2014 Oregon VFC Thermometer Guide

The Requirements

As required by the CDC and the Oregon VFC program:

Calibrated thermometers are a requirement for providers who receive VFC vaccines or other vaccines purchased with public funds.

The CDC currently recommends* continuous monitoring loggers with the following characteristics:

1) **Provide continuous monitoring information with an active display.**
2) **Digital thermometer with a probe in a glycol-filled bottle.**
3) **Include an alarm for out- of- range temperatures.**
4) **Have a reset button if using a data logger with a min/max display.**
5) **Capability to show current temperature as well as minimum and maximum temperatures.**
6) **Accuracy within +/-.5°C (+/-1°F).**
7) **Have a low battery indicator.**

In Oregon, VFC providers are **REQUIRED** to use continuous monitoring loggers in any storage unit containing VFC vaccine.

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* Recommendations are likely to become program requirements in the near future.

Last updated: 2/13/2014 by AMK
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The Requirements Explained

Calibration

According to the CDC, "Thermometer calibration must be tested annually (or according to the manufacturer's recommendation) by a laboratory with accreditation from an International Laboratory Accreditation Cooperation (ILAC) Mutual Recognition Arrangement (MRA) signatory body. Laboratories that have attained this accreditation meet the requirements for traceability."

To be considered "valid," a calibration certificate must EITHER:

(1) Come from an ILAC-accredited laboratory and contain all of the below items:

- ☐ Name of Device (optional)
- ☐ Model Number
- ☐ Serial Number
- ☐ Date of Calibration (Report or Issue Date)
- ☐ Measurement results indicate unit passed test and the documented uncertainty is within suitable limits (recommended uncertainty +/- .5°C (+/-1°F)).

(2) If from a non- ILAC-accredited laboratory it must contain all of the below items:

- ☐ Name of Device (optional)
- ☐ Model Number
- ☐ Serial Number
- ☐ Date of Calibration (Report or Issue Date)
- ☐ Measurement results indicate unit passed test and the documented uncertainty is within suitable limits (recommended uncertainty +/-.5°C (+/-1°F)).
- ☐ Measurements results for the device
- ☐ A statement that calibration testing conforms to ISO 17025

Participating ILAC organizations

The American Association for Laboratory Accreditation (A2LA)
http://www.a2la.org/dirsearchnew/newsearch.cfm

Laboratory Accreditation Bureau (L-A-B)
http://www.l-a-b.com/content/directory-accredited-labs
ANSI-ASQ National Accreditation Board (ACLASS)
http://www.aclasscorp.com/search-accredited-companies.aspx
International Accreditation Service (IAS)
http://www.iasonline.org/Calibration_Laboratories/CL.html
Perry Johnson Laboratory Accreditation, Inc.(PJLA)
http://www.pjlabs.com/search-accredited-labs

Sample of ILAC-accredited Oregon laboratories

Control Solutions
www.vfcdatalogger.com
PJLA Certificate # (Pending)
35851 Industrial Way, Suite D
St Helens, OR 97051
Phone: (888) 311-0636

Cal-Cert Company
www.cal-cert.com
IAS Certificate #CL-108
6709 SE Lake Rd
Portland, OR 97222
Phone: (800) 356-4662

JJ Calibrations, Inc.
www.jjcalibrations.com
A2LA Certificate# 723.01
7007 SE Lake Rd
Portland, OR 97267
Phone: (503) 786-3005

Micro Precision Calibration, Inc.
www.microprecision.com
A2LA Certificate# 935.18
7925 SW Nimbus Ave, #28D
Beaverton, OR 97008
Phone: (503) 746-5845

Quality Control Services, Inc.
www.qc-services.com
A2LA Certificate# 1550.01
2340 SE 11th Ave
Portland, OR 97214
Phone: (503) 236-2712

Continuous monitoring

The Oregon VFC Program requires the use of a continuous monitoring logger. This is a logger with the ability to record/graph temperatures over time. Do not confuse a high/low recording thermometer with a continuous monitoring thermometer. High/low units offer only basic information about the warmest and coldest temperature a thermometer has reached. By contrast, continuous monitoring units give you the ability to digitally store ***all*** past temperatures for future reference.

