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BUREAU OF INDIAN STANDARDS

PRELIMINARY DRAFT FOR COMMENTS ONLY

Preliminary Draft Indian Standard

Lifts for the transport of persons and goods
Part 7 Lifts for special applications
Section 1 Lifts used in Under-Construction Buildings

Last Date of Comments: 15 April 2022

Lifts, Escalators and Moving Walks Sectional Committee, ETD 25

FOREWORD

This draft Indian Standard (Part 7/Section 1) will be adopted by the Bureau of Indian Standards, after the draft finalized by the Lifts, Escalators and Moving Walks Sectional Committee will be approved by the Electrotechnical Division Council.

This Indian Standard is published in several parts covering different requirements for the Lifts for the transport of persons and goods.

Electric Traction Lifts with Conventional Machine Room are frequently used during construction stage in under-construction-buildings to transport instructed people associated with the site work, tools and materials used for construction of the building. These lifts may use a mix of temporary and permanent equipment of the lift. Also, the lift may be erected at the same location of the permanent lift or somewhere else if it is to be dismantled once the building is ready.

In order to ensure safety during the transport of persons and goods in the 'Lifts used in Under-Construction-Buildings (LUCB)', requirements are given in this document.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated expressing the result of a test, shall be rounded off in accordance with IS 2: 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

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1 SCOPE

This standard specifies requirements for the Electric Traction Lifts with Conventional Machine Room that are used during construction stage in under-construction-buildings to transport instructed people associated with the site work, tools and materials used for construction of the building. These lifts may use a mix of temporary and permanent equipment of the lift. Also, the lift may be erected at the same location of the permanent lift or somewhere else if it is to be dismantled once the building is ready.

In case of Lifts used in Under-Construction-Buildings (LUCB), full compliance with IS 17900 (Part 1) (*under print*) and IS 17900 (Part 2) (*under print)* is required; however certain exemptions as detailed in this standard may be granted. As a consequence, LUCB shall not be accessible to the general public unless they fully comply with both IS 17900 (Part 1) (*under print*) and IS 17900 (Part 2) (*under print*) as well as other statutory requirements.

2 REFERENCES

The standards listed below contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of these standards.

IS No.	**Title**
IS 16814 : 2021	Safety of Machinery — Safety Distances to Prevent Hazard Zones Being Reached by Upper and Lower Limbs (*First Revision*)
IS 17900 (Part 1) : 2022	Lifts for the transport of persons and goods : Part 1 Safety Rules (*under print*)
IS 17900 (Part 2) : 2022	Lifts for the transport of persons and goods : Part 2 Design rules, calculations, examinations, and tests of lift components (*under print*)
IS 17900 (Part 5)	Lifts for the Transport of Persons and Goods – Inspection Manual (*working draft*)

3 CONSTRUCTION, INSTALLATION, PROTECTION, OPERATION OF LIFTS USED IN UNDER-CONSTRUCTION-BUILDINGS

3.1 The Lifts used in Under-Construction-Buildings shall comply with IS 17900 (Part 1) (*under print*) and IS 17900 (Part 2) (*under print*) except as noted hereunder and may be inspected as per IS 17900 (Part 5) (*working draft*).

3.1.1 *Well Enclosure*

The lift well shall be fully enclosed if it is adjacent to areas permitting passage of people such as stairwells, floors, and work spaces outside of the well.

a) Deviating from **5.2.5.2.2.1** of IS 17900 (Part 1) (*under print*) the totally enclosed well enclosure is permitted to be made of wire mesh under following conditions:
   1) The lift speed shall be less than or equal to 1.0 m/s.
   2) Wire mesh may be used on all sides of the well except the entrance side.
   3) The wire mesh gaps shall reject a ball of 25 mm in diameter.
   4) The clearance between the enclosure & any moving part of the lift shall be greater than or equal to 150 mm.
   5) The wire mesh shall be strong enough to resist a force of 1000 N at right angles on an area of 0.3 m x 0.3 m at any point without deflecting so much as to touch any of the moving parts of the lift, for example, car, counterweight, or ropes, etc.

b) Overhead protection (protective ceiling) shall be provided across the entire cross-sectional area of the well at least. It shall be located above the machine floor and shall be capable of sustaining a concentrated load of 1500 N on any area 100 mm x 100 mm. It is recommended to put one additional identical overhead protection cover at a distance of 1 m for increased safety.

c) Where the lift is operating in a multiple well and work is to be performed in an adjacent portion of the well of the operating lift, the well of such operating lift shall be fully separated. If this partition is perforate, **4.2.4.1** of IS 16814 shall apply. The partition shall have sufficient rigidity to ensure that when a force of 300 N being evenly distributed over an area of 5 cm^2 in round or square section, is applied at right angles at any point of the partition, it shall not deflect so as to interfere with the moving parts of the lift.

3.1.2 *Pit and Protection of Spaces Below the Pit*

a) A pit shall be provided for every Lift used in Under-Construction-Buildings and conform to **3.1.1** above.
b) The minimum pit depth required shall be as per IS 17900 (Part 1) (*under print*) requirements.
c) The strength of the floor of the pit shall be as per IS 17900 (Part 1) (*under print*).

Protection of spaces below pit not extending to the lowest level of the structure shall conform to the applicable requirements of **5.2.5.4** of IS 17900 (Part 1) (*under print*) or the space below the pit shall be made inaccessible to persons with a fence/wall.

