

TEMPERATURE MONITORING: PROTECT WHAT MATTERS TO YOU

A white paper analyzing the use of a temperature monitoring system for industries relying on temperature-sensitive equipment, the benefits of these systems, and the best solution to meet a business's needs.



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EXECUTIVE SUMMARY

Valuable inventory. Costly infrastructure. Critical operations and equipment.

...Do you know if yours are safe?

Every year, billions of dollars in business investments are lost when equipment doesn't operate as planned. Refrigerators fail to refrigerate. Freezers don't maintain low temperatures. Critical systems overheat or lose power. Quite simply, any time climate-sensitive conditions fall out of acceptable temperature ranges, the result can be unanticipated costs, possible litigation, compliance failures, and ruined inventory. Spoiled pharmaceuticals, foodborne illness, and unrecoverable data are just a few of the consequences that can result from this. Whether the context is a pharmacy, hospital, distribution facility, restaurant, data center, greenhouse or other location, such hazards can be expensive and detrimental, and can increase the risk of liability and regulatory violations.

Make temperature monitoring part of your business's risk management strategy.

Knowing when temperature-sensitive equipment failures occur can protect you from such devastating losses. Better yet, establishing the proper measures may often prevent these problems from happening in the first place. The solution, then, is through preventative monitoring of the things that matter to you. Constant monitoring of your valuable inventory, equipment, and assets provides a sense of security, with the assurance of knowing your investments are safe and that you aren't at risk for losses or damage. Additionally, constant monitoring produces valuable data and reporting to ensure your facility always meets compliance and regulatory standards. However, you and your staff can't be everywhere at once, at all times, to keep an eye on things and confirm they are protected. Even if they were, that would be inefficient, time-consuming, and prone to human error. So how do you know when something is wrong? Or do you know after it is too late?

The ideal solution will:

- Provide around-the-clock temperature monitoring of the investments important to you.
- Be easy to use and customizable to monitor conditions based on your needs.
- Send immediate notifications and alerts to inform you the moment an issue occurs.
- Have a backup battery that properly and reliably operates despite power failures.
- Record accurate temperature data and status information at regular intervals, and generate reports used for analysis and compliance needs.
- Be proven in the field to be effective and efficient.

CAN YOU AFFORD TO LOSE YOUR INVENTORY?

No matter the industry, businesses that rely on temperature-sensitive equipment all share an alarming problem: the threat of that equipment failing. Broken parts, system malfunctions, temperature spikes, and power outages are just a few of the common issues that can occur. If that happens, the inventory contained within the equipment is at risk of being ruined and lost.

Furthermore, these problems often develop with no warning or prior knowledge. Without a reliable means to monitor inventory, you can be left with little time to react to such situations. Whether it is a refrigerator with critical vaccinations, or a walk-in freezer stocked with hundreds of pounds of costly food, such equipment failures damage your business and incur costs in more ways than just the initial loss of investments.

There are four prevalent consequences of temperature-sensitive equipment failures:

1 The loss of inventory and its associated trickle-down costs.

Products stored within temperature-sensitive equipment have to be kept within specific temperature ranges and environments to maintain their freshness, efficacy, usefulness, and value. If conditions fall outside the needed ranges, these products can only be sustained for a short period of time, if any, before they are ruined. Once the inventory is lost, their costs pile up and include:

- 💰 The cost of the inventory that was lost. Inventory is valuable, and this cost alone can be staggering. According to a 2006 study done by the Georgia Institute of Technology, perishable goods accounted for \$200 billion in profits annually for the supermarket (reach-in refrigeration) industry. However, 15 percent of the industry's *total* losses were attributed to food spoilage¹.
- 💰 The cost of equipment downtime and its effect on other systems and processes. If the business is reliant on the failed equipment, it may see ripple effects elsewhere.
- 💰 The cost to re-purchase the inventory, which effectively doubles the cost of the initial investment.
- 💰 The cost to quickly ship new inventory to the facility.
- 💰 The cost of efforts needed to correct the problem (disposal, cleaning, stocking, coordination, etc.). This takes time and efforts away from resources focusing on other areas of the business.
- 💰 The cost (in customer dissatisfaction) of delayed shipments, service, or deliveries to customers.

