

PROCUREMENT GUIDELINES

WALK-IN COLD ROOMS AND FREEZER ROOMS

Procurement Guidelines

Walk-In Cold Room (WIC)

Walk-In Freezer Room (WIF)

Key information for UNICEF staff and partners, ensuring effective and efficient procurement of Cold Chain equipment.

This module gives guidance to the procurement of Walk-In Cold Rooms and Walk-In Freezers for vaccine storage.

Always make sure that you have the latest version of this document by checking the [CCSP website](#).

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Acronyms

CCSP	Cold Chain Support Package
CO	Country Office
DOA	Direct Order Arrangement
EPI	Expanded Programme of Immunization
LTA	Long Term Arrangement
PHC	Primary Health Care
PQS	Performance Quality and Safety
PQT	Prequalification Team
PO	Purchase Order
PS	Procurement Services
SD	Supply Division (UNICEF)
WHO	World Health Organization
WIC	Walk-In Cold Room
WIF	Walk-In Freezer Room

1 Needs Identification

1.1 Introduction

Walk-In Cold Rooms (WIC) and Walk-In Freezer Rooms (WIF) are refrigerated enclosures accessible via at least one door and large enough for a person to walk into, housed within existing buildings. WICs and WIFs are an important storage point in the temperature-controlled supply chain and usually used at the central or national level. In some countries they are also used at the regional or district level.

The requirements for new WIC/WIFs need to be justified. The decision to acquire WICs and/or WIFs should be based on several criteria, most important of which are the current existing storage capacities for vaccines and the anticipated future storage requirements, especially in view of the introduction of new vaccines. The procurement of Cold Chain equipment should be based on national policy, Expanded Programme of Immunization (EPI) strategies and according to planned national asset acquisition and replacement policies. Acquiring WIC/WIFs calls for the involvement of EPI managers and logisticians to determine required storage capacities.



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A worker carries an insulated shipping container filled with polio vaccines from a Cold Room to a refrigerated van, at the National Institute of Health, in Islamabad, Pakistan. The National Institute of Health houses the Federal Vaccine Store, where all vaccines and related supplies are received and then distributed.

1.2 Cold Rooms and Freezer Rooms Supplied by UNICEF SD

UNICEF Supply Division (SD) only supplies WIC/WIFs that fulfil the quality requirements set by WHO, documented in the [WHO PQS manual](#).¹

UNICEF SD procures five WHO standard sizes via Long Term Arrangements (LTAs)²:

Table 1. WIC/WIFs Available on LTA (2016)

Cold Room, Walk-In Type, 10 m ³	Pre-fabricated Walk-In Cold Rooms supplied with all mechanical and electrical fittings
Cold Room, Walk-In Type, 30 m ³	
Cold Room, Walk-In Type, 40 m ³	
Cold/Freezer Room, 40 m ³	Pre-fabricated combined Walk-In Cold/Freezer Room (25 m ³ /15 m ³) ³ supplied with all mechanical and electrical fittings
Freezer Room, 20 m ³	Pre-fabricated Walk-In Freezer Room supplied with all mechanical and electrical fittings

¹ UNICEF SD procures pre-qualified and listed equipment that conform to WHO standards. These standards are documented in the WHO PQS (Performance, Quality and Safety) manual, which is accessible online.

² UNICEF SD establishes Long Term Arrangements (LTAs) with suppliers, usually for a period of 24 months. Refer to the document [General Procurement Guideline](#) for further details on LTAs.

³ These numbers refer to the capacity of the cold room section and the freezer room section respectively.

UNICEF SD is also able to assist with the supply of non-standard sized rooms. However, requests for non-standard sized WICs/WIFs may require an additional 2-3 months for procurement, due to the necessary tender processing. Supplier lead times, in this case, may be longer than for LTA standard-sized rooms. Based on technical review of incoming country requests for non-standard rooms, SD may suggest standard sized WIC/WIF to be supplied as an option. For further information refer to the Section on Delivery Lead Times in this document.

1.3 Types of WICs and WIFs

Two distinct types of WICs and WIFs exist:

a. Plug-in Model

A plug-in product has the controls, the compressor, the condenser and the evaporator as a complete unit, assembled and ready for installation. Each WIC/WIF is supplied with two complete plug-in refrigeration units to provide 100 per cent stand-by cooling. These are hung on the prefabricated panel walls of the WIC/WIF, or mounted on the ceiling panels.

