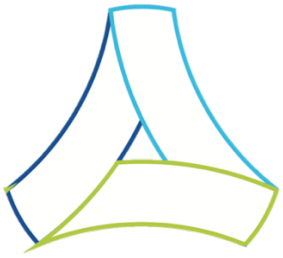


E001

Cold Rooms, Freezer Rooms and Related Equipment

All the equipment included in the E001 category is manufactured to meet the specific needs of national immunization programmes. End-users must specify their requirements for the procurement phase. They must also select or build the space where the equipment will be housed and must provide the necessary electrical power supply, wiring and other services to which the equipment will be connected by the installer. Once received on-site, the equipment must be assembled and commissioned by a competent installer.

Details regarding the products included in each sub-category of E001 as well as guidelines, performance specifications and verification protocols for this category, can be accessed through the drop-down sections below.

E001.1: Cold rooms and freezer rooms

A building that houses a cold room or freezer room needs to be site-ready and accessible to delivery vehicles. Details around adequate ventilation, electricity supply, among other key considerations, can be found in the pre-procurement checklist provided in the UNICEF Cold Chain Support Package.

The principle steps involved in buying and commissioning a cold room are:

1. **Establish net vaccine capacity:** It is essential to calculate accurately the net vaccine capacity of the cold room(s) and freezer room(s), taking account of future vaccine introductions. WHO tools are available to help establish the required capacity of the store. Orders should not be made on the basis of gross capacity — for example a 40 m^3 room — without verifying usable net capacity with the supplier.
2. **Decide location:** Select the spaces(s) in which the equipment is to be installed. Building selection and preparation guidance is provided in the WHO Guideline for establishing or improving primary and intermediate vaccine stores.
3. **Shortlist suppliers:** UNICEF Supply Division has long-term purchase agreements with prequalified cold room companies. If the cold room is not being purchased through UNICEF, a tender long list should be prepared. This should preferably include the companies of prequalified products listed in the UNICEF Supply Catalogue.
4. **Prepare and invite tenders:** Prepare tender documentation using the IMD-PQS performance specification E001/CR/FR-01.4 and verification protocol E001/CR/FR01-VP1.4. If required, tenders should be invited for a standby generator and voltage stabilizer at the same time. Specific guidance on specifying and buying generators is

provided in section E001.2. Guidance on heavy duty voltage stabilizers is provided in E001.3.

5. **Prepare the site:** The space for the cold room should be prepared in accordance with the supplier's requirements and the WHO Guideline for establishing or improving primary and intermediate vaccine stores.
6. **Supervise:** Care should be taken to supervise the installation and oversee commissioning and user training.
7. **Monitor:** Check the performance of the equipment in use and the effectiveness of the maintenance agreement should be monitored.
8. **Maintain:** Ensure that the temperature monitoring equipment is recalibrated annually. For additional guidance on maintenance refer to:
    - WHO-UNICEFs Effective Vaccine Store Management Initiative.
    - WHO Users' handbook for vaccine cold rooms and freezer rooms
    - WHO Self-assessment tool for looking after a cold room or freezer room

Prepare tender documentation using IMD-PQS performance specification E001/CR/FR-01.4 and verification protocol E001/CR/FR01-VP1.4. If required, tenders should be invited for a standby generator and voltage stabilizer at the same time. Specific guidance on specifying and buying generators is provided in the drop-down section below (E001.2), as is guidance on heavy-duty voltage stabilizers (E001.3).

E001.1: Stand-by generators

While WHO and UNICEF recommend that all primary vaccine stores should be fitted with a standby generator with automatic start up, regardless of the reliability of the mains power supply (refer to WHO also recommends that product users also consider installing standby generators in the following situations:

- at large intermediate vaccine stores, equipped with cold rooms
- at other sub-national stores where the mains power supply is sufficiently unreliable to compromise the performance of ice-lined refrigerators, even when they are fitted with voltage stabilizers..

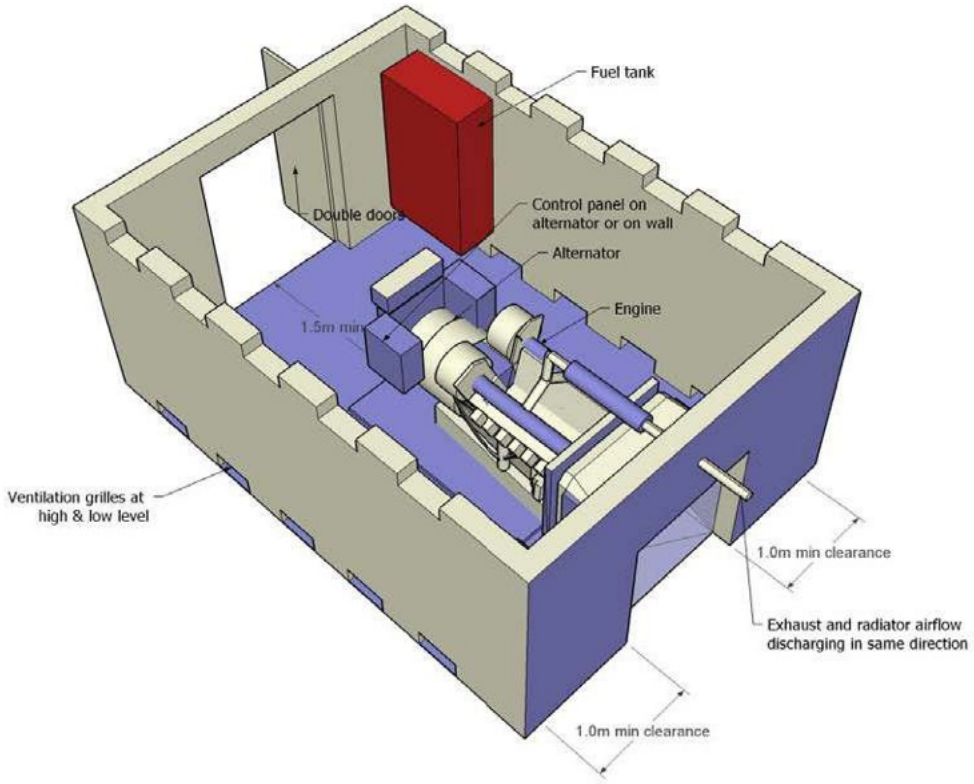
In all other situations, if power cuts are a chronic problem, review alternative solutions such as ice-lined appliances fitted with voltage stabilizers and photovoltaic equipment. The decision to purchase a standby generator should not be taken lightly as it involves a relatively high upfront investment as well as significant maintenance and training costs.