Internal vs. external temperature probes

The CDC and Oregon VFC Program STRONGLY encourage the use of loggers with an external probe in glycol. A study conducted by Michal Chojnacky with the National Institute of Standards and Technology (NIST) has shown that:

> ***"A glycol-filled bottle approximates the thermal mass and properties of liquid vaccine, producing measurements representative of actual vaccine temperatures."***
>
> 2011 National Immunization Conference, Washington, D.C.
> *Cold Chain Management: Temperature Monitoring Solutions*

Alarm (high/low)

Choose a unit that allows you to set a high and low alarm. With this functionality, your clinic will be alerted any time your refrigerator or freezer temperature goes outside of the recommended range.

Display (min/max)

A large, easy to read display is extremely useful when monitoring vaccine. Avoid loggers that use confusing symbols/ icons and those with small, hard to read displays. Your logger should have the ability to display (and reset) min/max temperatures between readings. A clear, uncomplicated display will go a long way in making your twice-daily readings a simple task.

Accuracy

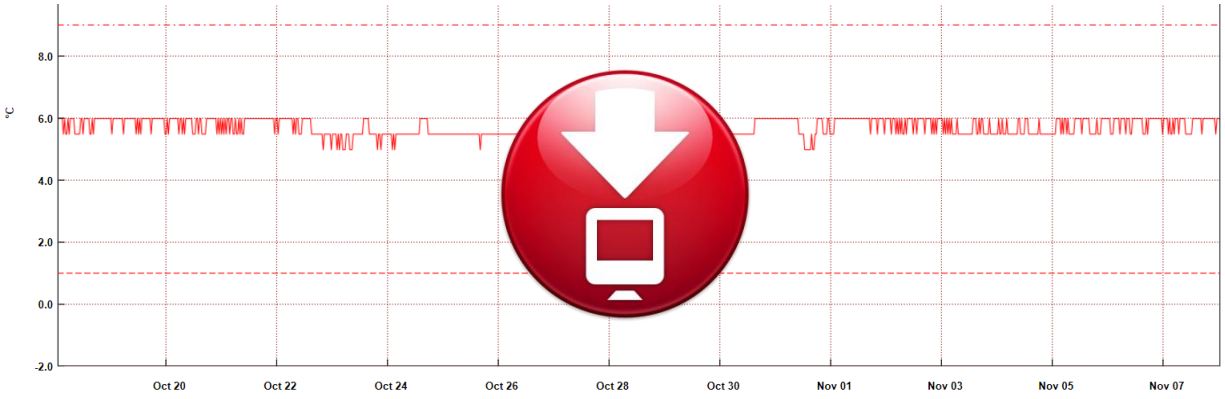
When choosing a thermometer, look for high accuracy, **+/- .5°C (+/- 1°F).**This information should be contained in the Certificate of Traceability and Calibration Testing (also known as a Report of Calibration).

Low battery indicator

Notification of low battery status is essential for accurate vaccine temperature recording. Such notification gives you advanced warning and ensures that vaccine monitoring is not interrupted or incomplete.

Software

Some digital units do not include free graphing software and will require an additional purchase. Refer to the manufacturer or distributor for full details on your chosen unit.



Wireless and cloud-based systems

Relative newcomers to the field of continuous temperature monitoring, Wi-Fi and Ethernet based systems are quickly gaining popularity. While more costly than stand-alone units, the increase in convenience and accessibility makes them a smart purchase. Some of the newer systems send temperature data directly to a cloud storage site which can be accessed, in real-time, from any computer in the world. Real-time feedback is especially useful when addressing time-sensitive vaccine excursions. Clinics will likely need a competent IT staff person (or an employee with strong technical skills) to help implement such a system.

