PQS Independent type-testing protocol

TITLE: Ice-lined refrigerator or combined refrigerator-icepack freezer: compression cycle

Product verification protocol:	E03/RF03-VP.1
Applies to specification ref(s):	E03/RF03.1
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Contents:

1. Scope:

This document describes the procedure for verifying the performance of compression cycle ice-lined refrigerators or combined refrigerator-icepack freezers. A product that passes the relevant tests will be pre-qualified with a specific temperature zone designation. Three temperature zones are described: moderate zone, temperate zone and hot zone; the scope of each category is

defined in Section 3. In addition appliances are tested to establish a minimum rated ambient temperature designation.

2. Normative references:

DIN 8985: 1983-05: *Testing the surfaces of installed refrigerators and freezers.*
IEC 60335-1: 2006: *Household and similar electrical appliances - Safety - Part 1: General requirements.*
IEC60335-2-24: 2007 - *Household and similar electrical appliances - Safety - Part 2-24: Particular requirements for refrigerating appliances, ice-cream appliances and ice-makers.*
ISO/IEC 17025: 2000: *General requirements for the competence of testing and calibration laboratories.*
WHO/PQS/E03/RF03.1: *Performance Specification: Ice-lined refrigerator or combined refrigerator-icepack freezer: compression cycle.*

3. Terms and definitions:

Acceptable temperature range: The acceptable temperature range for storing vaccine is +2°C to +8°C. However, brief excursions outside these limits will be tolerated. Measured over a five day period of testing these excursions must not exceed any of the following parameters:

- The cumulative total of all excursions over +8°C must not exceed 12 hours.
- No excursion must exceed +20°C.
- The cumulative total of all excursions below +2°C must not exceed 12 hours.
- No excursion must reach 0°C.

To establish compliance with these requirements, the total hours of runtime for the *stable running*, *icepack freezing*, *day/night cycle* and *minimum rated ambient temperature* tests will be recorded. Temperature logger data will be analyzed to establish the cumulative number of hours with temperatures lying outside the acceptable temperature range. The results will then be normalized to establish the extent of excursions over an average five day period.
Holdover time: The time in hours during which all points in the vaccine compartment remain between +2°C and +10°C, at the maximum ambient temperature of the temperature zone for which the appliance is rated, after the power supply has been disconnected. The same holdover time, or better, must also be achieved at the minimum rated ambient temperature.
Hot zone: Hot zone appliances must operate at a steady +43°C ambient temperature and over a+43°C/+25°C day/night cycling temperature range.
Icepacks: Flat plastic containers, filled with water, conforming to one of the specifications in PQS section E05.
Icepack freezing capacity: The maximum weight of icepacks which can be frozen, in one batch, during a 24 hour freezing cycle. During this period the temperature of the vaccine storage compartment must remain within the acceptable temperature range. The temperature of the icepack freezing compartment must not exceed -5ºC.
In writing: means communication by letter, fax or email.

Legal Manufacturer: The natural or legal person with responsibility for the design, manufacture, packaging and labelling of a product or device before it is placed on the market under his own name, regardless of whether these operations are carried out by that person himself or on his behalf by a third party.
Manufacturer's gross volume: The manufacturer's stated gross volume or, for purposes of comparison, the internal free volume, including the space occupied by the freezing compartment, and the volume occupied by shelves, but excluding the space taken by the ice-lining or other type of thermal storage, if present.
Minimum rated ambient temperature: In addition to the day/night test, all appliances will be challenged by reducing the ambient temperature in 5°C increments below the lower limit for the model's rated temperature zone, down to a minimum of -10°C. This test is designed to determine the lowest constant ambient temperature at which the acceptable temperature range can be maintained with a full vaccine load. Once established, this figure will be displayed in the blue sector of the Annex 1 temperature zone symbol. This will enable purchasers in countries with low winter temperatures to select the most appropriate models.
Moderate zone: Moderate zone appliances must operate at a steady +27°C ambient temperature and over a+27°C/+10°C day/night cycling temperature range.
Montreal Protocol: Montreal Protocol on Substances that Deplete the Ozone Layer.
Reseller: A commercial entity, licensed to act on behalf of a Legal Manufacturer, and which carries product liability and warranty responsibilities no less onerous than those carried by the Legal Manufacturer.
Temperate zone: Temperate zone appliances must operate at a steady +32°C ambient temperature and over a+32°C/+15°C day/night cycling temperature range.
Vaccine storage capacity: The net capacity in an appliance available for the storage of vaccines. It is measured in litres in the following manner:

- **Freezers:** The vaccine storage compartment is loaded up to the manufacturer's loading markings with boxes measuring 100x100x100 mm or 100x100x50 mm, packed so that there is minimal air space between each column of packets or between the packets and any adjoining wall. The total volume of the boxes, in litres, represents the net volume available for the storage of vaccines.
- **Refrigerators:** The vaccine storage compartment is loaded up to the manufacturer's loading markings with boxes measuring 100x100x100 mm or 100x100x50 mm, packed so that there is a minimum of 15mm air space between each column of packets or between the packets and any adjoining wall. If baskets are provided, the boxes are loaded into the baskets in the same manner, except that they may touch the sides of the basket(s). The total volume of the boxes, in litres, represents the net volume available for the storage of vaccines.

4. Applicability:

Type-testing will be carried out by an independent ISO/IEC 17025 testing laboratory, accredited by WHO.

5. Type-testing procedure:

5.1 *Evidence of conformity assessment:*

Products must carry the CE mark, UL mark and/or equivalent internationally accepted evidence of conformity assessment.

5.2 *Number of samples:*

The Legal Manufacturer or Reseller must supply the testing laboratory with a full duplicate set of the Product Dossier already supplied to WHO in accordance with the requirements of specification clause 7. One sample of the product is required. If more than one version of the product is available (for example, for different climate zones), provide one sample of each version. Ensure that the voltage and frequency rating of the sample(s) is suitable for the country where the test laboratory is located[1].

5.3 *Test procedure:*

5.3.1 Test 1: Type examination:

- **Step 1:** Unpack the product. Using the manufacturer's installation instructions only, set up the system components. Record the process and any problems encountered.
- **Step 2:** Check all samples for similarities between different models[2], dissimilarities between samples of one model, any defects or damage or any problem which make it difficult or impossible to test the appliance.
- **Step 3:** Record any differences between the samples ordered and those received.
- **Step 4:** Tabulate the following information for each model submitted for examination. Obtain any additional supporting information required in writing from the Legal Manufacturer or Reseller and attach this information to the report:

  Identification:
  - Code (a unique identifier to be assigned by the testing laboratory);
  - Model;
  - Legal Manufacturer or Reseller;
  - Product type (i.e. vaccine refrigerators or combination unit);
  - Country of origin;
  - Conformity assessment markings (e.g. CE mark).

  Performance characteristics:

[1] If there is any doubt that the performance of the product will vary under the other nominal voltage/frequency combinations supplied by the manufacturer, he must be asked to comment in writing.

[2] The purpose of this inspection is to establish whether products offered by competing companies are re-badged versions of an otherwise identical product.

- Temperature zone rating sticker conforms/does not conform to Annex 1 design (specification clause 4.2.1).
- Cycle type conforms/does not conform to specification clause 4.2.2.
- Voltage and frequency conforms/does not conform to specification clause 4.2.3
- Combined units only: Icepack freezing compartment capacity conforms/does not conform to specification clause 4.2.4.
- Exclusion of areas not suitable for vaccine storage conforms/does not conform to specification clause 4.2.5.
- Thermostat type conforms/does not conform to specification clause 4.2.7.
- Thermometer conforms/does not conform to specification clause 4.2.8.
- Lock conforms/does not conform to specification clause 4.2.13.
- Corrosion resistance conforms/does not conform to specification clause 4.2.14.
- Electrical safety rating conforms/does not conform to specification clause 4.2.15.
- Markings conform/do not conform to specification clause 4.2.16.
- Vaccine storage advice conforms/does not conform to specification clause 4.2.17.