- Advantages:
 - Faster and easier to assemble
 - Does not require extra wiring, piping and connection cabling
- Disadvantages:
 - Requires sufficient ventilation as the refrigeration units generate hot air in the vicinity of the cold room which affects the efficiency of the refrigeration system
 - In humid countries this could cause formation of condensate in WICs with the potential for vaccine wastage as a result of peeling of labels on vaccine vials.
 - Isolation of the condenser section is recommended which requires it to be fitted with ducting and air extractor fans to remove hot air from the room within which the WIC or WIF is installed.
 - Noise generated from the condenser/compressor may cause disturbance

b. Split-Unit Model

Unlike the Plug-in refrigeration units, the split unit refrigeration model consists of two main parts: (1) the condensing component for installation outside the room where the WIC/WIF is installed, and (2) the evaporator component installed inside the room. At the site of installation, these parts are linked with solid leak proof connection tubing between the evaporator and the condensing unit.

- Advantage:
 - The condensing unit can be located where noise generated from the condenser/compressor causes minimal disturbance, and where heat emissions generated by the compressor and condenser units do not affect the ambient temperature of room where the equipment is installed
- Disadvantages:
 - Not operational on receipt from the supplier as the condensing and evaporating components need to be installed in two different locations
 - Require that wiring and piping connections are made and charged with refrigerant gas after installation

- The installation process requires an experienced refrigeration technician to ensure leak proof connections as well as the electrical wirings and refrigerant gas charging.

2 Budgeting

For information about budgeting for procurement, refer to the [General Procurement Guideline](#).

3 Ordering

3.1 Starting the Process

Refer to the [General Procurement Guideline](#) and the [UNICEF SD Procurement Services website](#) for general guidance on how to order Cold Chain products and services. In the event that the General Procurement Guideline does not provide sufficient information, please contact the Supply Division Procurement Services for specific queries.

The option of ordering installation services through UNICEF SD is discussed in Section 6 of this document.

3.2 Delivery Lead Times

Refer to the section 'When to Order' in the document '[General Procurement Guidelines](#)'.

3.3 Technical Considerations

a. Standard Requirements for WIC and WIF

The following specifications are standard requirements for WICs and WIFs (extracted from WHO PQS⁴):

- Thermostat must be calibrated to ITS-90 (International Temperature Scale) and should be accurate to +/- 0.5°C;
- The stated hold-over time (Temperature must remain above +2°C for cold climate zones, below +10°C for hot and temperate zones for WIC, and must not rise above -10°C for WIF) for at least 8 hours for both WIC and WIF;
- Lighting must be internal ceiling mounted tungsten filament light fitting or LED with external switch and pilot light (fluorescent lighting must not be used);
- CFC Free refrigerant gas must be used;
- All compressors to be fitted with hour meter to record the running duration for each unit.

b. Dimensions and Power Consumption

An important consideration is whether the WIC/WIF ordered will fit into the allocated room, allowing for sufficient space for access and ventilation. Consult the [Quick Reference Guide](#) for dimensions and power consumption of standard WICs and WIFs currently procured through UNICEF SD. The purpose of these parameters is to assist in pre-installation prepositioning, advice on power requirements and programmatic planning for energy costs for running the WICs and WIFs.

⁴ For full WHO PQS specifications refer to the [WHO PQS Manual](#)

c. Generator

In some locations, the electricity supply for the WIC/WIF is not stable and reliable. The WHO PQS stipulates that the electric power supply should be maintained at least 8 hours per day for WIC/WIF to operate properly and maintain the appropriate temperature to safeguard the vaccines. 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.

c. Weight and Volume Factors

The UNICEF [Cold Chain Weight and Volume Calculator](#) and the WHO [EVM Assistance Tool](#) will help you identify the size and net storage capacities of WICs and WIFs. Estimated weights and volumes for standard WICs/WIFs are listed in the item specifications in the [UNICEF Supply Catalogue](#) (click on equipment item for detailed information). Please note that WICs and WIFs should be installed with ample space to allow for sufficient air circulation and be protected against adverse weather conditions.

d. Manufacturers Product Manuals

The UNICEF SD Cold Chain Unit has established an online database of [Manufacturers' Manuals](#), including Installation, User and Technician Manuals. The manuals are categorised by Product Category and Manufacturers' Name. They can be viewed, downloaded and printed.

