



## Oregon VFC Thermometer Guide

As mandated by the CDC and the Oregon Vaccines for Children program, all clinics are required to have:

**“A working thermometer certified in accordance with National Institute of Standards and Technology (NIST) or the American Society for Testing and Materials (ASTM) standards placed in a central area inside each storage compartment.”**

-2007 CDC VFC Operations Guide, Module 6, p. 9

Additionally, the Oregon VFC program requires that these thermometers be:

**“Calibrated and certified *continuous-tracking* thermometers”**

-2009 Oregon VFC Provider Agreement, Section 7

This temperature data (along with your twice-a-day temp logs) must be kept in a safe, retrievable place for at least **3 years**.

### What does this all mean?

**“Certified in accordance with NIST or ASTM standards”:** A certificate of calibration shows that your thermometer has undergone additional testing to ensure accuracy. A one-point calibration can be done by many local and regional testing agencies for between \$45 and \$99 dollars. The vendors listed in this document all offer this certificate for an extra fee.

**“Continuous-tracking”:** Continuous-tracking refers to a thermometer’s ability to graph temperature over time. Do not confuse a high/low recording thermometer with a continuous-tracking thermometer. High/low units only offer basic information about the warmest and coldest temperature a thermometer has reached. By contrast,

continuous tracking units give you the ability to review and store *all* past temperatures (on a paper wheel or electronically) for future reference.

## Purpose of this list

---

With the above guidelines in mind, we have compiled a short list of continuous tracking thermometers that would be appropriate for use by any VFC clinic. The list covers a range of price points and formats to fit any size clinic or budget. We do not recommend or endorse any of these products and only offer this list as a basic guide to our valued VFC partners. Ultimately, the terms, conditions, price, etc. related to your purchase are between you and the vendor.

**If you have found a unit you would like to purchase (that is not listed here), please contact your Health Educator for review and approval.** While we make every attempt to keep this document updated, please contact the distributor for up-to-date prices and specifications.

## Important points to keep in mind

---

### ***Calibration and certification:***

Most of these units require an additional fee for the NIST-traceable certificate of calibration. The calibration certificate informs the user of a thermometers true level of accuracy (i.e.  $\pm .5^{\circ}\text{C}$ ). Consult your vendor or Health Educator about your units re-calibration options. Remember to keep your updated NIST-traceable calibration certificate accessible. VFC may ask to see it during clinic visits.



Often times the manufacturer will offer an adjustment option (i.e. setting the unit back to factory specifications) for an additional fee. As an example, ThermoWorks has secured an agreement with Lascar (makers of the USB data loggers) to send any units falling outside factory specifications back to Lascar for adjustment. This service is anticipated to cost slightly more than the annual-recalibration and is a terrific option for those units suffering from extreme accuracy “drift”.

### **How often?**

Advice on recalibration schedules will vary but the generally agreed upon industry standard is an annual (yearly) re-calibration schedule. If a manufacturer recommends a different schedule -- as Dickson has with their temp wheels -- you are welcome to

follow that schedule instead. Speak to your vendor to see if there are specific recommendations for your chosen unit.

**Local calibration services:** If you are interested in keeping it local, several Oregon and Washington companies offer NIST-traceable calibration services for a reasonable fee. Among them are:

- Advanced Technical Services in Olympia Washington: 1-800-287-8046.
- Control Solutions Inc. in Warren Oregon: 503-543-5416

### ***Accuracy:***

When choosing a logging thermometer, look for high accuracy. Shoot for  $\pm .5^{\circ}\text{C}$  ( $\pm 1.0^{\circ}\text{F}$ ) if possible.

### ***Functionality (high/low alarm):***

Always choose a unit that allows you to set a high and low alarm. While not a specific requirement by the VFC program, a high/low alarm is an essential tool for monitoring your vaccine supply. With this functionality, your clinic will be alerted any time your refrigerator or freezer temperatures go outside of the recommended range.