Environmental requirements:

- Ambient temperature range during transport and storage conforms/does not conform to specification clause 4.3.1.
- Ambient humidity range during transport, storage and use conforms/does not conform to specification clause 4.3.2.

Physical characteristics:

- Overall dimensions conform/do not conform to specification clause 4.4.1.

Interface requirements:

- Voltage stabilizer compatibility conforms/does not conform to specification clause 4.5.1.
- Power lead conforms/does not conform to specification clause 4.5.2.

Human factors:

- General design of the product conforms/does not conform to specification clause 4.6.1.
- Control panel and thermometer conforms/does not conform to specification clause 4.6.2.

Materials and construction:

- Record materials of all major visible components;
- Refrigerant conforms/does not conform to clause 4.7.1.
- Thermal insulation foaming agent conforms/does not conform to specification clause 4.7.2.
- Other restricted materials listed in clause 4.7.3 are/are not present.

Physical data:

- Record major rectangular dimensions in centimetres (± 1.0 cm).
- Record weight in kilograms (± 0.25 kg).
- Record internal volumes of refrigerator and/or freezer compartment(s) in litres.

- Record estimated vaccine storage capacity in litres.
- Record maximum icepack capacity in kilograms, if freezer included.

Warranty

- Warranty conforms/does not conform to specification clause 4.8.

Instructions:

- Instructions conform/do not conform to specification clause 4.11.

- **Step 5:** Take a three quarter view digital photograph of the appliance with the door open. A 100 x 70 mm should be provided for attachment to the PQS report. Take any other photographs needed to illustrate features of the product in the report.
- **Acceptance criteria:** Inspection indicates full conformity with all major specification requirements.

5.3.2 Test temperatures:

The specific tests listed below apply equally to moderate zone, temperate zone and hot zone appliances. Relevant test chamber temperatures are given in the following format M:<XX°C> for moderate zone; T:<XX°C> for temperate zone and H:<XX°C> for hot zone.

5.3.3 Test 2: Cool-down:

Power: Continuous.

- **Step 1:** Set the test chamber temperature to M:+27ºC, T:+32°C, H:+43°C and leave for 48 hours with the appliance empty, the lid or door open and the power supply switched off.
- **Step 2:** Close the lid or door of the appliance, switch it on and leave it to stabilize.
- **Step 3:** Record temperatures every minute for 24 hours. During this period measure the energy consumption and determine the compressor duty cycle. Measure the duty cycle by timing from the end of one cycle to the end of a corresponding cycle approximately 24 hours later. Calculate the percentage 'on' time over this period. Measure electricity consumption over the same time scale.
- **Acceptance criterion:** Stabilized internal temperatures maintained within acceptable temperature range.
- **Rejection criterion:** Failure to stabilize within the acceptable temperature range during the test period.

5.3.4 Test 3: Stable running and power consumption test:

Power: Continuous

- **Step 1:** Set the test chamber temperature to M:+27ºC, T:+32°C, H:+43°C and leave for 48 hours with the appliance empty, the door open and the power supply switched off.
- **Step 2:** Fully load the appliance with simulated vaccine as described in Annex 1.
- **Step 3:** Close the lid or door of the appliance, switch it on and leave it to stabilize within the acceptable temperature range.
- **Step 4:** Record temperatures every minute for 24 hours. During this period measure the energy consumption and determine the compressor duty cycle. Measure the duty cycle by timing from the end of one cycle to the end of a

corresponding cycle approximately 24 hours later. Calculate the percentage 'on' time over this period. Measure electricity consumption over the same time scale.

- **Acceptance criterion:** Stabilized internal temperatures maintained within the acceptable temperature range. Power consumption to be reported.
- **Rejection criterion:** Failure to stabilize within acceptable temperature range within the test period.

5.3.5 Test 4: Stable running and power consumption test:

Power: Intermittent.

