THE NATIONAL BUILDING CODE, 2024

BUILDINGS ELEMENTS

HANDBOOK NO. 4

NATIONAL CONSTRUCTION AUTHORITY

OVERVIEW

This handbook covers the following related parts of the National Building Code:

PART VIII-Floors
PART IX-Walls
PART XI-Glazing and Cladding
PART XII-Staircases, Lifts and Escalators
PART XIII-Roofs

PART VIII-FLOORS

This part comprises paragraphs 97 to 100 of the Code.

The provisions outlined in this part regarding floors establish essential requirements for the construction and design of floors in buildings. These guidelines ensure structural integrity, fire safety, and suitability for specific environments, such as kitchens and bathrooms, while also addressing unique challenges posed by different soil types.

Key Points

Structural Requirements

Floors must support their own weight and any additional loads, with specific fire resistance measures.

Material Specifications

Floors in moisture-prone areas need to be water-resistant and non-slippery, with particular materials and thickness requirements detailed.

Soil Considerations

Special guidelines apply for constructing floors on black cotton soil, including excavation and filling protocols.

Fire Safety Compliance

Floors must adhere to fire safety standards and include proper under-floor membranes.

Timber Design Standards

Timber floors must comply with specific design and grading standards to ensure stability and performance.

Detailed Breakdown

Structural Requirements

Floors must be designed to support their own weight and any additional loads expected in their use.

Fire resistance must be appropriate for the intended use of the floor, with non-combustible materials required where necessary

Material Specifications

Floors in areas like kitchens, bathrooms, and laundry rooms must be both water-resistant and non-slippery to prevent accidents.

For suspended timber floors, under-floor ventilation is mandated.

Concrete floors must prevent moisture penetration from the ground by using either impervious materials or specified concrete slab thickness and strength.

Soil Considerations

When constructing on black cotton soil, the soil must be excavated to rock level or to a level approved by an engineer.

Excavated areas must be filled with suitable hard core and finished with fine material.

Specific depth requirements for removal and overlay materials are provided in the Building Code, ensuring stability and proper drainage.

Timber Design Standards

Timber floors must adhere to the standards of KS EN 1995-1-1-2004, ensuring proper design and safety.

Timber grading must follow KS 771 specifications, and performance for cross-laminated timber must meet ISO standards.

Specific size requirements for joists and flooring boards are outlined based on spacing, ensuring adequate support and stability

Important Considerations

Floors must be constructed with materials that are not only durable but also safe for their specific environments, with particular attention to moisture and fire resistance.

The Provisions specify minimum thicknesses for various materials, ensuring that they can withstand expected loads and environmental conditions.

The guidelines for construction on black cotton soil highlight the importance of proper excavation and filling to prevent structural issues.

Conclusion

This part on floor construction provide a comprehensive framework to ensure that floors are safe, durable, and suitable for their intended uses. By adhering to specific material requirements, structural standards, and safety measures, builders can create floors that meet both regulatory standards and practical needs. These guidelines are crucial for maintaining the integrity of buildings and ensuring the safety of their occupants.

PART IX - WALLS

This part comprises paragraphs 101 to 132 of the Code.

The provisions outlined in this part provide for the structural requirements and safety standards for walls in building construction. It encompasses Provisions related to structural strength, fire safety, moisture resistance, and specific construction practices for different types of walls, including masonry, timber-framed, and retaining walls.

Key Points

Structural Integrity

Walls must support loads safely and transfer forces to foundations, with specific requirements for roof supports.

Material Specifications

Walls must be constructed using specified materials, including various masonry units and timber, adhering to relevant standards.

Fire Safety Compliance

Walls must meet fire safety standards as outlined in Part XXI of the National Building Code 2024, ensuring adequate fire resistance.

Moisture Control

Provisions address damp-proofing and moisture resistance to protect the building's integrity and occupants' health.

Construction Standards

Detailed guidelines dictate wall dimensions, anchoring methods, and the installation of damp-proof courses.

Detailed Breakdown

Structural Strength and Stability

Load Bearing: Walls must safely sustain loads and transfer them to the foundation. Roof trusses or beams must be securely fixed to walls to withstand roof forces.

Height and Dimensions

Specific dimensions for masonry and timber-framed walls are outlined in the First Schedule of the National Building Code,2024, ensuring adequate support and stability.

Material Provisions

Masonry Units: Walls must use materials that comply with established specifications (e.g., KS 547, KS 625). Compressive strength requirements are also specified.

Timber Standards: Timber used in construction must conform to KS 771, ensuring it meets structural requirements.

