

When accuracy is critical

Calibration laboratories depend on high-quality test leads, probes, and connectors to meet exacting needs

In this era of increasing industry and government standards, the demands on calibration laboratories are growing. Whether it's an in-house cal lab or a field unit, the pressure is on to conduct more calibrations in a short period of time while still maintaining a high degree of accuracy.

"As the QS9000 standard is pushing people who supply parts for the automotive industry, the AS9100 standard is pushing people who make parts for aerospace, and the ISO 17025 requirements start to broaden not only into cal laboratories but into test laboratories, then more and more people are requiring more and more stringent calibration," said Mike Brown, service engineer for Fluke Corporation.

Critical components in any cal lab include high-quality test leads, probes and connectors. Good leads and connectors can help speed calibrations; poor-quality leads can cost an engineer hours in troubleshooting.

"It's being able to come in here with confidence and do your job knowing that you won't have to troubleshoot your test set up," said Michael White, calibration lab tech lead for Crane Aerospace and Electronics. "You can waste two, three, four hours trying to troubleshoot where the problem is. If you have a production supervisor downstairs that wants his or her gear back, you don't want to have to say 'the cables are bad and I don't have a spare set.'"

Founded in 1999, Crane Aerospace and Electronics is known for its technical strengths, proven product reliability, innovative solutions and overall value. Each Crane division is ISO 9001 and AS9100 certified and committed to world-class processes.

In Crane's Redmond, Washington, cal lab, they test general equipment, like power supplies, meters, scopes as well as burn-in boards and customized fixtures with custom internal applications. With burn-in boards, they conduct point-to-point probing on all the leads.

Demanding higher accuracy

"We're testing to make sure that during the burn-in process no ends have burned off that we can't see," White said. "So we know that each of the DUTs is actually

getting the power and loads that they're supposed to have so that they can be exercised the way that they're supposed to be.

"It's more of a verification than a calibration, but they bring it to us because they want the accuracy. Some of these resistors are 0.3 ohms and you need four wires and the trained people who are skilled and understand what the requirements are, know what they're reading on the meter and how to use the better equipment."

For the Crane team, reliability, durability, dependability and quality are what they require in leads and probes.

"Durability and dependability are key," White said. "When I spend so much on a set of Kelvin probes, I don't want to replace them in six-to-eight months. We want to be able to get four, six, seven years or longer out of them because every time we have to buy a replacement it costs us bottom line dollars.

"Another thing I look for is low loss. I don't want a lot of resistance because then I have to compensate for it and every time I compensate, I get errors. I don't want to compensate—it's just another error I have to factor into my uncertainty."

Crane relies on Pomona products for its cal lab.

"Reliability—that's why I go with Pomona," White said. "I've used knock-offs before and they just don't last. I get an intermittent in the wire, then I'm tracing it down—'is it the gear, my calibrator . . . no, it's the wire.' So we just throw them out and start over because we don't have time to deal with that."

Probing gets smaller

For Spectralux Manufacturing Engineer Charles Chu, the right probe is a top priority.

Spectralux Corporation manufactures proprietary components and modules for commercial and military aircraft. The company maintains a quality yield above 99 percent and an on-time delivery rate above 99.8 percent.

As the boards Spectralux manufactures get smaller and smaller, their need for small probes that can test without damaging delicate connections is critical.



Kelvin clip sets with gold plated plugs and clips connect to test points for accurate 4-wire resistive measurement. (Pomona model 5940)



Precision electronic probes with gold pogo pin tips provide reliable contacts without damaging delicate solder joints. (Pomona model 6341)

"Everything is smaller and smaller, sobig probes are not useful," Chu said. "I prefer the spring loaded tips. With them you don't have too much force to poke through and damage the device. With a solder joint, once you damage it, it's a real problem. When the tip is spring loaded you know you have a good contact. I use them daily—they're a lot more useful than general purpose probes."

Quality, reliability and value are also important considerations for Chu's leads and probes.

"We want to buy good quality leads that last a long time and are reliable," Chu said. "We need to make sure they last a long time because special test leads are not cheap. Pomona is a good brand we can rely on, so we aren't spending more time doing quality checks to make sure it's functioning."