The above only outlines the cost associated with the lost inventory itself, and doesn't begin to factor the other three consequences. Can you calculate the potential costs of such losses for your business? Conversely, if your equipment were automatically monitored and a problem resolved, what would be the potential savings?

2 The effects of potentially damaged products on the consumer.

Many temperature-sensitive equipment failures are easy to spot; they fail, you notice the failure, repair the problem, then return to operation. But what if the power goes out overnight and subsequently returns several hours later, all without your knowledge? What if the equipment is continuously running at a temperature higher or lower than expected? The products within that equipment could be spoiled or damaged, yet they may still be delivered to consumers. If consumers are provided with tainted products, there are numerous concerns and risks with their use.

For example, if a vaccine is stored in a temperature outside its required range, whether it is too hot or too cold, it will degrade and can lose its medicinal effectiveness, may not provide its intended therapeutic benefits, and may even have adverse effects on the human body. This can result in consumers receiving vaccinations that do not work properly or at all, while unknowingly living without any protection.

More specifically, in 2006 the Elsevier.com journal *Vaccine* published a meta-analysis that estimated 14 percent to 35 percent of all vaccines are subjected to accidental freezing². If a temperature excursion occurs without being known or documented, potentially ineffective vaccines may be unknowingly provided to patients. And in December, 2014, a swine flu vaccine was discovered to be ineffective as a result of being spoiled by heat, with only 20 percent of the batch maintaining its potency³. Once informed, consumers who were given this vaccine were then either inconveniently re-vaccinated or endured without it.

UP TO 35%
OF VACCINES ARE SUBJECTED TO ACCIDENTAL FREEZING

This instance of a degraded swine flu vaccination was correctable because the vaccine issued was a preventative measure. However, this problem could have occurred in more urgent, life-saving healthcare products as well. If a patient is treated with a critical medication that suffers the same effects of spoilage, the consequences may be far more severe and uncorrectable.

The FDA estimates that every year foodborne illnesses cause:



48 million people to become sick



128,000 people to be hospitalized



3,000 people to be killed

Likewise, the food industry has seen the effects of damaged and inedible products. According to the United States Food and Drug Administration (FDA), roughly 48 million people (1 in 6 Americans) get sick, 128,000 are hospitalized, and 3,000 die each year from foodborne illnesses⁴. This is a typical but largely preventable problem, as many of the most commonly-found bacterial pathogens creating foodborne illnesses are traced to improper storage and temperature conditions of the contaminated products. Nearly 40 percent of foodborne illnesses and associated health risks are caused by temperature-related storage and holding of foods⁵.

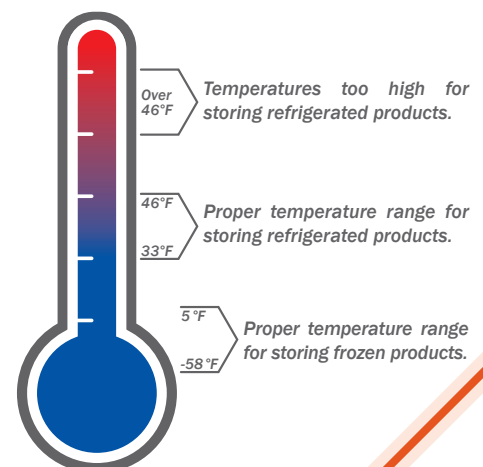
Beyond possible sickness resulting from poor temperature control, the environment food is stored in is critical to sustaining its quality. If food is kept above regulated temperatures, this not only increases the likelihood of foodborne illness and spoilage, but additional bacteria growth greatly affects its freshness and nutritional integrity as its proteins and compounds deteriorate more rapidly, impacting the nutrients within the food and its flavor. Conversely, food exposed to unnaturally cold temperatures will also suffer physical spoilage. Food that accidentally freezes and then thaws can suffer negative effects in terms of texture and appearance; skins and surfaces of products can crack and components can break down or separate, leaving them more susceptible to microbial contamination⁶.

Indirectly, consumers who use damaged or ruined products are impacted in a number of other ways, including increased medical bills, loss of income, out-of-pocket expenses, physical pain, and emotional distress.