Fire Resistance

Walls must adhere to fire safety standards to prevent the spread of fire, with detailed construction methods specified for fire resistance.

Moisture and Damp-Proofing

Damp-Proof Courses: Mandatory installation of damp-proof courses to prevent moisture from rising through walls. These courses must be positioned according to specific guidelines.

Cavity Walls

Cavity walls must be designed to prevent moisture penetration, with specific guidelines on cavity width and wall ties to ensure structural integrity.

- Boundary walls must be constructed from approved materials and have sufficient support for stability.
- They should be erected vertically or as designed and approved.
- The fence should be finished with an approved preserver.
- The wall should not exceed 2.4m in height.
- The wall should be consistent with the road's character.
- Parapet walls must have a coping to prevent vertical water penetration.
- Wall paint should comply with KS EAS 849, KS 1985-1, KS 1985-6, KS 1985-10, KS EAS 850, KS EAS 851, KS EAS 852, and KS EAS 852.

Construction Practices

Wall Anchoring: Guidelines for anchoring roofs to walls include using galvanized steel straps or wire, with specified depths of embedding for different roof types.

Movement Joints: Required in external cladding to accommodate movement and prevent damage, with specific spacing intervals outlined.

Important Considerations

Tables and Specifications

This part references multiple tables as appendices in the First Schedule (e.g., Table 9 for compressive strength, and Table 11 for wall dimensions) that provide essential data for compliance.

Testing for Rain Penetration

Procedures for testing walls for rain penetration ensure walls meet moisture resistance requirements, particularly in areas with heavy rainfall.

Conclusion

Part IX establishes comprehensive guidelines for wall construction in Kenya, prioritizing structural integrity, fire safety, and moisture control.

Adherence to specified materials and construction practices is crucial for ensuring the safety and durability of buildings. Key provisions include the necessity for damp-proofing, proper anchoring methods, and compliance with established standards for materials and dimensions. Overall, these Provisions aim to protect both the structural integrity of buildings and the health of their occupants.

PART XI - GLAZING AND CLADDING

This part comprises paragraphs 172 to 193 of the Code.

It outlines the Provisions for glazing and cladding in buildings as per the National Building Code, 2024. It specifies the required standards for materials, installation techniques, safety measures, and design considerations to ensure structural integrity, safety, and aesthetic appeal in buildings.

Key Points

Material Requirements

Glazing materials must be secure, durable, and capable of withstanding wind loads while preventing water penetration.

Installation Standards

Installation of glass panes must comply with specific British Standards (BS 8000-0:2014) regarding thickness and support structures.

Safety Provisions

Safety glazing is mandatory in specific locations, especially where glass is exposed to high traffic or risk of breakage.

Architectural Guidelines

Architectural glazing and cladding must adhere to various globally recognized Standards and include sound insulation measures.

Maintenance Considerations

Cleaning systems for curtain walling and other glazing installations must meet specified safety and access standards.

Detailed Breakdown

Material Requirements

Durability and Security: Glazing materials, including glass and plastics, must be securely fixed to withstand wind loads and prevent water ingress. Clear glazing must be visually identifiable to approaching individuals.

Safety Standards

Materials must have an appropriate safety rating based on their location and expected human interaction, aligning with BS 8000-0:2014.

Installation Standards

Thickness and Support

Glass panes must conform to specified thicknesses based on their size and location. For instance, panes not exceeding $1m^2$ must be at least 6mm thick unless classified as safety glass.

Installation Methods

The installation of glass must ensure that it is adequately supported by frames that can sustain the designed wind loads

Safety Provisions

Safety Glass Use

In areas where glass is exposed to potential impact or where individuals may come into contact with it, safety glass is required. This includes specific height Provisions for windows and doors.

Breakage Standards

Glazing must be designed to break safely, minimizing the risk of injury from sharp shards. Compliance with KS 1535-8 standards for safety glazing is required.

Architectural Guidelines

Types of Cladding

Architectural glazing and cladding may include various materials such as glass curtain walls, stone, and aluminum cladding, all needing certification from a qualified engineer or architect.

Thermal and Sound Insulation
Glazing units must include sound insulating seals and undergo thermal movement safety checks, ensuring compliance with relevant standards.

Maintenance Considerations

Cleaning Systems
Buildings with fixed curtain walls must have a cleaning cradle system or an openable glazing unit designed for maintenance access.

Height Provisions
Mechanical fixings for glazing systems exceeding 20m must be made of non-corrosive materials, ensuring durability and safety.

Other Important Considerations

Specific thickness requirements for various types of glass are outlined in Tables 27 and 28, ensuring compliance with safety and structural integrity.

