DICKSON insights

Spring 2014 ▪ CD276b

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Hello from the Dickson Offices!

As you may have noticed last month, the Dickson Catalog, a stalwart in the Data Monitoring Industry, has changed a bit. It has less product photos, product features, and product specifications, and more industry information. Why?

In the last six months, we've made an effort to provide informative, non-promotional content online to our customers. Most of this has been featured on our blog at **www.blog.DicksonData.com.** We've published everything from quick recaps of trade shows, to lengthy articles on vaccine regulations. After much positive feedback, we decided to take the next step, and change up our catalog to feature some of those articles.

In the future you can expect a greater dedication from us to provide free information to you. We want to give back to our faithful customers by sharing information that would make you all more informed, and maybe even better at your jobs. There's still product information and details in our catalog, and if you have questions, you can call **630-543-3747**, or go online to **www.DicksonData.com.** In the meantime, enjoy some content.

Michael Kirkpatrick Miller
Dickson Content Strategist

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Industry Insights

The World's Worst Nursing Advice

1. "Don't wear gloves for IV's, it's easier to feel the vein."
Not wearing gloves when inserting IV's is an absolutely awful idea, yet nurses hear it everywhere. Wearing latex gloves, and sanitizing the site of insertion, is absolutely not optional. You can search for a suitable vein to insert the IV in without gloves, but when sticking the vein, you have to wear gloves. Latex gloves help decrease the chance of blood-borne pathogens being transferred between patient and nurse.

What to do instead: Wear gloves, obviously. More than that however, try and help promote hand sanitation inside your hospital or clinic.

2. "Just pretend you didn't see it, then it's not your problem."
When talking with a few nurses, this blew our mind. After some research however, it did seem that this was a mantra to at least a few people within the profession. Don't think this way.

What to do instead: We were told that "nurses should take their work seriously, and if you see something that doesn't look right, there's a good chance it isn't, so make it your problem."

3. When leaving a patient, say, "The Doctor will be here in a few minutes."
This surprised us a little, because it seems so harmless. But one nurse we talked to saw our quizzical looks: "Sure," we were told. "It seems harmless, but why lie?" Many times the wait to see a doctor is longer than a few minutes. After a bit of our own research, we found that nurses should also not try to rush through their work before and after seeing a patient. Being meticulous is only a good thing.

4. "Documents, schmockuments. It's all just busywork."
The breaches and overall problems with Electronic Health Records have been well-documented seemingly since their invention. Whether your hospital or clinic uses paper or computers, don't help out those negative headlines. We were told simply, that you should take time to fill out documents, and have an eye out for your colleague's mistakes.

5. Tell the patient, "I've done this 1000 times," when you haven't.
We heard this from veterans about new nurses on the job. Don't lie to the patient, even if it is meant to comfort them. It sets yourself up for failure. If you haven't done it 1000 times, don't say so. You don't have to be overly anxious to talk about your inexperience, but you also don't have to portray false confidence.

DICKSON HOSPITAL MONITORING PRODUCTS

DicksonOne Wireless, real time monitoring. Multi-Location. Infinite Storage.

Page 10-12

Touchscreens Data at your fingertips. Multiple probe options. Audio and Visual Alarms.

Page 8

TM320 Simple, easy to use. Large Display. 32,000 Point Data Capacity.

Page 9

5 Things to Understand

Before Buying A Remote Probe.

1. There are three main types of remote temperature probes: Platinum RTD (Resistance Temperature Detector), Thermocouple, and Thermistor.

2. It all depends on your application. What you are monitoring with is determined by what you are monitoring. It's not as simple as "RTD for Food Manufacturing." The specifics of what product or environment you are monitoring, and what temperatures you are monitoring at are essential to picking the correct probe.

3. Generally speaking: RTD = Better Accuracy, Thermocouple = Larger Temperature Range, Thermistor = Cost-effective. These three rules hold true in most circumstances. So when buying a probe, be aware of them. You don't want to buy an RTD Probe to measure your 1500 degree furnace, just like you don't want to use a thermocouple probe when accuracy is your number one concern. If you have any questions about specific applications, call and talk to one of our specialists. We can help you find the perfect probe for your specific application. Just call **630-543-3747.**

4. Your remote probe, sensor, and/or device should come completely calibrated. So make sure it does! If you use a replaceable sensor, re-calibration is a cinch. Visit **Page 6** for more information on the new and improved process of calibration.

5. Thermocouple probes are particularly susceptible to electrical interference. Electrical interference can cause temperature readings to fluctuate to extreme levels in thermocouple probes. When monitoring a refrigerator, for example, by plugging in both your refrigerator and your thermocouple probe data logger or chart recorder to AC power, electrical interference may occur, and the temperatures displayed will not be accurate. How do you beat the interference? By wrapping the end of your probe in heat shrink tubing, which will provide you with accurate readings, absent of that interference.