3 Compliance/regulatory infractions and possible litigation.

For businesses that maintain temperature-sensitive inventory, it is critical that the equipment's performance is always compliant with various local, state, and federal standards and regulations. The FDA — through the Food Safety Modernization Act (FSMA), United States Department of Agriculture (USDA), and Centers for Disease Control and Prevention (CDC) have all established highly specific mandates for properly storing and monitoring these types of products to ensure they meet health and safety criteria.

The CDC, for instance, requires all refrigeration and freezing equipment containing vaccinations to maintain a temperature between 35 °F to 46 °F and -58 °F to 5 °F respectively. Similarly, refrigerated and frozen food products must be maintained at temperatures of 33 °F to 40 °F and below 0 °F respectively⁷. These temperatures are vital to preventing the spoilage of products and slowing the growth of pathogenic bacteria and remaining within health standards.



If these regulations are violated, the business may suffer costly repercussions (e.g. fines, penalties, public notices, shut downs, etc.) from the governing agencies. This can lead to further disciplinary actions, and may also result in the inventory being deemed as unsafe and needing replacement, thus the business also incurs the costs outlined in section 1. Moreover, lack of compliance can result in costly lawsuits, settlements, and other legal action due to negligence, misuse, breach of warranty (implied or written), or product failure.

4 Damage to the business's reputation, customer satisfaction, and loss of business.

Many of the aforementioned consequences of temperature-sensitive equipment failures involve damages that are measurable. But what about effects that are unseen or difficult to quantify? Measurable or not, they can be just as devastating, if not more so.

A business's good reputation can also be jeopardized as a result of poor temperature control, resulting in concerns about reliability, integrity, and trustworthiness. Consumers who have been negatively affected by poorly-maintained products have endured a poor customer experience, and customer satisfaction will significantly decrease if the problem is not resolved. This damage can be exacerbated through the use of social media. For example, consumers who have been made ill by a spoiled or ruined product will tell others about their bad experience. The formidable word of mouth made possible through social media or online reviews can have a detrimental impact on a business.



Additionally, consumers and industry partners may be wary if these types of problems arise. Likewise, this can have an internal impact on the existing workforce's morale and hiring prospective employees. This affects the business's profits from multiple angles, from loss of consumer business and partnerships to a steady decline in worker performance, further affecting the business's reputation and costs.

Damage control, relief efforts, public relations, and even solid "crisis communication" programs can only do so much to mend such relationships or blemishes to a company's good name. However, if a reliable monitoring system is in place, such disasters can be prevented from happening in the first place. Inventory, consumers, and relationships are all important to help a business succeed. No business wants to be at risk to lose these valuable investments and suffer expensive costs. This makes things clear: a system designed to protect those things should be used in conjunction with temperature-sensitive equipment.

SOLVE THE PROBLEM: UTILIZE A TEMPERATURE MONITORING SYSTEM

Using a reliable temperature monitoring system to prevent problems that result from temperature-sensitive equipment failures is just “good business.” The advantages of utilizing such a system extend to all facets of a business and greatly reduce the risk of incurring those unanticipated costs:

- Having an accurate measurement of the equipment’s temperatures provides a far better understanding of the inventory’s status. This will also provide reassurance that the inventory’s quality is maintained and can help prevent issues of unexpected spoilage or unknowingly shipping spoiled or damaged products.
- Continually monitoring temperatures assists in early fault detection and preventative maintenance of the equipment (e.g. noticing abnormal temperature cycles may indicate a faulty compressor, or consistently low temperatures may indicate the equipment needs service).
- Accurate temperature readings can develop a stronger prediction of the shelf-life of inventory, and can help in detecting earlier stages of product abnormalities or degradation.
- Monitoring promotes compliance and eases reporting relative to regulations by confirming the equipment is up to code and meets specific health and safety standards.

These are just a few of the basic benefits of temperature monitoring. Granted, industries that rely on temperature-sensitive equipment generally have some semblance of monitoring in place; no business is intentionally neglectful of their inventory. But the methodology for monitoring varies, and as such knowing all of the options available, along with their benefits and weaknesses, is essential for determining what best meets your needs. For the purpose of this discussion, monitoring capabilities are broken into three options: manual logging, wired systems, and wireless (aka: Wi-Fi) systems.