Equipment Options

With the above guidelines in mind, we have compiled a short list of equipment options that meet or exceed Oregon VFC and CDC requirements. The list covers a wide range of price points and configurations to fit any clinic size or budget. This guide is far from exhaustive and is only meant as an overview (with examples) of the *types* of continuous monitoring loggers to consider during your search.

As always, the Oregon Immunization Program is here to help. Don't hesitate to contact our VFC health educators with any question you have about these requirements or the logger options you are considering.

Disclaimer

As a state agency, we are precluded from endorsing any specific brand or product. Ultimately, the terms & conditions of your purchase are between you and your vendor.

Online vendors & manufacturers

You have many options when it comes to purchasing your loggers. Below are a few of the most popular online vendors & manufacturers:

Vendors

Control Solutions (an Oregon-based company): www.VFCdataloggers.com
CAS Dataloggers: www.dataloggerinc.com
TheDataLoggerStore.com: www.microdaq.com
ThermoWorks: www.ThermoWorks.com

Manufacturers

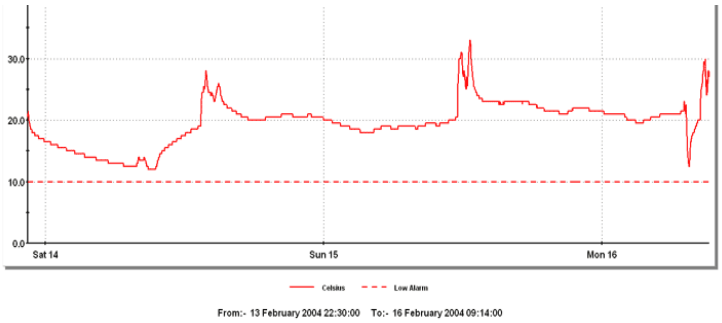
Lascar: www.lascarelectronics.com
T&D: www.tandd.com
Accsense: www.accsense.com
Primex Wireless: www.primexwireless.com
Dickson: www.dicksondata.com

Stand-alone digital loggers

Digital loggers come in a variety of shapes, sizes and styles. They are often simple to use and highly customizable. Some manufacturers offer units that allow for dual (freezer and refrigerator) temperature monitoring in one unit. Digital units work by storing continuous temperature data in the device's built-in memory or external media card. This stored data can then be downloaded to your computer for review and long term storage.

Battery life: Regardless of the logger you choose, it's strongly recommended that you keep a spare lithium battery(s) on hand to avoid gaps in data recording.

Lascar EL-USB-TC-LCD: Thermocouple Data Logger with LCD and USB Interface



This unit is not much larger than a traditional data flash drive. Place the attached probe (with glycol vial) in a central location within your fridge or freezer and use the LCD screen for easy twice-daily temperature readings. Depending on your vendor, the certificate of calibration, K-type probe and glycol bottle may be sold separately.

FEATURES:

- High contrast LCD, with four digit temperature display
- Built-in USB Interface for set-up and data download
- Uses K, J or T type thermocouple probe
- User-programmable alarm thresholds
- Status indication via red and green LEDs
- Immediate, delayed and push-to-start logging
- Quick and easy high/low reset
- stores over 32,000 temperature readings
- Accuracy: ±1°F (±.5°C) (logger only)
- Supplied complete with replaceable internal lithium battery and Windows control software

- Battery life: Typically 1 year of operation
- Battery type: Replaceable 3.6V ½ AA lithium battery.
- EasyLog software included

For more information visit: www.lascarelectronics.com

Dickson SM420: Display Temperature Data Logger

This temperature data logger has a high accuracy RTD probe and a large digital display. The display provides current and min/max readings so you get the information you need without having to download the data. This logger also includes a removable FLASH memory card for easy weekly downloads and visual and auditory alarm for any out of range events.

