FLUKE®

Fluke 568 Infrared Thermometer keeps industrial processes on a roll

Application Note

Testing Functions
Case Study

Tool: Fluke 568 Infrared/Contact Thermometer

Testers: Dave Summers, Facility and Process Engineering Mgr, Helios Coatings, Inc.; John Cummings, Maintenance Supervisor, at Vermont Butter and Cheese Co.; Rob Darr, Electrical Engineer, Advanced Filtration Systems Inc.

Tests: Checking temperature during baking and curing processes, verifying thermostats, recording baseline temperatures, electro-mechanical troubleshooting

Mitch Curtin of Helios Coatings Inc., uses the 568 IR Thermometer and the included 80PK-1 Bead Probe to monitor the fluid temperature of a soap bath solution used in the cleaning of raw wheels before the first primer process.

From Chevy rims to Chèvre cheese

Whether you're engineering a new, environment-friendly metal coating process or managing the ancient alchemy of cheese, success often boils down to measuring and controlling temperature.

No wonder FlukePlus members were hot to enter a members-only contest to beta test the new Fluke 568 Infrared Thermometer.

In the world of infrared non-contact thermometers, the Fluke 568 is the über-tool. It's engineered to measure a wider range of temperatures than most other infrareds (-40 °C to 800 °C / -40 °F to 1472 °F), while offering users more features controlled through an intuitive graphical display and menu. Its 50:1 distance-to-spot ratio allows users to measure smaller targets from farther away. It's compatible with standard miniconnector K-type thermocouples, for applications where direct contact measurement is required.

Using the soft key control buttons, users can matter-of-factly adjust emissivity for differing test surfaces to improve their measurement accuracy, activate the built-in alarms, or start data logging (up to 99 data points). The unit has a built-in tripod mount for hands-free, stationary monitoring and logging applications. Users can power the 568 and log data directly for display with the included FlukeView® Forms software if they connect the 568 to a laptop with the included USB cable. Industrial use? No problem. Like its little brother, the new Fluke 566, the Fluke 568 is engineered to withstand a 4.8 foot drop.

The go-to guy

His official title at Helios Coatings, Inc. is Manager of Facility and Process Engineering. Informally, Dave Summers of Canton, Ohio is known as "the go-to guy." He's been involved with technology since he built an FM radio while in third grade. He installed a digital dashboard in his 1951 Mercury back in 1980. At Helios, his challenge is to maintain precise control over the proprietary process his company uses to finish car wheels and hubcaps. The core of the company's business is refinishing wheels, but auto makers are eyeing the process for OEM work because of its low environmental impact and durability.

"We use green technology to do chrome-like finishes on aluminum rims," said Summers. said. A veteran of the powder coating industry, Summers knows how important temperature control can be when baking finishes onto temperature-sensitive parts like plastic hubcaps. Parts have to be cleaned, primed, finish coated using a vacuum metal deposition process, and finally clear coated for protection.

