Achieving Quality

The Final Piece of the Puzzle

By Valerie Zaleski

Properly calibrated testing equipment ensures quality

In order for a business to generate a high-quality product or service, it is essential to obtain a quality measurement system that will be used to study the integrity of its finished product. In the certification industry, testing equipment is essential to measure the different variables that could potentially alter the quality of a raw material, finished product or final status on a certification report.

The quality of a product or service is compromised if the test equipment used to measure the final quality is not reading accurate results. This is why a flawless calibration system is the final puzzle piece to achieving a high-quality product or service.

What is Calibration?

In this article, calibration will be defined as the comparison between measurements. During the calibration of a test instrument, a device with a known magnitude or assigned correctness, known as a standard, will be used to check the measuring accuracy of a test instrument. Calibration ensures that a measuring instrument is providing results for a sample that fall in an acceptable accurate range. Accurate testing results allow manufacturers or certification agencies to eliminate or minimize factors that could cause inaccurate measurements during production or testing.

Calibration procedures naturally vary depending on the instrument being calibrated. Generally, the test instrument is used to test calibrators, which are one or more test samples that have known values. The results are then used to establish a relationship between the measurement instrument and the known values. The calibration processes eliminate or "zero out" the current instrument error at the specified calibration points. This process basically "teaches" the instrument to produce more accurate results. After a test instrument is calibrated, it will provide more accurate results for unknown values tested during its everyday normal usage. To keep a successful calibration system, calibrations must be done consistently and on a systematic schedule.

When is Calibration Needed?

During the manufacturing or certification process of any product, there may be many different types of test instruments used to determine the quality of a product or service. The question of which test instruments need to be calibrated and which do not is answered by whether or not the test performed and the test instrument used affect the final quality of the product or service.

There are situations in which a test instrument does not need to be calibrated. If the readings of the test instrument are for reference only, and the accuracy of the test results have little or no impact on the quality of the product or service being provided, then you do not need to calibrate the test instrument. It is important to be aware that non-calibrated instruments can appear to be working properly while not providing reliable results.

Sometimes cost is the main reason that people choose not to calibrate a test instrument. It is important to know that there can be huge hidden costs associated with not calibrating a test instrument that should be calibrated. Calibrating test instruments may decrease the number of final product rejects because they do not fall within acceptable tolerances. Besides saving money in some situations, there are health, safety, legal and regulatory concerns that should be considered.

Who Should Perform Calibrations?

Once it is determined which test instruments need to be calibrated, the next step is to determine who will perform these calibrations.

To be sure that the calibration results are accurate, they must be traceable back to standards held at a national measurement institute. In order to maintain formal traceability of measurements, the calibrations should be done by a national metrology institute or a United Kingdom Accreditation Service-accredited (or equivalent) laboratory that has independent third-party accreditation. National Physical Laboratory is an example of one of these national measurement institutes. It is also essential that the appropriate equipment and procedures are used in the calibration process and that trained, authorized personnel are performing the calibrations.

You can choose a non-accredited source to calibrate your equipment, and you can also choose to calibrate your equipment yourself, but keep in mind the confidence that can be placed on the results will be much greater if the calibration source is third-party accredited.

Frequency of Calibration

After you decide who will perform your calibrations, the next question is how frequently an instrument should be calibrated. Just like refueling your car, you should calibrate your test instrument when needed.

Daily or periodic standard checks can provide a good indication of how the test instrument is performing. If these checks show that the instrument performance is stable, then the instrument does not need to be recalibrated. If the history of standard checks show that the instrument is showing a short-term significant shift, then the test instrument should be recalibrated.

Some laboratory standard operating procedures or regulatory requirements may require that the test instrument be recalibrated on a set schedule even when the standard check results do not indicate that a recalibration is needed.

These requirements should take primacy when there is uncertainty as to whether to recalibrate the test instrument. New devices should be calibrated more frequently to establish their metrological stability. *wqp*

Valerie Zaleski is facility assessor for the Water Quality Assn. Zaleski can be reached at vzaleski@wqa.org or at 630.929.2531.