



TEMPERATURE MONITORING DEVICES: AN OVERVIEW

| LOCATION | MINIMUM WHO RECOMMENDATION | AVAILABLE WHO PREQUALIFIED DEVICES (July 2013) | DEVICE USE |
|--|--|---|---|
| INTERNATIONAL VACCINE SHIPMENTS (2°C to 8°C) | Electronic shipping indicators (liquid-crystal display [LCD] or computer downloadable) | 20-DAY ELECTRONIC SHIPPING INDICATORS (irreversible) | Monitors temperature during shipment of vaccines. Alarm is activated if temperatures exceed or fall below the recommended range. Single use; once the alarm has been activated, the device cannot be used again. |
| INTERNATIONAL VACCINE SHIPMENTS (-20°C [e.g., oral polio vaccine]) | Cold chain monitor cards | COLD CHAIN MONITOR CARDS (irreversible) | Monitors temperature during shipment of frozen vaccine. Single use; once the alarm has been activated, the device cannot be used again. |
| THROUGHOUT THE SUPPLY CHAIN | Vaccine vial monitors (VVM) | VVM2, VVM7, VVM14, VVM30 (irreversible) Types are determined by WHO based on heat stability of vaccine. <small>Photo: Umit Kartoglu</small> | Assesses heat exposure of individual vials or other primary containers of vaccines. Used throughout the supply chain. |
| COLD ROOMS AND FREEZER ROOMS | Continuous temperature monitoring systems with alarm and a back-up dial thermometer | INTEGRATED DIGITAL OR DIAL TEMPERATURE MONITORS <small>Photo: PATH/Amy MacIver</small> | Monitors the temperature inside a cold room or freezer room. Presents an external visual display of the current temperature. |
| | | DIAL THERMOMETERS (gas/vapor pressure) <small>Photo: World Health Organization</small> | Monitors current temperature. Included with all cold/freezer room purchases. May be used as a backup external temperature display in case of power failure. |
| | | CENTRAL TEMPERATURE MONITORING SYSTEMS <small>Photo: PATH and Berlinger & Co. Photo: PATH</small> | Monitors temperatures and sends recorded data and alarms to a central server or cellular phone at set intervals. Recommended for large, multiple, or remote cold/freezer rooms. |
| | | 30-DAY ELECTRONIC TEMPERATURE RECORDERS | Records temperatures at regular intervals. Provides alarms if temperatures exceed or fall out of range. If a central temperature monitoring system is not relevant, available, and/or affordable, device may be used as a back-up external temperature display or internal recording device in case of power failure. |
| | | FREEZE INDICATORS (irreversible) | May be used as a backup indicator for potential freeze exposure in low-temperature locations within a cold room. Single use; once the alarm has been activated, the device cannot be used again. Not used in freezers. |
| REFRIGERATED VEHICLES | Electronic continuous temperature monitoring systems with recording capacity and one freeze indicator per shipment | DASHBOARD-MOUNTED CONTINUOUS TEMPERATURE MONITORS No prequalified products are currently available. | Monitors current temperature inside refrigerated vehicle. Installed in refrigerated vehicle with visual dashboard mount. |
| | | FREEZE INDICATORS (irreversible) | Detects freeze incidents. One freeze indicator should be placed near the most freeze-sensitive vaccine in the shipment when the vaccine is packed in the issuing store. Single use; once the alarm has been activated, the device cannot be used again. |

TEMPERATURE MONITORING DEVICES: AN OVERVIEW

| LOCATION | MINIMUM WHO RECOMMENDATION | | AVAILABLE WHO PREQUALIFIED DEVICES (July 2013) | DEVICE USE |
|---|---|--|--|--|
|  REFRIGERATORS | Integrated digital or dial thermometers | INTEGRATED DIGITAL OR DIAL THERMOMETERS |  <p>Included on all PQS prequalified refrigerators</p> <p><small>Photo: PATH/Amy MacIver</small></p> | Monitors current temperature and displays temperature externally. |
| | | FREEZE INDICATORS (irreversible) |    <p>Freeze-tag[®] FreezeAlert[™] Q-tag[®] Quad</p> | Detects freezing incidents. Not needed if 30-day temperature recorders are used. Single use; once the alarm has been activated, the device cannot be used again. |
| | | 30-DAY ELECTRONIC TEMPERATURE RECORDERS |    <p>LogTag[®] TRID30-7FW Fridge-tag[®] Fridge-tag 2[®]</p> | Records temperatures at regular intervals. Provides alarms if temperatures exceed or fall out of range. Used to ensure that equipment is functioning effectively. |
|  FREEZERS | Integrated digital or dial thermometers | INTEGRATED DIGITAL OR DIAL THERMOMETERS |  <p>Included on all PQS prequalified freezers</p> <p><small>Photo: PATH/Amy MacIver</small></p> | Monitors current temperature and displays temperature externally. |
| | | DIAL THERMOMETERS (gas or vapor pressure) |  <p>Rueger TFV100BI</p> <p><small>Photo: World Health Organization</small></p> | Monitors current temperature. External display of freezer temperature. |
|  COLD BOXES AND VACCINE CARRIERS | Irreversible freeze indicators when freeze sensitive vaccine is being transported | FREEZE INDICATORS (irreversible) |    <p>Freeze-tag[®] FreezeAlert[™] Q-tag[®] Quad</p> | Detects freezing incidents. Single use; once the alarm has been activated, the device cannot be used again. |
| | | 20-DAY ELECTRONIC SHIPPING INDICATORS |      <p>VaxAlert[™] LogTag[®] TIC20 Q-tag[®] CLm doc Q-tag2 plus[™] Q-tag[®] CLm</p> | Monitors temperatures inside cold boxes and vaccine carriers during transport. Provides alarms if temperatures exceed or fall below range. Typically used in shipping but could be used in cold boxes and vaccine carriers. Single use; dispose of after 20 days. |
| | | VVM + PEAK TEMPERATURE INDICATORS | No prequalified peak temperature indicators available. | Used together, the VVM and peak temperature indicator show whether cumulative or peak heat exposure has occurred. Used for transport of vaccines licensed for use in a temperature controlled chain. |
|  TEMPERATURE MAPPING OF COLD ROOMS AND FREEZER ROOMS | 30-day temperature recorders or user programmable data loggers | 30-DAY ELECTRONIC TEMPERATURE RECORDERS |    <p>LogTag[®] TRID30-7FW Fridge-tag[®] Fridge-tag 2[®]</p> | Records temperatures at regular intervals. Provides alarms if temperatures exceed or fall out of range. Used to map temperatures in cold/freezer rooms. Devices are placed in specific areas of the cold or freezer rooms or as part of a centralized system with wireless sensors. |
|  STUDIES OF THE ENTIRE SUPPLY CHAIN OR A PORTION OF THE SUPPLY CHAIN (e.g., validating transport routes) | User programmable data loggers | USER PROGRAMMABLE DATA LOGGERS |       <p>Libero CB PDF Logger[®] Libero CS PDF Logger[®] Libero Ttl PDF Logger[®] LogTag[®] PTID30-7F LogTag[®] PTID30-7F LogTag[®] TRIX-8</p> | Records temperatures at user-specified intervals. Provides alarms if temperatures exceed or fall out of range. Used for studies to understand the quality of existing cold chain equipment and management and report the temperature profiles of vaccines throughout the supply chain. |