FLUKE®

Intrinsically safe tool cuts hours from daily troubleshooting routine

Application Note

Testing Functions **Case Study**

568 Ex Intrinsically Safe Infrared Thermometer saves time, paperwork at a Texas oil refinery

Oil refineries are among the most challenging work environments in all of industry. First of all, they're massive—about the size of an average small town. Plus, they have multiple processes in motion involving hydrocarbons that are pressurized, heated, evaporated and transformed into products used by millions of people.

Tool: Fluke 568 Ex Intrinsically Safe Infrared Thermometer

Operator: Plant and reliability engineer, independent refiner headquartered in Texas.

Application: Troubleshooting heaters, pumps, turbines, motors, process piping

Crude oil flows in and petroleum finished products flow out—among them gasoline, jet fuel, propane and butane. Several of the products being produced, if leaked or ignited, could be dangerous. Thus, many of the work areas in oil refineries are deemed hazardous or potentially explosive atmospheres where intrinsic safety protocols are in order.

Those are areas in which instruments and tools certified as intrinsically safe should be used. Devices that are certified as intrinsically safe are designed to prevent the release of sufficient energy, by either thermal or electrical means, to cause ignition of flammable materials.

Such an environment necessitates safety controls to protect workers, including the reliability and maintenance personnel whose job it is to check and maintain equipment in the refining process. At an independent oil refiner and marketer headquartered in Texas, the commitment to safety is baked into procedures.

Permit needed to carry electronics

Even entering the work unit with equipment such as a laptop computer, cell phone or electronic tools requires a stop at the control room to apply for a low-energy permit. The permit is a safety check in order to ensure the areas being accessed don't have hazards. Sometimes it can take up to 45 minutes for each permit to be processed.

And about 20 low-energy permits a day are required to go along with work orders created to do proactive maintenance, troubleshooting or repair work at the refinery, which has a crude capacity of over 100,000 barrels a day.

So when the plant and reliability engineer with eight years of experience had a troublesome heater last winter, he faced some choices. He knew that it would take frequent temperature monitoring and spot checks to troubleshoot the specific issues involved in the heater. But he also knew that would mean pulling a low-energy permit each time, a necessary procedure but also one that is fairly slow.

"It was a cumbersome process," he said, "because you have to go into the control room and ask for a low-energy permit and then the operators have to go out to the area where you were going to actually do your work to check for levels of hydrocarbons. It required a great deal of time each shift."

Ideal for oil and gas

The experienced engineer decided it was time to explore options. He bought a Fluke 568 Ex, an intrinsically safe infrared thermometer that is certified for use in Class 1 Div 1 and Div 2 or Zone 1 and 2 hazardous environments anywhere in the world. Such a tool is ideal for oil and gas, petroleum, chemical or pharmaceutical production environments.

He found it a real time saver because he did not need to request that low-energy permit each time he entered the unit—90 percent of which is deemed as a potentially explosive environment. In addition, with his new intrinsically safe infrared thermometer, he is also able to quickly check the temperatures in pumps, motors, turbines and process piping as his group moves toward a less-reactive maintenance strategy to more preventive and predictive models.

Indeed the Fluke 568 Ex has become a go-to diagnostic tool that he is able to carry around with him. It also signals to coworkers his personal commitment to safety. "I can't take my cell phone into the unit, but I can take the thermometer," he said. "But the biggest payoff is what it does out in the field."

A short while into using his new tool, he learned its added value. While making his rounds at the plant and checking on another job, he came across a somewhat noisy pump, which also seemed to be a bit hot.

Fluke 568 Ex spots problem pump

He dashed off to his truck, grabbed the Fluke 568 Ex, and was able to quickly shoot a temperature profile on the pump's mechanical seal, a part that is continuously flushed with liquid to cool the equipment, increasing its reliability and usable lifespan.

"It was very hot, 280 degrees Fahrenheit," he said. "We shot it real quick and did a quick profile and determined that something was wrong." Specs on the seal showed that normal operating temperature was 180 degrees or less, removing any doubt that there was a problem.

A short time later, an inspection of the seal showed that a three quarter inch stainless steel pipe that carries cooling fluid from the seal pot to the seal had become disconnected. Thus, the pump wasn't receiving proper lubrication or coolant and was overheating. The engineer was able to then quickly fill out a work order to have the part fixed.

"This tool was very helpful in assessing the situation and determining the cause of a potential problem," he said, "because we just noticed that something was wrong due to the noise level." The engineer also notes that his 568 Ex is accurate and easy to use. "It really did come in handy there," he said.

Without such a troubleshooting tool the pump may well have failed and required more extensive—and expensive—repair work, or even replacement.

"It would have been very hard for us to pinpoint it," he said. "You could have had a mechanical failure because there was no flushing. Eventually the pump would have stopped pumping because the seal would have failed."

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