Regardless of the type of system being used, there are two key functions that a temperature monitoring system should perform:

- **Logging:** Regular recording of data for analysis and compliance purposes, and performed at a set interval (e.g. every hour, every day, etc.). This may help with knowing if equipment is functioning correctly or is in need of maintenance.
- **Alarming:** In addition to logging, the immediate notification of an issue with the monitored equipment (e.g. temperature out of required range, loss of power, etc.). This may proactively alert you of a problem or if inventory is at risk, and whether appropriate measures have been taken to address inventory at risk.

Temperature Monitoring Systems	
Manual Logging	Traditional means of monitoring using a thermometer in the equipment and manually recording the temperature on a log. This typically involves an employee visiting the equipment at certain intervals, checking its temperature, and then writing the temperatures on a log sheet.
Wired System	An automatic monitoring system installed with the use of wires (e.g. Ethernet, cable, etc.) connecting directly to the equipment to be monitored. Wired systems monitor temperatures and transmit the data typically to an ERP system or to a third party resource such as a cable company or security service.
Wi-Fi System	This type of system monitors temperatures within designated equipment, conveying the data via a local Wi-Fi connection to an online server or email address.

There are several advantages and disadvantages for these monitoring systems, and examining them further can help you take the next step in deciding what is right for you.

Manual Logging	
Advantages	<ul style="list-style-type: none"> ■ Easy to implement. There is little capital equipment or process development cost needed. This is practical for businesses on a strict budget. ■ Widely understood method that requires little training or organization to implement.
Disadvantages	<ul style="list-style-type: none"> ■ No alarming capabilities. Without around-the-clock monitoring, there is no knowledge of an overnight issue until the following morning, or an issue that occurs during a holiday or other day without work until a return to the facility. ■ Manually checking temperatures only indicates the equipment's status at that particular time. Temperatures can fluctuate outside of needed ranges between those times, and the business would not be aware of this. ■ Can be costly by calculating the salary needed to have an employee routinely monitor equipment. ■ Potentially time-consuming and inconvenient process; employees physically recording temperatures will take time away from their other tasks. ■ Requires a dedicated monitoring schedule, which can be easily interrupted due to reliance on employee availability. ■ Inconsistent manual monitoring and recording may not notice or recognize compliance or legislative violations. ■ Paperwork can be lost, incorrectly or inaccurately recorded, or falsified. This opens up the possibility of liability issues, but can be avoided if manual recording is done using a digital device. ■ Manual logging is prone to human error, either indirectly or willfully.

Wired Monitoring System	
Advantages	<ul style="list-style-type: none"> ■ Remote monitoring solution that automatically monitors temperature at all times without the need to physically check equipment ■ Provides built-in record keeping that tracks data and verifies inventory is safe and equipment is compliant. ■ Can provide an email or text message notification to the user in the event an issue is detected. ■ Many wired monitoring systems are integrated into the equipment direct from the manufacturer, reducing the cost and time associated with adding monitoring functionality and hardware.
Disadvantages	<ul style="list-style-type: none"> ■ Potentially expensive or invasive installation process. Requires dedicated wiring and hardware to be installed, and is limited with respect to where it can be installed based on the equipment it monitors. ■ Systems built into equipment itself may limit configuration and installation options for the equipment. ■ Installation also can be troublesome if numerous pieces of equipment need monitoring, extending the amount of wiring needed and increasing disruption. ■ System is not designed to handle emergencies and is prone to power outages. Wired systems have no means of offering protection or notifications if such an issue occurs. ■ Monitoring charges through a third party service can be expensive.