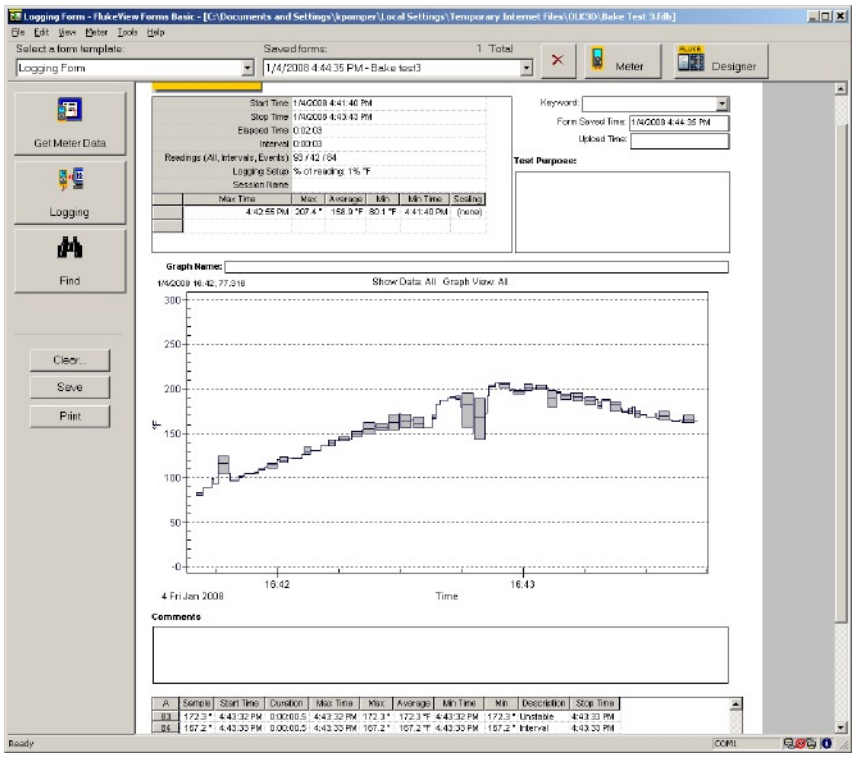
"During the process we use an infrared heater to cure the coatings," he said. "Temperature is critical as some of the center caps that are coated will warp easily. Attempts with a stationary sensor have failed miserably." A try at curing one set of high-end rims failed when the plastic caps curled up.

"In our lab environment, the Fluke 568 absolutely kicks ass," Summers said. "I really enjoyed having the opportunity to play with it and that's what I call it—playing with it—because I absolutely had a blast with it."

The rims and caps go through an infrared curing process, then through a high-tech ultraviolet system.

"The whole idea is not to heat your aluminum above 200 °C (400 °F)—you'll lose the temper in the wheel," Summers said. "There's an art to doing it without destroying the aluminum itself, so we're real careful about temperatures. We don't just throw them in a baking oven. It's all in timing, distance and intensity of the radiation."

Monitoring that precise heating process was one place where the Fluke 568 paid off for Summers. The lab's experimental infrared curing setup includes a built-in thermometer, but Summers discovered that hand-holding the Fluke 568 at approximately 18 in (45 cm) from the slowly-rotating parts delivered far more accurate readings.



The angle of the rise of the curve is the important part of the process. The smaller the angle of rise, the less chance of any bubbles forming in the finish. If this condition happens, the underlying area will do what is known in this industry as "out-gassing." "When we are using the IR heater we want a slow rise in surface temperature, "says Summers," so the coating does not surface cure before the underlying areas have a chance to cure. In the case of this test rim, we were looking at getting the surface of the rim to 200 °F (93 °C) from ambient temperature to prepare the rim for a UV bake. The UV heaters have a fan cooling system which could disturb the coating surface, so a prebake with the IR is necessary to gel the coating on the rim."

James Solomon monitors the surface temperature of a wheel that just had a primer coat applied in the spray booth in Helios Coatings research lab.

Mitch Curtin of Helios Coatings Inc., uses the 568 IR Thermometer to check the exit temperature of wheels after a metal primer coating is cured in a UV oven.

Holey schmoley!

"When I found out what that 568 did, I was like, holey schmoley, this thing's like a Godsend," Summers said. "As far as the menu, it's extremely intuitive." Adjusting the emissivity for accurate readings on different materials required only a few touches on the control buttons. "A three-year-old could do it," he said.

He also experimented with the FlukeView Forms software that comes with the Fluke 568. "The software was just simple and intuitive," he said. "Most of the software I deal with on a daily basis is just a pain. You need a copy of '*War and Peace*,' for a manual. This, I was up and running and able to do a bake curve in 30 seconds." A bake curve displays the rate at which parts in the finishing process are heated and cooled over time. Gradual heating and cooling delivers the desired quality. "Heating a clear coat too fast will yellow the finish, Summers said."

The unit's two-level backlight also won praise. "Every piece of equipment I own has lights on the screen, because there's a lot of times when you're in the dark," he said.

A lifelong Fluke user, Summers said the Fluke 568 shows the kind of performance he relies on in his other Fluke tools. "My life depends on Fluke—that's how I look at it," he said. "When I'm going into a cabinet to troubleshoot and I've got to do it live, I've got to depend on the tools I'm dealing with. My meters are Fluke meters. I put my life in Fluke's hands, and they take good care of me."