The Science of Calibration
Frequently Asked Questions

1. What is calibration?
In its most simple form, a calibration is a comparison between two measurements. The context and associated terms around calibration can get a little confusing. Before we get to those however, let's back up. What is a comparison between two measurements? Think of it like this: You have a ruler that is 13 inches long, and you have another ruler that is 12 inches long. Each ruler is making a different measurement. You can compare one ruler to another to see which one is correct. That, in essence, is a calibration. Calibration labs (where calibrations occur) that calibrate temperature monitors (like Dickson's!) put a unit under test and compare it with a device that can accurately tell you exactly how hot or cold a particular point is. To be more specific, it measures accurately all temperatures: 70F, 0C, 137F, etc.

The key to calibrating an instrument is knowing that one device (a ruler, thermometer, gas gage) is more accurate than another device. The device that is more accurate, and can tell us exactly what 70F, 0C, 137F, etc. are, is called a standard. The device that is less accurate (our 13 inch ruler), is properly titled the unit under test.

That is calibration. A standard and a unit under test being compared with each other.

2. Why should I calibrate?
You should calibrate because we assume you want to know your device is accurate. Back to our ruler metaphor. Rulers aren't built to be 13 inches too often. But, as part of product quality, when you purchase a ruler, it would be nice to ensure it was indeed 12 inches. That is why you should calibrate. A temperature sensor is built, and you want to ensure its accuracy. When your temperature sensor is put under test, adjustments are made (like sawing off an inch of a ruler) if inaccuracies are found. Changes are made to the device to accurately meet the standard. These changes are called an adjustment.

3. Who says what is accurate?
So who says what is accurate? Who knows what 70F feels like? Who says a yard is a yard? It may seem arbitrarily argumentative, but it's a compelling question. The answer is NIST. Who is NIST? NIST stands for the National Institute of Standards and Technology. This government agency creates and maintains standards of measurement for length, mass, time, etc. In regards to temperature, standards are sent in by their manufacturers, and those standards are told their accuracy. They then become a NIST standard, of which some variation you will find in Calibration labs.

4. Recalibration
Sadly, yes, recalibration is a word. Let's head back to our ruler metaphor one last time. Over time, your calibrated 12 inch ruler may experience some wear and tear. Let's say a piece of the ruler breaks off 8 months after you have it. You of course would just go buy a new ruler, instead of trying to fix that one. But let's pretend that ruler was a really, really nice ruler, and the cost of making it 12 inches again was cheaper than buying a new one. What do you do? You send it back to a company certified by NIST, and then they compare it with a NIST ruler, which is exactly, or nearly exactly, 12 inches. If there is a difference, they add a little bit or subtract a little bit from your ruler. This happens to devices that measure temperature as well. Over time, due to natural wear and tear, temperature sensors lose their pinpoint accuracy. Specifically, environmental factors such as dust, dirt, and humidity can negatively affect a sensor's accuracy. This is called drift. These devices probably won't read 95F in a refrigerator that feels cool, but they may be off by a few degrees. For many applications, that matters. So, if you have a temperature monitor, you send it to a Calibration lab (like Dickson!) and we recalibrate, and then adjust your device for any differences with our standards.

Dickson Replaceable Sensors

Recalibration Made Easy

THE OLD WAY

1. Call or order a recalibration online.
2. Acquire a Return Authorization Code from a Dickson Representative.
3. Take unit and probe out of their environment.
4. Shut down production/storage area if necessary.
5. Box unit up.
6. Ship it to Dickson.
7. Dickson recalibrates the unit and ships it back.
8. Receive the unit.
9. Place unit back in your environment.

Total Down Time: 7-10 Days

THE NEW WAY

1. Call or order a Replaceable Sensor online.
2. Receive Replaceable Sensor.
3. Take old sensor off, put new sensor on.

Total Down Time: 0 Days

MODEL	PROBE TYPE	TEMPERATURE RANGES	ACCURACY	PRICE
TEMPERATURE/HUMIDITY				
R200	Digital Sensor	-40° to 185°F (-40° to 85°C)	±0.8°F, 20 to 120°F (±0.44°C, -6.67 to 48.89°C)	**$69**
R250	Digital Straight Sensor	-40° to 185°F (-40° to 85°C)	±0.8°F, 20 to 120°F (±0.44°C, -6.67 to 48.89°C)	**$69**
TEMPERATURE				
R300	Digital Sensor	-22° to 122°F (-30° to 50°C)	±0.8°F, 20 to 120°F (±0.44°C, -6.67 to 48.89°C)	**$49**
R350	Digital Straight Sensor	-22° to 122°F (-30° to 50°C)	±0.8°F, 20 to 120°F (±0.44°C, -6.67 to 48.89°C)	**$49**
R400	K-Thermocouple	300° to 2000°F (-184° to 1093°C)	±1.8°F, -22 to 122°F (±1°C, -30 to -50°C)	**$49**
R500	Thermistor in Glycol Bottle	-58° to 158°F (-50° to 70°C)	±0.9°F, -58 to 68°F (±0.5°C, -50 to 20°C)	**$69**
R525	Stainless Steel Thermistor	-40° to 300°F (-40° to 149°C)	±0.8°F, -20 to 176°F (±0.44°C, -28 to 80°C)	**$69**
R600	Platinum RTD	-148° to 350°F (-100° to 176°C)	±0.5°F, -148 to 350°F (±0.3°C, -100 to 176°C)	**$199**
R700	Dual K-Thermocouple	300° to 2000°F (-184° to 1093°C)	±1.8°F, -22 to 122°F (±1°C, -30 to -50°C)	**$99**
R800	Dual Thermistor in Glycol Bottles	-58° to 158°F (-50° to 70°C)	±0.9°F, -58 to 68°F (±0.5°C, -50 to 20°C)	**$69**

