Controlling Furnace Temperature

Heat Treatment is a typical process used by manufacturers to alter a metal's physical or chemical features. By controlling the heating or cooling to accurate values, manufacturers can ensure their metallurgy's highest quality and peak results.

Annealing: To prepare metals for further shaping or to increase their strength, metals are heated to a specific temperature and then cooled at a known rate.

Normalizing: Metal is heated above its upper critical temperature limit and then cooled back down to room temperature. This process produces a more uniform composition, resulting in a softer material with increased ductility.

Stress Relieving: Used to reduce the stresses in metal usually caused by cold forming or non-uniform cooling. The metal is heated below its lower critical temperature and then cooled uniformly.

Aging: Heating solution heat-treated metals to form metal precipitates, which increases the strength of the metal while also reducing its ductility. Aging can happen naturally or be produced artificially.

Quenching: Used for durability and strength, quenching involves rapid cooling of a metal after it's been heated. The cooling process requires water, air, or oil.

Each of these processes depends on accurate temperature control. Even the slightest deviation from the ideal temperature range can result in low-quality material.

Furnace Temperature Sensors

Operators need to control the furnace temperature, which may reach up to 1200°C, to assure quality. Often the accuracy required is between 5 to 10°C, an accuracy of ± 0.5% to ± 1.0% of reading. They depend on high-quality temperature sensors to give them these readings.

However, even the highest quality temperature sensors degrade over time, and because temperature control is vital, assuring that these sensors remain accurate is essential. To properly calibrate these sensors, most operators look for a temperature calibrator that's 4 to 5 times more accurate.

In addition, uninstalling and moving the sensor to a calibration lab is not ideal, so they would prefer a portable temperature calibrator that allows them to perform on-site calibrations.

At AMETEK STC, we have a solution with our JOFRA CTC-1205 temperature calibrator.

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Our Solution

At only 7.1 kg (15.7 lbs), we designed our CTC-1205 (Compact Temperature Calibrator) for in-field use. Its compact size and lightweight make it easy to move from a laboratory to the furnace and complete the calibration on-site.

In addition to its ideal size, the CTC-1205 has the accuracy (± 2°C), range (100 to 1205°C), and stability (± 0.1°C) to calibrate high-temperature sensors used in the heat treatment processes. It offers a silent mode operation which provides an improved working climate and features a fast cooling of 45 minutes, saving time and improving workflow.

For detailed specifications, please see the complete datasheet on ametekcalibration.com.

CTC-1205 Compact Temperature Calibrator