The guidance notes in this section are for background information only. They are intended to be used to brief a professional engineer and/or to communicate with system suppliers and installers. Wherever possible, the generator should be supplied by the cold room/freezer room manufacturer as part of a comprehensive package (see E001.1). In all other cases, seek the advice of a qualified electrical engineer. In situations where an engineer is not available, refer to a reliable technical source such as *Engineering in Emergencies — A Practical Guide for Relief Workers* (ISBN-13: 978-1853395215 and ISBN-10: 1853395218).

E001.2.1: Specifying the generator

The generator house: The size of a standby generator is determined by the rated load of the equipment to which it is connected. The figure below shows the layout of a typical generator house.

A typical generator house



The generator house should have a concrete floor slab. Install ventilation openings near the bottom of the walls to provide cooling air, with additional openings in the wall nearest the air filter to supply cool air for combustion. In addition, provide ventilation openings along the top of the walls to release accumulated hot air. All ventilation openings should be fitted with mesh grilles to keep out pests. Arrange the exhaust pipe above the cooling air outlet to discharge in the same direction. Keep the exhaust system as short as possible and with the minimum number of bends.

Fuel tanks should ideally be 'bunded'. A bunded tank consists of a tank mounted inside an outer housing large enough to accommodate the total contents of the tank, should it develop a leak. This ensures that fuel spills are contained and cannot get into the drainage system or the ground water.

E001.2.2: Inviting tenders for a generator

Prepare a tender short list. Every company on the short list must have a satisfactory arrangement with a competent installation contractor in the country where the equipment is to be installed and should be able to provide a long-term maintenance service or training for local technicians.

Tender invitations must include the following information:

1. **Client:** Name of the client.

2. **Location:** Site location.

3. **Delivery/installation date:** Specify the required date for delivery/installation should be specified.

4. **Payment arrangements:** Specify currency, payment stages and other relevant information should be specified.

5. **Information to be supplied by tenderers:**

- price (Incoterms)
- full technical details of the proposed equipment including fuel consumption on full load: fuel consumption will be a significant factor in choosing a generator set if anticipated run-times are long and less significant if the generator will be used infrequently
- details of the manufacturer's in-country installation and service network
- manufacturer's infrastructure requirements (e.g. cable connections)
- manufacturer's detailed recommendations for the generator house layout, construction and ventilation.

6. **The supply required:** Either: single-phase, 2-wire (phase and neutral), and system voltage, for example 110V, 220V or 240V. Or: three-phase, 4-wire (three-phase and neutral) and system voltage, e.g. 380/220V or 415/240V.

7. **Supply frequency:** 50 Hz or 60 Hz.

8. **Connected equipment:** A schedule listing every item of connected equipment, including cold rooms, freezer rooms, refrigerators and freezers. In addition, list all other equipment for which standby power is required, such as computers, printers and electric lighting. For each item on the list, give the power requirement in kW. In the case of motors (e.g. cold room compressors) give the method of starting, e.g. direct-on-line (DOL). If you cannot find this information, give full details of each item of equipment, including manufacturer and model number, and request the tenderer to obtain the missing data.

9. **Site conditions:** Ambient temperature, humidity and altitude affect generator performance. Give the annual maximum and minimum temperature at the site in degrees centigrade, the maximum and minimum relative humidity in percent and the altitude of the site above sea level in meters.

10. **Mounting method:** Skid mounted. (Mobile units are available, but are not appropriate for a fixed installation.)

11. **Weather protection:** State whether the generator should be supplied as an open or weather-protected set. Open sets will be housed in a generator house. Weather-protected sets may be mounted outdoors.

12. **Soundproofing:** Sound-proofed housings are usually expensive. A locally-made masonry enclosure is often cheaper and, in the case of units installed outside, they also provide protection against the weather (see above figure).

13. **Fuel:** Diesel is universal for all but the smallest portable generators. Natural gas might be required in areas with stringent air pollution regulations.

14. **Engine start:** If automatic mains-failure start and/or shut down are needed, this must be clearly stated. Otherwise specify hand and/or electric start, complete with battery (even with electric start, it is useful to have a hand-start facility when the battery is flat or missing).

15. **Engine monitoring facilities:** Over-heating, low oil pressure, battery charging ammeter or indicator. Automatic engine shut-down in the event of over-heating, low oil pressure or broken fan belt. Engine monitoring meters and indicators may be mounted on the control panel.