The Provisions emphasize the necessity of marking clear glazing areas to enhance visibility and safety.
Permanent manifestations or markings on glazing are mandated under certain conditions to prevent accidents.

Conclusion

This part establishes comprehensive guidelines for glazing and cladding in buildings, prioritizing safety, durability, and aesthetic considerations. Compliance with specified standards is critical for ensuring structural integrity and minimizing risks associated with glass installations. Architects and engineers play a vital role in certifying that all materials and installations meet these regulatory requirements, contributing to safer and more resilient building designs.

PART XII-STAIRCASES, LIFTS AND ESCALATOR

This part comprises paragraphs 194 to 236 of the Code.
It outlines the requirements for the construction and safety of staircases, lifts, and escalators in buildings. It emphasizes the need for accessibility, safety measures, and compliance with specific standards to ensure the welfare of users, particularly in emergencies.

Key Points

Staircase Requirements
Buildings exceeding one storey must have a staircase with defined dimensions and safety features, including handrails and proper clearances.

Escalator and Lift Provisions
If escalators are installed, accompanying staircases must also be built. Buildings with multiple storeys must have lifts, particularly for those exceeding six storeys.

Safety and Accessibility Standards
Staircases must comply with safety Provisions, including fire safety measures, and must be accessible to individuals with disabilities

Load and Structural Integrity
Staircases and lifts must be constructed to support anticipated loads and ensure safe movement between floors.

Emergency Measures
Buildings must provide adequate means of escape and access for emergency responders, particularly in the event of a fire. Inspection Doors and Emergency Exits must be imperforated, key-operated, and operable from inside the well without a key.

Ventilation Requirements
Lift wells must be ventilated adequately, with specific dimensions for openings to ensure airflow.

Structural Integrity
Lift wells and machine rooms must support various loads and be constructed from non-combustible materials.

Access and Safety Measures

Access to machine rooms should be safe and clearly marked, with specific dimensions for doors and ladders.

Equipment Handling

Provisions outline the necessary features for safely handling equipment in machine rooms.

Detailed Breakdown

Staircase Provisions

General Requirements: Buildings over one storey must have at least one staircase. For structures exceeding four storeys, the main staircase must reach the roof unless a separate fire escape is available.

Dimensions and Safety Features:

Clear height must be at least 2m.

Width must be no less than 900mm for residential buildings and 1200mm for non-residential buildings.

Handrails must be provided on both sides, with specific dimensions for tubular and rectangular designs.

Natural Lighting and Ventilation: Staircases in buildings intended for separate occupation must have natural lighting and ventilation.

Escalator and Lift Installation

Complementary Staircases: If an escalator is installed, a staircase must also be constructed.

Lift Requirements: Buildings over six storeys must have at least one passenger lift, and all installations must adhere to safety standards outlined in relevant ISO Provisions.

Lift Well Specifications: Lift wells must be structurally sound, with specific dimensions to accommodate the lift car and ensure safety during operation.

Safety and Compliance

Fire Safety Measures: Staircases must allow unobstructed access for firefighters and be designed to protect them from smoke and fire.

Load-Bearing Requirements: Staircases and their components must be

able to withstand anticipated loads, ensuring safe movement.
Accessibility Standards: Staircases must be designed to accommodate individuals with disabilities, including appropriate handrail heights and widths.

Important Considerations

Dimensional Specifications

Staircases must not exceed 16 risers in a flight, with landings provided at both the top and bottom of each flight. The dimensions of risers and treads must be uniform, with specific limits set for different types of staircases.

Emergency Access

Buildings must have clear escape routes, and emergency doors must be accessible and properly marked. Where necessary, intermediate emergency doors should be installed to limit the distance between landing door sills.

Inspection Doors and Emergency Exits Specifications

Inspection doors, emergency doors, and traps must not open inward and should be equipped with a key-operated lock that can be closed and locked without a key.
Accessibility: These doors must allow for emergency exit from the inside without requiring a key, even when locked.

Ventilation Requirements

Ventilation Standards: A lift well must have suitable ventilation, which cannot serve any other room. An opening at the top must be at least 1% of the well's horizontal cross-section area, with a minimum free area of 0.15 m^2.

Structural Integrity

Load-Bearing Capacity: The lift well structure must support potential loads from the lift machinery, safety gear, and other components during operation. This includes supporting loads from hydraulic systems and ensuring that materials used in construction are durable and non-combustible.

Surface Requirements: The inner surfaces of lift wells must be smooth and hard to prevent dust accumulation, and projections must be properly designed to avoid obstructions.

