

Ware housing building —Specification

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Foreword

This Kenya Standard was prepared by the construction technology committee and under the guidance of the Standards Projects Committee, and it is in accordance with the procedures of the Bureau.

In the preparation of this standard, reference was made to the following publication:
The building code

Public Review Draft

Ware housing building—Specification

1 Scope

This Kenya Standard specifies requirements for warehouses building used for storage.

2 Normative references

No reference standard was used in development of this standard

3 Terms and definitions

For the purpose of this document the following terms and definitions apply

3.1 Warehouse

a large building where raw materials or manufactured goods may be stored prior to their distribution for sale.

3.2 Free Movement Floors (FM)

refer to areas where materials handling equipment operates in random, non-defined directions and have an infinite number of travel paths. Floors in manufacturing, retail and distribution, where materials handling equipment is free to move in any direction

4 Warehouse floor

The warehouse floor level shall: -

- i. Balanced or optimized of bulk earthwork operations.
- ii. Avoid the risk of flooding in major storms.
- iii. allow vehicle access from municipal roads and entrance gates.
- iv. The materials used for construction shall meet Kenya standards.

4.1 Floor Hardness & Concrete Sealers

The floor shall be hardened surface finished smooth and even

4.2 Floor Joints

All floor joints shall meet the requirement in the building code.

4.3 Floor Strength

The floor shall be power floated and a specialist floor hardener shall be applied to provide a dust free surface for increased durability.

4.4 Floor Flatness

The internal warehouse floor shall be constructed to a FM² floor.

4.5 Corners

All exposed structural concrete corners shall be protected by suitably sized steel angles.

4.6 Damp Proofing

All floors and walls shall be damp proofed and as required for good building practice in the particular local area. Place surface bed directly in damp proof heavy duty polythene sheeting over compacted sub grade laterite fill.

4.7 Anti-Poisoning & Termite Proofing

The ware house shall be termite proof.

5 Warehouse structure

5.1 Internal columns

An optimal structural grid shall be determined in conjunction with the structural and logistics engineers in order to optimize the benefits a cost effective yet functional warehouse layout.

Where required in open storage areas, internal columns shall be painted 2m high (chevron style black and yellow) to improve their visibility to truck and forklift operations. Protective barriers shall be placed around columns to protect the structure from damage incurred by impact. Columns requiring protection will be specified by registered industrial consultants.

6 Air conditioning

6.1 Refrigeration Requirements

For storage of perishable goods, warehouse shall have refrigeration facilities.

6.2 Electrical

The main power supply to chiller panel shall be a dedicated supply from the generator panel.

Complete air conditioned warehouse power supply shall be supplied with an isolator rated according to Electrical Engineers specification.

Individual compressor unit's circuit shall be supplied with individual circuit breakers according to specification.

Compressor shall be fitted with an overload of correct value to indicate compressor trip. Compressor trip indicator light shall be installed in same position as the Carel controller.

Power for the chiller lights shall be supplied from warehouse light circuit.

Compressor unit shall supply power to its own controlling Carel controller.

7 Warehouse height

An optimal height shall be selected to suit warehouse operations based on the storage of optimum modules of pallets.

A 7 meters' clearance to the underside of trusses (eave height) shall be allowed. This is a global maximum working height be used allowing forklift reach limitation, eliminating facility/forklift damage. (Floor should be as per the use of the use of the structure)

8 Roof Structure

As a generalization, it is envisaged that the warehouse structure shall consist of hot rolled structural steel rafters or trusses depending on the final design optimization. The design shall minimize the presence of dust collection surfaces. The roof shall be designed for self-weight, maintenance loads with insulation, lighting and the installation of solar panels by the client that requires a design weight of 20kg/m².

All structural steelwork shall be in accordance with local and international standards.

9 Roof sheeting

The warehouse shall be t h o r o u g h l y weather-tight facility.

Note: All *cavities etc., which might induce the nesting of birds or ingress of vermin shall be closed. Anti-bird perch material shall be fixed to all exposed trusses.*

10 Thermal insulation to roofs and side walls

Thermal insulation to roofs shall be in accordance to approved standards.

11 Rainwater disposal

The ware house shall have rain water disposal e.g roof gutters piped to rain water storage tanks, Overflow drains etc.

12 Brickwork

All brickwork shall be according to relevant standards and building code.

13 Vertical cladding

Vertical cladding shall be I.B.R. sheeting to same material specification as the roof sheeting fixed vertically to steel girt rails with all trims, sills and closure pieces.

14 Balustrades

Balustrades shall meet minimum KS specifications.

15 Electrical specifications

Electrical installation and specification shall be in accordance with Local and International Standards.

15.1 External Lighting

External lighting shall comprise of suitable floodlights and wall pack bulkheads mounted on poles and on the building façade respectively to suit the final layout, distribution warehouse and site facilities. External lighting to be controlled by photocell switches with manual override.

External light system shall cater for a 24-hour operation to achieve the stated lux levels in the outdoor areas. Minimum lux levels measured at boundary fence to be 20 lux.

15.2 Emergency Lighting

Emergency/escape lighting system shall conform to the requirements of the Local Authority's Fire Officer.

The emergency lighting systems shall comprise a 1-hour self-contained non-maintained system converting designated general purpose luminaires within office areas or utilizing devoted fittings.

Emergency lighting shall be provided as a minimum to each external exit door, each internal emergency exit door, changes in direction or level along emergency access routes and as appropriate to open plan and other areas.

Emergency lighting is to be provided to all essential rooms and areas on a 50 % basis

Emergency lighting is to be provided at all electrical panels.

16 Warehouse Ventilation

Warehouse shall be ventilated to prevent degradation of stock stored at high levels.

17 Smoke and warehouse ventilation

Fire protection codes and the classification of the building will meet smoke ventilation requirements.

The warehouse shall have a fire alarm system.

18 Fire Protection

As a generalization hose reels and portable fire extinguishers shall be required as a norm. External hydrants shall also be a requirement. An 800mm border shall be left as fire access around the internal perimeter of the warehouse; 800mm access gaps shall be left between bins to access fire exits and firefighting equipment.

18.1 Fire Extinguishers

Hand held fire extinguishers shall be required within the warehouse.

18.2 Fire Hose Reels

hose reel system will be required within the building; reels shall be located in such a way as to ensure coverage of entire space. It is anticipated that the water serving this system will be taken from the rising fire mains serving the sprinkler zone valves. Hose reels shall be positioned at a suitable height (1.5m recommended) to prevent damage by forklift trucks. Forklift barriers shall be strategically placed to reduce damage.

18.3 Smoke Detection

Sufficient Smoke detection connected to the alarm shall be installed throughout buildings.

18.4 Parking Areas

Ware house shall be provided with parking area, loading and offloading which should be near the entrance or the exit of structure.