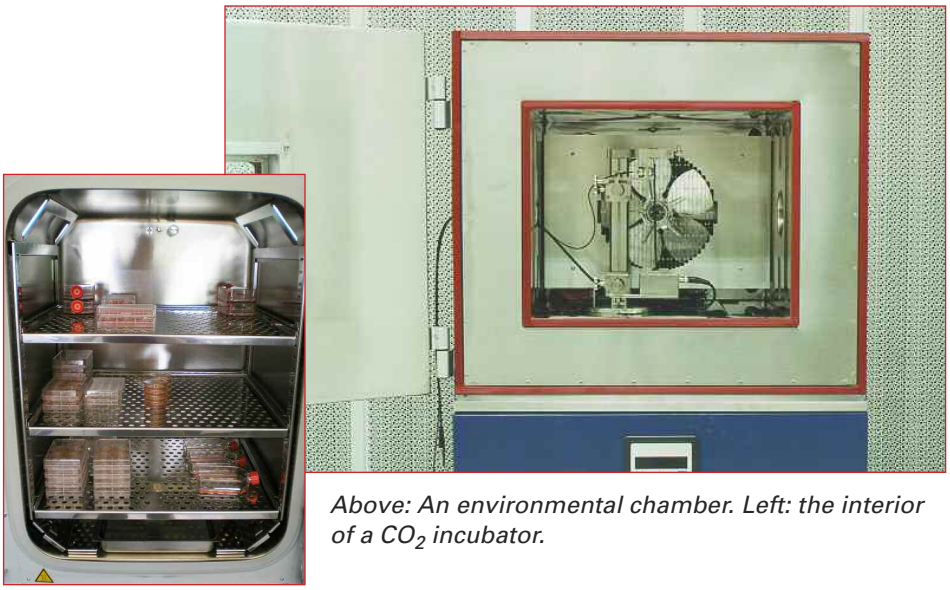
How to Prepare for Chamber Mapping – 8 Critical Steps

Most chamber mapping projects that fail do so because of inadequate preparation. Poor or inadequate preparation for the mapping study can lead to a failed mapping study, which can lead to unnecessary costs in valuable production time or regulatory and product quality issues.

These 8 steps for thorough preparation will help ensure your chamber mapping study is successful:

1. Understand why the mapping is required.

You will need to meet the regulations for your chamber equipment and for your industry. Conducting a mapping study because, "We always have", is not the best practice. How do you know the mapping was conducted properly? Are there possibilities to improve the collected data and reporting? Can the mapping be conducted more efficiently and accurately? If the equipment is being mapped for the first time, it's important to know why you are mapping to ensure that you produce a solid plan and reporting that can be presented to regulators.



Above: An environmental chamber. Left: the interior of a CO_2 incubator.

2. Make sure to have complete operating knowledge of the chamber.

Know how to operate the chamber to be mapped and have at least a basic understanding of how it works. It is surprising how many chamber mapping studies are conducted without taking the time to run the equipment first. When the person conducting the mapping study needs to take time to learn about the equipment during the study, errors and aborted test cycles will often occur. Understanding exactly how the chamber operates plays a large part in determining sensor placement for the mapping. It is also a good idea to make sure that any necessary documentation from the chamber manufacturer is available to chamber operators, internal process approvers and regulators.

3. Review and understand the objective of the mapping study.

The objective should answer questions such as:

- What will the mapping study prove or disprove?
- What are the required parameters to be measured?
- Is temperature the only parameter required?

