E007
Cold Chain Accessories

The products in this category include miscellaneous cold chain accessories. IMD-PQS specifications for single-phase and three-phase voltage stabilizers and energy harvest systems have now been published and manufacturers have been invited to submit products for prequalification.

Details regarding the products included in each sub-category of E007, as well as guidelines, performance specifications and verification protocols for this category, can be accessed through the drop-down sections below.

E007.1: Voltage stabilizers for refrigerators and freezers

Fluctuations in the voltage and frequency of mains supply power can cause serious damage to refrigerators, freezers and other powered appliances and devices. Frequent episodes of under- and overvoltage can compromise the functioning of critical refrigerator components like the compressor, electronic controls and thermostat.

To protect such appliances from damage, voltage stabilizers are used to reduce and correct fluctuations of input voltage and frequency and to thereby ensure a stable, safe electricity supply for refrigerators and freezers.

WHO requires every mains-powered refrigerator and freezer to be provided with either an integrated or a standalone voltage stabilizer. Single-phase voltage stabilizers must be prequalified to WHO IMD-PQS specification E007/VS01.6 or latest version. Three-phase voltage stabilizers must be prequalified to WHO IMD-PQS specification E007/VS02.1 or latest version.

E007.1.1: Voltage stabilizer types

There are several different types of technology for automatic voltage stabilization, with the most common being electromechanical for small single-phase appliances, and three-phase voltage stabilizers for Walk-in Cold/Freezer Rooms.

Tap-changing voltage stabilizers are commonly used and suitable for refrigeration equipment. Two common types of tap-changing technology are relay-based and servo-based voltage stabilization. Solid state relay-based tap changing technology has no moving parts

and uses switching relays and a transformer to correct input voltage. Servo-based devices use motors to change the taps on the transformer to correct the voltage.

Given relay-based devices have no moving parts, they are less subject to mechanical breakdown and may require less maintenance compared to servo-based devices. However, servo-based devices have benefits over relay-based devices, including higher correction speed, higher precision of output voltage and greater ability to withstand inrush currents.

For single-phase devices, the simplest arrangement is to supply one single-outlet unit with each appliance. NEVER use an adaptor to connect more than one appliance to a regulator's electrical outlet and never use an adaptor to connect more than one regulator to a wall socket. Under IMD-PQS, all models are prequalified for powering both compression and absorption types of equipment.

For three-phase stabilizers, the device may be configured for star of delta connections in various different national grid utility tensions in countries.

Any associated electronic temperature monitoring equipment and computers should, ideally, be connected to a separate voltage-regulated circuit; this type of equipment is particularly sensitive to voltage fluctuations and to lightning-induced power spikes.

E007.2: Solar direct drive surplus energy harvest controls

Energy harvest is a new technology that provides a limited amount of electricity to health facilities where there is unreliable electricity (weak-grid) or no electrical service (off-grid). Weak-grid facilities may use energy harvest as a backup power system for lights, communications and more. Off-grid facilities may use energy harvest as their only sure source of electricity.

During the course of most days, solar direct drive (SDD) vaccine refrigerators and/or water-pack freezers (i.e. appliances) cannot consume all the solar electricity available. That excess solar electricity is wasted unless it can either be captured and used immediately, or stored for later use. Energy harvesting was developed to capture this excess energy. This technology now enables facilities to power fans directly, recharge batteries in cell phones and lights and store power for nights in separate batteries that can be used in many ways, including equipment monitoring systems (EMS) and select medical devices.

Energy harvesting is an option only with some SDD appliances. In order to be granted IMD-PQS prequalified status, an Energy Harvest Control device (EHC) must be coupled to a specific IMD-PQS prequalified SDD, and the combination of EHC-SDD must then also pass laboratory tests and field evaluation. Four general types of EHC systems are currently available: (1) a standalone "kit" including some electrical devices (e.g. a battery, cabling, lights and other electrical consuming load devices); (2) basic "integrated" functionality (i.e. users to provide plug-in devices for USB, 12 Volt or other loads); or (3) "custom" where the surplus electricity can be directed for other uses (e.g. 12-volt battery recharging to power user supplied 5 vdc and 12 vdc loads or an inverter to power limited 120/220 vac user

supplier loads, or (4) "basic USB" which is strictly limited ti a 1A 5 vdc (maximum of 5W) USB-A port integrated into the appliance. Energy production from the EHC can be as little as 5 to 60 Wh/day for a "Basic USB" EHC, to over 500 WH/day for a "kit" or "custom" EHC. All types must be tested and prequalified. However, only “kits” will be identified with an IMD-PQS code number. IMD-PQS does not lab-test load devices like lights, fans, other peripheral optional items or customized systems (e.g. inverters, medical equipment).

Additional information is provided in the "Comments" section of the relevant SDD product data sheet(s). Product data sheets can be found in the IMD-PQS Catalogue section E003: Refrigerators and freezers.

