



# THE IMPORTANCE OF ——— **PREVENTATIVE MAINTENANCE**

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## Abstract

Environmental test chambers are an essential tool for bringing a product to market. To protect their unique capabilities, though, maintenance is paramount to keeping the chamber running over the years. This upkeep is known as preventative maintenance. Associated Environmental Systems (AES) helps provide customers across all industries with best practices to ensure optimal performance. As a result, numerous customers have been able to increase their chamber's lifespan, including one specific electronics company that has been able to keep their chamber running for four decades. Learn more about the techniques they followed, recommended by AES.



# Introduction

Environmental testing chambers are the most specialized testing equipment across industries. From EVs to aerospace to consumer electronics, countless industries rely on environmental testing to control and recreate specific conditions to evaluate a product's durability and reliability. These conditions include humidity levels, extreme temperatures, and more.

AES is a full-service provider that understands just how important product testing is for a company. When environmental testing chambers are necessary to comply with industry standards, we also recommend a preventative maintenance care package along with your purchase. Even the shortest unintended downtime can result in extensive delays and setbacks, negatively impacting operational costs and testing schedules. Companies have strict deadlines to meet when testing and launching a product on a tight deadline. Chamber downtime due to not consistently keeping up with maintenance is completely avoidable. AES recommends a preventative maintenance check and calibration every six months to a year, depending on chamber usage, to keep your chamber in peak condition. To keep their test chamber running smoothly and minimize the risk of functionality, a consumer electronics company took our preventative recommendations to keep their chamber on track to last. Each step of the way, AES worked alongside the customer, ensuring they stayed compliant with quality standards and kept their chamber well-maintained.



# A Consumer Electronics Company with Purpose

## Why the Company Came to AES

The consumer electronics industry is growing rapidly. The global consumer electronics market was valued at \$723 billion in 2022 and is expected to hit \$1,264.52 billion by 2032, poised to grow at a compound annual growth rate (CAGR) of 5.80% during the forecast period 2023 to 2032. This rapid growth and demand for consumer electronics products pushes businesses to quickly test and produce ready-to-go products, such as electronic components, including resistors, diodes, integrated circuits, and more.

Realizing the need for electronic components back in the 1980s, one customer came to AES, a leading expert, for environmental test chamber solutions. They wanted a temperature and humidity chamber that could help them test their products intermittently during fall, winter, and spring, with summer seasons off. Electronic components can often be at risk for damage due to water exposure and corrosion from humidity, so this customer wanted to ensure their products didn't alter due to environmental conditions.

Additionally, the customer needed to test in accordance with common consumer electronics environmental testing standards. For example, many consumer electronics companies need to remain compliant with the International Electrotechnical Commission (IEC). Customers who own an AES humidity chamber can rest assured that their chamber complies with the IEC 62133 standard, which tests how a product can survive when stored or transported at extreme humidity temperatures. Humidity chamber owners also comply with the IEC 60068 standard, which tests how devices perform under various conditions, such as extreme cold, dry heat, and damp heat.





## Chamber Type and History

The consumer electronics company purchased what is now known as a BHD Series humidity testing chamber. The BHD is a benchtop-style environmental test chamber, designed to fit efficiently within a lab space. Benchtop chambers are designed to be stackable up to three chambers high, allowing you to triple your workspace volume for performance, employee movement, tripling throughput, and more. The BHD Series has essential safety features and an expertly crafted structure that helps it last for many years if properly taken care of. The internal and external construction is highly efficient and provides low k-factor and thermal insulation.

Originally purchased in the 1980s, the customer's humidity chamber is far from brand new. Due to their diligence of staying on track with preventative maintenance checks and annual controller calibrations, the consumer electronics company has been able to keep the chamber running smoothly over the past four decades. From the start, they maximized the craftsmanship of the chamber, recognizing the high-quality engineering and being careful to preserve the chamber's integrity. The preventative maintenance techniques they implemented continue to ensure chamber longevity.