3.4 Recommended Components

UNICEF is supporting the following WHO recommended components for primary and intermediate vaccine stores to meet international norms for WICs and WIFs. Consequently, WICs and WIFs supplied by UNICEF include these components:

a. Temperature data logger

The temperature data logger is a WHO PQS standard requirement for WICs and WIFs. This should be a programmable electronic temperature and event logger with integral alarm and auto dialler and meet the [WHO E6/TR03 PQS product verification protocol](#).

Data logger features:

- Temperature sensor for specific locations within the cold/freezer room; Wired or wireless type
- Door-open sensor for detecting whether door is open or closed;
- Power failure sensor;
- PC to store, display and print temperature and event reports;
- Alarm sounder triggered whenever sensor records a temperature or event excursion outside programmed alarm settings;
- Auto dialler which dials pre-programmed telephone numbers; or sends E mails, SMS messages in case of alarm;

For further information refer to the document [UNICEF Cold Chain Support Package Temperature Monitoring Devices](#)

b. Alarms (standard)

Alarms should be mains operated and audible with battery back-up and automatic recharge, triggered in the event of mains failure or when cold/freezer room temperatures are outside set parameters.

3.5 Optional Accessories

When ordering WICs and WIFs, the following optional accessories should be considered, depending on local conditions:

a. Alarms (optional)

Audible alarms forming part of a programmable electronic temperature and event logger system with an auto dialler (Email or SMS messaging) to specific personnel responsible for the cold chain store (described in [E6/TR03 WHO performance specifications](#)).

b. Temperature monitoring for WIC and WIF

Option 1. Wall mounted pen recording thermometers (optional)

This is an option for countries where computers for use with data loggers are not feasible. A 7-day pen recorder should be included as optional back-up for countries without reliable power for PCs.

The following performance specifications should be met (extract from WHO PQS⁵):

- Upper and lower limits + 50°C to – 30°C
- Accuracy +/- 1°C
- Resolution +/- 0.5°C
- Refillable or inkless pen
- Minimum acceptable recording period between chart changes is 7 days
- Power source 110/240 volts 60/50 Hz mains operated with rechargeable and replaceable battery backup with 48hrs charge capacity (PQS E06/TR04)

Option 2. Dial thermometer (optional)

A vapour or gas pressure dial thermometer for ease and quick reference of temperature to be mounted on the front face of the WIC/WIF in line with WHO/PQS/E06/TH01.1 performance specifications. This is intended for visual temperature monitoring/checking where electronic data temperature data logger could be installed at a secluded and not readily accessible location.

c. WIC/WIF Cooling unit changeover Options

Option 1. Change-over Switch

A change-over-switch can be requested with specifications for either:

- Manual change
- OR
- Switch with an automatic duty sharing circuit with 7 day⁶ change over and manual override in the event of mechanical failure

Option 2. Thermostatic Control

Alternative to the switch is a thermostatic control for the dual units through differential settings of the thermostat. This allows for the dual cooling units to be in the 'ON' position all the time but

⁵ WHO/PQS/E006/TR04.1

⁶ Or number of days as requested

set at staggered temperature. In the event of temperature rise, the one on higher setting takes up the cooling.

Note: For this reason the back-up generator should be able to support the power requirement of both units at the same time – this is often miscalculated.

d. Voltage Stabilisers

WICs and WIFs have electronic components and control systems which are susceptible to power fluctuations. Intermittent national grid power supply, as well as stand-by generators during start-up on heavy load pick-up and shut down, result in transients that contribute to system failure. This creates high surges that are detrimental to sensitive components and accessories, leading to their failure and consequently that of the WICs/WIFs.

It is therefore recommended to equip WIC and WIF rooms with voltage stabilisers which only allow power to the system when pre-set conditions are met. Diverse Cold Chain store loads will require appropriate sizing of the voltage stabilisers to match the equipment installed. This should take into account refrigerators and freezers.