16. **Control panel:** Integrated (set-mounted) or free-standing control panel. Integrated control panels must be mounted on anti-vibration mountings. Instrumentation should include:

- one ammeter per phase
- one voltmeter and selector switch (to monitor each phase-phase and phase-neutral voltage)
- a frequency meter
- an hours-run meter.

17. **Fuel tank capacity:** Sufficient to allow a minimum of 72 hours continuous running and should be bundled.

18. **Exhaust pipework:** Run length and bends needed to ensure discharge in a safe location.

19. **Spare parts:** Either: the supplier must have an effective service network in-country. Or: an adequate supply of spare parts and consumables, sufficient for a minimum of two years of normal operation, as recommended by the set manufacturer, should be ordered.

20. **Installation:** It should be specified whether the equipment is to be installed and commissioned by the manufacturer's in-country agent (strongly recommended), or by another party.

21. **Training:** The manufacturer, or installer, must train vaccine store staff and maintenance technicians in the use of the equipment and must provide comprehensive operating and service manuals in the appropriate language.

22. **Maintenance agreement:** Wherever possible, the equipment should be maintained by the set manufacturer's in-country service agent. The tender documents should clearly specify the length of the maintenance agreement, the minimum requirements for routine maintenance and the maximum acceptable response time in the event of an emergency; e.g. equipment failure during a power outage.

E001.2.3: Choosing a supplier

The lowest bidder is not always the cheapest when lifetime operating costs are considered. Significant factors which reduce operating costs include:

- **Local availability of technical expertise and spare parts:** Tenderers without a local service network should generally be excluded from consideration.
- **Fuel consumption:** A model with low fuel consumption may be cheaper to operate over its whole working life than a model with higher fuel consumption but a lower purchase price.
- **Revolutions per minute (RPM):** Slow running generators with ratings below 1800 RPM have longer working lives. Models running at 3000 to 3600 RPM generally require more maintenance, have greater fuel consumption and a higher rate of mechanical wear. A cheap high RPM model may be a poorer choice than a more expensive low RPM model.

E001.2.4: Suppliers of standby generators

A list of standby generator suppliers can be found in the UNICEF Supply Catalogue. **This list does not constitute an endorsement or imply any recommendation by WHO of any of the products contained therein.**

E001.3: Voltage stabilizers for larger vaccine stores

Fluctuations in the electricity supply can cause the premature failure of motors, compressors and other electrical and electronic components. Fortunately, fluctuations can be controlled effectively and damage can be avoided by installing a voltage stabilizer on the power line which supplies the equipment. In addition, a surge protection device is recommended to prevent damage in the event of lightning induced spikes on the supply line. Lightning protection should also be included in areas where lightning is common.

Wherever voltage fluctuations exceed ±7%of the rated voltage at the supply point, WHO recommends that refrigeration equipment should be connected to the mains supply via a voltage stabilizer. This applies to cold rooms, freezer rooms, vaccine refrigerators and vaccine and ice-pack freezers at any level in the cold chain.

Associated electronic temperature monitoring equipment and computers should also be connected to a voltage-regulated circuit; this type of equipment is particularly sensitive to voltage fluctuations and to lightning-induced power surges.

There are various types of surge protectors. Some can survive only a limited number of surge events and with this type of equipment it is essential to stock an adequate stock of replacement components and to know how to replace them in the event of a failure.

It is generally good practice to ensure that refrigeration equipment and temperature monitoring/computers are supplied by separate dedicated supplies with separate voltage stabilizers. This ensures that the load variation of the refrigeration equipment does not adversely affect the electronic equipment, and enables the most appropriate type of voltage stabilizer to be chosen for each of the two load types.

Finally, the cost and design life of available equipment vary widely, with a design life of up to 20 years possible for highly critical applications. Large vaccine stores can hold hundreds of thousands of dollars' worth of vaccine; the cost of losing this inventory must be considered when choosing a voltage stabilizer and/or surge protector. It may be economically justifiable to install a more expensive system if it is more reliable and longer lasting.

E001.3.1: Types of stabilizer

The chosen voltage stabilizer must be able to cope with the full range of voltage fluctuations found at the vaccine store site.

Servo-mechanical voltage stabilizers: These provide a reliable and economical method of stabilizing mains voltage range variations of up to 50%. They use a proven technology that combines electro-mechanical components with electronic sensing and control to give a continuous, smooth and very stable output voltage. Servo-mechanical voltage stabilizers have some moving parts which, depending on the application, will require a small amount of low-level maintenance after a long period of time. This technology is the most suitable one for primary vaccine stores and for larger sub-national stores. A disadvantage of the technology is its slow response time to voltage changes, but this is not considered to be a major drawback for cold store equipment. Another disadvantage is that it may be less reliable than tap-changing, particularly if the equipment is not properly maintained.

Electronic voltage stabilizers: A solid-state continuous-acting electronic voltage stabilizer provides a better alternative for applications requiring extremely fast correction speed, or applications located in hostile climatic conditions. A problem with cheaper models of this type of equipment is that they often incorporate a cooling fan. These may clog up in dusty conditions. Alternatives which rely entirely on convection cooling are available, but they are typically more expensive than servo-mechanical devices.