NEW PRODUCTS FOR 2014

1. Report Logger

We decided to make the best compact data logger on the market, our **RL200.** With a new outer case, user selectable logging times, and redesigned PC interface, it's exactly what you need.

59 $

2. Touchscreen Handheld Indicator

TC700/TH700 Instant temperature or temperature/humidity data. No-slip silicone cover. Battery powered.

299 $

3. Waterproof High Temperature Data Logger

HT300 Waterproof, High Temperature Data Logger. HACCP and FDA Compliant. USB Download. IP68 Rating. Temperature Range -40° to 257°F (-40° to 125°C).

349 $

TOUCHSCREEN DATA LOGGERS

Full Control
At Your Fingertips.

No running back to your PC to see data. Jumbo 4.9" x 6.4" touch-screens. Zoom and scroll with the touch of a finger. Audible/visual alarms. USB and FLASH card data download. Rechargeable Backup Battery. Optional Display Lock. Pre-Calibrated Sensor Compatible.

MODEL	REMOTE PROBE	PROBE TYPE	TEMPERATURE RANGES	ACCURACY	RELAYS	PRICE
TEMPERATURE/HUMIDITY						
FH625	Optional	Temp/RH PCS*	-40°F to 185°F (-40° to 85°C)	±0.8°F, ±0.45°C		**$489**
FH635	Optional	Temp/RH PCS*	-40°F to 185°F (-40° to 85°C)	±0.8°F, ±0.45°C	▪	**$529**
TEMPERATURE						
FT600	Optional	Temp PCS*	0 to 122°F (-17° to 50°C)	±0.8°F, ±0.45°C		**$399**
FT620	1	KT/C	-300°F to 2000°F (-184° to 1093°C)	±1.8°F, ±1°C		**$449**
FT630	2	KT/C	-300°F to 2000°F (-184° to 1093°C)	±1.8°F, ±1°C	▪	**$499**
FT625	▪	Thermistor	-40°F to 300°F (-40° to 148°C)	±0.8°F, ±0.45°C		**$449**
FT640	1	Thermistor/Glycol	-40°F to 158°F (-40° to 70°C)	±0.9°F, ±0.5°C		**$469**
FT645	2	Thermistor/Glycol	-40°F to 158°F (-40° to 70°C)	±0.9°F, ±0.5°C		**$489**
FT660	▪	RTD	-148°F to 350°F (-100° to 176°C)	±0.5°F, ±0.28°C		**$549**

*Pre-Calibrated Sensor

Temperature and Temperature/Humidity

Data Logging Solutions

Data loggers are cost effective solutions for monitoring any required area. With solutions for the food, pharma, manufacturing and dozens of other industries, Dickson's data loggers get you your data how you want it.

1

2

3

4

1 **SM300 $249** Temperature Logger. Range -4 to 158°F, -20 to 70°C. Accuracy ±0.8°F, ±0.44°C.
SM320* $299 Temperature Logger. Remote Probe. Range with Probe -300 to 2000°F, -184 to 1093°C. Accuracy ±1.8°F, ±1.0°C.
SM325* $399 Temperature Logger. Two Remote Probes. Range with Probe -300 to 2000°F, -184 to 1093°C. Accuracy ±1.8°F, ±1.0°C.
SM420 $499 Temperature Logger. Remote Probe. Range with Probe -50 to 350°F, -45 to 176°C. Accuracy ±0.5°F, ±0.28°C.
TM320 $299 Temperature and Humidity Logger. Range -4 to 158°F, -20 to 70°C. Accuracy ±0.8°F.
TM325 $399 Temperature and Humidity Logger. Remote Probe. Range -40 to 185°F, -40 to 85°C. Accuracy ±0.8°F.

2 **SP125 $119** Temperature Logger. Accuracy ±1.2°F, ±0.67°C. Range -10 to 176°F, -23 to 80°C.
SP175 $229 Temperature Logger with Thermocouple Probe. Accuracy ±1.8°F, ±0.1°C. Range -300 to 2000°F, -30 to 50°C. A203 Probe required for +500°F.
TP125 $199 Temperature and Humidity Logger. Accuracy ±0.8°F, ±0.45°C. Range -10 to 176°F, -23 to 80°C.