More details on Voltage Regulators and Stabilisers can be found in the respective guideline on the product page of the [CCSP web portal](#).

A list of the most common accessories for WICs and WIFs is given in Annex 1.

3.6 Ordering Spare Parts

When ordering WICs and WIFs, the manufacturers' guidelines should be considered in ordering replacement parts and consumables. In some countries replacement parts cannot be sourced locally at short notice. In these circumstances it may be prudent to order essential spare parts together with the equipment. Some countries have a Maintenance Workshop tasked with the maintenance and repair of Cold Chain equipment. Such a workshop may keep a stock of essential spare parts, which facilitates a rapid response in case of equipment breakdown. Refer to the [Manufacturers' Product Documentation](#) for details on recommended spares.

3.7 Requesting SD Support for Installation

The option of ordering installation services through UNICEF SD is covered in Chapter 6 of this document.

4 Site Preparation

4.1 Site Readiness for Installation

The importance of site readiness cannot be over-emphasized. Cold Rooms are very bulky items that require special care and consideration during the pre-installation period.

COs and Procurement Services (PS) partners are advised to consider the following instructions for site readiness to allow for the contracted technician(s) to start work immediately upon arrival at the installation site:

- a) Ensure that all components are on site and located within carrying distance from the final installation area before arrival of the technician (if the supplier is carrying out the installation);
- b) All components should be stored in a covered and secured area, protected from excessive heat;
- c) Ensure that the intended installation site is cleared and ready for immediate installation to commence;
- d) Equip installation space with adequate ventilation/windows which can be opened on top of existing wall(s) with netting/burglar proof grills;
- e) Minimum staff required on site, for installation purposes:
 - Engineers from the installation service supplier. The engineers will be in charge of the installation. Equipment crates should be opened by the engineers to verify that all components have arrived as packed by the supplier; a receipt checklist/report should be prepared.
 - Local labourers. Ensure that there are local labourers available for carrying the materials and doing minor work such as installation of floors, wall, ceiling panels, doors and shelving under the supervision of the supplier's engineer.
 - Local electrician. It is recommended that a local electrician is available on site to assist with the installation and connection of equipment to the local power supply network.
 - Local staff. It is recommended that all technical personnel responsible for the future daily operation, maintenance and service of the room(s) are present at the installation and participate in the installation work to help them gain a thorough understanding of the equipment.



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EPI technician checks the vaccines in a Cold Room to maintain the Cold Chain system for the Northern Region, managed by the Ministry of Public Health for Balkh Province in Afghanistan.

4.2 Prefabricated Rooms

COs and PS partners should consider the following guideline pertaining to prefabricated rooms:

- a) Depending on the configuration of the WIC/WIF, the door position (on the long or short wall) should be in the middle, leaving a space of 2.5 – 3 meters in front of the door wall for easy access to the room, such as handling and possible repacking of stored goods;
- b) When planning the room lay-out, please note that the side and back of the room should be installed with a minimum distance of 100 mm from the existing building wall;
- c) As a prerequisite, installation of the WIC/WIF should be done on a levelled concrete floor;
- d) As rooms are made of prefabricated insulation panels, the levelling/base evenness requirements are maximum +/- 5 mm per 5 m; and
- e) The door entrance to the installation area should be at least 900 mm wide to allow access for the prefabricated panels and other components.

WHO Cold Store planning information and dimensions are given in the [Quick Reference Guide](#), giving details of a typical Cold Room installation plan, both in top view and cross-sectional view.

4.3 Electrical Supply and Power Consumption

Power supply for the WIC/WIF is supplied by the national grid or by a generator. The power supply can either be 220-240V single phase or 380-400V 3-phase, 50/60 Hz. A proper switch box/distribution board with fuses and a main switch to isolate the power supply must be installed.

5 In-Country Transport

Procured products will often need to be transported within the country. In some larger countries, WIC/WIFs are deployed at sub-national level, e.g. in regional and district or zonal stores. In-country transport should be taken into consideration during the budgeting and ordering stages. The necessary local resources for transportation, manpower and time should be included in the planning process.

For further information refer to the document '[General Procurement Guidelines](#)'.