A taste—and tests—for fine cheese

The processes he tracked were way different, but temperature control was equally important for John Cummings, Maintenance Supervisor at Vermont Butter and Cheese Co. in Websterville, Vt. He wasn't refinishing Chevy rims, but watching over the plant producing Chèvre goat's milk cheese and other fine European-style cheeses and butter.

Both the quality and safety of dairy products requires precise control of the timing and temperature at each step in the production process. A veteran in the dairy products business, Cummings worked for Ben & Jerry's Homemade Ice Cream and Cabot Creamery Cooperative before moving to Vermont Butter and Cheese. He used the Fluke 568 to double-check the sensors and controls built into the production equipment at Vermont Butter and Cheese.

"It's very high quality gourmet Food Channel type cheeses," Cummings said. "We've got a climate control system that controls temperature and humidity, we have an aging room, a drying room, and I would just go in and double check the temperatures there to make sure it matched up with the computer. Sometimes you get a drift on those."

And was the interface easy to use? "Sí," Cummings joked. "I used the language options." The Fluke 568 offers six language choices for the user interface. Having been shipped to him before the 568's test process was completely in place, his test unit was out of calibration, but the deviation was consistent so Cummings adjusted to compensate. Beta-testers sometimes have to be flexible.

"I thought it was extremely easy to use and well built," he said. "I liked the thermocouple attachment—it came with a probe. I plugged that in to do a record in the freezer, just to double-check that. There are integrated thermostats in the walls, but they're off a few degrees."

Cummings used the thermometer both for process checks and for preventive maintenance applications: recording baseline temperatures on conveyors, detecting a gearbox that was heating up and identifying a lug on a power panel that required tightening. Additional checking turned up a problem with one of the plant's cooling units.

Ten pounds of cheese in a five-pound bag

"When I did the Mascarpone (a type of cream cheese), that goes in at approximately 180 degrees; by the time it hits the cooler it's probably about 160. Then it goes into a 35 degree cooler with high air flow, to drop it down. After a half hour it should show a 25 degree temperature drop. Last week I only got a 10 degree drop. It turned out my cooling unit was frosted up; we were low on refrigerant and had a small leak. We got that fixed and the product was fine."

The pre-holiday period in December is a busy time for Vermont Butter and pushes storage needs beyond capacity. "We're battling the 10 pounds in a five-pound bag syndrome," Cummings said. To meet the need for storage, refrigerated trailers are stationed outside the plant to supplement the small in-house cooler. Cummings used the Fluke 568 to spot check temperatures in those units. "They've got a thermostat, but I went inside to check the actual reading by measuring the temperature of the products in the trailers," he said.

"It's something that I trust," Cummings said of the Fluke 568. "I know the meter's right, and it became part of my routine."

Verifying power-coats

In Champaign, Ill., Advanced Filtration Systems Inc. makes oil, fuel and hydraulic fluid filters for Caterpillar diesel equipment. Electrical engineer Rob Darr put the Fluke 568 to work verifying temperatures achieved in baking powder-coated filter canisters. He also checked temperatures generated in the exothermic chemical reaction when urethane components are mixed and cured. The materials are heated and poured through a mixing nozzle into a mold, then the filter canister is set into the mold before the material hardens.

"I was checking the mold temperature," Darr said. "We have to pre-heat the molds prior to dispensing the urethane. If you don't maintain the temperature you won't get a good product. The reaction won't happen properly or you'll get moisture infiltration." Filter elements must be thoroughly dried before assembly. "There's a pretty tight window on everything," Darr said.

Darr objected to one operating characteristic of the 568, that is included for safety: when it's plugged into a computer, the laser-aiming beam goes off and must be turned back on manually. "You can turn it back on, but it still only operates when you pull the trigger," he said.

"Feature-wise, I liked the features that it had," Darr said. "I went through basically every feature in the menu. It was pretty straight-forward. I think anybody could pick this up and use it."

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