3 **SP425 $159** Temperature Logger. Digital Display. Accuracy ±1.2°F, ±0.67°C. Range -4 to 158°F, -20 to 70°C.
TP425 $249 Temperature and Humidity Logger. Digital Display. Accuracy ±0.8°F, ±0.45°C. Range -4 to 158°F, -20 to 70°C.

4 **SK550 $699** Temperature. Pack of twelve. Accuracy ±1.8°F, ±1°C. Range -4 to 158°F, -20 to 70°C.
TK550 $999 Temperature & Humidity. Pack of twelve. Accuracy ±1.8°F, ±1°C. Ranges -4 to +158°F, -20 to +70°C.

Software required and sold separately. For software and other accessories, visit Page 15, call **630.543.3747** or go to **www.DicksonData.com.**

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Dickson Social Media Accounts

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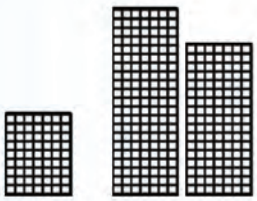
Search "Dickson"

Search "Dickson Data Loggers"

DicksonOne

Temperature and Humidity Monitoring. Re-imagined.

DicksonOne is a wireless temperature and humidity monitoring system that automatically collects your data and delivers it to wherever you are. No more changing charts, no more downloading data.



MULTI-LOCATION How many points will you be monitoring? 1, 5, 100, 1000? From small cheese factories to multi-location healthcare distributors, DicksonOne is up for the task. Monitoring an additional location is as simple as buying another logger.

ALARMS When temperatures get too hot or cold, your power goes out, or your probe is unplugged, DicksonOne can call, text, or email you to alert you of the mishap. Throw away less products, and ensure the safety of your environment, even when you're not there.

INFINITE STORAGE We don't run out of space, and you never have to worry about hard drives or file folders. We've got you covered.

WHY DID WE MAKE IT?

DicksonOne is the direct result of customer feedback like this:

1. We want to monitor **multiple locations** with one system.
2. We're spending too many **personnel** hours changing charts and pens.
3. We want an **easier way** to share our data.
4. We need **more robust** alarming capabilities.
5. I need to view **my data** from anywhere.

DICKSONONE HARDWARE

DicksonOne Data Loggers are robust and reliable. With battery backup, your choice of Ethernet or Wi-Fi communication, and a digital display, these loggers provide the security and convenience your application needs.

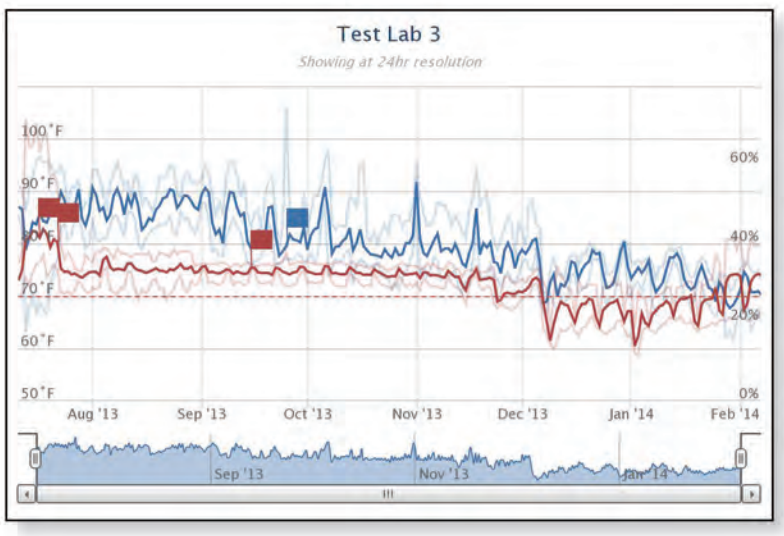
DICKSONONE SOFTWARE

DicksonOne is a SaaS (Software as a Service) platform that automatically stores your data and makes it accessible anywhere.

The software is the real key to DicksonOne. We believe it rises above the competition in usability, security, and scalability. The interface is easy to navigate for everybody, from your IT team to the end-user working with the product you're trying to keep safe. DicksonOne is 21CFR11 compliant, and all data is backed up redundantly, perfect for showing an audit trail. We've had a jump on all other environmental monitoring systems for over a year, and we've kept it that way. We continually improve the system and add new features based on customer feedback. Seriously, someone is working to make it better right now.

The list of features in DicksonOne is endless. Instead of listing them all, we invite you to see for yourself.