FEATURES:

- Accuracy: +/-0.28C from -46 to 176C
- Alarm: Audio/Visual on High/Low Temp Limit
- Battery Backup with use of AC Adapter
- Battery Life: (Avg) 6 Months
- Cable Details USB - Male Series A plug to 5 pin Male Series B mini plug. Serial - 9 pin female D-shell to male 2.5mm stereo plug
- Cable Length 6ft
- Data Capacity 32,000
- Display Type LCD
- Download Time 1 Minute (USB), 3 Minutes (Serial)
- Download Type USB / Serial / Flash Card
- Included Accessories Four AA Batteries, Quick Start Guide and RTD Probe. ***Software and glycol vial are not included.**

For more information visit: www.dicksondata.com

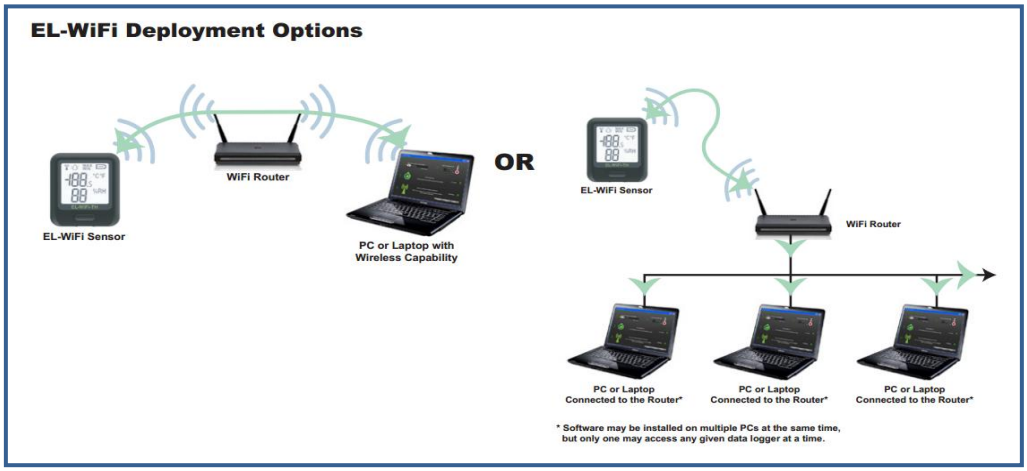
Wi-Fi and Ethernet loggers

Wireless systems offer a step up in convenience and monitoring over their stand-alone counterparts. The biggest advantage of wireless logging is the ability to monitor multiple refrigerators and freezers from a single computer (or internal network) in

real-time. These systems save staff from having to manually disconnect and download temperatures or change out paper wheels on a weekly basis. **However, a wireless system does not preclude you from the requirement of twice-daily temperature checks (by hand or digitally).**

Lascar EL-Wi-Fi-TP (and TP+): Wi-Fi Thermocouple Temperature Data Logging Sensor

The EL-Wi-Fi-TP sensor measures the temperature of the environment in which the probe is situated. Data is transmitted wirelessly via a Wi-Fi network to a PC or network and viewed using a free software package. During configuration the sensor will search for an existing wireless network while physically connected to the PC. It can then be placed anywhere within range of the network. If the sensor temporarily loses connectivity with the network, it will log readings until it is able to communicate again with the PC application (max 120 days at 10 second sample interval). The range of the sensor can be increased by using Wi-Fi extenders.



Note: System requires 802.11b compliant Wi-Fi router/network. Compatibility with Enterprise Networks

Coming soon from Lascar: cloud-based storage and interface

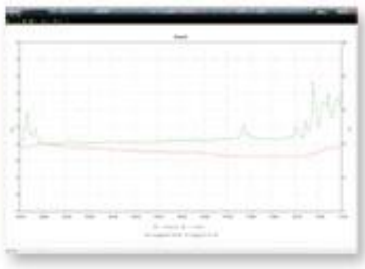
Lascar is nearing release of a cloud-based interface which allows for direct upload, monitoring and review of your continuous monitoring devices. Access this system from any internet connected device in the world.