Access and Safety Measures

Access Design: Access doors to machine rooms must be a minimum of 600 mm wide and 1.8 m high, with clear signage in English and Kiswahili warning against unauthorized access. If the lift pit exceeds 1.6 m in depth, an access door is required.

Safety Features: Ladders must be fixed, equipped with safety hoops if over 2 m high, and accompanied by platforms with railings. The area must be kept clear for maintenance access.

Equipment Handling

Machine Room Specifications: The machine room must be constructed to withstand expected loads, with non-slip flooring and adequate height (at least 2.1 m) for safe access to equipment.

Safety Notices: Access doors and trap doors must have clear warnings and instructions in both English and Kiswahili, reinforcing the importance of secure access.

Load Specifications: The base of a lift pit must support an imposed load of at least 5 kN/m^2 if accessible spaces exist beneath the lift.

Partition Requirements: Partitions are required between moving parts of different lifts to enhance safety, extending from the lift pit floor to a height of 2.5 m.

Construction Materials: All materials used in the lift well and machine room must be non-combustible and durable, ensuring safety and compliance with Provisions.

Conclusion

The Provisions in this part emphasize on the importance of safety, accessibility, and structural integrity in the design and construction of staircases, lifts, and escalators in buildings. Compliance with these standards is crucial for ensuring the safety and well-being of all users, particularly in emergencies.

PART XIII-ROOFS AND CONSTRUCTION

This part comprises paragraphs 237 to 243 of the Code.
It outlines the essential requirements and standards for roofing construction, emphasizing design considerations, material specifications, installation methods, and waterproofing guidelines. The aim is to ensure that roofs are durable, functional, and compliant with safety provisions while effectively addressing environmental factors such as rainwater accumulation and heat stress.

Key Points

General Roof Requirements

Roofs must withstand forces, be durable and waterproof, prevent rainwater accumulation, and minimize heat stress.

Design Specifications

Roof designs must be created by qualified engineers or architects and adhere to established standards.

Timber Quality and Installation

Timber used in roofing must meet stringent quality criteria, and installation practices must ensure structural integrity.

Waterproofing Standards

Compliance with various ASTM and EN standards is necessary for effective waterproofing of roofs.

Construction Techniques

Specific construction techniques, including the use of flashing and maintaining proper slope angles, are mandated to enhance roof performance.

Detailed Breakdown

General Roof Requirements

Roofs are required to withstand various forces, providing durability and waterproofing. They must be designed to prevent rainwater accumulation, which can lead to structural damage, and to minimize the heat island effect, a phenomenon that exacerbates urban heat stress.

Design Specifications

The design of roofing structures must be conducted by licensed engineers or architects to ensure compliance with safety and performance standards. This professional oversight is crucial for the integrity of the roofing system.

Timber Quality and Installation

Timber roofs must comply with KS EN 1995, which governs the design of timber structures. The timber used for structural components must be of high quality—well-seasoned and free from decay, pests, and significant defects such as large knots or splits. All joints in timber roof trusses and framing must be accurately cut and securely fastened using approved materials. Timber roofs mustn't exert thrust on supporting walls or piers. Components such as trusses and beams must be properly anchored to their supports using galvanized steel straps, bolts, or other approved fastening methods.

Waterproofing Standards

If waterproofing is required, it must be executed according to specified standards including KS 2259 and various ASTM standards such as ASTM C208 and ASTM D226. Adherence to these standards is critical to ensure that the materials and methods used effectively prevent water ingress, which can lead to significant structural issues over time.

Construction Techniques

Roof coverings must be installed at the minimum slope angles specified in Table 4 of the guidelines to ensure proper drainage. Flashing is essential at junctions where roofs meet walls or around penetrations to provide additional waterproofing. For flat roofs, a minimum slope of 1 in 50 is required to facilitate drainage, and the surface must be impervious to water.

Important Considerations

Compliance with the specified design and installation standards is crucial for maintaining the structural integrity and safety of roofing systems. The use of quality timber and proper fastening techniques are critical to prevent structural failure. Adherence to waterproofing standards is necessary to avoid water damage, which can lead to costly repairs and safety hazards.

Conclusion

Th provisions under this Part establish comprehensive guidelines for roofing construction, highlighting the importance of qualified design, high-quality materials, and adherence to safety standards. Key aspects include the structural requirements for timber roofs, the necessity for proper waterproofing, and the implementation of effective construction techniques. Following these guidelines is essential for ensuring the longevity and functionality of roofing systems, ultimately contributing to the safety and comfort of building occupants.

9th Floor, KCB Towers Kenya P.O.Box 21046-00100

+254 709 126 102/172/173

info@nca.go.ke