

## 9.2.3

# Temperature Recorder Usage Guidelines

### 1. Background

Temperature recorders are regularly used to measure delivery air temperature in containers and vessels en route. Having immediate access to records of the delivery air (DAT) in the container/vessel for the entire voyage on arrival, is a benefit that many exporters and receivers regard as very valuable. In case of quality problems, evaluation of temperature records can assist in processing claims quicker and more effectively. Analysis of breaks in the cold chain often assist in determining the impact on the condition of the fruit.

Exporters each have their own policy regarding when and what recorder is to be used. Here are general guidelines that can be considered when making a decision regarding the use of temperature recorders.

### 2. Conventional vs Containerised Shipments

The use of temperature recorders in conventional vessels is not a regular practice. Should a quality problem related to temperature problems be identified, PPECB can be requested to evaluate the vessel's logs and establish whether the vessel was at fault.

In the case of containers temperature recorders are regularly used. Retrieving temperature logs of a specific container is cumbersome and can take months as the container may have been shipped to other destinations in the meantime. Shipping lines are not keen on making these records available and will also only do it if a fee of \$100+ is paid. Using temperature recorders to get quick access to temperature information is therefore advisable.

### 3. Insurance

Some insurance companies insist on the use of temperature recorders if the exporter has marine insurance. The specification of the recorder may vary from company to company. Records of some recorders are admissible in court whereas some are not.

### 4. Receivers

Receivers of the consignment may insist on temperature recorders and may also specify the type depending on available software. In certain markets such as the Far East, some receivers insist on strip chart recorders in order to have immediate records in a hard copy manner. The trend is increasingly for digital recorders where data can be analyzed and/or e-mailed.

If the receiver is unable or not interested in retrieving the data when required, it makes no sense to use recorders. The situation must be cleared with the receiver prior to shipment.

### 5. Commodity

Certain commodities are more sensitive to temperature fluctuations than others. The more critical the temperature is, the greater the reason for using a temperature recorder. Shipment of plums in containers will almost always be accompanied with a recorder whereas some exporters opt for not using recorders for hard citrus.

## **6. Practical Considerations**

Loading points are responsible for inserting recorders. Instructions of using different recorders for different consignees often lead to errors. The more standardized an instruction is, the less chance there is for making mistakes.

Short term shortages can also be solved by drawn stock from other exporters that use the same model of recorder.

Recorders vary their user-friendliness which impacts on the risk of the recorder not being activated correctly.

## **7. Service Levels**

Service levels vary from one supplier to the next. Access to stocks on short notice, availability of calibration certificates, supply of pallet stickers and access to software are all factors that must be taken into account.

## **8. Cost Considerations**

Margins on fruit exports are very slim and any cost that can be taken out of the cost chain must be considered seriously. It is the exporter's decision whether a temperature recorder is essential or a nice to have.

The cost varies from one recorder model/make to another. Some are reusable but have to be retrieved and returned. There are also some recorders that can be returned for marginal refunds e.g. \$2 each.

Software for digital recorders is normally readily available at no cost.

## **9. Technical Features and options**

### **9.1 Strip chart recorders**

Mechanical strip chart recorders are the traditional temperature monitoring devices used, which provide a thermal paper report of the temperature history. They are still being used these days, but to a much lesser extent due to the newer technologies available. Strip chart recorders are economical, need to be manually recovered at the receiving site, are easy to use and used only to give an indication to the shipper or receiver if there had been any temperature fluctuations.

### **9.2 Electronic temperature recorders**

The first electronic temperature recorders became available in 1990, and are currently used extensively. Like strip chart recorders, they need to be manually recovered at the receiving site. The first versions required downloading cradles or interfaces and dedicated software for downloading, but in the last 4-5 years the "plug and play" USB versions that require neither an interface nor software to download, have become available. Electronic temperature recorders are more accurate than strip chart recorders, provide electronic data that can be easily downloaded and emailed as an attachment. Humidity and probe options are generally also available.

### **9.3 Radio Frequency (RF) electronic temperature recorders**

RF Recorders were introduced in 2009, and helped to facilitate the recovery and downloading process. The RF technology entails the installation of RF reading infrastructure (e.g. gateways, base stations or repeaters) at the receiving site. When the RF monitor arrives at the receiving site, and moves into a specific range of the RF reading infrastructure, the data is transferred via RF to the reading infrastructure, i.e. removing the necessity for manual intervention to recover and download the monitor. WiFi or network capabilities are generally used to send the downloaded temperature information to a database, which in turn is used to send email alerts to the relevant parties.

### **9.4 Real-time cellular based technology temperature recorders.**

Cellular based technology temperature monitoring started to be used more extensively in 2016, due to the cost becoming affordable. The process involves the recording of temperature, location and humidity readings onto the device, which are then broadcast via the cellular network to a cloud-based setup at various intervals, enabling various alerts. The real-time capability is however determined by cellphone reception and network availability.

### **9.5 Data analysis and process improvement**

Latest trends include the centralisation and archiving of the electronic, RF and real-time temperature recorders data into various databases with reporting capability and alert options. This enables the data to be utilised for process improvement, e.g. to determine trends, such as identification of problematic routes, service providers, loading / packing operational procedures, instead of simply for an accept or reject criteria upon arrival in the case of quality or condition problems.

## **10. Temperature Management**

Objective analysis of information can assist in pro-actively identifying problem areas and taking early corrective steps. Breaks in the cold chain for excessive periods may be a regular occurrence and can serious effect fruit quality.

## **11. Conclusion**

As can be seen several factors influence the decision on what type and technology to use. It is proposed that each exporter considers its circumstances and with the different considerations listed above makes a policy decision that is clear and can be implemented in a practical manner.

26/07/2020