- **Step 1:** Continue the Test 3 conditions, but cycle the power supply 8 hours on and 16 hours off for 20 days.
- **Step 3:** Record temperatures every minute for 24 hours. During this period measure the energy consumption and determine the compressor duty cycle. Measure the duty cycle by timing from the end of one cycle to the end of a corresponding cycle approximately 24 hours later. Calculate the percentage 'on' time over this period. Measure and report electricity consumption over the same time scale.
- **Acceptance criterion:** Stabilized internal temperatures maintained within the acceptable temperature range. Power consumption to be reported.
- **Rejection criterion:** Failure to stabilize within the acceptable temperature range within the test period.

5.3.6 Test 5: Icepack freezing capacity:

Application: Combination units only.

Power: Intermittent.

- **Step 1:** Continue the Test 4 conditions.
- **Step 2:** Stabilize icepacks at M:+27ºC, T:+32°C, H:+43°C .
- **Step 3:** Load 1.6 kg of icepacks the freezer compartment, if possible in a row and with the edges perpendicular to the evaporator surface. Install the freezer thermocouples, centred as uniformly as possible between the loaded icepacks. The minimum distance between a thermocouple and the lid/door, wall or evaporator should be 30mm.
- **Step 4:** Record icepack and vaccine load temperatures every minute for the following 24 hours.
- **Step 5:** At the end of the test period check that the icepacks are frozen (to -3ºC or below). Check that the vaccine load has remained within the acceptable temperature range throughout the 24 hour test period. Remove the icepacks.
- **Step 6:** Repeat steps 3 to 5 introducing larger loads of stabilized icepacks up to the point when one or more of the following conditions occurs:
  - One or more of the icepacks does not fully freeze within the 24 hour period;
  - The temperature of the vaccine load breaches the acceptable temperature range;

  Establish and record the maximum weight of icepacks that can be frozen whilst still meeting the requirements of specification clause 4.2.5. This is the appliance's 'icepack freezing capacity'.
- **Acceptance criteria:** In combined units with freezer compartment, a minimum of 1.6 kg of icepack must be frozen per 24 hours whilst maintaining

the temperature control specified in 4.2.5. For freezers with at least 50 litres of gross freezer volume a minimum of 2.4 kg of icepack must be frozen per 24 hours whilst maintaining the temperature control specified in 4.2.5.

- **Rejection criteria:** Failure to meet one or more of the acceptance criteria.

5.3.7 Test 6: Holdover time:

Power: Intermittent.

- **Step 1:** Fully load the appliance with simulated vaccine as described in clause 5.3.4. Ensure that the icepack compartment (if present) is empty.
- **Step 2:** Switch the appliance on and cycle the power supply 8 hours on and 16 hours off for 4 days.
- **Step 3:** At the end of the 4th day switch off the power supply at the start of a compressor ON phase. Record the length of the preceding compressor OFF period.
- **Step 4:** Monitor the temperature of the vaccine load at one minute intervals. At the moment when the warmest point in the load exceeds +10ºC, record the elapsed time since switch off.
- **Acceptance criterion:** More than 20 hours at a continuous ambient temperature of M:+27ºC, T:+32°C, H:+43°C.
- **Rejection criterion:** Failure to meet the minimum period at the upper temperature of the temperature zone for which the appliance is rated.

5.3.8 Test 7: Day/night test:

Power: Continuous.

