

Furnace Comprehensive Monitoring Program

WIKA data sheet IN 00.55

Infrared scanning + in-depth analysis + custom advisory = enhanced performance

Furnaces and heaters are the heart of a refinery, and sub-optimal operation leads to loss of time and money. WIKA USA is a trusted partner for the [oil and gas industry](#), offering not only high-quality measuring instruments, but also an array of services that optimize furnace performance.

WIKA USA has long been an industry leader for temperature measurement solutions in the oil and gas industry, becoming a trusted business partner for refining operations around the world. Our experts, who often conduct onsite visits and discuss equipment monitoring requirements, have noticed that certain issues prevented critical furnaces from reaching peak performance.

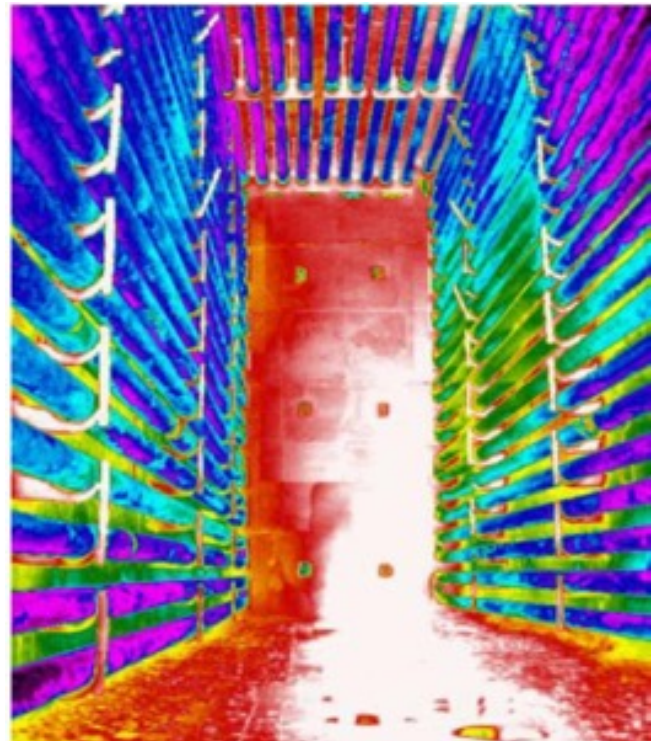
This led to the development of the Furnace Comprehensive Monitoring Program, a thorough assessment, diagnostic, and advisory service that finds opportunities for:

- Optimal placement of tubeskin thermocouples (TSTC)
- Enhanced throughput
- Extended run lengths
- Preventing unscheduled shutdowns
- Improving turnaround planning
- Averting tube failures

With our expertise in designing [temperature instruments](#) and in IR scanning, WIKA offers the industry's most comprehensive solutions for monitoring and improving furnace performance.

Furnace Comprehensive Monitoring Program begins with infrared diagnostics of your fired heaters

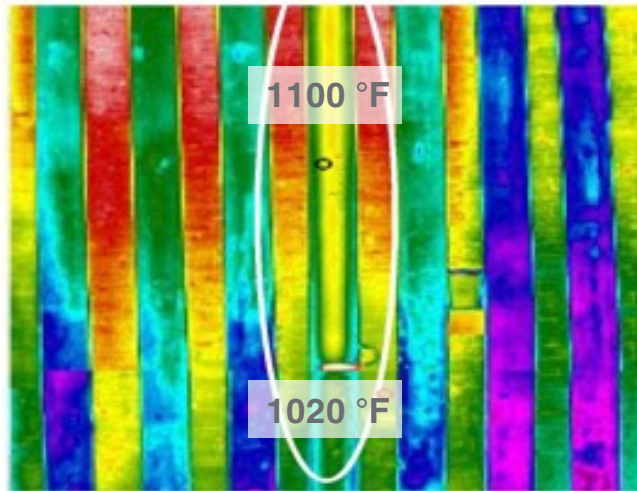
The mission of FCMP is to help equipment operate as close as possible to target conditions. The first step is to collect data on a furnace's current state and its operating history. This is accomplished through field data, infrared scans of furnace walls and tubes, historical operating data, and other input from the site (information on operations, production, and inspections). This initial assessment detects hotspots, heat flux imbalances, tramp air ingress, issues with hardware (burner, tubes, etc.), and then identifies issues of concern and areas for improvement.



IR scanning is a powerful tool for understanding the spatial temperature distribution and relative temperature difference between various zones in fired equipment. Equally important, however, is data analysis. We use proprietary software and robust methodology to accurately predict tubeskin temperatures and to recommend placement. This methodology comes from the know-how we have gained through extensive testing in the heater at the WIKA [R&D Center in Houston](#), and validated using industry standard references for accurate tubeskin temperature measurement.

Furnace Comprehensive Monitoring Program helps tell the whole story

Coking and fouling layers build up inside a furnace tube over time, resulting in hotspots, localized overheating, and accelerated coke formation. Existing tubeskin temperatures (TST) while in operation provide guidance to the operator on specific locations for maintaining temperatures within its integrity limits. However, these temperature sensors do not always capture the critical zones.



In the above image, the upper two-thirds of the middle furnace tube (circled) shows extensive coking. We know this because the IR scan reveals the coke signatures, and the temperature is around 1100°F. Meanwhile, the TSTC, installed lower on the tube, registers 80°F lower.

To resolve this issue of extensive coking, WIKA's temperature experts might suggest remedial actions, such as cleaning a fouled burner, tuning the burners, and/or adjusting the flow through the tube. Depending on the furnace's operating history, another recommendation might be a more optimal placement of the existing thermocouples.

The bottom line: If it weren't for comprehensive furnace monitoring, this furnace tube's coking issue would never have been detected.

WIKA USA leads the market in furnace temperature measurement, and the Furnace Comprehensive Monitoring Program provides a complete and accurate profile of equipment conditions. The analyzed data, along with observations and recommendations from our experts, can help customers make informed decisions that improve furnace performance, meet production targets, and ensure safe operations. Make WIKA USA part of your refinery business.

How WIKA USA supports customers with comprehensive furnace monitoring

FCMP comes in three different tiers to fit your refinery's needs. Choose from the following options:

1. **Basic Package:** IR scanning + one-time equipment health check
2. **Annual Service Plan:** sequenced IR scanning + analysis and monitoring of critical furnaces
3. **Advanced Analysis & Troubleshooting:** IR scanning + diagnostics and problem-solving of fired heaters

The Furnace Comprehensive Monitoring Program comes with the following key deliverables:

- Field assessment of key furnaces using advanced diagnostic tools
- Reviewing preliminary findings with operations, inspections, and technical personnel
- A full furnace performance report with recommendations (optional: guidance on the optimal number and locations of thermocouple sensors)
- Supporting the customer's site personnel as they implement the suggested improvements

In addition to these IR scan packages, WIKA USA offers thermocouple validation and repairs. Our state-of-the-art R&D facility has a full-size test furnace to accurately characterize the behavior of tube metal temperature (TMT) sensors, bridge-wall thermocouples, velocity thermocouples, and other temperature measurement devices.