### ***Display:***

Each of the example units listed below were chosen for their ability to display the current temperature in real-time. This is essential for taking your twice-a-day temperature readings. There has been some debate about the reliability of LCD screens under freezing conditions. If you are using an extremely cold freezer ( $-25^{\circ}\text{C}$  or colder) you may want to consider a unit that mounts on the outside of the refrigerator/freezer and uses wire probes for temperature readings.

### ***Internal vs. external temperature probes:***

For the most part, this is a matter of preference. Some clinics enjoy the ease of use afforded by an internal probe, stand alone unit. They eliminate the hassle of running wires and reading confusing dual-probe displays. However, others prefer the external probe units for their lower cost, ability to display without opening doors and reduced overall wear. As stated previously, if you are using an extremely cold freezer ( $-25^{\circ}\text{C}$  or colder), an external probe for your freezer is recommended.

### **Software:**

Some digital units do not include graphing software and will require an additional purchase. Refer to the individual descriptions for more information on software options.



### **Wireless systems:**

There are numerous options when it comes to wireless/Ethernet/LAN systems. These are often a costly investment but the quality and accessibility of data is unmatched. Clinics will need a competent IT staff person to help implement such a system.

---

## **Option 1: Paper and Pen**

---

**Description:** One of the most straightforward thermometers, the paper wheel style is a reliable and low-tech option for your clinic. These units require weekly paper changes and new supplies (i.e. pen and paper) on an ongoing basis.

### **VFC21 4" Vaccine Chart Recorder, -18 to +21°C**

\$249.00 (+ \$99.00 for NIST-traceable certificate of calibration) per unit.

Dickson has designed the VFC21 chart recorder with an easy-to-read chart clearly showing when refrigerators or freezers go out of acceptable temperature range and for how long. This unique chart recorder highlights acceptable ranges for refrigerator vaccines (2 to 8°C) and freezer vaccines as well (-15°C and lower).



- Calibrated and Certified
- 24/7 Continuous monitoring, even during nights and weekends
- 4" Diameter Easy-to-Read Vaccine Chart Circular Bands on Chart Show Acceptable Vaccine Ranges
- Digital Display for Quick Reference
- Perfect for Refrigerator and Freezer
- Small Compact Size
- Made in the USA

### **Specifications:**

**Temperature Range:** -18 to 21C

**Temperature Accuracy:**  $\pm 2\%$  of full scale (pen)

**Temperature Sensor:** Precise spiral-wound bimetallic strip transducer

**Power Source:** One AA battery (user replaceable)

**Battery Life (Avg):** 2 years  
**Display Accuracy:**  $\pm 1.8^{\circ}\text{F}$  ( $\pm 1^{\circ}\text{C}$ )  
**Chart Size (Diameter):** 4"  
**Recording Times:** 7-Day  
**Response Time:** 11 minutes to move 63% of full scale  
**Resolution:** 0.1F / 0.1C  
**Enclosure:** Black ABS & Polycarbonate  
**Calibration:** Standard Dickson Certificate of Calibration  
**Available Calibration Options:** User: None Factory: NIST Traceable  
**Dimensions (Inches/cm):** 5.2x5.2x2.4  
**Weight:** 0.65 lbs  
**Included Accessories:** Battery and calibration statement

For more information visit: [www.Dicksondata.com](http://www.Dicksondata.com)

## Option 2: Digital

---

**Description:** A technological step up from the pen and wheel type thermometers, some of these digital units allow for dual (freezer and refrigerator) temperature monitoring in one unit. Continuous temperature data is stored in the device's built-in memory. This stored data can then be downloaded to your computer on a routine basis (i.e. every Friday) and stored on a safe back-up drive for later review by clinic or VFC staff.

### Lascar USB Temp/Humidity Data Logger w/ LCD Display

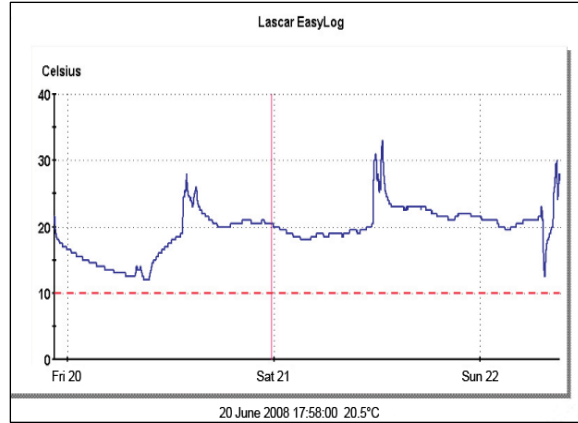
\$89.00 (+ \$40.00 for 2-point NIST-traceable certificate of calibration) per unit.

