GEF Solar Chill

Training Module 3

COMMISSIONING & OPERATION

VACCINES

- The main goal is to prevent the further spread of diseases like

  - Varizella
  - Diphteria
  - Influenza
  - Measles
  - Polio
  - Tetanus

Photo: thermodata.us

HOW TO STORE VACCINES? THE COLD CHAIN!

- Proper handling of vaccines is mandatory. From the time they are manufactured until distribution

- Exposures of vaccines outside the temperature ranges
  - Decrease their potency
  - Reduce effectiveness and protection
  - Increase cost

Good practice is most important!

HOW TO STORE VACCINES? THE COLD CHAIN!

- The manufacturer provide recommended temperatures

  - Typical safe temperature range for Vaccines (2- 8 °C). This is the requirement for the actual WHO certification
    - Inactivated vaccines
    - Influenza, rotavirus, typhoid and yellow fever

  - Other vaccines might required freezing temperature -50°C – (-15)°C
    - Varizella (MMRV) NEED Freezer
    - MMR can be stored in either refrigerator or freezer
    - If both is stored in one health facility, MMR is also better stored in the freezer to avoid accidental problems with MMRV

PERSONNEL

- Primary vaccine coordinator (with backup)

  - Responsible for proper storage and handling
    - Ordering vaccines
    - Oversee proper receipt and storage
    - Organizing vaccines within the unit
    - Temperature monitoring (?)
    - Provide Log-file (?)
    - Physical inspection
    - Expiration date of vaccines
    - General maintenance

TRAINING AND EDUCATION

- Daily routine and emergency storage plan

  - Provide guidelines for
    - Ordering and accepting vaccine deliveries
    - Storing and handling vaccines
    - Managing inventory
    - Managing potentially compromised vaccines

  - Backup Health facility available?

STARTING THE FRIDGE AFTER INSTALLATION

- Read Manufacturer instructions
- Each fridge may have a different starting time delay
- Once running most fridges need about a week to fully chill the cold storage and be truly safe for vaccine storage
- Do not store vaccine until fridge is fully cooled and temperature is consistently between +2C and +8C

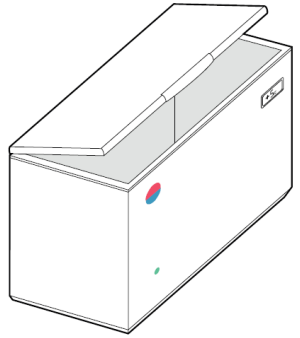


Figure 4.1: Top opening, chest style refrigerator

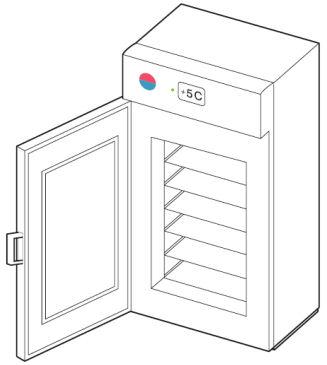


Figure 4.2: Front opening, cabinet style refrigerator

Graphic: FGL/IM-PAHO and Solar Electric Light Fund (SELF)

STARTING THE FRIDGE – WHAT TO EXPECT?

- What happens when the installation is completed, and conditions are

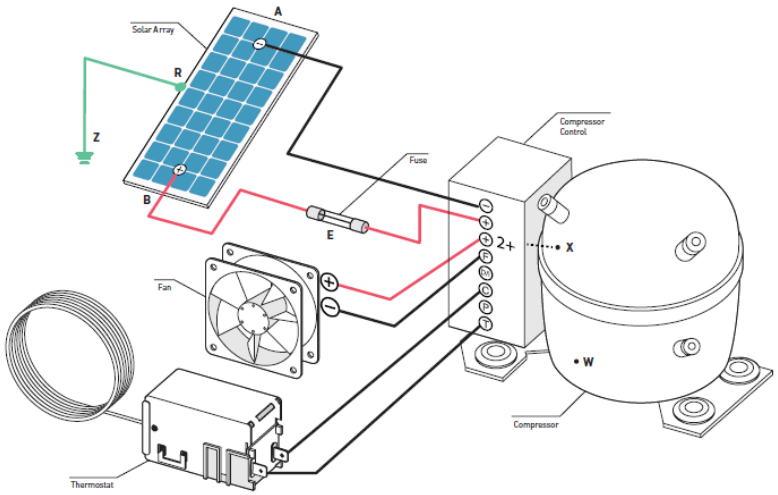
  - late afternoon - there may not be enough solar to start compressor;
  - medium to strong sun on the array - the compressor should start;
  - cloudy or rain - it may not start; or
  - partly cloudy, partly sunny - the compressor may start and stop frequently

Graphic: National Weather Service, US Government open source

WHAT IF IT DOESN´T START?

- What happens when the installation is completed, and conditions are favorable, but the compressor does not start

  - Re-read start up instructions - there are troubleshooting procedures to follow
  - Many wiring problems are due to open circuits – check fridge switch is on, check array cable connections, check fuse, etc



Graphic: FGL/IM-PAHO and Solar Electric Light Fund (SELF)

PERFORMANCE EVALUATION (~30 DAYS POST INSTALLATION)

Continuous Temperature performance

- Inspect 30DTR and verify ID against refrigerator ID
- Recover/download 30+ days of post installation temperature data
- Sum up totals for
  - High and Low Alarms
  - Total # of excursions
  - Cumulative excursion durations
- Evaluate with/in relation to Temperature reporting form

End user knowledge and reporting

- Monthly maintenance tasks & responsibilities are understood
- System documentation/manuals onsite and available
- Use of forms
  - Temperature Record Report
  - CCE Maintenance Report
  - Vaccination report

VISUAL INSPECTION

End user

- Interview the end user to see if there have been any problems
- No other products (drinks, food, other) in the refrigerator
- Waterpacks are stored in the correct location of the refrigerator
- Vaccines arranged as per manufacturer recommendation
- Solar array is clean
- Grounding pit is damp

Building

- Ventilation
- Sun exposure
- Water ingress

Solar array

- Visually inspect the solar modules, browning, fractures, and water proofing
- Check fastenings, connections, cabling, and ground rod

Refrigerator

- Door seals are watertight
- Hinges are in good condition and aligned
- Compressor(s) and fan(s) are working
- Input cable from PV array secured
- If applicable, verify that water level in refrigerator is correct if of the fillable type *[GVR & ZLF models]*

MEASUREMENTS & DIAGNOSTICS

Solar Array

- Orientation and slope
- Use a tablet-based solar array shading application (or solar Pathfinder) to identify any objects (trees, buildings, other) that may cause array shading throughout the year
- Perform a complete set of diagnostic measurements on the solar PV system

Refrigerator

- Perform a complete set of system wide diagnostic measurements as per the manufacturer's guidelines
- Record values

COMMISSIONING OF MONITORING SYSTEMS

- There are several challenges
  - Correct mounting of cables and sensors
  - Correct connection to power supply (Own PV minipanel or tapping from compressor power line)
  - Correct type and installation of prepaid data SIM card for the local network operator
  - Correct software settings in data logger. DTI will preferably check this before shipment

- Once the installation is in place, DTI will check if the device is active on the relevant internet site

Thank you for your attention!