6 Installation

6.1 Timely Installation

As WIC/WIF require installation, it is important to take into consideration the time required for installing and making equipment fully operational. Allow for minimum 4-5 weeks of preparation time from issuance of service contract including clear outlined Terms of Reference together with declaration of site readiness to the arrival of the technicians. This time varies from case to case depending on visa and medical requirements, flight availability, etc. To assist the supplier with planning, the customer should provide all relevant facts to the supplier, and provide support to help minimize potential delays. This can for example include recommending and booking suitable hotel accommodation, and should always include the provision of local transport to and from the installation site(s).

6.2 In-Country Installation

6.2.1 Installation without UNICEF SD Support

In cases where in-country capacity is available, it is recommended to procure the installation of the WIC/WIF either internally from the national Cold Chain services or from locally contracted firms. In this case, it is important to ensure that the in-house or contracted technicians are properly trained and have the professional experience to undertake this type of work.

Outsourcing the installation of WICs and WIFs provides an opportunity for training in-house technicians. In order to build local capacity in installation, use and preventive maintenance of WIC/WIF, it is recommended to include a training session for local technicians while the contracted installer is present on site. Further information on this type of training can be obtained from the [UNICEF SD Cold Chain Unit](#).

An animated installation video is available [here](#). The video shows the installation process of a prefabricated cold room with plug-in type refrigeration units and serves as additional help tools.

For countries intending to conduct the installation of received cold and/or freezer rooms themselves, the Site Preparation section, earlier in this document, will provide useful additional reference. It should be noted that the guide does not replace the necessity of qualified and knowledgeable personnel to conduct the installation. At the end of an installation project the [Installation Completion Checklist](#) serves as conclusive documentation and proof for completion.

6.2.2 Installation with UNICEF SD Support

Timely preparation of installation projects can save considerable time and resources. If a country has insufficient capacity to conduct the installation of WIC/WIF equipment, procurement of installation services through SD is an option, also in the event of post-installation complications and complaints handling.

Where in-country installation capacity is unavailable or limited, the installation of WIC/WIF by a supplier's technicians can be an opportunity for in-country capacity building on the installation, use and preventive maintenance of WICs and WIFs. SD can assist in co-coordinating and ordering training services.

To request SD assistance with installation, the following information needs to be communicated to SD, in a timely manner:

- a) When were the rooms delivered and under which PO reference?
- b) When do the rooms need to be in place (timeline for installation)?
- c) What are the Terms of Reference (TOR) for this project? Include all relevant information regarding the expected extent of the work and whether additional work is required such as training, repair of existing rooms, etc. If the project goes beyond installation of WIC/WIF, SD can explore favourable options with the service provider to optimise the project outcomes, if communicated early.
- d) What is the status of site readiness, including electrical installations, foundation platform, etc.?
- e) Is there outstanding repair work or maintenance that could be connected to the project?
- f) What WIC/WIF types and sizes are to be installed, and what is the refrigeration unit type (plug-in or split-type)?

- g) Are local staff with suitable base level qualifications available for training if required? If so, what would be the estimated number of training participants?
- h) Which type of training is required?
- i) When and where were the rooms delivered? What is the PO reference?
- j) What is the exact address of the installation site(s)?
- k) Is there a need to distribute the equipment to one or more destinations other than the place of delivery defined in the PO? Inform SD whether the rooms are already available on-site or what the estimated timeline is for in-country distribution to the installation site(s).
- l) If different locations are involved, information about distances and travel times between the sites, the number of rooms per site, etc. should be communicated to SD. Are all installation sites ready for installation?
- m) Who in the CO can be contacted for queries? Please provide contact details. The contact(s) should be available for clarification on procurement related aspects of the projects and for technical enquiries (e.g. site preparation, energy sources, logistics, etc.).

If technical in-country expertise for the installation of WICs/WIFs is limited or unavailable, it is recommended SD be alerted as early as possible. This will help minimise the risk of potential bottlenecks, in particular relating to the availability of external technicians, practical preparation of travel and organizing additional training if required.

6.3 Finalising Installation

UNICEF requests that countries complete an [Installation Completion Checklist](#). This document is to be duly signed by a CO/PS partner representative. Customer concerns, claims or any other issues related to the delivery of the service must be raised before signing the completion report. A signed report serves as confirmation that service delivery was satisfactory, and triggers the release of financial settlement of related invoices.

