

From The Lab



BY BOB NEVES



The UL Survival Guide (Part 2)

Are you experienced? Doesn't that just bring to mind a Jimi Hendrix tune? I always think of experience as "What you get when you didn't get what you really wanted." When you think about your own UL recognition "experience," do words like "complicated," "expensive," "slow," and "confusing" come to mind? If so, you are not alone. I hear people using such adjectives when describing their UL experience. Although we do not have a specific UL Listing, we have helped a number of companies in obtaining their UL listing. In an effort to provide increased assistance to enhancing the UL experience, we are in the final stages of becoming an official UL approved third party test site. This will allow PWB Manufacturers and Material Suppliers to choose who they want doing their testing.

As we moved toward becoming an "approved" laboratory for UL testing, I thought that it would be relatively straight forward. Read the UL Specs (UL746A, UL746B, UL796, UL94) and follow what they say. Sounds simple enough, I thought. But as usual, things are never quite what they seem (silly me). We found out right away that there is much more to the process than what is written in the specs. History and precedence has set much of the policy regarding the interpretation of the UL specifications. "Welcome to the Grand Illusion."

We started our UL experience several years ago by participating in the Witnessed Test Program offered by UL. This program allows any Lab Facility (including yours) to test to UL standards with UL personnel witnessing the test and making sure it is done properly. This approach is not financially feasible for short-term testing, since the cost for flying UL personnel out to witness a test can be higher than having UL perform the testing directly. It does become feasible for Long-Term testing where programs can stretch to a year or more. During the last several years of performing Long-Term UL testing, we learned that the procedures pub-

lished in the UL standards are almost always open to (someone else's) interpretation.

Experience is the key to understanding interpretation and precedence set on previously run UL programs. Unfortunately, when starting out, experience is the one thing you do not have, and you "can't always get what you want" while gaining that experience. To compensate for this lack of experience, it is important to develop a relationship with the UL engineer assigned to your file. During the last several years of working with UL, we have had the opportunity to work with engineers from three of the four U.S. UL offices. What we have found is that each engineer and each UL office adds their own unique touch to every program, so it is important to get to know your UL project engineer's touch (the writer does not endorse any contact that might be construed as "harassing" in nature).

One of the primary goals in setting up a UL program is to get the most listings and approvals for the minimum amount of testing, cost and grief. These approvals and listings should be a part of a well-thought-out plan which allows easy modification as materials and technology changes. To accomplish this, a working knowledge of the applicable specifications is a must. Understanding your product's maximums and minimums, and what limits will cover you for multiple products, types, thickness, and pattern limits, is important. This understanding will save time, money and aggravation. Your suppliers are also a gold mine of UL "experience." They have typically experienced (or seen others experience) programs described by many of those adjectives listed above while working with their customers. They have experience with other manufacturer's UL programs, and can usually add the beneficial experience to your situation. Many suppliers have already been through the trouble of doing much of the testing for you in order to entice you to use their product! Another excellent source of information and artwork for UL testing can be found in

IPC-A-22. This document contains the artwork and directions on how to manufacture to samples for UL testing programs.

One of the questions I am most often asked is how much testing will have to do. The testing requirements for UL 796 vary based on what you were trying to do with your file. Testing for printed wiring boards can include testing for the attributes of bond strength, blistering and delamination, flame retardancy and plating adhesion. Variations in process flow or product parameters can relate to conductor parameters, solder shock, solder re-flow, delamination, multi-layered construction, plating, and process steps over the maximum-rated operating temperature. The actual testing requirements can be found in UL 796 tables 13.1 through 13.8 and will be discussed in detail later in my UL column series.

If you are a manufacturer of Flexible Printed Wiring Boards, there are some variations and additions that apply especially to you. Sections 24-33 of UL 796 were written especially for flexible PWB Manufacturers and contains requirements for Flammability, Flexibility, Bond Strength, Cold Bending, Coverlay Laminations, and several types of Electrical Requirements. UL is currently in the early stages of putting together a new specification for Flexible materials (UL 746F) which will hopefully expand upon the current requirements in UL 746E and include some of the benefits that have been historically associated with Rigid Materials in the past.

Don't let the sad songs of the seventies describe your UL experience. Country Music is also probably not a good spot to look for inspiration. If it were me, I would focus on the "Don't worry be happy" song—it doesn't usually apply to our industry, but it might make you think of a Caribbean island for a moment while you are stuck in the UL grind! If you've reached the end of this column and are wondering "what is he talking about?" consider yourself lucky, as you are definitely not the one in charge of your UL file.

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