Tap-changing voltage stabilizers and conditioners: A number of different tap-changing regulators are available; some are more reliable than others. A common type, used by many manufacturers, incorporates electronic tap-changing techniques. This type is prone to failure due to switching stresses. The more reliable devices use relays. For less sensitive equipment, where the output voltage only needs to be maintained within broad limits, a tap-changing solution is acceptable. All tap-changing regulators produce voltage jumps at the moment of tap-changing. Fortunately, refrigeration and air-conditioning units can accept these jumps. Tap-changing regulators may be unsuitable for loads such as sensitive monitoring equipment because they can cause graphic distortion or data loss. If ignored, this will eventually shorten

the life of the connected equipment or cause expensive damage. Tap-changing regulators are an appropriate choice for stabilizing the supply to individual refrigerators or freezers in small sub-national stores and at service point level. As an example, one widely used unit can control output voltages between -8% to +9% when the input voltage varies between -34% to +26%. These units should always include a time delay cut out to protect against high/low voltage damage to refrigeration compressors. High capacity tap-changing units are available for cold rooms but are typically more expensive than equivalent servo-mechanical units.

E001.3.2: When to install a voltage stabilizer

Voltage stabilizers are strongly recommended whenever new vaccine refrigeration equipment is being installed, particularly if electricity supply to the site is problematic. If existing vaccine cold room motors, compressors, relays and other related electric equipment suffer frequent failure, this is a good indication that the stability of the mains supply is poor.

If the area surrounding the vaccine store is under development, there is a risk that the development of the electricity supply will not match growing demand. This can lead to an unstable, unreliable or fluctuating electricity supply. In such situations it is prudent to install voltage regulation equipment as a precautionary measure.

E001.3.3: Inviting tenders for a voltage stabilizer

Prepare a tender short list and provide bidders with the following information:

1. **Rated mains supply:** Either: Single phase, two-wire (phase and neutral) and system voltage, for example 110V, 220V or 240V. Or: Three-phase, four-wire (three-phase and neutral) and system voltage, for example: 380/220V or 415/240V.
2. **Supply frequency:** 50 Hz or 60 Hz.
3. **Measured voltage and frequency fluctuations:** A qualified electrical engineer should be asked to obtain these measurements, which should be taken at frequent intervals over a period of at least one week. Allow for all potential loads and allow also for seasonal load variations.
4. **Electrical storm activity:** Indicate the frequency and intensity of electrical storms.
5. **Connected equipment:** Provide a schedule listing every item of connected equipment, including cold rooms, freezer rooms, refrigerators and freezers. In addition, list all other equipment for which voltage regulation and surge protection is required, such as computers, printers and electric lighting. For each item on the list, give the power requirement in kW. In the case of motors (e.g. cold room compressors), give the method of starting, e.g. direct-on-line (DOL). If you cannot find this information, give full details of each item of equipment, including manufacturer and model number and request the tenderer to obtain the missing data.
6. **Site conditions:** Peak ambient temperature and humidity may affect equipment performance. Give the annual maximum temperature at the site in degrees centigrade together with the maximum relative humidity in percent.
7. **Generator:** If there is a standby generator, full details of the unit, including make, model, kVA rating, start method (manual or automatic mains failure) and stop method (manual or mains-resumption), should be provided.

E001.3.4: Suppliers of voltage stabilizers

A list of prequalified voltage stabilizers can be found in Section E007 of the Catalogue. A list of voltage stabilizer suppliers can also be found in the UNICEF Supply Catalogue. These lists do not constitute an endorsement or imply any recommendation by the World Health Organization of any of the products contained therein.

E001.4: Solar power systems for cold and freezer rooms

Solar power systems can be considered for walk-in cold rooms and freezer rooms (CR-FR) where no electrical power is supplied, in situations where sustaining a reliable electrical supply is not possible, where power costs are not affordable, or where fuel and technical support is difficult and costly to obtain.

Energy requirements for CR-FR are significantly higher than solar-powered vaccine refrigerators/freezers; while solar refrigerators operate on low voltage direct current (45 Vdc or lower) a CR-FR will require more dangerous — even lethal — voltages including high-voltage (Vdc) solar generation as well as high-voltage alternating current (usually greater than 120 Vac) supplied as either single or three phase supply. A solar-powered CR-FR will require both an inverter (i.e. converts Vdc to Vac) and a backup generator (Vac), which are components not included in PQS solar refrigerator/freezer kits.

Both the solar electricity system and the back-up generator must be capable of powering 100% of the CR-FR electrical requirements, including battery chargers powered by the back-up generator. For more details see equipment performance specification E001/PVAC: Solar power system for cold and freezer rooms.

The configuration of a PQS compliant solar power system for CR-FR is more complicated compared to a PQS solar refrigerator/freezer kit. It is significantly larger in size and requires a higher initial investment. Furthermore, members of the immunization community have less experience with these larger hybrid solar-backup generator systems compared to solar powered vaccine refrigeration. A limited collective experience with larger solar power systems coupled with a 100% back-up power generation requirement necessitates the careful consideration of the energy efficiency of the selected CR-FR, meticulous design, safe installation and long-term commitment to sustainability.

Key requirements for the use of solar powered CR-FR include:

- energy-efficient, site-specific design, to ensure adequate performance,
- a qualified, professional electrician to ensure safe installation,
- solar and generator servicing availability to sustain operation, and
- planning and budgeting for repairs and eventual battery replacement.

Investing in an energy efficient CR-FR can reduce both the initial cost and long-term operating costs of the hybrid solar power system, in particular, by eliminating costly regular battery replacements. Like the site-specific design of the CR-FR, a site-specific power system

design is needed to consider local ambient temperatures, solar radiation and battery autonomy, as well as the site's peak electrical requirements. IMD-PQS requires CR-FR designers to comply with international norms and standards for sizing power system equipment (e.g. Institute of Electrical and Electronics Engineers IEEE 1562: Guide for array and battery sizing in stand-alone photovoltaic (PV) systems).