- **Step 1:** Stabilize the test chamber at M:+27ºC, T:+32°C, H:+43°C. Fully load the appliance with simulated vaccine as described in clause 5.3.4. Ensure that the icepack compartment (if present) is empty.
- **Step 2:** Switch the appliance on and allow the temperature of the vaccine load to stabilize within the acceptable temperature range. Allow to run for a further 24 hrs.
- **Step 3:** Over a 3-hour period reduce the temperature of the test chamber to M:+10ºC, T:+15ºC, H:+25ºC. Hold this temperature for 9 hours. Raise the temperature to M:+27ºC, T:+32°C, H:+43°C over a 3-hour period. Hold at M:+27ºC, T:+32°C, H:+43°C for a further 9 hours. Reduce again to M:+10ºC, T:+15ºC, H:+25ºC again over a further 3 hr period. Repeat this simulated day/night cycle five times. Record the vaccine load temperature every minute.
- **Step 4:** Review the data and establish the highest and lowest temperatures recorded during the test.
- **Acceptance criterion:** Vaccine load temperatures must remain within the acceptable temperature range throughout the test. Freezer compartment temperature (if applicable) must remain below -5ºC.
- **Rejection criterion:** Failure to maintain the vaccine load within the acceptable temperature range throughout the test and/or failure to maintain the freezer compartment below -5ºC.

5.3.9 Test 8: Compressor starting test:

Power: Continuous.

- **Step 1:** Empty the appliance.

- **Step 2:** Switch on the appliance using a starting voltage 20% lower than the nominal voltage of the compressor.
- **Step 3:** Repeat Step 2 ten times from cold with the compressor at M:+27ºC, T:+32°C, H:+43°C.
- **Step 4:** Repeat Step 2 ten times with the compressor at its normal stable running temperature.
- **Step 5:** Reduce the voltage to -22% of the nominal voltage, repeating steps 2 to 4 for each voltage.
- **Step 6:** If there is a test failure at or before the -22% voltage test, establish the likely cause of the problem and include the diagnosis in the test report.
- **Acceptance criterion:** Ten out of ten starts must be successful in both cold start and hot start tests at a minimum of 22% below the manufacturer's nominal voltage.
- **Rejection criterion:** One or more start failures.

5.3.10 Test 9: Minimum rated ambient temperature test:

Power: Continuous.

- **Step 1:** Stabilize the test chamber at M:+10ºC, T:+15°C, H:+25°C.
- **Step 2:** Fully load the appliance with simulated vaccine and icepacks (if applicable) as described in Annex 1. Switch the appliance on.
- **Step 3:** Allow the temperature of the vaccine load to stabilize within the acceptable temperature range. For combination units, stabilize the minimum specified icepack load at the current ambient temperature.
- **Step 4:** Load the icepacks (combination units only) and leave the appliance to run for 24 hours.
- **Step 5:** Record temperatures every minute. At the end of the 24 hour test period, remove the icepacks from the freezing compartment (if applicable) and check that they are fully frozen.
- **Step 6:** Lower the temperature of the test chamber by 5°C and repeat steps 3 to 5. Continue this cycle until **either**: the minimum icepack load (if applicable) is not fully frozen, **or**: the vaccine load temperature strays outside the acceptable temperature range **or** the temperature of the test chamber reaches -15°C.
- **Acceptance criteria:** Record the lowest temperature increment at which the vaccine load temperature remains within the acceptable temperature range throughout the 24 hour cycle and the minimum icepack load (if applicable) is fully frozen by the end of the cycle. This temperature is the minimum rated ambient temperature for the appliance[3] and this figure will be printed in the blue sector of the temperature zone symbol (see specification Annex 1).
- **Rejection criterion:** No rejection criterion provided the appliance passes the test at the **Step 1** temperature (this is the same as the lowest temperature in the day/night test).

5.4 *Test criteria for qualification:*

A final report must be issued after all testing is complete. The report of the tests must contain the following data and analyses:

[3] Although the test chamber may reach -15°C during the test, the minimum rated ambient temperature will never be below -10°C.