Furthermore, it is technically possible to increase the energy harvest (Wh/days) both with more efficient harvest of single compressor appliances, harvest from dual compressor appliances as well as multiple SDD + EHC harvesting in parallel (e.g. to charge a larger battery or run other motors).

E007.3: Refrigerator and freezer spare parts and kits

Refrigerator and freezer spare parts are listed in the IMD-PQS Catalogue on the same page of each relevant prequalified appliance.

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

Performance specifications

PQS performance specification E007/EHC01.1: Solar direct drive surplus energy harvest control

PQS performance specification E007/EHC02.1: Solar Direct Drive Basic Energy Harvest Control devices

PQS performance specification E007/VS01.6: Single-phase voltage stabilizer for AC-powered refrigerators and freezers

PQS performance specification E007/VS02.1: Three-phase voltage stabilizer for AC powered Walk-In Cold & Freezer Rooms

Verification protocols

PQS Self-testing verification protocol E007/VS02-VP.1: Three-Phase Voltage Stabilizers for AC powered Walk-In Cold and Freezer Rooms

PQS independent type-testing protocol E007/VS01-VP.6: Single-phase voltage stabilizer for AC-powered refrigerators and freezers

PQS independent type-testing protocol E007/EHC02-VP.2: Solar Direct Drive Basic Energy Harvest Control devices

PQS independent type-testing protocol E007/EHC01-VP.1: Solar direct drive surplus energy harvest control devices

Guidance for manufacturers or suppliers

IMD-PQS Guidelines for Prequalification Holders

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

Supporting information for users

Solarization: Access to modern energy services for health facilities in resource-constrained settings

WHO Immunisation Devices - Performance, Quality & Safety

E007 EHC: Cold chain accessories

Product name:	**Health Centre Kit**
IMD-PQS Code:	E007-001
Status:	Prequalified
Date of acceptance:	13 Jun 2018
Appliance type:	E007
Product description:	Energy Harvest Control
Manufacturer:	B Medical Systems Sarl
Manufacturers Reference:	Health Centre Kit
Country of Manufacture:	Luxembourg
Address:	17 Op der Hei L-9809 Hosingen Luxembourg Luxembourg
Telephone:	+ 35 2 92 07 311
Email:	info@bmedicalsystems.com
Website address:	www.bmedicalsystems.com
Valid until:	31 May 2026

Specifications

PRODUCT SPECIFICATIONS - MAIN

Climate zone	Hot	**Nominal Power (W)**	55.00
Solar radiation ref period (kWh/m2/day)	3.50	**Min Average Daily Energy (Wh)**	450.00
Max Energy on Battery (Wh)	120.00		

PRODUCT SPECIFICATIONS - POWER OUTLETS

Cooling Appliance Max (V)	47.00	**Cooling Appliance Nominal (V)**	47.00
Cooling Appliance Number of Port	1.00	**USB Ports Max (A)**	1.00
USB Ports Nominal (A)	1.00	**USB ports Number of ports**	2.00
Car Socket Maximum (V)	14.70	**Car socket Nominal (V)**	12.60
Car socket ports Number of ports	1.00	**Fan Connector**	Included in load
Fan Connector Max (V)	14.70	**Fan Connector Nominal (V)**	12.60
Fan connector ports Number of ports	1.00	**LED lights portable**	Included in load
Harvesting LED Lights Max (V)	18.00	**Harvesting LED Lights Nominal (V)**	17.00
Harvesting LED Lights Number of ports	2.00	**Mode of operation**	Other

PRODUCT SPECIFICATIONS - AVAILABLE ENERGY HARVEST

Connected load 1	2 xLED + fan	**Run Time At Night 1 (hours)**	4.00
Run Time per Day 1 (hours)	16.00		

Comments	Solar panel voltage: 47 V Max Harvesting_LED_lights_nominal: yes Dust_and_Water_Ingress_Protection: 54 Input voltage regulation range V: 0 Input frequency regulation range (Hz): 0 Mode of operation: Servo-Induction Mechanical tap-changing

PRICE AND SHIPPING

Shipping volume (m3)	0.433	**Shipping weight (kg)**	44.00
Price	> 100 units 1281 Euros	**Year of base price**	2025
Incoterms	EXW		

QUALITY STANDARD

Quality Standard	ISO 13485;Other	**Quality standard (Other)**	CE marking; ISO 9001:2015; ISO 14001:2015
Specification Reference	Applicable PQS specification: EHC01.1 Applicable PQS VP(s): EHC01-VP.1		

VERIFICATION

Verification Laboratory	CEMAFROID SAS	**Address**	5 Avenue des Pres CS 20029 F94 266 Fresnes Cedex FranceFrance
Telephone	+33 1 49 84 84 84	**Email**	gerald.cavalier@cemafroid.fr
Verification Report Reference	WHO 17-003		

PRODUCT SITES

Organization name	B Medical Systems Sarl
Address	17 Op der Hei L-9809 Hosingen Luxembourg Luxembourg

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.