Solar power and back-up generators, like any other electrical supply and distribution systems, will require the timely availability of qualified service providers to sustain, maintain and repair the system. It is essential to establish an ongoing service programme with qualified service providers to sustain system operation, and minimize the risks associated with the potentially lethal voltages and components of solar powered CR-FR that may not be known to local service workers.

Planning and budgeting for ongoing services, unexpected repairs and eventual component replacements will ensure that the CR-FR has power when needed. Like early solar-plus-battery vaccine refrigerator/freezers, the much larger and more costly CR-FR battery will eventually fail and need to be replaced. Only those who prepare and budget for battery replacement and other sustainability needs will be able to ensure that power continues to be available as needed.

E001.5 Future developments: Battery-free SDD CR-FR

Solar cold and freezer room (CR-FR) designers indicated potential user preference for a battery-free solar direct drive (SDD) room, rather than for CR-FRs with battery-dependent solar power systems. WHO IMD-PQS had drafted specifications and verification protocols, enabling the future prequalification of SDD CR-FR's. SDD CR-FRs are currently being evaluated.

Solar-powered CR-FRs can now reach off-grid areas. If they may be cooled with battery-free SDD systems, this will avoid the cost and vulnerabilities associated with battery storage. Even in the case of mains-electricity grid availability, SDD may be a more reliable power supply. Given the lower-costs of solar module arrays, and the removal of battery-related costs, the SDD CR-FR is likely to have a lower total cost of ownership compared to diesel generators, and even compared to some mains grid power supply, whilst simultaneously imparting a lower environmental impact versus fossil fuel-generated electricity.

In addition to these SDD CR-FRs, E001 is also charting new territory with the:

- requirement for thermal energy storage to prolong autonomy time,
- optional allowance of energy harvest to power electrical needs (i.e. those needs that are not essential to cooling),
- allowance of standalone, exterior rooms,
- allowance of small volume rooms (5m3 up to 40m3),
- requirement for the CR-FR to pass laboratory testing, and
- the requirement for the room and solar power to undergo a field evaluation.

CATEGORY DOCUMENTATION, GUIDANCE FOR MANUFACTURERS/SUPPLIERS & SUPPORTING INFORMATION FOR USERS

Performance specifications

PQS performance specification E001/CR-FR01.4: Cold rooms and freezer rooms

PQS performance specification E001/PVAC01.0: Solar power system for cold and freezer rooms

Verification protocols

PQS type-examination protocol E001/SDD CR-FR VP.1: Solar direct drive cold rooms and freezer rooms

PQS quality assurance protocol E001/SDD CR-FR VP.2: Solar direct drive cold and freezer rooms

PQS type-examination protocol E001/LWICR01.1-VP2.2: Large Walk-in Cold Rooms

PQS quality assurance protocol E001/LWICR01.1-VP1.2: Large Walk-in Cold Rooms - guidance section

PQS quality assurance protocol E001/CR-FR01-VP2.4: Cold rooms, freezer rooms

PQS type-examination protocol E001/CR-FR01-VP1.4: Cold rooms, freezer rooms

PQS quality assurance protocol E001/PVAC-VP2: Solar power system for cold and freezer rooms

PQS type-examination protocol E001/PVAC-VP1: Solar power system for cold and freezer rooms

Guidance for manufacturers/suppliers

Generic guide for the field evaluation of new technologies for WHO PQS prequalification GENERIC/GUIDE 1.1

IMD-PQS Guidelines for Prequalification Holders

Supporting information for users

Cold room temperature mapping studies

Guideline for establishing or improving primary and intermediate vaccine stores

How to calculate vaccine volumes and cold chain capacity requirements

How to develop and repair a maintenance system for cold chain equipment

How to look after a cold room or freezer room: self-assessment tool

Self-assessment tool for looking after a cold room or freezer room

User's handbook for vaccine cold rooms and freezer rooms

WHO-UNICEF Effective Vaccine Store Management Initiative: Modules 1–4

WHO Immunisation Devices - Performance, Quality & Safety

E001: Cold rooms, freezer rooms, and related equipment

Product name:	**Cold rooms and Freezer rooms**
IMD-PQS Code:	E001-001
Status:	Prequalified
Date of acceptance:	17 Aug 2010
Appliance type:	E001
Product description:	Cold rooms and Freezer rooms
Manufacturer:	Porkka Finland Oy
Manufacturers Reference:	Cold rooms and Freezer rooms
Country of Manufacture:	Finland
Address:	Ravitie 3, FI-15860 Hollola FI-33470 Ylöjärvi Finland Finland
Telephone:	+358 10 2019200
Email:	petri.hiilloste@porkka.com
Website address:	www.porkka.com
Valid until:	31 May 2026

Specifications

PRODUCT SPECIFICATIONS - MAIN

Temperature Zones	Multizone	**Pre-qualified regions**	All regions
Auto defrost	Yes		

ENCLOSURE CONSTRUCTION OPTIONS

Cold room sizes available (largest, m3)	10.00	**Freezer room sizes available (L, m3)**	10.00
Door size options available	Yes	**Door frame heating available**	Yes
Panel insulation material	Polyurethane high density	**Panel jointing system**	Cam-lock jointing
Panel thickness options	100mm (standard); 150mm (option)	**Shelving system**	Adjustable shelves only
Shelving material	Plastic only	**Shared wall construction**	Yes
Strip curtain available	Yes	**Pressure release valve (FR only)**	Yes
Floor panel heater mat (FR only)	Yes	**Wall/Celling Panel Finish**	Polyester coated steel
Floor panel finish	Glassfiber re-enforced anti-slip plywood	**Type of Foaming Agent**	N-Penthane