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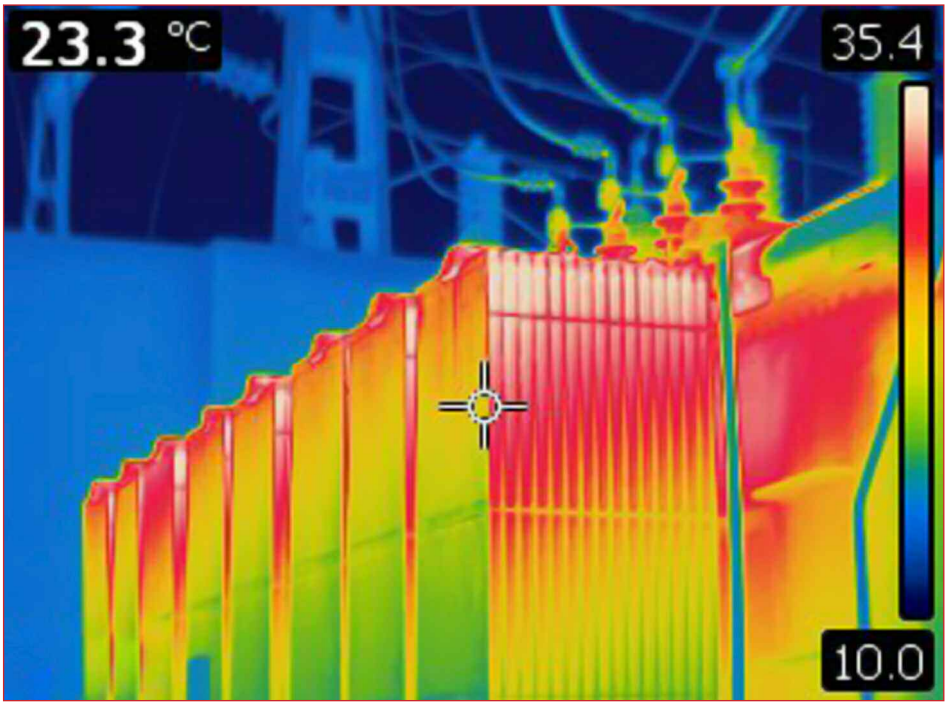
3. Review and understand the objective of the mapping study. *(continued)*

- Are humidity or pressure readings required?
- What is the duration of the measurement period?
- How many and what type of sensors are needed?

A good starting point for mapping studies on chambers such as incubators, climatic chambers, or ovens, is to ask the manufacturer of the equipment for advice about how to conduct a proper mapping study. The manufacturers have the most experience with their own equipment and should have a good understanding of your industry standards. For example, they can advise you about the location for sensors that may be important when it comes to detailing specific characteristics of the system (i.e., hot or cold spots). Many times, the mapping completed as part of the factory test can be duplicated. These mapping protocols may be available for your mapping study. This will increase the chance of a successful mapping study. If there is a problem with the mapping, it will be easier to speak with the chamber manufacturer to troubleshoot the problem because you followed their recommended procedures. A well thought out and documented plan including a clear objective will speed the mapping process and give approvers and regulators assurance that a methodical plan was implemented.



Example of a thermal image.

4. Document the mapping plan.

Document the mapping plan with plain spoken verbiage and with illustrations that help tell the story of your plan. The answers to the questions posed above should also be incorporated into your documentation.

5. Confirm proper operation of mapping sensors, loggers and software.

Ensure the devices and any software used for a mapping study are functioning properly and calibrated. Many mapping studies fail or are delayed because the measurement device calibration is out of date. Ensure that the calibration for all devices will be valid throughout the duration of the entire mapping study. Even if only a post mapping calibration is performed, it is good to know that the data logging equipment used for the mapping is functioning correctly *before* starting the study. Interrupting a mapping study to fix or calibrate equipment is frustrating and time consuming.

6. Understand the mapping device output options for reporting.

Understand any equipment, or mapping equipment software options or features that can assist in generating mapping reports. Many modern mapping software packages include built-in calculations and reports that can save you

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time in preparing the final report. These options can eliminate tedious tasks such as manually calculating data, or creating graphs manually with spreadsheets. Clear understanding of these features during the preparation phase pays off in time savings during the report writing phase of the mapping study.

7. Determine how the mapping study will be monitored.

If the mapping period has a long duration, it is important to determine if monitoring the measurement results throughout the duration of the study will be possible. For example, wireless loggers are convenient but accessing the data during a mapping study may not be possible. Monitoring and collecting data during the mapping can save time by early detection of equipment failure. If this is important for your mapping project, it will affect the type of equipment, sensors and reporting system selected for the mapping.

Resources

- ISPE Controlled Temperature Mapping (2012) http://www.ispe.org/publications-guidance-documents/controlled-temperature-chamber-mapping
- WHO – Temperature Mapping of Storage Areas
- Rotronic Technical Note – How to Avoid the Most Common Mapping Mistakes
- Rotronic Technical Note – Making Sense of Sensor Placement
- Rotronic Technical Note – Calibration, a Critical Success Factor for Mapping

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8. Understand how to set up and employ the data logging system.

It is important to understand this before the mapping study commences. Something as simple as starting the data loggers is sometimes missed. Run a quick and complete test of the system including the collection of sample data. Review the data storage process and location for security and access.

Conclusion

These 8 steps will help you avoid some common pitfalls that can cause frustration and possible failure with chamber mapping projects. Knowing the *why* and the objective of the mapping, along with a complete understanding of the equipment helps you conduct a mapping project that is delivered on time with solid, convincing data. Good preparation is the first step towards a successful and meaningful mapping.

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