\* Note: software included in price.

The diminutive size of this unit is perfect for a VFC clinic looking to maximize space. Not much larger than a traditional data flash drive, these little data loggers include all of the features needed to comply with Oregon VFC and CDC requirements. Place each unit in a central location inside of your fridge and freezer and use the LCD screen for an easy twice-a-day temperature check. Every week the log can be downloaded and/or printed to a safe location. Perhaps most importantly, the built-in alarm LED alerts you to any out-of-range temperature on a real-time basis.



- Temperature, humidity, and dew point
- LCD for quick viewing
- Range: -35°C to 80°C
- Accuracy to  $\pm 0.5^\circ\text{C}$
- Store up to 16,328 readings per channel
- Connects directly to PC via USB
- Software and PC connection included
- LED alarm indication
- No cables, dongles or docks
- 1 year battery life
- Free software included



**Battery life:** It is recommended that you keep a spare 3.6V 1/2 AA lithium battery on hand to avoid data loss or reduced performance. Search internet merchants for reasonable prices.

**This unit is offered by several distributors, each offering different price points and specials. Please contact one of the following distributors for more information:**

Control Solutions (Warren, OR): [www.VFCdataloggers.com](http://www.VFCdataloggers.com)

ThermoWorks: [www.ThermoWorks.com](http://www.ThermoWorks.com)

TheDataLoggerStore.com: [www.microdaq.com](http://www.microdaq.com)

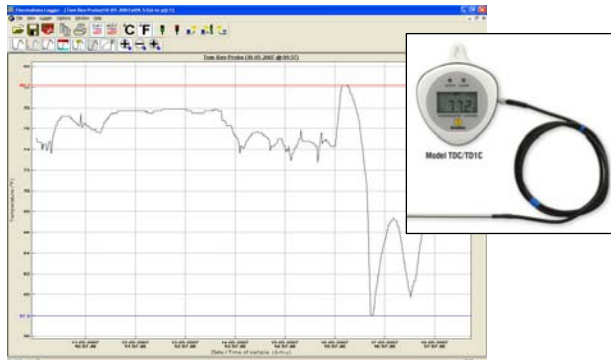
### **ThermaData Logger- Series II with LCD Display (Model TD and TD2C)**

\$109.00 (+ \$45.00 for 2-point NIST-traceable certificate of calibration) per unit.

\$89.00 software and USB download cradle sold separately.

\*Note: The new model (TD2C) allows for two removable external wire probes.

Hang each unit in a central location inside of your refrigerator and freezer for a continuous log of downloadable temperature data. If you prefer to control both refrigerator and freezer from one unit, ask Dalen at ThermoWorks about their new TD2C model. A flashing warning light alerts you if temperatures have gone out of range.



- LCD displays current reading
- Stores 4,000 readings (2,000 per channel)
- Out-of-range alarm indication
- 2 year battery life
- Range to 257°F (125°C)
- Accuracy to  $\pm 0.9^\circ\text{F}$  ( $\pm 0.5^\circ\text{C}$ )
- Single software suite for all loggers

Each logger includes an integrated LCD display so you can quickly check the current reading. The logging interval is user-selectable from 6 seconds to 250 minutes.

Start your logger right on site with a convenient magnet start key. LED indicators show alarm conditions and that the logger is active. Download your data directly into a single software suite for viewing. Graphs can be overlaid, exported to Excel, viewed, and analyzed all with ease and convenience.