# Ensuring Test Chamber Longevity

## Preventative Maintenance Techniques

At AES, we encourage our customers to never stop investing in their chambers. The consumer electronics customer took advice from our service experts and has continued to implement best practices throughout the years. After their chamber was installed, they consistently completed common preventative maintenance techniques on their own that routinely examined the condition of the chamber. Techniques included the following:

- Run chambers periodically during intermittent testing.
- Conduct regular and thorough cleanings.
- Inspect the electrical, humidity, refrigeration, and circulation systems, looking for small issues that need attention (while the chamber is powered off).
- Check the exterior, workspace, and floor panels for punctures, tears, and dents.
- Check the degradation of all gaskets: door(s), window(s), port(s), wiring, and plug(s).
- Change the denim cartridge when required.

AES came and performed preventative maintenance and annual calibrations in addition to the customer proactively doing preventative maintenance checks on their own quarterly. Calibration ensures each device remains accurate and continues to meet national and international testing requirements. It also yields quality data and gives precise control of testing. AES completed routine chamber calibrations and also offer the following:

- Controller Calibration
- Temperature Gradient Check
- Single Point Calibration (Multiple sensors check)
- Multi 9 Point Calibration (Multiple sensors check)

Even as the chamber continues to age, the customer has the option to enhance its capabilities. If the customer wants to utilize the newest technology, AES can work with them to upgrade with retrofit services. This alteration would modify the chamber's interior and software through controller upgrades known as AESONE CONNECT. This suite of hardware and software products provides remote monitoring, not requiring a technician to always be present next to a chamber throughout testing.





## Preventative Maintenance Techniques

As a result of the customer's attention to detail and preventative measures, their humidity chamber continues to run smoothly. They have continually been able to meet testing requirements and avoid downtime.

By curbing any risk of downtime, the customer has avoided hiccups that could severely cause them to miss deadlines, experience financial penalties, and experience production delays. Simply conducting routine maintenance checks and having AES come and do routine calibrations, this customer's chamber continues to work despite having been running for four decades. As long as they continue keeping up with their chamber, their chamber will continue to serve them for many more years. As technology transforms and evolves rapidly, the customer's preventative maintenance precautions will prepare them for testing adjustments.



# Signs Your Chamber is Not Working Properly

## How to Know When Your Test Chamber Needs Repairs

The consumer electronics customer is not an anomaly. You, too, can achieve test chamber longevity, and avoid needing test chamber repair, if you routinely complete preventative maintenance measures and schedule annual calibrations. But don't wait. Chamber malfunctions can quickly arise without proper care. Even on your own, evaluate your chamber thoroughly to avoid issues that could be detrimental to your testing. Here are some common issues that often need troubleshooting, if you have purchased an AES chamber, feel free to reach out to our support team with photos to check if you should be concerned about your chamber:

- Poor air circulation
- Dust buildup
- Mineral buildup and contamination with humidity system
- Poor drainage
- Interior corrosion
- Compressor failure
- Issues maintaining temperature

If not properly maintained, the refrigeration, electrical, sensors, and controls can collectively fail. To ensure these systems are performing correctly, be on the lookout for issues that need proper environmental chamber repair. Test chamber corrosion can ultimately pause testing indefinitely, so check your chamber's sealant from the inner to the outer cabinet to guarantee there are no leaks. Don't forget to also consistently clean the condenser from dirt and debris.







## Conclusion

Buying an environmental test chamber is only the beginning. Chamber preventative maintenance is the ultimate foundation that keeps your chamber running smoothly and saves you financially in the long run.

We recommend that all customers complete quarterly environmental test chamber preventative maintenance checks independently along with annual calibrations and preventative maintenance checks by an AES service expert every 6 months to a year depending on usage. Should you have any questions regarding this schedule or test chamber maintenance best practices, we encourage you to [reach out to a sales engineer today](#). Our team of experts can provide you with more information about our wide variety of environmental chamber maintenance services. Let's get started.



# References

Cryostar Industries, Inc, [Troubleshooting: Environmental Test Chambers](#)

International Electrotechnical Commission, [Homepage](#)

Precedence Research, [Consumer Electronics Marketing Size, Share and Trends](#)