Contact Control Solutions (Oregon vendor) at (888)311-0636 for more details.

The EL-Wi-Fi-TP is a low powered battery device. When configured using typical sampling periods (e.g. once every 60 seconds) the sensor will operate for over one year. The battery can then be recharged via a PC or USB +5V wall adapter using the USB lead provided.

The core of Lascar's Wi-Fi solution is the free EasyLog software supplied with each data sensor. Using a wizard format to guide the user through the setup of the sensor and subsequent download of collected data.





FEATURES:

- Temperature data logging sensor with thermistor probe
- Wi-Fi capability and integrated display
- Wireless connectivity to PC via Wi-Fi
- Option to upload, monitor and review loggers from the cloud (coming soon)
- Easy sensor set-up using free PC software
- View and analyze multiple sensors using the PC application, immediate graphing of historic data
- Measurement range -40 to +125°C (-40 to +257°F)
- Accuracy for TP model: ±.5°C (TP+ Model: ±0.1°C)
- 802.11b compliant
- Capable of logging greater than 1 million data entries
- High and low alarms with visual indicator on sensor and with audible and visual indicators on host PC
- Sensor memory stores all data even if Wi-Fi is temporarily disconnected

- Rechargeable internal lithium polymer battery
- Configurable high and low alarms with indicator
- Max & Min readings
- Low battery indicator
- Wi-Fi connection indicator
- USB port used for recharging
- EasyLog software included

For more information visit: www.lascarelectronics.com

Dickson WFT25: Wi-Fi Temperature Data Logger

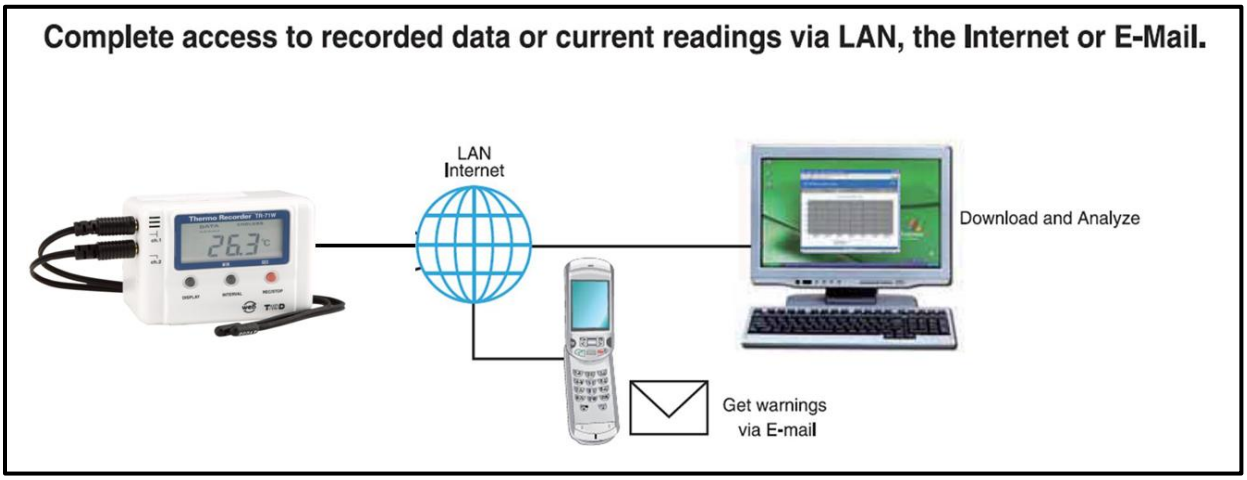
DicksonOne loggers automatically collect temperature and humidity data and delivers it to your local computer or cloud-based storage. Using the fee-based cloud service DicksonOne, access your data from any internet connected device, anywhere. Monitor one point or thousands, this system is scalable to any number of loggers. Easily set alarms and track trends and receive alert notification via Email and SMS Text.