**Specifications:**

**Temp. Range (internal):** -40°F to 185°F (-40°C to 85°C)

**Temp. Range (external):** 40°F to 257°F (-40°C to 125°C)

**Accuracy:**  $\pm 0.9^{\circ}\text{F}$  ( $\pm 0.5^{\circ}\text{C}$ )

**Memory:** 4,000 readings (2,000 per channel)

**Sample Rate:** 6 sec. to 255 min.

**Battery/Life:** 3.6V Lithium/2 year battery life

**Display:** 1/8" diam. X 4.25"L w/3' cable

**Display:** 2 LEDs/LCD

**For more information visit:** [www.ThermoWorks.com](http://www.ThermoWorks.com)

---

**SM325: Time-Saver Two-Probe Temperature Data Logger**

\$399.00 (+\$99.00 for 1 point NIST-traceable certificate of calibration) per unit.

\$79.00 Dicksonware software and USB cable sold separately.

\*Note: This unit comes in multiple configurations/prices. The options include a unit with Ethernet connectivity for e-mail notifications.

Unit mounts on the outside of the refrigerator and wire probes are placed in the freezer and refrigerator compartments. Data is downloaded on a regular basis via the main unit or FLASH memory card. Out-of-range temperature warnings are displayed both visually and audibly.



- USB-enabled triple-speed downloading
- FLASH memory card data transfer-capable
- 2 K-Thermocouple Probe
- Jumbo display PLUS visual/audio alarms

**Specifications:**

**Remote Sensor:** 4' Teflon coated K-Thermocouple bead-wire probe with mini-connector

**Remote Temperature Accuracy:**  $\pm 1.8^{\circ}\text{F}$  ( $\pm 1^{\circ}\text{C}$ ) logger only;  $\pm 7.9^{\circ}\text{F}$  ( $\pm 4.4^{\circ}\text{C}$ )

**Download Type:** USB, Serial or Memory Card  
**Keypad Functions:** 3 buttons with tactile feedback; Min/Max, Alarm, Download  
**Power Source:** Batteries, 4 AA Alkaline; AC adapter - optional (Input Voltage/Current: 120VAC/60Hz/16W; Output Voltage/Current: 9VDC/1A)  
**Input Connections:** Plugs directly into outlet; Output Connection: 3.5mm stereo plug; Length: 6 feet)  
**Battery Life (Avg):** 6 months  
**Battery Backup:** Yes with optional AC Adapter  
**Memory:** EEPROM, Removable Flash Storage Device - stores data from 1000+ Data Loggers  
**Data Capacity:** 32000 16-bit Samples  
**Sample Interval:** Records data in configurable 1 second to 24 hour intervals, in 1 or 10 second increments.  
**Alarm:** Audio/Visual  
**Calibration:** Standard Dickson Certificate of Calibration  
**Available Calibration Options:** User: zero point, Factory: NIST traceable  
**Included Accessories:** Batteries, instruction manual  
**DicksonWare™ Computer Interface:** RS-232 serial (COM) port or USB  
**Warranty:** 12 Month Limited

For more information visit: [www.Dicksondata.com](http://www.Dicksondata.com)

## Option 3: Wireless

---

**Description:** Wireless systems are the most advanced option and, subsequently, also the most expensive. Such a system allows a clinic to monitor refrigerator and freezer temperatures in real-time on a remotely connected PC (and in some cases, via internal network or internet). Wireless systems are best suited for clinics with multiple refrigerators and freezers and the need to remotely monitor and graph temperatures in real-time. These systems save staff from having to manually download temperatures or change out paper wheels on a weekly basis. Please note that a wireless system does not preclude you from continuing to document your temperatures twice a day.

**Note:** You have many options when it comes to wireless/internet based logging systems. A few of these options are listed below:

### T&D wireless/Ethernet/LAN data loggers



Wireless RTR-5 Series is a system wherein the data measured and recorded by the data logger units can be transmitted to any of the T&D multi-functional Communication Interfaces (RTR-57U / RTR-50 / RTR-5W) via short wave radio communication.



Thermo Recorder TR-7W is a new type of Temperature & Humidity Data Logger that incorporates an Ethernet / LAN interface. This

capability allows for quick and easy collection of recorded data and monitoring of current conditions; it can even send warning E-mails. These data loggers can be connected to either a wired or wireless LAN, allowing cost effective control of temperature and humidity from remote locations.

