

1.2 FUNCTIONAL REQUIREMENTS OF BUILDINGS

The functional requirements of buildings are the essential conditions that a building must fulfill to perform its intended purpose effectively and efficiently. These requirements ensure that the building supports the activities of its users, provides safety and comfort, and stands up to environmental and operational stresses over time.

Here's a detailed breakdown of the key **functional requirements of buildings**:

1. Strength and Stability

- The building must withstand **structural loads** (dead load, live load, wind load, seismic forces, etc.).
- It should remain stable and safe throughout its service life, without excessive deflection or collapse.
- Foundation, framing, walls, and roof must be properly designed and constructed.

2. Weather Resistance

- The building envelope (roof, walls, windows, doors) must prevent the **entry of rain, snow, wind, and moisture**.
- Materials and construction should protect against **weathering**, corrosion, and deterioration over time.

3. Durability and Longevity

- Materials and construction methods should ensure the building has a **long service life** with minimal maintenance.
- It should resist **wear, rot, corrosion, insect attack**, and other forms of degradation.

4. Thermal Comfort (Insulation and Temperature Control)

- The building must provide suitable **interior temperatures** year-round.
- This includes **thermal insulation**, proper orientation, and possibly active systems like **heating and cooling (HVAC)**.

5. Sound Insulation (Acoustic Comfort)

- It should limit the transmission of **noise** from external sources and between rooms.
- Especially critical in residential buildings, schools, hospitals, and offices.

6. Lighting and Daylight

- Adequate **natural and artificial lighting** must be provided.
- Windows, skylights, and lighting fixtures should be planned to ensure **visual comfort** and **energy efficiency**.

7. Ventilation and Air Quality

- The building must provide adequate **ventilation** to maintain **fresh air**, remove pollutants, and control humidity.
- This can be achieved through **natural ventilation** (windows, vents) or **mechanical systems** (exhaust fans, HVAC).

8. Fire Safety

- The design must include **fire-resistant materials, fire exits, smoke detectors, sprinklers, and compartmentation** to prevent the spread of fire.
- Must comply with local **building and fire codes**.

9. Safety and Security

- The building should protect occupants from **injury** and unauthorized access.
- Includes **non-slip surfaces, railings, secure doors/windows**, surveillance, and alarm systems.

10. Water Supply and Drainage

- Reliable systems for **clean water supply** and **wastewater drainage** are essential.
- Includes plumbing for kitchens, toilets, bathrooms, and external water disposal (stormwater systems).

11. Space Utilization and Layout

- The internal layout must support the building's **intended function** (e.g., classrooms in a school, patient rooms in a hospital).
- Efficient **zoning** of spaces: private vs. public, quiet vs. noisy, wet vs. dry zones.

12. Accessibility

- The building must be **usable by people of all abilities**, including those with physical disabilities.
- Requires **ramps, elevators, handrails, accessible toilets, and clear signage**.

13. Aesthetic and Psychological Comfort

- The building should create a **pleasant and inspiring environment**.
- Elements such as colors, textures, proportions, and natural light contribute to **user well-being**.

14. Flexibility and Adaptability

- The design should allow for **changes in use** or layout without major reconstruction.
- Example: movable partitions, multipurpose rooms, or modular furniture systems.

15. Energy Efficiency and Sustainability

- Building should minimize **energy consumption** through smart design, insulation, energy-efficient appliances, and renewable energy integration.
- Reduce environmental impact with sustainable materials and low-waste systems.