- **Summary:** Conclusions and recommendations, including confirmation of the temperature zone(s) for which the product is suitable.
- **Test 1:** Comments on samples received, tabulated data on the type-examination test and relevant photographs.
- **Test 2:** Results of cool-down test, including temperature graphs.
- **Test 3:** Results of stable running and consumption test (continuous power), including temperature graphs.
- **Test 4:** Results of stable running and consumption test (intermittent power), including temperature graphs.
- **Test 5:** Results of icepack freezing test, including temperature graphs.
- **Test 6:** Results of holdover time test, including temperature graphs.
- **Test 7:** Results of day/night test, including temperature graphs.
- **Test 8:** Results of compressor starting test.
- **Test 9:** Results of minimum rated ambient temperature test, including temperature graphs.
- **Excursion analysis:** Normalized five day excursion analysis based on test data in accordance with acceptable temperature range definition.
- **Annexes:** Description of the test apparatus. Test chamber temperature records. Copy of reference thermometer calibration certificate(s). Diagrams showing the location and identification codes for temperature sensors, clearly distinguishing between sensors measuring vaccine, icepack, freezer and evaporator temperatures. Additional supporting documentation requested and received from the Legal Manufacturer or Reseller during the course of the type-testing.

6. Quality control checklist:

6.1 *Quality control standards:*
All testing and reporting must be carried out in accordance with the requirements of ISO 17025:2005 or later edition.

6.2 *Quality control checklist:*
An on-site inspection of the manufacturing plant is not required.

6.3 *Quality control evaluation:*
Not required.

7. Pre-qualification evaluation:

A product will qualify for inclusion on the register of PQS pre-qualified ice-lined refrigerator equipment in accordance with WHO procedures provided the final report indicates full conformity with the requirements of specification **E03/RF03.**

8. Modified products:

The legal manufacturer or reseller must notify WHO in writing of any changes which affect the performance of the product. WHO will carry out a desk evaluation of the reported change(s). If any change is deemed adversely to affect

the performance of the product, WHO may request full or partial re-verification based on the test procedures described in this document.

Annex 1 – General test conditions

The following conditions are applicable to all refrigerator and freezer tests.

Test conditions:

- Carry out tests in a test chamber in which temperatures can be controlled to ±1ºC and humidity within the range of 45% to 75% unless otherwise stated below.
- Maximum room temperatures of +27ºC, +32ºC and +43ºC are required for the tests.
- Temperatures within the appliance must be continuously monitored to an accuracy of ± 0.5ºC without the presence of the sensors influencing the test in any way. Thermocouples that are sealed within the appliance are most commonly used. Up to 15 simultaneous temperature measurements may be required for a single appliance. The suggested temperature sensor locations are shown in Annex 2.
- Position the test appliance in the test chamber with its back face 200mm clear of one of the chamber walls. Ensure that it is accurately levelled.

Stabilization times:

Before measuring the performance of a refrigerator or freezer under normal running conditions, temperature conditions inside the appliance must be stable. This is normally assumed to exist when either:

- The thermostat has been cycling for 24 hours, or
- The temperature at each of the thermocouple points in the appliance varies by less than 2ºC over 24 hours.

Loading:

Appliances are tested in both the empty and the loaded condition. Tests which call for a vaccine load require cardboard boxes 100 x 100 x 100 mm and 100 x 100 x 50 mm containing empty glass vials or bottles such that the gross weight of the load is equivalent to 0.35 to 0.45 kg per litre of boxes.

The appliance should be filled up to any maximum loading line recommended by the manufacturer. The load must not be placed in the fast freeze compartments of freezers. If baskets and shelves are supplied by the manufacturer, these should be used.

- *Freezers:* The dummy vaccine load must be packed so that the smallest possible air spaces are left between the boxes, between the boxes and the internal walls of the appliance or between the boxes and the internal face of the loading basket(s) - if supplied.
- *Refrigerators:* The dummy vaccine load must be packed leaving a continuous 15mm air space between each column of boxes and between the outermost boxes and the adjoining walls of the refrigerator. If loading baskets are supplied, these should be filled in the same manner, but the outermost boxes may be tight up against the internal faces of the basket(s).

The total volume of vaccine which can be stored in this way represents the vaccine storage capacity to be used in the tests. In all cases, the volume and distribution of the vaccine load should be recorded.
Tests which require icepacks must use 0.6 litre icepacks conforming to Specification E05/IP-01 or 0.4 litre icepacks conforming to specification E05/IP-02.