Wi-Fi Monitoring System	
Advantages	<ul style="list-style-type: none"> ■ Remote monitoring solution that automatically monitors temperature at all times without the need to physically check equipment or divert manual resources. ■ Seamless installation that can be flexible based on the needs of the facility. Through the deployment of wireless sensors and devices, installation may be quick and can be done without professional assistance. ■ Provides built-in record keeping that tracks data and verifies inventory is safe and equipment is compliant. ■ Can provide an email or text message notification to the user in the event an issue is detected. ■ Recorded data is available to be viewed through spreadsheets or online services.
Disadvantages	<ul style="list-style-type: none"> ■ Wireless Wi-Fi systems may have backup battery power to temporarily protect themselves against power outages, but the loss of power still causes the Internet service provider to lose power. Wi-Fi systems have no means of offering protection or sending notifications if such an issue occurs. ■ Wi-Fi systems will only work where there is Wi-Fi access. If an area that requires monitoring is not currently served by Wi-Fi, then the network would need to be extended into that area, incurring equipment and labor costs. ■ Wi-Fi systems are prone to poor performance during Internet downtime or from poor connections. Wireless Internet may also be subject to interference, which can temporarily disable sensors or cause them to respond unpredictably. ■ Can cause potentially slow Internet service at the facility if the system suffers from bandwidth issues as a whole.

Each of these monitoring systems provides something that the others do not. However, none of them offer the level of support and security that would be provided by an ideal solution, because they do not cover all of the requirements outlined (see page 1) to meet those needs. Power failures, for instance, are among the most common threats to temperature-sensitive equipment, yet none of these systems are able to reliably operate during them. If these systems cannot provide the support needed during such a critical time, an alternative solution that does should be explored.

SEPARATING FROM THE PACK: CELLULAR MONITORING

For those who want the convenience of an automatic monitoring system, but do not want to be left in the dark if the power fails, there is a fourth type of monitoring system available: cellular.

Compared to wired and Wi-Fi monitoring systems, a cellular-based monitoring solution operates in a similar fashion, offers the same level of support, and delivers the same functionalities: it provides a remote means of monitoring temperature; it records data logs and produces reports; and it sends notifications to the user whenever an issue is detected. Also like Wi-Fi systems, the cellular solution is wireless, providing installation flexibility and customization, and convenience through remote system management.



Where the cellular solution differs from — and outperforms — other options is its use of the cellular system as the basis for communication. With communication managed via a cellular network, the cellular solution offers a distinct advantage over hard-wired electrical or Wi-Fi-based systems: **it reliably operates in the wake of power outages.** With the support of backup batteries, generators, and independent power grids, cellular-based monitoring systems retain power for long periods of time despite the loss of city power. Data will still be transmitted, and more importantly, notifications will still be forwarded even if power is lost. This means alerts are sent as soon as issues arise and regardless of the circumstances, and you can react swiftly to prevent harmful and costly problems.

Additionally, cellular networks aren't subject to common interference and disruptions that can plague a local Wi-Fi connection. And today's cellular systems offer nearly ubiquitous coverage, so temperature monitoring can occur even in remote areas.

THE IDEAL SOLUTION:



Shown: The Cellular Machines control station and three wireless pods.

Between its ability to operate despite power failures and the cellular network's consistent and far-reaching coverage, the cellular monitoring system provides the most reliable and sustainable service available. It is the only solution that addresses all of the criteria set out on page 1 of this white paper. Again, these are:

- Provide around-the-clock temperature monitoring of the investments important to you.
- Be easy to use and customizable to monitor conditions based on your needs.
- Send immediate notifications and alerts to inform you the moment an issue occurs.
- Have a backup battery that properly and reliably operates despite power failures.
- Record accurate temperature data and status information, and generate reports used for analysis and compliance needs.
- Be proven in the field to be effective and efficient.

Knowing the best available solution is the first step. The next is finding the best supplier of that technology. Again, an ideal solution needs to meet the above requirements in order to offer the highest level of monitoring service.

Anaren's Cellular Machines Temperature Monitoring System is the solution that meets all of this criteria. Designed to remotely and efficiently provide monitoring solutions for a variety of needs, the Cellular Machines Temperature Monitoring System can be seamlessly integrated into most temperature-controlled equipment scenarios, and installed in under 15 minutes.

How does the Cellular Machines Temperature Monitoring System work?

Anaren's Cellular Machines Temperature Monitoring System continuously monitors temperatures for a variety of systems and equipment that must be maintained in controlled environments. This is accomplished by utilizing:

- A centralized control station to manage the system.
- The deployment of wireless pods and temperature sensors within equipment to monitor temperature readings and detect variances.
- An outside cellular network to send notifications to up to five mobile phones and data to a cloud server to be logged for viewing and compliance reporting.