Start your free trial at **www.DicksonOne.com**



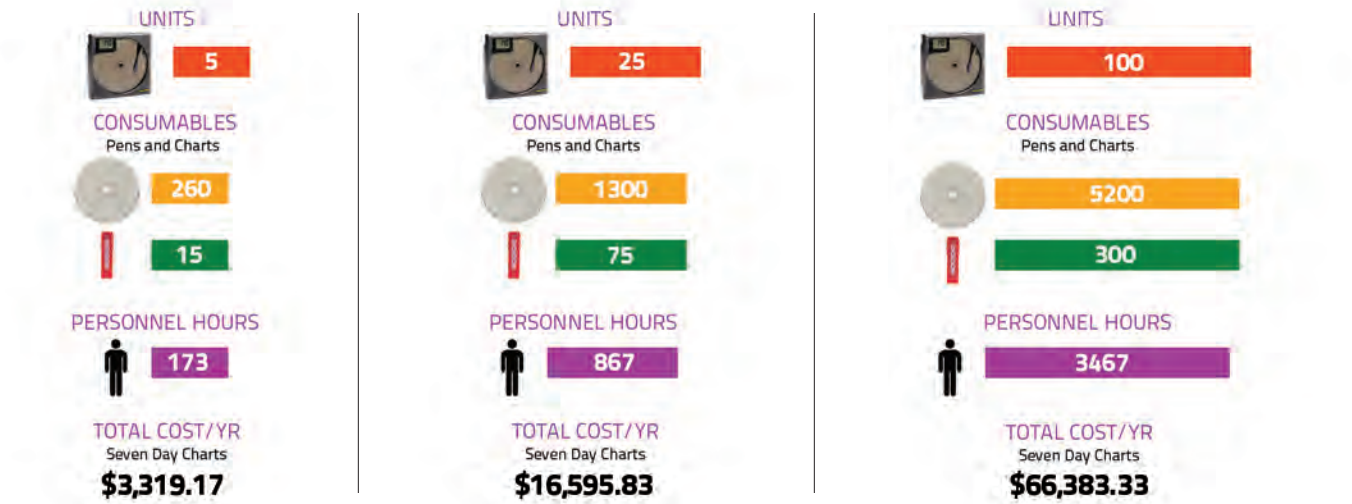
DicksonOne
Hardware Pricing

MODEL	REMOTE PROBE	PRICE
WFH20/ENH20	Digital Temperature and Humidity Replaceable Sensor	**$499**
WFT20/ENT20	Digital Temperature Sensor	**$499**
WFT21/ENT21	Thermistor Temperature Sensor with Glycol Bottle	**$479**
WFT23/ENT23	K-Thermocouple Temperature Sensor	**$479**
WFT25/ENT25	Platinum RTD Temperature Sensor	**$599**

DicksonOne
Software Pricing

PLAN	DEVICES	FEATURES	PRICE
Basic	Unlimited	Data Stored for 30 days, 1 hour sample rate	**$0**
Starter	1 to 5	Unlimited Data, Multiple Sample Rates, API Access	**$119/year**
Regular	6 to 20	Unlimited Data, Multiple Sample Rates, API Access	**$359/year**
Plus	21 to 50	Unlimited Data, Multiple Sample Rates, API Access	**$1199/year**
Enterprise	51 +	Unlimited Data, Multiple Sample Rates, API Access	**Call for Quote**

Consider The Cost Of That Old Chart Recorder...



Temperature and Temperature/Humidity

Chart Recorders

Want a physical readout right where you are monitoring? Our Chart Recorders have you covered. For ninety years we've built the best chart recorders in the business. Check out our models below.

8 and 6 Inch Models

Eight and Six Inch Chart Recorders to see detailed temperature and humidity values.

MODELS AND FEATURES

KT6	6 Inch Temperature	**Starting at $369**
KT8	8 Inch Temperature	**Starting at $419**
TH6	6 Inch Temperature and Humidity	**Starting at $489**
TH8P	6 Inch Temperature and Humidity	**Starting at $489**

4 and 3 Inch Models

Four and Three Inch Temperature Chart Recorders designed to fit any application.

MODELS AND FEATURES

SL4350	4 Inch	**$239**
SL4100	4 Inch	**$239**
SC3 Series	3 Inch	**$239**

Charts sold separately. For charts and accessories, visit Page 15, call **630.543.3747** or go to **www.DicksonData.com.**

PRESSURE DATA LOGGERS

Pressure Data Logger One second sampling rate. User replaceable battery. Optional delayed start. USB connectivity. Pressure sensor includes built-in diaphragm seal.

PR125	**$499**	0-100 PSI
PR325	**$499**	0-300 PSI
PR525	**$599**	0-500 PSI

Rugged Utility Pressure Data Logger Water resistant case. 3 year battery. Unobtrusive design. Fits easily in a toolbox. USB Connection.

PR150	**$499**	0-100 PSI
PR350	**$499**	0-300 PSI

PRESSURE CHART RECORDERS

4 and 8 Inch Models

Four and Eight Inch Chart Recorders to meet your needs.

