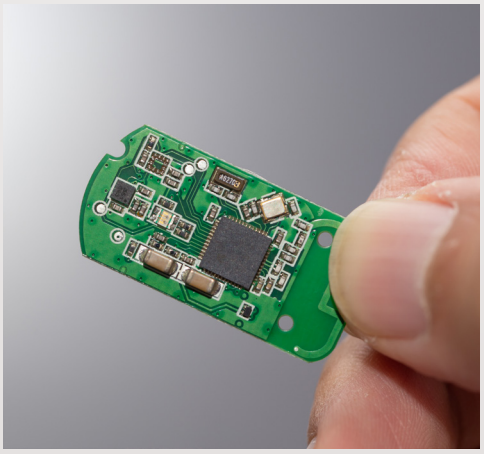

Small boards are a big challenge to clean.

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Benchtop cleaning is an important step in the assembly of printed circuit boards. Whether it be during initial manufacture or during post-reflow assembly, it is critical that you properly clean PCBs (printed circuit boards) before moving on to the next step in the manufacturing process. Before shipping brand-new or repaired circuit boards out the door, manufacturers need to remove all contaminants including adhesives, fluxes, finger residue or other materials. Anything left on the board that isn't meant to be there may negatively affect the performance of the board. This is why so many companies consider PCB cleaning as a mission-critical process. If the cleaning is not effective, the device simply will not function reliably for the required life of the product. Better cleaning directly translates to more reliable PCBs, which means better finished consumer and industrial electronics in the market.

With the wide variety of possible contaminants and the increasingly miniature components of various geometries being added to PCBs, successful benchtop cleaning is more complex. Failing solder joints cause a large percentage of PCB failures, so engineers often specify stronger, more active fluxes, which result in better solder joints. Problems with "cold joints," bridging, and shorts can also be avoided with these stronger fluxes. However, these fluxes can be a real challenge to clean. Combine that with small boards filled with more tightly packed components, and effective cleaning becomes a big challenge for PCB manufacturers. They need more sophisticated cleaning processes to effectively clean these newer modern electronics.

The Modern Way to Clean Printed Circuit Boards at the Benchtop

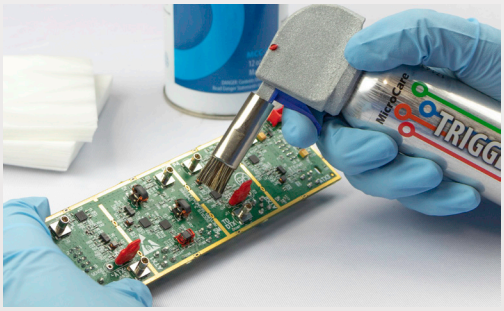
What is surprising is that many companies are using the same, often ineffective benchtop cleaning techniques from 40 or 50 years ago. For decades, dip-and-brush cleaning with isopropyl alcohol (IPA) has been the benchmark for cleaning printed circuit boards. Dip-and-brush cleaning was perhaps good enough years ago, with larger simpler boards containing more robust components. But today, with new fluxes and pastes, new PCB designs, and delicate component packages that most often have reduced stand-off height, the dip-and-brush may no longer be the best solution. In today's world of highly complex and intricate electronics, we need a better benchtop cleaning process to produce consistently clean PCBs at the benchtop.

One of the most effective ways to clean any PCB is to use an automated cleaning process, for example, a vapor degreaser. This process produces consistently clean circuit boards. However, automated cleaning often is not practical. For example, if spot cleaning is required before adding components post wave solder, or if a manufacturer is operating at capacity. The benchtop technician needs a faster, affordable and more convenient answer. The best option is to use a specially formulated cleaning fluid combined with a controlled dispensing system and the four-step process of wet, scrub, rinse, and dry.

Match Your Cleaning Fluid to the Job

The first step in getting consistent circuit board cleaning is choosing the right cleaning fluid for the job. There are a number of brands and formulations of flux removers on the market to choose from. These fluids can get under tight-fitting components and remove fluxes before they can cause corrosion. They target fingerprint oils, uncured solder paste, some conformal coatings, marking inks and

Today's sophisticated PCBs need a better cleaning method than the old dip-and-brush.



The TriggerGrip™ improves benchtop cleaning results, reduces cleaning fluid waste and enhances worker safety.

other contaminants. Evaluate the type of contaminant to determine which one will work for your particular scenario. For instance, if you need to clean lead-free solder flux residues from a board, you'll need a fluid with more aggressive solvency to get the job done. However, if you are cleaning fingerprints of silicone oils after manufacturing, a milder, safer cleaning fluid may be your best option.

When choosing a cleaning fluid, materials compatibility is also important to consider. Typically, the stronger the solvent, the higher the risk that it may damage the material you are cleaning, especially plastics. Test clean the cleaning fluid on the components first to determine if it will be safe for use on your materials. When in doubt, opt for a milder cleaning fluid to start.

Use a Dispensing Tool for Better Cleaning Control

When used properly, a controlled dispensing system can improve benchtop cleaning results, reduce cleaning fluid waste and enhance worker safety. With a dispenser hose attached to a can of cleaning fluid, the benchtop technician has better control of how much and where the cleaning fluid is dispensed. They can spray cleaning fluid exactly where they need it without overspray, reducing wasted solvent. The dispensing system typically includes brushes and syringes. They help get into and under low surface mounted components for better, more thorough cleaning. The normal cleaning power of the cleaner is amplified by the scrubbing action of the brush. Contamination is quickly loosened and removed and rinsed away with minimal effort and minimal cleaner. In addition, it has been documented that technicians use less cleaning fluid when they use controlled dispensing technology.

Plus, using a dispensing tool produces less landfill waste. The systems are designed to use every last drop of solution within the aerosol can. It is also far easier to dispose of the cans because they are not partially filled with residual fluid.

In addition, dispensing systems enhance worker safety. Since they are closed systems, technicians do not pour fluids from pails or drums. This reduces the risk of spills and helps limit the fire hazard. And there is less odor too.

The Four-Step Process

Following the four-step process of wet, scrub, rinse and dry ensures the circuit boards are cleaned effectively and consistently. First, wet any residues on the board with the cleaning fluid. This will loosen any contaminant on the board. Second, scrub the circuit board with a brush to remove any hard-to-remove particulates or oils. Third, rinse away the contaminants with more cleaning fluid. Rinsing is important to flush the contaminant away from the board. If you can't rinse, then the board may not be completely clean. Finish the process by patting the circuit board dry with a lint-free wipe.

To meet the critical cleaning demanded by today's modern electronic components, new cleaning formulations and tools must ensure the long-term reliability of the printed circuit boards. To clean PCBs effectively, safely and reliably, employ the four-step cleaning process of 'wet, scrub, rinse and dry'. Also use an appropriate cleaning fluid and a controlled dispensing system.

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About the Author:
Mike Jones, retired Vice President of International Sales for MicroCare, has over 30 years of experience in the critical cleaning industry. He is a prolific writer and educator focusing on critical cleaning in general and vapor degreasing and benchtop cleaning in particular. For more information, visit www.microcare.com.

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