Field calibration

Field calibration has become a booming business as more companies prefer to not staff in-house cal labs and don't want their equipment to leave the premises. Field calibration also requires engineers have everything they may need with them—which makes complete kits with large selections of leads, probes and connectors a convenient part of any field operation.

"Kits are great for field service because when you go on site you never know what you're going to get," said Fluke's Brown. "When I worked for a field calibration company, I'd load up a van with three-fourths of my lab equipment and set up at the customer's facility to perform calibrations. I calibrated at several companies annually. We would go and calibrate 460 units in a week. So we'd take all of our equipment, all of our adapters and connectors and set up shop for a week and calibrate their entire inventory."

Fluke Corporation is the world leader in the manufacture, distribution and service of electronic test tools and software. It has a well-earned reputation for portability, ruggedness, safety, ease of use and rigid standards of quality. Its own cal lab engineers have a vast wealth of experience both in-house and in some cases, like Brown, in field work.

"A lot of other people have some pretty pricey items and don't want to risk them getting damaged in transit, so it makes more sense to go there and calibrate on site," Brown said. "That's where you need all your cables and adapters. If you get out to the field and you realize you don't have a BNC, you're out of luck. There's nothing you can do until you come back the next day."

"It's pretty common to have available a cable with BNC or banana connectors on each end so with a good variety of adapters you can get from this to whatever device," said Neil Faulkner, a metrologist for Fluke. "You'd have an adapter to UHF, an adapter to banana. Now you're hauling around a limited number of cables and a whole lot of adapters. You're not carrying around a lot of dedicated cables."

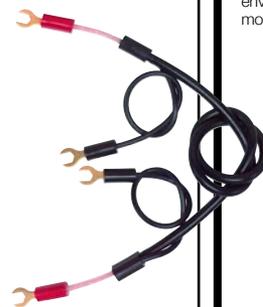
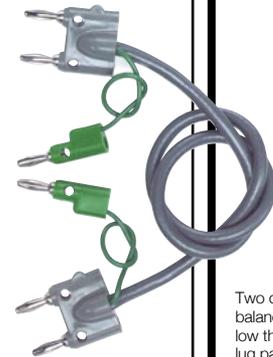
For more precision calibrations in the laboratory, specialized test leads are required.

"On the higher end, the two conductor shielded balanced line is what we would use for hooking to the HI, LO and guard on the higher end meters," Faulkner said. "The shielded low thermal EMF spade lug patch cord is also great for more accurate measurements."

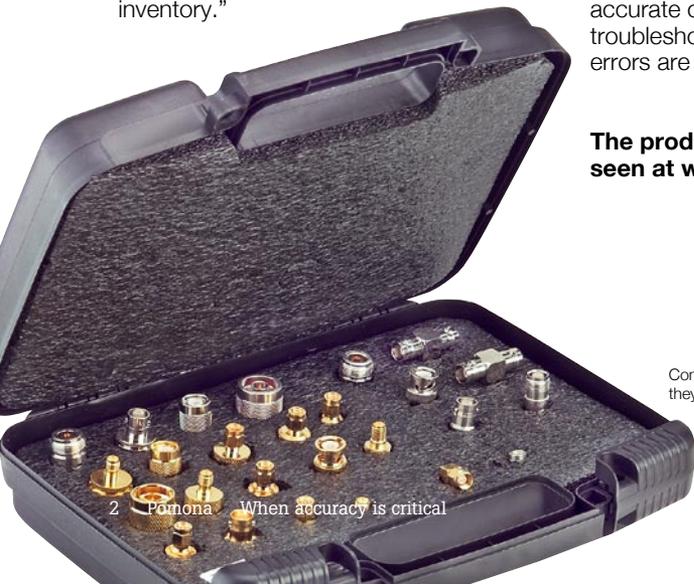
Quality and dependability

Reliable, durable, high-quality test leads, probes and connectors are an essential part of a calibration laboratory. They make the difference between easy, accurate calibrations and losing hours troubleshooting a test set up to find where errors are occurring.

The products listed above may be seen at www.pomonaelectronics.com.



Two conductor shielded balance line and shielded low thermal EMF spade lug patch cords provide accurate measurements in controlled voltage environments. (Pomona models 1167 and 1756)



Comprehensive adapter kits ensure technicians have the adapters they need to perform any task. (Pomona models 5748 and 72934)

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