PRODUCT SPECIFICATIONS - EQUIPMENT OPTIONS

Refrigerant	R455A	**Refrigeration unit mounting options**	Wall
Refrigeration unit types	Monoblock;Split type	**Lighting system**	Tungsten
Duty sharing	Timed changeover;Manual changeover	**Cold climate protection CR**	Yes
Evaporator plume guard CR	Yes	**ISO 9001/13485 certified**	Other
ISO 9001/13485 certified (Other)	ISO 9001;ISO 13485;IEC 60335-1	**Electric Safety Compliant To IEC 60335-1**	Yes
High/low voltage protection	Yes	**Voltage,Frequency,Phasing options?**	Yes
Voltage Regulator Available?	Yes	**Surge Protection Available?**	Yes
Cut-out system	Yes		

PRODUCT SPECIFICATIONS - TEMPERATURE MONITORING & ALARM OPTIONS

Temperature recording system	Dial thermometer;Event logger	**Alarm system**	Yes

ISO 14001 certified	Yes
Comments	Can provide cold rooms larger than 40m3 Freezer room sizes: >10 m3

WARRANTY, INSTALLATION AND MAINTAINENCE

Warranty period (months)	12.00	**Maintenance service**	Advisory service;Maintenance network
Installation service	Advisory service;Installer network		

QUALITY STANDARD

Specification Reference	Applicable PQS specification: CR-FR01.2 Applicable PQS VP(s): CR-FR01-VP.2

PRODUCT SITES

Organization name	Porkka Finland Oy
Address	Ravitie 3, FI-15860 Hollola FI-33470 Ylöjärvi Finland Finland

Current PQS status:	*Prequalified*	**Valid until:**	*31 May 2026*

Note: If Current PQS status is 'Suspended' or 'Withdrawn', this product is NOT to be purchased.

WHO Immunisation Devices - Performance, Quality & Safety

E001: Cold rooms, freezer rooms, and related equipment

Product name:	**refrigerator or freezer walk-in rooms 10 to 40m3**
IMD-PQS Code:	E001-002
Status:	Prequalified
Date of acceptance:	20 Apr 2011
Appliance type:	E001
Product description:	Cold rooms and freezer rooms
Manufacturer:	SN Zhendre
Manufacturers Reference:	refrigerator or freezer walk-in rooms 10 to 40m3
Country of Manufacture:	France
Address:	122 Avenue des Pyrénées 33140 Villenave d'Ornon France France
Telephone:	+33(0)6 79 02 13 95
Email:	clement.feuillon@eiffage.com
Website address:	www.zhendre.com
Valid until:	31 May 2026

Specifications

PRODUCT SPECIFICATIONS - MAIN

Temperature Zones	Multizone	**Holdover time CR**	Not tested
Holdover time FR	Not tested	**Pre-qualified regions**	All regions
Auto defrost	Yes		

ENCLOSURE CONSTRUCTION OPTIONS

Cold room sizes available (largest, m3)	10.00	**Freezer room sizes available (L, m3)**	10.00
Door size options available	No	**Door frame heating available**	Yes
Panel insulation material	Polyurethane high density	**Panel jointing system**	cam-lock, 2 polyethylene joints onto the 4 edges of each panel
Panel thickness options	100 mm - 150 mm	**Shelving system**	Adjustable shelves only
Shelving material	Plastic & Steel	**Shared wall construction**	---
Strip curtain available	Yes	**Pressure release valve (FR only)**	Yes
Floor panel heater mat (FR only)	No	**Wall/Celling Panel Finish**	Galvanized steel 5/10 Iceberg white powedered-coated
Floor panel finish	Phenolic resin	**Type of Foaming Agent**	Polyurethane high density

PRODUCT SPECIFICATIONS - EQUIPMENT OPTIONS

Refrigerant	R455A	**Refrigeration unit mounting options**	Wall;Wall split
Refrigeration unit types	Monoblock;Split type	**Lighting system**	Tungsten
Duty sharing	Manual changeover	**Cold climate protection CR**	Yes
Evaporator plume guard CR	Yes	**ISO 9001/13485 certified**	Other
ISO 9001/13485 certified (Other)	ISO 9001;IEC 60335-1	**Electric Safety Compliant To IEC 60335-1**	Yes
High/low voltage protection	Yes	**Voltage,Frequency,Phasing options?**	Yes
Voltage Regulator Available?	Yes	**Surge Protection Available?**	Yes
Cut-out system	Yes		

PRODUCT SPECIFICATIONS - TEMPERATURE MONITORING & ALARM OPTIONS

Temperature recording system	Dial thermometer	**Alarm system**	Yes

ISO 14001 certified	Yes
Comments	Freezer room sizes: >10 m3 Shelving material: anodized aluminium frame / polyethylene shelves

WARRANTY, INSTALLATION AND MAINTAINENCE

Warranty period (months)	12.00	**Maintenance service**	Advisory service;Maintenance network
Installation service	Advisory service;Installer network		

QUALITY STANDARD

Specification Reference	Applicable PQS specification: Applicable PQS VP(s):

PRODUCT SITES

Organization name	SN Zhendre
Address	122 Avenue des Pyrénées 33140 Villenave d'Ornon France France

Current PQS status:	*Prequalified*	**Valid until:**	*31 May 2026*

Note: If Current PQS status is 'Suspended' or 'Withdrawn', this product is NOT to be purchased.