Single AA battery powered. Rugged low-maintenance design features. 7-day or 24-hour recording times. 1/4 inch NPT Connector.

MODELS AND FEATURES

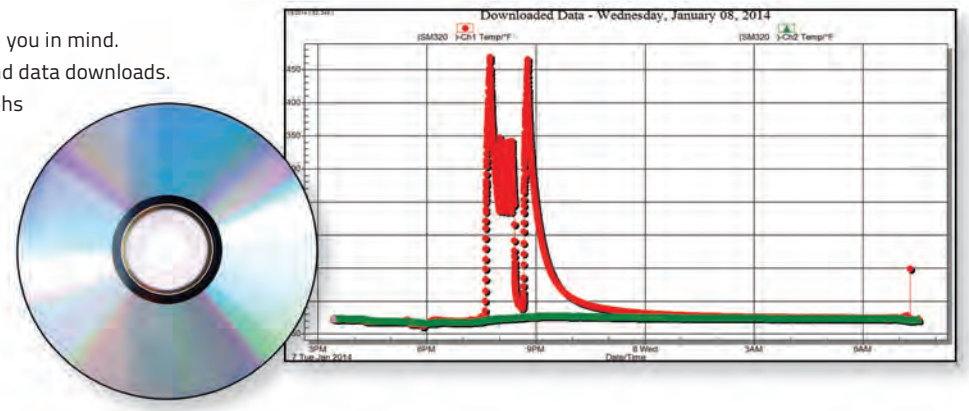
0-100 PSI	**PW860/1**	**$629**		**PW470**	**$449**
0-200 PSI	**PW864/5**	**$629**		**PW474**	**$449**
0-300 PSI	**PW866/7**	**$629**		**PW476**	**$449**
0-500 PSI				**PW479**	**$629**
0-1000 PSI	**PW875**	**$749**			

Charts sold separately. For charts and accessories, visit Page 15, call **630.543.3747** or go to **www.DicksonData.com.**

DicksonWare

DicksonWare Software was designed with you in mind. Easy installation. Painless logger setup and data downloads. Data visualization through populated graphs and tables.

Learn more at **www.DicksonData.com**



PROBE ACCESSORIES

D617 $52 10' K-TC Straight Extension Cable

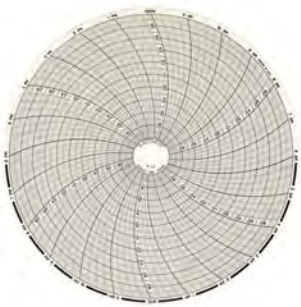
D605 $79 4" Piercing Probe

A203 $125 6" High Temperature Immersion Probe

CHARTS AND PENS

We make reordering charts and pens a cinch.

Only authentic Dickson charts and pens guarantee the accuracy of your temperature, humidity, and pressure data. Fortunately we've made the process of reordering charts and pens fast and easy. Simply go to www.DicksonData.com, click 'Charts and Pens" at the top, choose your device, and easily reorder to the exact specifications you desire. Or give us a call.



Go to **DicksonData.com**
Or call **630-543-3747**

Dickson Test:
What Happens Inside A Pot Of Rice?

As temperature gurus, we decided to test how much temperature you lose when taking the top off of a boiling pot of rice for a brief amount of time, and then what happened to that rice once you did that.

While we can't say for certain how much it affected the quality of the rice we cooked (some of you may like your rice a little different than others), we can tell you how much temperature was lost, and what the rice looked and tasted like compared to a control group in which we didn't lift the lid. Here's what we did, and what we found . . .

The Research Question:
How much heat does the air inside a boiling pot of rice lose when removing the lid for 10 seconds from the top of the pot?

The Experiment:
The first test was our control group. 1 cup of rice and 2 cups of water were combined, boiled, covered, and allowed to simmer for 15 minutes. During that time we did not take the top off of the pot. We snaked a K-Thermocouple probe through a small hole in the glass top of the pot, and down 1.5 inches into the ambient air of the simmering rice and water, to take temperature readings of the air inside the medium-sized sauce pan. The temperature climbed to approximately 210F and plateaued there for the remainder of the cooking.

We ran the test groups through the experiment three times, each time taking the lid off of the pot of rice for 10 seconds, and then placing it back on the rice. Here is what we found:

We found that on average, temperature immediately dropped 95.9F. It then quickly climbed back up to a high temperature (in both cases the temperature inside the pot after the lid was put back on the rice was at approximately 190F 30 seconds after putting the lid back on. However, increasing the temperature from 190F to the original 210F never totally happened by the time the rice was done cooking in any of the three test cases.

To read the complete article on the experiment, and other tests Dickson has done, visit our blog, at **blog.DicksonData.com.**

Food and Drug Manufacturing and Storage

Tips On Working With The FDA

Yup, working with the FDA. If you are in the food and drug manufacturing or storage world, you will probably say hello to this crew once in a while. In the past, maybe you've gotten scared when an FDA auditor gave you a ring, wanting to hide under the blankets like a youngster who just saw "The Ring" for the first time. So, instead of running scared, avoiding them, finding loopholes, and abhorring their presence in your facility, take the opposite approach: work with them.

