

Calibration, a Critical Success Factor for Mapping

Frequently Asked Questions

Why is calibration a critical success factor for a mapping study?

One of the biggest decisions to be made for a mapping study is deciding about a pre-mapping calibration or a check of an instruments current calibration and a post mapping calibration check. A decision about making, or *not* making, a pre or post calibration check can be the difference between a successful study or a time consuming failure.

Why do I need to do a pre-mapping calibration if my calibration instruments are still within the device calibration interval?

The pre-mapping calibration has a lot to do with confidence in your instruments and devices. If you are confident that the instruments operate accurately and consistently over time, then a calibration at this point in the study may not be necessary. The ability to skip this calibration step can save a lot of time for conducting the study and reduce the amount of documentation as well. Of course, the calibration dates for the instruments should be verified and documented before beginning the mapping study to ensure that the calibrated instrument measurements will still be valid at the end of the study.

Instead of a pre-mapping calibration, is it acceptable to perform a check of the instruments and devices?

Yes. This is the most common practice for mapping studies. The reason a check is quite often performed is because it can save aggravation and time for a failed sensor during the study.

You will need to determine how many points are checked. Determining the number of points to check depend on the range of the instruments and the operating range of the equipment or area to be studied. You may feel comfortable using a single point for the normal operating range of your study. If the operating range is extreme you may feel better about checking the low, high and even mid-point of the range. Again, checking multiple points will add time to the total time of your mapping study but can provide confidence that your instruments are reading correctly.

Remember that the main purpose of this step is to save time with a potential failure during the mapping study. Depending on the test criteria, even a single incorrect instrument reading can create a failed mapping study. Checking that all of the sensors are reading within tolerance before a mapping study begins can be a great time saver. An out of tolerance sensor can also lead one to draw conclusions about the study or equipment that are not really present. Replacing or re-calibrating an instrument before a mapping study can save you from re-conducting the test, or from extra documentation and scrutiny from approvers and regulators.

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Will an approver or regulator require a pre-mapping calibration or check?

Generally, no, but they will want you to document and verify that calibration certificates are available for the instruments, and that each instrument was within its calibration interval at the time of use.

The mapping study was well within the tolerances of my study. Will an approver or regulator require a post calibration check?

Even if the mapping was successful an approver or regulator may still ask for post calibration data. There is a small chance that a sensor is out of tolerance which helped the study fall within the stated tolerances.

It is certainly true that modern instruments are more stable and accurate than those of the past. The majority of mapping studies (especially in the past) are for temperature using thermocouple wire. Thermocouples can be damaged from handling or poor manufacture causing inaccuracies. Historically some approvers and regulators are used to seeing post calibration checks. That does not mean it is required, but you may find it easier to provide the calibration check and have less explaining to an approver.

I don't have the equipment to perform a pre-or post-study calibration because this would require a well-equipped calibration lab. Can I just skip the calibration checks altogether?

As stated above, you can but you may have some additional explanations required for an approver.

You could also consider renting or purchasing calibration equipment. In some cases, simply checking your instruments against a traceable device in a controlled environment will be sufficient to an approver. For a temperature mapping that may mean purchasing a traceable device that is relatively inexpensive. It does not require a 'well equipped lab'. When purchasing a traceable device, remember to ensure the traceable device has at least the same, if not more accurate specifications than your instruments used for the study.

Other measurement instruments such as humidity loggers can be difficult to calibrate or check. In these cases, it is quite common for there to be no calibration or checks performed. However, the calibration records for these instruments will most likely be reviewed more heavily.

I have made my decision about the calibration check, should I start my documentation and begin the mapping study?

Once you have the approver on board and any other individuals involved with the mapping it is time to write the documentation. Once the documentation is set and approved it will be time to execute the mapping study. In the next edition of Mapping Matters, we will cover some common pitfalls to avoid in the mapping documentation and execution step.