WHO Immunisation Devices - Performance, Quality & Safety

E001: Cold rooms, freezer rooms, and related equipment

Product name:	**HAIER Cold rooms and Freezer rooms**
IMD-PQS Code:	E001-003
Status:	Prequalified
Date of acceptance:	25 Oct 2011
Appliance type:	E001
Product description:	Cold rooms and freezer rooms
Manufacturer:	Qingdao Haier Biomedical Co., Ltd
Manufacturers Reference:	HAIER Cold rooms and Freezer rooms
Country of Manufacture:	China
Address:	No.280 Fengyuan Road High-tech Zone Qingdao Shandong China
Telephone:	+86-15066227057
Email:	tianhui.yu@haierbiomedical.com
Website address:	http://www.haiermedical.com
Valid until:	31 May 2025

Specifications

PRODUCT SPECIFICATIONS - MAIN

Temperature Zones	Multizone	**Pre-qualified regions**	All regions
Auto defrost	Yes		

ENCLOSURE CONSTRUCTION OPTIONS

Cold room sizes available (largest, m3)	10.00	**Freezer room sizes available (L, m3)**	10.00
Door size options available	Yes	**Door frame heating available**	Yes
Panel insulation material	Polyurethane	**Panel jointing system**	Tongue and groove, cam lock
Panel thickness options	100 - 150 mm	**Shelving system**	Adjustable shelves only
Shelving material	Steel only	**Shared wall construction**	Yes
Strip curtain available	Yes	**Pressure release valve (FR only)**	Yes
Floor panel heater mat (FR only)	Yes	**Wall/Celling Panel Finish**	Zinc polyester powdered coated
Floor panel finish	Rubber corrugated	**Type of Foaming Agent**	Polyurethane

PRODUCT SPECIFICATIONS - EQUIPMENT OPTIONS

Refrigerant	R448a or R455a	**Refrigeration unit mounting options**	Wall;Ceiling
Refrigeration unit types	Monoblock	**Lighting system**	Tungsten
Duty sharing	Manual changeover	**Cold climate protection CR**	No
Evaporator plume guard CR	Yes	**ISO 9001/13485 certified**	Other
ISO 9001/13485 certified (Other)	ISO 9001;ISO 13485;IEC 60335-1	**Electric Safety Compliant To IEC 60335-1**	Yes
High/low voltage protection	No	**Voltage,Frequency,Phasing options?**	Yes
Voltage Regulator Available?	No	**Surge Protection Available?**	No
Cut-out system	Yes		

PRODUCT SPECIFICATIONS - TEMPERATURE MONITORING & ALARM OPTIONS

Temperature recording system	Event logger	**Alarm system**	Yes

ISO 14001 certified	Yes
Comments	Upon request: AVR; Surge protection; split units - Cold climate protection not yet available. Event logger: Haier Intelligent Recorder Power options: DC and AC compressor optional Freezer room sizes: >10 m3

WARRANTY, INSTALLATION AND MAINTAINENCE

Maintenance service	Advisory service	**Installation service**	Advisory service

QUALITY STANDARD

Specification Reference	Applicable PQS specification: Applicable PQS VP(s):

PRODUCT SITES

Organization name	Qingdao Haier Biomedical Co., Ltd
Address	No.280 Fengyuan Road High-tech Zone Qingdao Shandong China

Current PQS status:	*Prequalified*	**Valid until:**	*31 May 2025*

Note: If Current PQS status is 'Suspended' or 'Withdrawn', this product is NOT to be purchased.

WHO Immunisation Devices - Performance, Quality & Safety

E001: Cold rooms, freezer rooms, and related equipment

Product name:	**Cold Rooms & Freezer Rooms**
IMD-PQS Code:	E001-004
Status:	Prequalified
Date of acceptance:	26 May 2015
Appliance type:	E001
Product description:	Cold Rooms & Freezer Rooms
Manufacturer:	FOSTER Refrigerator
Manufacturers Reference:	Cold Rooms & Freezer Rooms
Country of Manufacture:	United Kingdom
Address:	Plant 3 Rollesby Road PE344LS Kings Lynn Norfolk United Kingdom of Great Britain and Northern Ireland
Telephone:	+44 1553 780501
Email:	virginia.kisieliute@foster-gamko.com
Website address:	www.fosterrefrigerator.co.uk
Valid until:	31 May 2026

Specifications

PRODUCT SPECIFICATIONS - MAIN

Temperature Zones	Multizone	**Temperature Zones (Other)**	Testing
Holdover time CR	Not tested	**Holdover time FR**	Not tested
Pre-qualified regions	All regions	**Auto defrost**	Yes

ENCLOSURE CONSTRUCTION OPTIONS

Cold room sizes available (largest, m3)	40.00	**Cold room sizes available (smallest, m3)**	10.00
Freezer room sizes available (S,m3)	40.00	**Freezer room sizes available (L, m3)**	10.00
Door size options available	Yes	**Door frame heating available**	Yes
Panel insulation material	High density CFC free polyurethane	**Panel jointing system**	Cam locks at regular interval with factory cut corners
Panel thickness options	75 to 100 mm	**Shelving system**	Fixed shelves only
Shelving material	Steel only	**Shared wall construction**	Yes
Strip curtain available	Yes	**Pressure release valve (FR only)**	Yes
Floor panel heater mat (FR only)	Yes	**Wall/Celling Panel Finish**	White foodsafe laminate on galvanised steel substrate
Floor panel finish	Rigidised galvanised steel	**Type of Foaming Agent**	High density polyurethane