FEATURES
Alarm Type: Phone Call, SMS Text, Email, Audible
Antenna Type: External
Battery Backup: 4 AA Batteries
Battery Life (Avg): 72 hours
Data Capacity: 32,000 (Backup)
Download Type: Wireless
PC Requirements: DicksonOne.com can be accessed from any Windows, Mac, or Linux PC/Laptop using Google
Configuration: Wi-Fi loggers are compatible with WEP, WPA, and WPA2 Personal security protocols.
Power Cord: 6 ft
Radio Frequency: 2.4 GHz
Remote Sensor Length: 6 ft
Remote Sensor Type: 1 Platinum RTD Probe (Hard-Wired)
Signal Strength: Less than 100 mW
Temperature Accuracy: +/-0.3C from -100 to 176C
Included Accessories: USB Cable, AC Adapter, 4 AA Batteries, RTD Probe
Software: Dickson software sold separately

For more information visit: www.dicksondata.com

T&D TR-7W: Network Dedicated Temp/Humidity data logger

Thermo Recorder TR-7W is a new type of temperature and humidity data logger that incorporates an Ethernet / LAN interface. This capability allows for collection of recorded data and monitoring of current conditions, and can send warning E-mails. These data loggers can be connected to either a wired or wireless LAN, allowing control of temperature and humidity from remote locations.



FEATURES

- Interface: Wired LAN 10/100 Base
- Accuracy: ±0.3°C [-20 to 80°C]
- Alarm Type: Phone Call, SMS Text, Email, Audible
- Data Capacity: 8,000 data sets (One data set consists of readings for all channels in that type of unit.)
- Power Source: AC adaptor (AD-05C1 or AD-0605)
- Battery Backup: lithium battery (CR-2032)
- Browser Functions: View Temperature and Humidity Data in Graph Form , Start Recording,Download Data , Monitor Current Readings , Check Back-up Battery
- Digital Display: Yes
- Warning Mail Function: E-mail: Register up to 5 addresses to receive mail
- PC Requirements: MS Windows
- Software: Dickson software sold separately

For more information visit: www.tandd.com

Extras

This section was created to showcase additional equipment, add-ons and services you might consider when assessing you vaccine storage and monitoring needs.

Back-up continuous monitoring loggers

CDC recommends* having a back-up temperature probe for each vaccine storage unit, in the event that something happens to the primary temperature probe or if the primary probe must be sent to a laboratory for calibration. The back-up probe should have the same setup as the primary unit (i.e., temperature probe in glycol). In addition, CDC recommends that the back-up probe have a different calibration schedule than the primary probe so that the back-up is available when the primary probe is sent for calibration.

* Recommendation set to become a program requirement in 2015.

Alarm phone dialers

Now a relatively old technology, these units still have a place in clinics with limited internet connectivity or recurrent power outages. They are sold by several manufacturers with varied models, styles and prices to choose from. Designed to call pre-determined phone numbers when temperatures go out of range, they are a simple and reliable alarm option. Keep in mind, the system is only useful if it's accurate. Maintaining a temperature reading that mirrors your current calibrated continuous logger is imperative to its usefulness.

This style of unit is offered by several manufacturers. Below are a few examples:
Sensaphone: www.sensaphone.com
Dickson: www.dicksondata.com
United Security Products: www.unitedsecurity.com

Emergency power generator

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

goes out. Clinics (especially rural and coastal) should seriously consider adding a back-up generator in case of emergency. If a clinic already has a back-up generator, make sure the vaccine refrigerator and freezer are connected to that emergency power circuit.

According to the CDC, back-up generators should be tested quarterly and should receive maintenance at least annually (check manufacturer specifications for test procedures and maintenance schedules). Back-up 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.

There are many manufacturers and vendors selling generators. Below are a few examples:

Peterson Power Systems (Oregon vendor): www.petersonpower.com
Olympian (CAT) Generators: www.olympianpower.com
Winco Generators: www.wincogen.com
Generac Generators: www.generac.com