

An Introduction to Fire Safety for High-Rise Buildings

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As land becomes increasingly scarce in urban areas, the real estate market is shifting toward high-density developments. High-rise buildings (those exceeding 18 meters in height) now accommodate a variety of uses, including residential, commercial, healthcare, shopping malls, and mixed-use projects. In this article, we will delve into fire hazards in high-rise buildings and outline key parameters you should evaluate before investing in one.

Fire safety in high-rise buildings involves a multi-layered approach, including prevention, early detection, suppression, and evacuation. In this article, we will primarily focus on preventive measures such as architectural planning and material selection.

Architectural planning serves as the first line of defence against fire hazards. A well-matriculated design can help prevent mishaps by ensuring compliance with safety standards, both in architectural elements and firefighting equipment.

We will revisit the fundamentals and discuss how various building elements play a crucial role in ensuring users' fire safety.

Staircases

Ideally, each high-rise building should have a minimum of two fire exits, and thus two staircases. In India, where there is no regulation on minimum plot sizes, providing two staircases often becomes a challenge. In buildings with only one staircase, it must be protected with a two-hour fire-rated door. Additionally, for internal staircases, a positive pressure ventilation system must be included.

Refuge Area

Refuge areas are typically provided at the mid-landing of staircases. These cantilevered slabs extend outward to allow easy access for fire tenders to initiate rescue operations.

Electrical Ducts

Electrical ducts are vertical shafts housing the main electrical wiring, running from ground-floor meters to distribution boards within individual units. They act as vertical conduits, much like staircases, and can serve as pathways for fire and smoke. To mitigate this risk, all electrical duct doors should be made of two-hour fire-rated material and protected with fire doors.

Façade / Elevation

For simple wall elevations, AAC blocks with flaked aluminium powder can be used to achieve fire resistance for 2–6 hours, depending on wall thickness. For glass elevations such as

unitized glazing, aluminium façade panels, and ACPs, the gap fillers at slab edges should be at least two-hour fire-rated to prevent the horizontal or vertical spread of fire and smoke.

Corridors / Passages

Corridors and passages are critical as they serve as routes leading to staircases or refuge areas. The false ceilings in these areas should be made of two-hour fire-rated materials to ensure safe passage during emergencies.

Wall Claddings / Partitions

Internal wall claddings in entrance foyers and lift lobbies should be constructed with two-hour fire-rated materials. Materials such as plywood panelling, stone claddings, clay sheets, glass partitions, and entrance canopies must comply with the architect's or fire officer's specifications.

Fire Exit Plan

Every floor must display a fire exit plan, printed on vinyl or acrylic and equipped with photo luminescent features to ensure visibility in low-light conditions.

Interior Design

Interior design and contracting should prioritize the use of fire-retardant materials throughout the project to minimize the risk of fire.

Depending on the intended use of the space within a high-rise building, specifications for flooring, ceiling, partitions, wall panelling, and other materials can vary significantly. A hospital, for example, will have very different fire safety requirements compared to a residential home. Therefore, fire safety must be a major consideration both when purchasing and designing properties.