To help you out, we generated some tips we've learned over the years, to help you both pass an audit and work with the FDA to achieve better, safer results.

1. Develop multiple lines of communication.
AKA: Go to forums, attend events, talk to more people than just your auditor.

2. Streamline internal communication.
AKA: Not just sending mass emails. Figure out how to get people in your organization the information they need to know quickly, and then figure out how to get information back from them to the right people as well.

3. Learn from other's mistakes.
AKA: Read the news, keep updated on salmonella outbreaks and pharmaceutical miscues. By doing so, Quality Assurance will stay top of mind, allowing you to ask, "we don't do that, do we?" When details about the FDA finding issues with someone's operation come to light, be on top of it.

4. If it isn't documented, it doesn't exist.
AKA: "We sanitized space X every single day but we lost the documentation showing that we did." Well then you didn't do it.

5. Perform internal/mock audit.
AKA: Your best friend. Internal and Mock Audits allow you to work out the kinks before an auditor shows up at your doorstep. Would "Wicked" been as good if they never had a dress rehearsal? Don't think so.

6. During an audit, tell, then show.
AKA: Show them you documented. When you make a claim, be able to prove it to the auditor. Wishy-washy has no business with the FDA.

7. Guessing is penalized.
AKA: Just like in the SAT, if you don't know, don't make something up. Claiming your refrigerator temperatures were "OK" during a power outage from a few months ago on a hunch because it "felt cold" is not a good thing to do. Honesty and clarity go a long way.

8. Audit done? Clarify.
AKA: Don't let the auditor leave if you have questions. If anything is unclear, ask once the audit has been complete. Go back through what was said, any problems you need to absolve, and general questions that came up while the audit was being performed.

9. Fix problems ASAP.
AKA: Don't dawdle. Do what you need to do.

Monitoring Vaccines
Six Things You Need To Know Now.

Monitoring vaccines can be confusing. That's why we've created the following list, outlining six things to know about monitoring vaccines, summarized directly from the Center for Disease Control's (CDC's) recommendations. Failing an audit, or finding out vaccines stored at improper temperatures were administered to patients, makes us all a little sick. While this is in no way an end-all-be-all list of information on monitoring your vaccine supply, health professionals will find it a useful update and reminder on some key aspects of vaccine monitoring.

1. Monitor continuously, please.
Checking vaccine temperatures twice a day will soon be a thing of the past. The CDC recommends continuous temperature monitoring for all vaccines. Think about it. If you check temperatures inside a refrigerator only twice per day, what could happen in between those 12 hour increments? Temperature and temperature and humidity data loggers allow those who store and administer vaccines to feel safer about the products they provide to patients.

2. Glycol or Glass Beads? Both.
The verdict isn't in on whether one type of material to immerse your probe in is better than the other. For now, the CDC recommends both. Why do they recommend both? See **FIGURE 1.**

We had a Dickson engineer test each solution to see if there was any variance in temperature readings. The probes were placed in the same environment, and thus monitored the same temperature. As you can see, we found very little difference between the two solutions. They each followed the exact same curve at the exact same time as the temperatures they monitored rose and fell.

Why submerse a probe into a bottle filled with glass beads or a Glycol solution? Because it takes longer for vaccine temperatures to change than it does the air of your refrigerator or freezer. A sensor (including internal device sensors!) without an attached Glycol bottle or vial of glass beads records the temperature of the atmosphere. Thus, the sensor will show extraneous temperature readings caused by air fluctuations (i.e. opening and closing a refrigerator door) which may not be indicative of the temperature of the individual vaccines.

FIGURE 1. Temperature Sensor immersed in Glycol versus Temperature Sensor immersed in Glass Beads. The temperature curve is nearly the exact same.

3. Calibrate.
It seems like a hassle, but calibration and re-calibration are essential to monitoring vaccines and ensuring the accuracy of temperature readings. Calibration is the process of ensuring your devices ability to accurately monitor temperature, by comparing it with a standard measurement which has been predetermined to be correct. Re-calibration may seem equally ludicrous. However, overtime, devices fall out of calibration, and thus need to be re-calibrated. Dickson has simplified the process of re-calibration with its replaceable sensors.

4. Wait 3 years to discard temperature logs.
Yes, three years. If you use a chart recorder to document your inventory, we recommend writing the dates and times of the monitoring interval on the back of your used chart, and then storing it in a safe place, chronologically, for future audits and review. If storage for three years of charts doesn't seem like your version of efficient (especially if you are monitoring multiple refrigerators or freezers) then consider investing in a data logger, which gives you the ability to download your data to a PC, or send your data to a secure cloud application.