Recording temperatures

Temperatures are recorded at various points within an appliance to monitor the temperature of the load, or the internal temperatures of the appliance when empty. Readings must be taken once per minute.
In general, temperatures at the centre of the vaccine load or empty cabinet are recorded together with any positions which are likely to experience extremes of temperature. Such positions might be near door seals, or where air circulation is restricted by the appliance design. In addition, other positions are also monitored so that an overall picture of the temperature distribution can be obtained – see Annex 2.
Where applicable, the following points should also be monitored:

- Surface temperature of evaporator plates;
- Flue temperature;
- Condenser fins or outer skin temperatures.

The position of sensors must never be altered during the stable running tests.

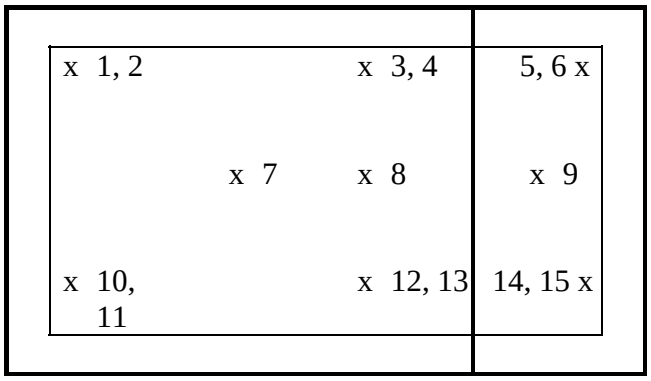
Multi-fuel and multi-function appliances

In cases where an appliance can use more than one fuel or power source (typically absorption refrigerators) the tests should start on electrical power before moving to another option.
In the case of appliances which can be run either as a freezer or as a refrigerator, the first set of tests should test the refrigerator function and the second set should test the freezer function. Dual compressor systems should be tested with both compressors on as this is typical of actual use.
Multi-fuel, multi-function equipment will be lengthy and costly to test, so a decision on which options should be tested will be made by WHO on a case by case basis.

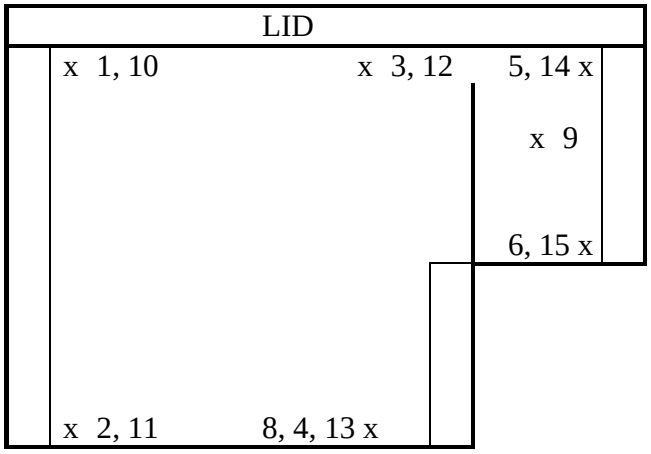
Annex 2 – Temperature sensor positions

Ice-lined refrigerators and/or freezer

Plan view



Front view



Revision history:			
Date	Change summary	Reason for change	Approved
23.03.2007	General edit	Final revisions to PQS format.	UK
26.04.2007	Revised to SMc comments & teleconference UK, SMc, AG 26.04.07		UK
16.05.2007	Final review version. Minimum ambient temperature test substituted for cold climate freeze protection test. Other minor changes.	Response to SMc and SS comments.	UK
23.05.2007	Areas not suitable for vaccine storage definition omitted (moved to specification). Holdover time definition corrected. Icepack freezing capacity definition corrected. 5.3.1: Minor additions. 5.4: Minor correction. 5.4: Excursion analysis added.	Consistency with other VPs.	UK
31.05.2007	5.3.8: Maximum freezer compartment temperature added	SMc. Consistency with other VPs.	UK