PRODUCT SPECIFICATIONS - EQUIPMENT OPTIONS

Refrigerant	R290, A21, R449, R452	**Refrigeration unit mounting options**	Wall;Ceiling
Refrigeration unit types	Monoblock;Split type	**Lighting system**	Tungsten
Duty sharing	Timed changeover;Manual changeover	**Cold climate protection CR**	Yes
Evaporator plume guard CR	Yes	**ISO 9001/13485 certified**	Other
ISO 9001/13485 certified (Other)	ISO 9001;IEC 60335-1	**Electric Safety Compliant To IEC 60335-1**	Yes
High/low voltage protection	Yes	**Voltage,Frequency,Phasing options?**	Yes
Voltage Regulator Available?	Yes	**Surge Protection Available?**	Yes
Cut-out system	Yes		

PRODUCT SPECIFICATIONS - TEMPERATURE MONITORING & ALARM OPTIONS

Temperature recording system	Dial thermometer;Event logger	**Alarm system**	Yes
ISO 14001 certified	Yes		

Comments	Cold room and freezer rooms sizes: 10m3, 20m3, 30m3, 40m3 Cold rooms and freezer rooms are available either with mono-block or split refrigeration systems.

WARRANTY, INSTALLATION AND MAINTAINENCE

Warranty period (months)	12.00	**Maintenance service**	Advisory service;Maintenance network
Installation service	Advisory service;Installer network		

QUALITY STANDARD

Specification Reference	Applicable PQS specification: E001/RF01.3 Applicable PQS VP(s): E001/RF01-VP1.3

PRODUCT SITES

Organization name	FOSTER Refrigerator
Address	Plant 3 Rollesby Road PE344LS Kings Lynn Norfolk United Kingdom of Great Britain and Northern Ireland

Current PQS status:	*Prequalified*	**Valid until:**	*31 May 2026*

Note: If Current PQS status is 'Suspended' or 'Withdrawn', this product is NOT to be purchased.

WHO Immunisation Devices - Performance, Quality & Safety

E001: Cold rooms, freezer rooms, and related equipment

Product name:	**Viessmann**
IMD-PQS Code:	E001-005
Status:	Prequalified
Date of acceptance:	05 Jun 2019
Appliance type:	E001
Product description:	Cold rooms and Freezer rooms
Manufacturer:	Viessmann Kuhlsysteme GmbH
Manufacturers Reference:	Viessmann
Country of Manufacture:	Germany
Address:	Dr.-Vießmann-Straße 1, 95030 Hof/Saale, Germany Germany
Telephone:	+49 151 746 568 74
Email:	dosf@viessmann.com
Website address:	https://www.viessmann-cold.com/
Valid until:	31 May 2026

Specifications

PRODUCT SPECIFICATIONS - MAIN

Temperature Zones	Multizone	**Pre-qualified regions**	All regions
Auto defrost	Yes		

ENCLOSURE CONSTRUCTION OPTIONS

Cold room sizes available (largest, m3)	10.00	**Freezer room sizes available (L, m3)**	10.00
Door size options available	Yes	**Door frame heating available**	Yes
Panel insulation material	Polyurethane	**Panel jointing system**	Cam-lock jointing
Panel thickness options	80, 100, 120, 150 mm	**Shelving system**	Adjustable shelves only
Shelving material	Steel only	**Shared wall construction**	Yes
Strip curtain available	Yes	**Pressure release valve (FR only)**	Yes
Floor panel heater mat (FR only)	Yes	**Wall/Celling Panel Finish**	Polyester-Epoxid coated steel
Floor panel finish	Stainless steel with anti-slip finish	**Type of Foaming Agent**	Penthane

PRODUCT SPECIFICATIONS - EQUIPMENT OPTIONS

Refrigerant	R134a, R407A, R452A, R290, R513a, R449	**Refrigeration unit mounting options**	Wall;Ceiling
Refrigeration unit types	Monoblock;Split type	**Lighting system**	Tungsten
Duty sharing	Timed changeover	**Cold climate protection CR**	Yes
Evaporator plume guard CR	Yes	**ISO 9001/13485 certified**	Other
ISO 9001/13485 certified (Other)	ISO 9001;IEC 60335-1	**Electric Safety Compliant To IEC 60335-1**	Yes
High/low voltage protection	Yes	**Voltage,Frequency,Phasing options?**	Yes
Voltage Regulator Available?	No	**Surge Protection Available?**	Yes
Cut-out system	Yes		

PRODUCT SPECIFICATIONS - TEMPERATURE MONITORING & ALARM OPTIONS

Temperature recording system	Dial thermometer	**Alarm system**	Yes
ISO 14001 certified	Yes		

Comments	Freezer room sizes: >10 m3

WARRANTY, INSTALLATION AND MAINTAINENCE

Warranty period (months)	12.00	**Maintenance service**	Advisory service
Installation service	Advisory service		

QUALITY STANDARD

Specification Reference	Applicable PQS specification: E001/CR-FR01.4 Applicable PQS VP(s): E001/CR-FR01-VP

PRODUCT SITES

Organization name	Viessmann Kuhlsysteme GmbH
Address	Dr.-Vießmann-Straße 1, 95030 Hof/Saale, Germany Germany

Current PQS status:	*Prequalified*	**Valid until:**	*31 May 2026*

Note: If Current PQS status is 'Suspended' or 'Withdrawn', this product is NOT to be purchased.