5. Large inventory? Get a temperature monitoring system.
When monitoring multiple vaccine storage containers at multiple locations throughout the vaccine cold chain process, a temperature monitoring system may be your best option. These systems come in all shapes and sizes, and require some research to determine which is right for your application. Dickson offers the cutting-edge wireless monitoring system DicksonOne. DicksonOne, designed with input from industry customers, allows you to monitor your vaccines from anywhere.

6. Review your data at least once a week.
Stored environmental data should be downloaded and reviewed at least weekly by providers, to ensure the timely review of data and to fix issues with refrigerators, freezers, or monitoring practices. The CDC recommends reviewing your temperature data weekly, looking for temperature excursions, then reporting such excursions. If walking in on a Monday to find out your refrigerator's power went off overnight for multiple hours last Tuesday doesn't sound ideal, consider a data logger with preset alarms.

7 STEPS TO WAREHOUSE MAPPING SUCCESS

Map Your Environment

Not enough manufacturing supervisors, supply chain managers, or vaccine coordinators map their environments. However, you did a little research, figured that temperature mapping might be a good idea and want to learn the steps to be successful at it, which is awesome. So congrats!

We created this list of steps in part as a refresher to our 2011 article on Warehouse Mapping (which you can find on our blog), as temperature mapping technology has changed, specifically with the rise of wireless monitoring options for manufacturing and warehouse supervisors.

Before you do anything (it's so essential you can't even consider it a step), document. Document, document, document. The more documentation, the better. So document.

Step 1: Determine who, where, when, and what.
Who: Will you perform it internally, or use a contractor?
Where: Are there multiple warehouses? Is this a contracted warehouse?
When: Will you map for multiple seasons in a year?
What: What are you mapping for? A temperature sensitive product? Some temperature sensitive products?Temperature and humidity sensitive products?

Step 2: Sensor distribution.
Whoa boy. It's tough to concretely make assumptions about sensor distribution, because every warehouse is different. Also, you don't measure the temperature of an area. Yup, that's right. Temperature measuring instruments measure temperature at one specific point. Your thermostat in your house is only telling you the temperature at the thermostat, not in the attic, the bathroom, or even 5 feet from the thermostat. It works the same way when temperature mapping. You need to have enough sample points, or distribute enough sensors, to be able to analyze the temperature in all areas of your facility that you wish to map. The best thing to do is ask an expert. Whether that is your internal QA Manager, a Cold Chain Contractor, or a Temperature Mapping Firm, getting a good sense of where temperature sensors should go is essential to finding problem spots, seeing air flow, and understanding the micro climates within your facility.

Step 3: Pick the right data logger.
Data loggers these days come with everything but a kitchen sink. Which one is right for you? If you've hired an outside contractor to map your environment for you, this isn't something you need to be as worried about (still ask questions about equipment, though). However, if you are doing the audit internally, it's best to know your application, length of time, and the data analysis that is important to you. We wrote a post on picking the right data logger a few months back. You should check it out on our blog.

Step 4: Sampling Rate (Snapshot Mapping vs. Long-term Mapping).
With the advent of temperature sensors that can log tens of thousands of data points, and the recent prevalence of wireless monitoring options, grabbing and dealing with "too much data" is less of an issue today than it was ten years ago. This being said, you should base your sample rate on how long you will be mapping for. That's why those words in the parenthesis are included.

Snapshot Mapping (AKA Short-term Mapping): This type of mapping project is short and sweet. You map for only a few hours to a couple of days, and get a focused set of information on your warehouse. Advantages? Data you can deal with and the ability to see minor fluctuations. This type of mapping is great for those warehouses that store really temperature sensitive products, or that are susceptible to rapid changes in temperature at a moment's notice.

Long-term Mapping: Yup, the opposite of Short-term Mapping. Long-term Mapping is mapping your warehouse for an extended period of time, to see the fluctuations over weeks and even months that your products might go through. Some QA Managers will take a brief snapshot of their warehouse, find some problem spots, and then continue to monitor and map their environments with less loggers, for a longer period of time. When you are worried about seasons, HVAC systems, and thermal mass, you should consider Long-term Mapping your environment.

Step 5: Review the data.
The bare-bones of what you are looking for are minimum, maximum, and mean kinetic temperature of your products and your environment. With this data, you can sniff out most problem spots in your warehouse.

Step 6: Modify your environment.
Unless your warehouse scored an A+ on the temperature mapping test (be honest, it most likely had a few issues) you need to modify your environment, or what products are going in which environment. Sometimes this means roping off an "off-limits area," other times, it means fixing your HVAC system. You have the results, now implement them into your section of the supply chain.

Step 7: Test again.
Yup, do it all over again. Sometimes this means testing immediately after having made modifications. Often it can mean setting up temperature sensitive loggers in the problem spots of your warehouse. At other times it simply means documenting the results, and documenting when you will test again.

Last thing: did you remember to document?

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