

ENTEC and the Fluke 1555 deliver cold hard facts to help clients steer clear of trouble

Application Note

Testing Functions Case Study



What plant manager wouldn't want to hit that perfect target of not over or under maintaining? What if you could know how often you really do need to check, and have a "magic" reading that would tell you what you need to know—without having to invest in a major monitoring system?

That fantasy is becoming more of a reality for clients of ENTEC Services, Inc., a leading mechanical service and temperature control company, based in Peoria, Illinois.

So what's the secret? Well it's not a secret...it's an insulation resistance tester (IRT), the Fluke 1555 to be specific.

"Fix it right the first time"

Throughout Central Illinois and Eastern Iowa, ENTEC designs, maintains, optimizes, and repairs mechanical, generator, heating and cooling, and building automation systems for everything from processing and manufacturing plants to office complexes, hospitals, universities, and church organizations. If it heats and cools, or turns on the lights or alarm system, ENTEC provides solutions for it.

ENTEC started in 1981 with a single goal: to "fix it right the first time." ENTEC has expanded its commitment beyond just fixing it right the first time to helping clients avoid a failure in the first place. "Our customers operate under a fixed budget, and most of their systems are quite large. If any piece of equipment goes down it costs

them thousands of dollars a day," says Bernie Kargol, Chiller Team Leader for ENTEC Services, Inc. "The cost of the repair is minor compared to the cost of downtime. So we have invested in the testing equipment and the training so that we can more accurately predict our customers' future equipment performance and help them take corrective actions to reduce the wear rate on their equipment."

Kargol specializes in refrigeration and air conditioning systems ranging from 5 ton to 5,000 ton capacity. Before joining ENTEC in 2009, he spent 15 years working as a factory service representative for two of the largest chiller manufacturers in the United States.

The busy season starts typically in late winter because customers want their systems checked out before the weather heats up.

Tools: 1555 Insulation Resistance Tester

Operator: Bernie Kargol, Chiller Team Leader for ENTEC Services, Inc.

Measurements: Resistance, dielectric absorption, polarization index



Bernie Kargol (left) and Mike Schum download and discuss data from the Fluke 1555 Insulation Resistance Tester after running tests (when the chiller is powered off) on one of several chillers at a large hospital.

Moving from pass/fail to avoiding failure

In the past, technicians used the pass/fail type of insulation testers to test chiller motors. This only provided results within a range, so they could see when a motor was already damaged or so close to failing that it would present out-of-range numbers. ENTEC decided that wasn't good enough. They wanted to take preventive maintenance a few steps further than everybody else and provide their clients with more precise numbers that would spot trends, rather than offer a pass or fail result.

"A motor will fail if it's dirty or if the insulation is breaking down. To the client it doesn't make a difference; all he knows is his equipment is down, his production line is down, or his hospital has no cooling and he wants to know why," Kargol explains.

Here's where the Fluke 1555 Insulation Resistance Tester comes in. The 1555 allows ENTEC to provide more predictive and less reactive maintenance. "Nobody like surprises, especially ones that impact budgets," says Kargol. "We needed an insulation tester that could do multiple unit testing and store those numbers so that we could come back a year later and retrieve and compare that information." That level of testing would provide ENTEC customers with the information they needed to prepare for a corrective action, and the time necessary to determine the impact of that action on their budget.

The Fluke 1555 tests the entire range of voltages (up to 10 kV) specified in the IEEE 43-2000 standard and carries a CAT III 1000 V and CAT IV 600 V safety rating. It measures resistance up to 2 TΩ and automatically calculates dielectric absorption (DAR) and polarization index (PI). Inspectors can store measurements in as many as 99 memory locations in the 1555, each identified by a unique user-defined label for easy recall.

Putting the Fluke 1555 to the test

Kargol recently used the Fluke 1555 to perform annual insulation testing on the main drive motor in the chiller system of one of his hospital clients. Kargol uses the 1555 for many tests, but in this case he ran DAR and PI tests. These measurements calculate the resistance drop over a specific time period and trend it two different ways to indicate whether the motor is at a low point or high point. "Ensuring that the air conditioning system in a hospital is working effectively is much more than just a comfort or a downtime issue; it is critical to patient health and safety," says Kargol.

In the past, these tests were usually performed by professional motor shops and then typically only after a problem occurred. Now, for questionable situations, ENTEC can review the reports with a local motor shop to determine whether the results warrant further testing or that the motor is okay after all.

In addition to insulation testing, Kargol brought along a Fluke Ti45FT Thermal Imager to scan the array of running motors and pumps in the hospital's cooling system to discern any temperature differences that could indicate a need for further diagnostics. In this case, the hospital's chiller system passed both insulation testing and thermal imaging scans with flying colors.

After the insulation inspection Kargol plugged the 1555 into his laptop, uploaded all the measurements, and then imported them into the Fluke View Forms software—included with the 1555—to generate instant reports. "With the 1555 we're able to provide our clients with a benchmark," says Kargol. "We can spot trends that indicate when a motor is starting to break down or is getting dirty, so they can schedule service before it becomes critical. Scheduled repairs usually cost less than emergency repairs because clients can arrange it around a scheduled downtime or make sure they have a backup system."

Knowing what you're buying

Kargol first researched Fluke insulation resistance testers online. After going to the Fluke website, Kargol narrowed his choices to the Fluke 1550C Insulation Resistance Tester and the Fluke 1555.

Other than the higher voltage capabilities in the 1555 the two models are identical.

Since the new models were not yet available, Kargol tested the older model Fluke 1550B MegOhmMeter for about six weeks on several different types of chillers before finalizing the purchase. Kargol found the tool to be very easy to use. He was able to program it—with a little help from the Fluke Tech Support team—to perform a variety of tests, store the results in the tester, and send them to a laptop to instantly create reports for review.

"You don't really know what you're buying until you have it in your hands," says Kargol. "Initially we were planning on going with the 1550C Insulation Resistance Tester, but we found that we'd be better off going with the 1555 because some of our customers have higher voltage environments that require the 10 kV capabilities in the 1555. That's what is great about Fluke. It is as important to them as it is to us that we buy the right tool the first time."

Expanding the business

Already, ENTEC's use of the 1555 is expanding beyond the chiller service and diagnostics business. As customers began to see the chiller equipment reports gleaned from the advanced testing capabilities of the 1555, they started asking for the same type of information regarding other critical equipment. "We purchased the 1555 mainly for the extensive chiller inspections and diagnostics; we are finding that there are so many capabilities with this tool that it is helping us expand our scope into other areas," Kargol notes.

ENTEC is expanding its use of other Fluke tools as well, including 724 Temperature Calibrators, 289 True-rms Multimeters, temperature sensors, and thermal imagers. For example, they initially purchased Fluke Ti45FT IR FlexCAM® Thermal Imagers to use for heat loss recordings on buildings but have found them also very useful for predictive maintenance, such as with the hospital client. "We're making sure we're maximizing the use of each tool to provide a much higher grade of service to our customers," Kargol concludes.



Bernie Kargol uses a Fluke FlexCam® thermal imager to look at the thermal signature of a motor on a chiller.



Mike Schum uses a Fluke Ti45FT Thermal Imager to compare performance across an array of motors and pumps. Next to Mike, the chilled water pumps move chilled water to and from the air handling units located throughout the hospital. Behind him, the uninsulated condenser water pipes move condenser water to and from cooling towers.

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