Temperature limits are established for the monitored equipment, and the temperature sensors monitor the equipment to ensure its environment remains within that range. At regular intervals, the sensors wirelessly send readings to the control station, which concurrently logs the data to a cloud server. If a sensor detects a temperature outside of the set range, or any other issue such as a power failure, the control station will immediately send a text message alert to the connected mobile phone(s) to inform you of the problem.

Here is an example (using our standard Cellular Machines Temperature Monitoring Kit) of how the Temperature Monitoring System works after it is installed:



How the Cellular Machines Temperature Monitoring System meets the “ideal” requirements.

Examining what the Cellular Machines Temperature Monitoring System offers can provide clarity on how it fulfills the ideal system requirements and fits into your business's risk management strategy.

- ✓ **Around-the-clock temperature monitoring of the investments important to you.**

As soon as it is installed, the Cellular Machines Temperature Monitoring System begins to operate 24/7 without disruption. It will provide data, status information, and alerts at all hours, allowing you to focus your attention and efforts elsewhere.

✓ **Easy to use and customizable system that monitors conditions based on your needs.**

The Cellular Machines Temperature Monitoring System requires very little instruction and guidance to set up and use. It can be installed out of the box in under 15 minutes, without the assistance of a professional or IT department: simply attach the control station to a surface and plug it in, attach the wireless pods to their monitored equipment, and place the temperature sensors inside the equipment to be monitored. That's all: no wiring or hardware needed. Installation is also very flexible, as the wireless pods have connectivity ranges of several hundred feet to the control station. This opens up a variety of installation options, as the system can be operated despite all of its components being great distances from each other. Additionally, the system can be expanded to monitor up to 16 separate assets.

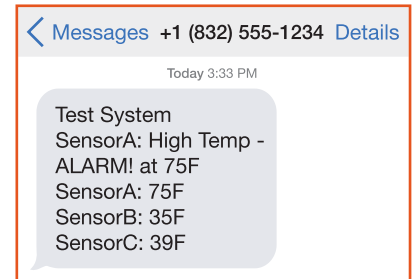
Simple naming options of the system's components also allow you to customize the system to your needs. Temperature limits, sensor names, temperature scale, alarm delay times, status updates, text message notifications, and reporting information are among the plethora of options that can be customized. Better yet, the ability to personalize the system can be done from the device itself or through the Cellular Machines online user dashboard, providing the flexibility of managing your system no matter where you are.

✓ **Send immediate notifications and alerts to inform you the moment an issue occurs.**

Utilizing the reliable cellular network, the Cellular Machines Temperature Monitoring System's control station will send a text message alert to a mobile phone once an issue is detected. These alerts will include the alarm in question, as well as the current status of every temperature sensor connected to the system. Temperature issues, equipment conditions, system status, power outages, and low battery power are just a few of the many types of issues that can be detected.

General status updates can also be received on a daily basis to notify you of the condition of all equipment being monitored. This is a convenient proactive measure that allows you to have eyes on your investments, and know how things are going even when you are not at the facility.

Additionally, the system is able to send text message alerts to up to five mobile phone numbers, providing information to everyone who needs to know critical equipment information.



✓ **Backup battery that properly and reliably operates despite power or equipment failures.**

