11 Vertical Transportation System

General

Healthcare facilities are greatly depended on lifts to provide a reliable and efficient vertical transport system for the movement of patients, staff, visitors, medical equipment, and associated support services. They are also dependent on lifts to provide firefighting and evacuation facilities. All lifts shall meet the statutory regulations from Municipality and Civil Defense authorities.

Lift Categories

The lifts in healthcare buildings shall be categorized and provisioned based on the function as below:

- General Passenger Lifts

  These lifts supporting general passenger traffic including wheelchair users. The clear internal dimension of a general passenger lift serving clinical areas should not be less than 2000mm wide by 1700mm deep with a minimum loading capacity of 1250kg with a minimum clear door opening width of 1100mm and clear height of 2100mm. This is to enable proper circulation space for patients on wheelchair and accompanying persons. The lifts intended for housekeeping services may be part of a group of general passenger lifts. However, housekeeping activities should be scheduled not to coincide with general peak passenger demands. As far as practically possible, care should be taken so that public passenger lifts are separated from the Bed, Service and Goods lifts with access to separate lifts lobbies.

- Bed Lifts

  These lifts are intended for the carrying of a patient on patient beds or stretchers together with the necessary staff and support equipment. The bed lifts should have a minimum rated load capacity of 2500 kg, with a minimum clear car dimension of 1800mm wide by 2700 mm deep. Clear door-opening width must be no less than 1400mm and 2200mm high. Lift car internal height should not be less than 2500mm.

- Service/Goods Lift/s

  These lifts are intended for the movement of items such as furniture, equipment, building materials, equipment maintenance supplies, waste etc. The service/goods lifts should have a minimum rated load capacity of 2500 kg, with a minimum clear car dimension of 1600mm wide by 2200 mm deep. Clear door-opening width must be not be less than 1200mm and 2200mm high. Lift car internal height should not be less than 2500 mm. For smaller healthcare facilities (less than 50 beds) smaller sized goods lifts may be considered based on proper due diligence. However, in facilities where heavier equipment is anticipated to be transported, larger goods/service lift with wider door opening size to be provided.

Design Considerations

Below is key recommendations and requirements to be adhered with while designing vertical transportation solution for healthcare facilities.

- Selecting the appropriate lift operational speed and drive system is important in order to optimize the operation, comfort, and efficiency of the system.
- Lifts to be located away from sensitive areas in consideration of vibration and acoustics, and with respect to magnetic distortion for MRIs.
- Depending upon the nature of the facility firefighting lift/s to be provided where called for as per Civil Defense requirements.
- In large facilities with numerous lifts, Passenger Lifts may be categorized based on different usage such as VIP Lifts, OPD Lifts and Visitor's Lift etc., Such designation, however, is not mandatory.
- It is recommended that as far as possible the Bed Lifts and Service Lifts to be identical in design and specifications. This will give the operator maximum flexibility allocate the lift types for different use as the need arises and the operation of the facility changes over time.
- The Service Lifts need to be categorized for different types of use. As a minimum there should be two groups, Dirty Lifts and Clean Lift.

  Dirty Lifts may be used for: Transport waste bins, Dirty Linen, Diseased patients, Infected Patients, Dirty SSU goods, Returned food trolleys and similar goods as well as staff.

  Clean Lifts may be used for: Transportation of items from the central stores, clean food trolleys, Clean SSU goods, medication and occasionally a patient bed (when the bed lift is under maintenance) and staff.

- In large facilities, with numerous lifts, the operator should consider designating specific tasks to the service lifts such as: Food Safe Lift, Waste Lift, Clean Goods, Etc. Apart from Clean/Dirty, the above subdivisions are not mandatory.

- Firefighting lift can also be used for regular passenger/patient use during normal operation of the healthcare facility. However, it is recommended that the designated firefighters lift is not used for moving waste, goods, equipment etc. in order to prevent the risk of the lift being occupied or its entrance being obstructed when the lift is required for firefighting.
- In healthcare buildings, choosing the appropriate number, capacity and operational speed and drive system is important in order to minimize any adverse effects, particularly on patients and care providers. The criteria to consider while determining the vertical transportation solution include but not limited to:

  Anticipated number of patients

  Anticipated number of staff

  Operation and visiting hours

  Nature of the departments

  Location of Imaging equipment such as MRI's

  Food deliveries

  Waste disposal

  Emergency evacuation

  Clinical workflows

  Configuration of the building

  Because a healthcare environment has a higher percentage of sick and vulnerable people, special consideration needs to be given during the traffic analysis.

  The selection of an appropriate speed is dependent on building height. Table below indicates suggested values. However, speed has very little effect on the handling capacity of lifts in healthcare facilities due to the longer loading and unloading times; therefore, rated speeds could be lower than would normally be required in office buildings. The average interval of the lift (the time between successive lift arrivals at the main entrance floor) can be longer than that is recommended for office building. Interval time of 30s to 50s is generally acceptable for healthcare buildings.

Travel Height (m)	Rated Speed (m/s)
18	0.63
30	1.0
48	1.6
75	2.5
100	3.5
120	4.0
150	5.0

- Centre opening doors provide better traffic performance as compared to side opening doors; in consideration of this, only center opening doors shall be provided for lifts serving patient and clinical staff. Side opening lifts may be acceptable for goods lifts not intended for clinical staff or patients. The center opening doors shall be in two leaves or four leaves configuration to suite the available lift shaft.
- In order to reduce the stress imposed on vulnerable patients the acceleration of the lift cars used to serve surgical and clinical areas shall not exceed 0.6 m/s^2, while rate of change of acceleration or deceleration shall not exceed 1.0m/s^3.
- During vertical transportation traffic analysis for healthcare buildings, lift car occupancy to be

considered lower than the normal 80% of rated capacity used in commercial building traffic calculations to account for the space requirement for wheel chair, stretchers, equipment etc.; 25% of the rated capacity will be more appropriate for healthcare buildings.

- Diffused soothing illumination of 100 lux to be provided in lift cars at floor level. The car should not be widely over lit or under lit due to patient safety and comfort considerations.
- Emergency lighting to be provided in lift cars as part the lift car design with 3hr local battery back up to provide a minimum illumination of 10 lux.
- Lift shafts generally penetrate all floors of a healthcare building and therefore pose a risk for the transmission of infection across the floors. To reduce this risk, lift shaft wall and ceiling should be sealed and painted.
- Lift car doors should be fitted with contact free passenger/obstruction detection to minimize the risk of car/landing door collisions with persons, beds, or equipment, working in conjunction with the automatic door operator.
- Lift cars and all landing shall indicate the floor number and direction of travel of the lift car.
- When function of the lifts physically located as a group are similar, such cars shall be grouped and controlled in “collective” method, while the function of each lift in the group are different (such as dirty, clean, staff etc.) the cars may have to be controlled individually (simplex).
- Depending upon operational workflows and security strategy, electronic card access systems to be implemented, along with emergency bed services function. Emergency bed services facilitate priority lift car call option for patients in critical care and associated staff.
- At least one elevator in a bank of lifts to be fed from the emergency (secondary) branch of power distribution.

  Power supply for lifts to be sourced directly (grouped or individually) from the main distribution board (MDB) of the healthcare building.