

PROCUREMENT GUIDELINES

VOLTAGE REGULATORS AND STABILISERS

Procurement Guidelines

Voltage Regulators and Stabilisers

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

This module gives guidance to the procurement of Voltage Regulators and Stabilisers for the protection of Cold Chain equipment for vaccine distribution.

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 Country Support Package
CO	Country Office
DOA	Direct Order Arrangement
LTA	Long Term Arrangement
PQS	Performance Quality and Safety
PS	Procurement Services
SD	Supply Division (UNICEF)
WHO	World Health Organization

1 Introduction to Voltage Regulators and Stabilisers

In many countries, the mains power supply is erratic with voltage fluctuating in both directions (high and low) frequently. These voltage fluctuations can damage Cold Chain equipment. When the supply voltage goes down, electric current in the equipment increases, which can result in burning the compressor motor and other components of refrigeration equipment. Using voltage regulators and stabilisers is therefore recommended.

WHO recommends that wherever supply voltage fluctuations exceed 7% of the nominal voltage, up or down, regulators or stabilisers should be used ([Section E001.3 WHO PQS Manual](#)). This applies to all refrigeration equipment, including refrigerators and Cold Rooms.

As the name suggests, voltage stabilisers stabilise the voltage, which means that when the supply voltage fluctuates, it keeps the supply to the equipment within a desired range. A common type of stabiliser uses electromagnetic regulators with so-called tap changers and autotransformers. In the event that the output voltage is out-of-range, a mechanism switches the tap and changes the transformer setting to an acceptable range. It may not give a constant voltage output, but it ensures a safe voltage range.

Servo voltage stabilisers use an advanced electronic controlled servo motor to govern a motorized variable transformer. Because of the mechanics involved, there is a short delay in voltage correction. Output voltage accuracy is usually $\pm 1\%$ with input voltage changes of up to $\pm 50\%$. This type of technology tends to be very effective when considering large three phase applications, such as Cold Rooms.

There is some confusion as to the terminology used for voltage regulators and stabilisers, therefore both titles are used as synonyms in this manual.

2 Choosing the Right Type and Size

A distinction is made between single- and three-phase voltage stabilisers. A three-phase voltage stabiliser is required when voltage stabilization is needed for a three phase motor, or for stabilizing voltage for a full three-phase setup.

Smaller appliances such as refrigerators or freezers work on a single-phase voltage regulator, while a three-phase voltage stabiliser is normally used for Cold Rooms and Freezer Rooms.

When determining the size of a stabiliser it is, first of all, important to know the total load to be connected to the stabiliser. Stabilisers are usually rated in VA (Volt Ampere) or kVA (Kilo Volt Ampere, which is equal to 1000 Volt Ampere).

Because of the surge power requirement when starting a compressor, it is recommended that the stabiliser is rated at least 3 times the load value. For example, when the Cold Room has a power requirement of 5kVA, choose a stabiliser of at least 15kVA.

3 Voltage Regulators and Stabilisers supplied by UNICEF SD

UNICEF SD procures Cold Chain products via Long Term Arrangements (LTAs)¹.

Table 1. Voltage Regulators and Stabilisers supplied by UNICEF SD (LTA, 2014)

Product Description
5 kVA 3-Phase Voltage Regulator for Cold Rooms
10 kVA 3-Phase Voltage Regulator for Cold Rooms
15 kVA 3-Phase Voltage Regulator for Cold Rooms
20 kVA 3-Phase Voltage Regulator for Cold Rooms

Currently available on Direct Order Arrangement (DOA):

Table 2. Voltage Regulators and Stabilisers available on DOA

Product Description
1 KVA Voltage Regulators for Compression Refrigerators

4 How to Order

4.1 The Ordering Process

Refer to the [General Procurement Guidelines](#) document and the [UNICEF SD Procurement Services](#) website for general guidance on how to order products. Please contact the [Supply Division Cold Chain Unit](#) for specific queries related to ordering Voltage Regulators and Stabilisers.

4.2 Considerations for Country Offices

- Certain models voltage regulators can be procured via DOA (Direct Order Arrangements).
- When ordering through UNICEF SD, voltage regulators and stabilisers are shipped either by air or by sea. This will depend on the quantity, total weight and volume. If in doubt, COs can contact UNICEF SD for detailed information on the weight and volume of the different makes and models. Some of this information is given in the item specifications in the UNICEF Supply Division Supply Catalogue.
- Requests for non-standard items can add an additional 2-3 months to the procurement process due to necessary tender processing. Supplier lead times may be longer than for LTA standard devices.
- Based on technical review of incoming country requests for non-standard items, SD may suggest alternative standard items to be procured instead, unless specific reasons prevent the use of standard items.

Please contact the [Supply Division Cold Chain Unit](#) for any related queries.

¹ UNICEF SD establishes Long Term Arrangements (LTAs) with product suppliers, usually for a period of 24 months. Refer to the document General Procurement Guideline for further details on LTAs.

4.3 Delivery lead time

Standard supplier lead times for Voltage Regulators and Stabilisers are indicated in the Table above. Refer to the section 'When to Order' For further information, refer to the Section 'Estimation of Arrival Date' in the document '[General Procurement Guidelines](#)'.

Annex 1: Additional Resources

Links to additional resources on Voltage Regulators and Stabilisers.

Description	Source
WHO Guidelines on Voltage Stabilisers	Section E001.3 WHO PQS Manual
Handbook for Vaccine and Cold Chain Handlers	UNICEF Website (India)
Voltage Stabilizer Specification PQS E007/VS01.2	http://apps.who.int/immunization_standards/vaccine_quality/pqs_catalogue/catdocumentation.aspx?id_cat=36

Note: Users of this manual are invited to suggest additional resource materials, to add to this list.

Annex 2: Record of Revisions

Date	Description	By
April 1, 2012	First draft of this manual, by UNICEF SD\HTC\Cold Chain Unit	GK,DH,AS
June 26, 2014	Second draft of this manual, by UNICEF SD\HTC\Cold Chain Unit	BR
August 9, 2014	Updated, minor corrections	BR
October 28, 2014	Updated, minor corrections	BR
October 14, 2016	Updated, minor corrections	VAL