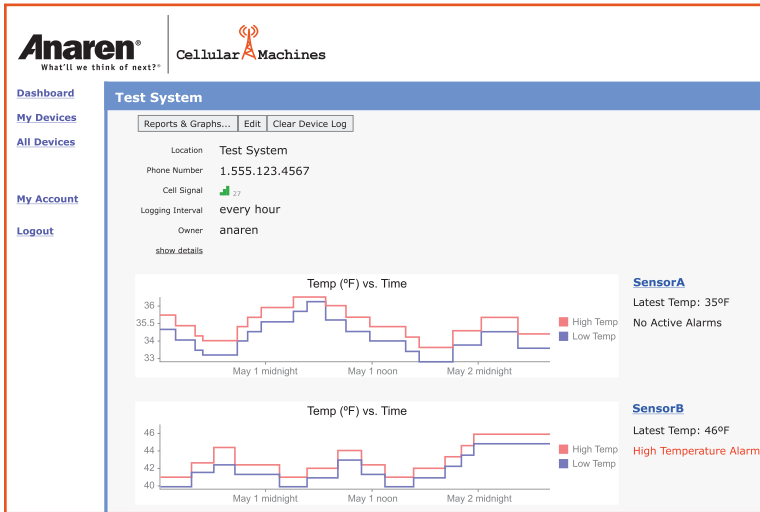
As mentioned earlier, the use of a cellular network in favor of a hardwired electronic or wireless Internet connection boasts several benefits. Cell towers and antennas are resilient and do not easily lose their functionality during power outages, thanks to the support of backup batteries and generators. Even with the loss of power, cell towers can operate for several hours. Cell towers are also not subject to the same types of disruptions that Internet services are, meaning the ability to transmit data and send notifications cannot be interrupted as easily.

Furthermore, the Cellular Machines Temperature Monitoring System is installed and operated independently of the equipment it is monitoring and any systems at the facility. Any effects to the monitored equipment, wireless Internet service, or any other facility system will have no or minimal impact on the system. In the event the control station's external power source fails due to a power outage, its internal backup battery will maintain its power for 15-20 hours, and its ability to send alerts and data will be unaffected.

✓ **Record accurate temperature data and information that can generate reports.**

During regular intervals that you can customize, the Cellular Machines Temperature Monitoring System will transmit temperature data and any alarm status from the control station to a secure and customizable cloud server.

Accessed via your own user dashboard on the cloud server, detailed logging information and reports can be viewed for assurance, future analysis, and compliance reasons. This can be very helpful in preventative maintenance, understanding changes in equipment conditions, determining causes of issues, and providing detailed records for audits or inspections.



This data and report information is available by logging into the Cellular Machines online user dashboard. A wide range of report types, data charting, and temperature history is available. This can be very beneficial in understanding temperature cycles, discovering abnormal patterns, and pro-actively maintaining equipment.

Additionally, not only can you view temperature data, but you also have complete access to your system's settings and can remotely update them. You can also share access of the dashboard with others within your organization, or even your customers.

✓ Proven in the field to be effective and efficient.

Cellular Machines Temperature Monitoring Systems have already been installed and utilized in a variety of industries and facilities. The system is designed to be user-friendly and efficient. It offers you the ability to remotely monitor all of your temperature-sensitive equipment, know the slightest changes in conditions, and be informed the moment an issue happens. And it is built with an emphasis on reliability. The utilization of a cellular network to support its communication infrastructure provides an excellent level of service, allowing you to keep your investments monitored no matter what problems may occur.

CONCLUSIONS

For any business relying on temperature-sensitive equipment, incorporating a reliable monitoring system is a significant step towards protecting your investments from unanticipated harm and costs. Whether you are a large national corporation, or a small local establishment, Anaren would like to help your business succeed by protecting your investments and ensuring they — and your customers — are safe.

Anaren's Cellular Machines Temperature Monitoring System is the most cost-effective, easy-to-deploy, and dependable system available. Its user-friendly and intuitive design, extensive notification and reporting services, along with its cellular network reliability, make it the ideal solution to meet your business's needs.

Contact Anaren or your local reseller to purchase a Cellular Machines Temperature Monitoring System today, or visit the Cellular Machines website at www.anaren.com/cellularmachines for more information.

Anaren Customer Support:

Phone: Call toll free 1-800-411-6596 (8a.m-5p.m. EST Monday-Friday).

Email: support@cellularmachines.com. A response will be sent within one business day.

Website: www.anaren.com/cellularmachines, and fill out the "Contact Us" form. A response will be sent within one business day. The website also has a live chat help feature, with a pop-up that is displayed periodically on each page. This option is a chat-like conversation through the website.

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ABOUT ANAREN, INC.

Anaren, Inc. designs, manufactures, and sells custom high-frequency solutions and standard components for the wireless communications, space and defense electronics, wireless consumer electronics, and IoT markets. Additional information can be found on the company's website: www.anaren.com.