For more information visit: <http://www.tandd.com>

---

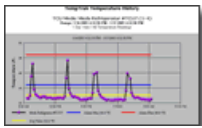
### Temp Trak wireless system



The Temp Trak system has a base receiver that is connected directly to a local area network. In a normal installation, there is on average one base receiver located per building. They are normally located near a network closet. The balance of the facility is covered by non-obtrusive signal repeaters which can be located throughout the facility.



Temp Trak tracks the event from the time of occurrence until the time the event is cleared and records all the corrective actions for reporting purposes.



Temp Trak provides a whole host of user-friendly reports from hourly to daily to monthly. The reports can be graphic or numeric. The software is designed to recognize user identity and only provide the information that the user is approved to view. Users are also configurable for read-access only.

For more information visit: <http://www.cooper-atkins.com/>

---

### Accsense wireless system



The A1-02 Temperature Sensor Pod is designed for measuring temperature at a remote site. Right out of the box, it will measure the ambient temperature. Additionally, the screw terminal connector can be used for hooking up multiple highly-accurate and extreme-temperature-range sensors.



The gateway is the junction between your data and the internet. The B1-01 Web Enabled Gateway sends all of your data to our secure servers, located at Rackspace. Data can be downloaded as a CSV file, and loaded into most database applications. Additionally, our servers can send out alerts (with Premium Subscription) to inform the appropriate people when a reading falls out of range.

All of the measurements acquired using the Accsense Solution are immediately available on your secure Accsense Account, online. Each gateway requires an online account subscription. Updated in

real-time, you can plot measurement history, analyze tabular data, and set alarms to watch your data and provide email, pager, or cell phone alerts.

For more information visit: <http://www.accsense.com/>

## Extras

---

**Description:** This section was created to showcase additional equipment, add-ons and services you may want to consider when assessing your vaccine storage and monitoring needs. These options are in *no way required* to participate in VFC; they are merely being offered as a resource for those who are interested.

### Back-up thermometer



#### **FRIO-Temp Thermometers**

Easy-to-Read, Made in the USA

NIST Traceable Certificate of Compliance

The FRIO-Temp® Thermometer is available in several styles. Each is designed to accurately measure temperatures in blood banks, freezers and refrigerators. It utilizes a safe, nontoxic, nonhazardous, biodegradable Enviro-Safe® bottle and liquid or glass beads.

Several temperature ranges available.

**This style of unit is offered by several distributors. Below are two examples:**

LabSource: <https://www.labsource.com>

VWRLab Shop: <http://vwrlabshop.com>

---

### Alarm phone dialers

These are sold by several manufacturers with varied models, styles and prices to choose from. They are designed to call pre-determined phone numbers when the attached temp probe goes outside of the user-set range. Alarm phone dialers are especially useful in areas that experience frequent power outages.



**This style of unit is offered by several distributors. Below are three examples:**

Sensaphone: [www.sensaphone.com](http://www.sensaphone.com)

Dickson: [www.dicksondata.com](http://www.dicksondata.com)

United Security Products: [www.unitedsecurity.com](http://www.unitedsecurity.com)

---



### **Refrigerator / freezer power back-up**

Disruption in power supply is one of the most frequent causes of costly vaccine loss. It doesn't take long for a refrigerator and freezer to begin to warm once the power has been cut. With this in mind, a clinic may want to consider adding a secondary source of power in case of emergency. If a clinic already has a back-up system, it is highly recommended that you have your refrigerator placed on that emergency power circuit.

For those clinics without one, a small back-up generator might be a great option for an extra layer of protection. Backup generators should be of a sufficient capacity to run continuously for 72 hours if necessary. Plans should be made to ensure that an adequate supply of fuel is on hand. Some examples include:

**This style of unit is offered by several distributors. Below are two examples:**

Guardian: [www.guardiangenerators.com](http://www.guardiangenerators.com)

Winco: [www.usa-emergencygenerator.com/winco](http://www.usa-emergencygenerator.com/winco)