7 Commissioning

Equipment commissioning is a formalised process through which equipment is tested, demonstrated and officially accepted by the owner. Equipment commissioning needs to be conducted to ensure that equipment is functioning properly before it is put to use. For WIC/WIF the commissioning process entails two options:

- a. Installation done by countries themselves. In this case countries complete the [WIC/WIF Installation Completion Checklist](#), which includes a section that allows for comments on the installation and commissioning process.
- b. Installation by supplier, or contracted agent. In this case the supplier is responsible for the correct installation, training and commissioning of the equipment. The supplier fills in the form and has it co-signed by the beneficiary, e.g. the Ministry of Health.

Commissioning of WIC/WIF should span a period of at least 24-48 hours, to allow for sufficient 'cool-down' time of the rooms, so that proper functioning can be ensured.

8 User Training

In order for WICs and WIFs to deliver their intended services, staff using the equipment need to be trained in using the equipment correctly and confidently. The training will include routine and preventive maintenance actions, such as temperature monitoring, cleaning of the rooms and fault reporting. The User Manual supplied by the manufacturer is an important source of information. In addition, the WHO publication '[How to look after a cold room or freezer room, self-assessment tool \(WHO\)](#)' provides an invaluable resource for user training.

9 Maintenance

Maintenance serves the purpose of keeping WICs and WIFs in good working order throughout their lifetime. A distinction is made between corrective and preventive maintenance. Countries need to develop in-house capacity for the maintenance of the entire stock of Cold Chain equipment. A suitably qualified technician needs to be available on location, to carry out first-line maintenance on the WICs and WIFs. This person will be qualified to carry out basic maintenance actions and be able to determine when outside professional expertise needs to be called in. The technician will be suitably trained and have experience with the maintenance and repair of complex cooling installations.

The proportion of equipment serviced externally (outsourcing, contracting) will depend on in-house technical capacity and the availability of financial resources.

A comprehensive national inventory database of Cold Chain equipment facilitates the proper management and maintenance of equipment. Countries are advised to develop and maintain such a system.

10 Complaints Handling

For Complaints Handling procedures refer to the [General Procurement Guideline](#).

11 Warranty

For general rules on warranty and when it applies, refer to the [General Procurement Guideline](#).

12 Decommissioning

Decommissioning refers to the process of writing-off and physically disposing of equipment that is no longer cost-effective. Countries are advised to adhere to national public sector procedures for the correct disposal of health sector physical assets.

Annex 1: Accessories for Walk-In Cold Rooms and Freezer Rooms

Item	Usage
Voltage Regulator for WICs and WIFs	Used for protection of WICs and WIFs in situations where supply voltage is erratic.
Central Temperature Monitor	Used to monitor the temperature inside a WIC or WIF. Presents an external visual display of the temperature.
Standby Generator	Provides power to the WIC and WIF in situations where the main electricity supply fails.

Note: This overview does not necessarily list all applicable accessories.

Annex 2: Additional Resources

Links to additional resources specifically on WIC/WIF.

Description	Source
Technical Handbook for the Repair and Maintenance of Walk-In Coolers and Freezers, UNICEF, April 2009	Pdf document (5.5Mb) from Internet
User's Handbook for Vaccine Cold Rooms and Freezer Rooms, WHO, 2002	Pdf document (0.5Mb) from WHO Library
How to look after a Cold Room or Freezer Room, Self-Assessment Tool, WHO, 2002	Pdf document (0.2Mb) from WHO Library
Handbook for Vaccine and Cold Chain Handlers	UNICEF website (India)

Note: Users of this manual are invited to suggest additional resource materials, to add to this list. Please email your suggestions to [UNICEF SD Cold Chain Unit](#).

Annex 3: Record of Revisions

Date	Description	By
April 1, 2012	First draft of this manual, by UNICEF SD\HTC\Cold Chain Unit	GK,DH,AS
April 15, 2014	Draft updated with comments and suggestion made by members of global CCSP Development Group	BR
August 9, 2014	Draft updated	BR
October 28, 2014	Minor correction to volume of Cold/Freezer Room, 40 m3 (25/15)	DH