Using Extreme Heat to Measure Concrete's Mass

A customer in charge of constructing and maintaining roads, highways, bridges, and other motorways came to us looking for a solution for one of their tests. This test requires them to place samples of concrete into an oven and raise the temperature to 550°C. The temperature is held for two hours and then increased to 950°C. They record the sample's mass at each temperature, which tells them the loss of organic matter and CO_2. They use thermocouples to ensure their oven reaches these key temperatures, and they contacted us looking for a temperature calibrator they could use to calibrate these thermocouples.

Our Solution

The customer purchased a CTC-1205A dry block temperature calibrator to provide a calibrated temperature to check and document the performance of their thermocouples with specified regularity. We showed them how to use the CTC front panel controls to quickly and easily set and read temperature from the calibrator. They inserted their thermocouple and used their handheld read-out to indicate the temperature. We progressed through a few setpoints, and the engineers were quickly comfortable with the advanced simplicity user interface on the CTC-1205A.

The lead engineer then inquired about using our JOFRACAL calibration software to perform and document calibrations. We set up the calibration using the CTC-1205A as the heat source and their handheld as a manual reference read-out. Using this process, the customer waits for the software to indicate temperature stability from the CTC -1205A, and then manually enters the temperature indicated by their handheld. The calibrator will remain at the test point until they record the reading and press enter. We explained that they could perform other tasks without missing a test point, as the calibrator would not change temperatures until directed.

Our Advanced Solution

Although we had improved their process, we knew that JOFRACAL calibration software had an even more efficient option using our ASC-400 multi-function calibrator. We demonstrated the ASC-400 multi-function calibrator and explained how they could replace their handheld read-out. Although the accuracy of the ASC-400 exceeded their instrument, they were most impressed by the full color, easy-to-read display.

Continued on next page ▶

CTC-1205A Dry Block Calibrator and
ASC-400 Multifunction Calibrator

The display far surpassed their current handheld, and they thought the user interface would be easy to learn, as it is essentially the same as the CTC-1205A temperature calibrator. They even took the instrument into another area of the lab to show other technicians.

In addition to the improved display and accuracy, the ability to connect the ASC-400 multi-function calibrator to their lab computer was key. We explained that with the two instruments connected to JOFRACAL calibration software, they could complete a fully automated calibration without the need for operator interaction. Creating a scenario using the CTC-1205A, the ASC-400, and predetermined setpoints could save them time and money.

We pressed start and allowed the routine to proceed. When the dry block temperature calibrator reached stability at a calibration point, the ASC-400 would collect a reading of the thermocouple. The software would document the CTC-1205A temperature, and the ASC-400 reading of the thermocouple and store the results in its database. Once completed, JOFRACAL allowed them to create a PDF of a calibration report and retain the information in a database for future analysis.

The profiles used for the thermocouple tests could be copied and reapplied to different serial numbers and locations, saving even more time. By collecting and storing information for all their sensors in the same program, they were confident that they could review performance trends and perform predictive replacements before failure. Over time, they could also estimate the effective life for each sensor.

Summary

We offered the customer a complete solution, and one that they were not even aware was possible. They now start their calibration process and switch to other tasks, no longer needing to dedicate a technician's time to testing their thermocouples. They can focus on other work, and when they come back, the job is done. Also eliminated are hard copy certificates, as JOFRACAL stores the results of each test in its digital database.