3.1.3 *Location and Guarding of Counterweight*

3.1.3.1 *Location of counterweights*

The location of the counterweights shall be in the same well as the car.

3.1.3.2 *Counterweight pit guards*

a) Counterweight guards shall be installed in the pit on all open sides of the counterweight path.
b) The design, construction, and location of the guards shall conform to **5.2.5.5.1** of IS 17900 (Part 1) (*under print*).

3.1.4 *Machine Room/Machinery Spaces*

3.1.4.1 *General requirements*

a) Spaces containing machines, control equipment, sheaves, and other machinery shall be fully enclosed and protected from the environment. Enclosures shall be so supported and braced as to deflect not over 25 mm when subjected to a force of 450 N applied horizontally over an area of 100 mm x 100 mm. The overhead protection of the machine room shall conform to **3.1.1 b)**. The floor of the machine room shall conform to **3.1.4.2**.

b) A safe means of access to the machine room and machinery spaces shall be provided for authorized personnel. Access doors shall be of a minimum height of 2 m and a minimum width of 0.6 m, and shall be kept closed and locked.

c) Electric lighting shall be provided in the machine room and machinery spaces. The illumination shall be not less than 200 lux at floor level everywhere a person needs to work and 100 lux at the floor level to move between working areas.

d) Machine rooms shall be maintained free of refuse, and may be used for the storage of material necessary for the construction, maintenance, or operation of the lift only.

3.1.4.2 *Machine room floor/machinery space floor*

a) A metal or concrete floor shall be provided.

b) The floor shall be located above, level with, or directly below the machine beams.

c) Floors shall be designed to carry safely the loads it is subjected to with a minimum live load of 250 kg/m^2.
The machine beams shall be supported independent of the machine floor unless the floor is designed to take the reactions of the machine beams.

d) Machine Supports
   1) All machines, pulleys, over speed governors and similar units shall be properly supported and fixed to prevent any unit from becoming loose or displaced. Supporting beams shall be of steel or reinforced concrete.
   2) The overhead beams and their supports shall be designed as follows:
      i) The total load on overhead beams shall be assumed as equal to all equipment resting on the beams plus twice the maximum load suspended from the beams.
      ii) The factor of safety for all overhead beams and supports based on the ultimate strength of the material and the load in accordance with subsection i) shall be not less than 5 for steel and 7 for RCC.
   3) The deflection of the overhead beams under the maximum static load and calculated in accordance with **3.1.4.2 d) 2) i)** shall not exceed 1/1 500 of the span.
   4) Wood shall not be used for structural frame work of any lift.

(e) The area to be covered by the floor shall be at least entire area of the lift well.

3.1.5 *Conditions for Working in the Well of the Lift used in Under-Construction-Building*

a) Work in adjacent portions of a multiple well may be carried out provided **3.1.1 c)** above is complied with.
b) Hoisting of materials in any portion of the well of the Lift used in Under-Construction-Building is prohibited except when the car is unoccupied and the mains switch is OFF.
c) Hoisting of materials in adjacent portions of a multiple well is permitted only under direct supervision of the lift supervisor.

3.1.6 *Landing Doors and Gates*

A landing door or gate shall be provided at each landing. When closed, it shall guard the opening to its full height. Provided that the lift speed is less than or equal to 1m/s; deviating from **5.3.1.2** of IS 17900 (Part 1) (*under print*) the landing doors shall be solid, collapsible type, or openwork construction that shall reject a ball 25 mm in diameter. Collapsible landing gates shall be of a design that, when fully closed (extended position) shall reject a ball 60 mm in diameter.
The doors including their tracks shall withstand a thrust of 345 N applied normally at any point excepting any vision panel without permanent deformation and without the doors being sprung from their guides. For collapsible doors, this thrust may be applied at points on two

adjacent pickets so as to divide the load equally. Each door or gate shall be equipped with Locking and Emergency Unlocking of landing doors as per **5.3.9** of IS 17900 (Part 1) (*under print*). Operation of the car shall not be possible unless all the landing doors are closed and locked.

3.1.7 *Car Enclosure, Car Doors/Gates, Car Illumination*

3.1.7.1 *Enclosures required*

Except at the entrance, cars shall be fully enclosed with metal or wood on the sides and top. The enclosures shall be solid. The minimum clear inside height of the car shall be 2000 mm. Car top enclosures shall be constructed to sustain a load of 2000 N on any 0.3 m x 0.3 m area without permanent deformation.

3.1.7.2 *Securing enclosure*

The enclosure shall be securely fastened to the car platform and so supported that it cannot loosen or become displaced in regular service on application of the car safety, or on engagement of the buffer.

3.1.7.3 *Illumination in the car*

Each car shall be provided with at least two electric light fittings. The illumination of at least 100 lux shall be available on the car platform. Light bulbs and tubes shall be suitably protected against accidental breakage.

3.1.7.4 *Top emergency exits*

Deviating from IS 17900 (Part 1) (*under print*), it is permissible to provide an Emergency Exit with a trap door in the roof of the lift car and shall conform to the following:

a) Emergency Exit opening shall have minimum dimensions of 0.5 m x 0.7 m.
b) Emergency Exit trap door shall be provided with a means for manual locking.
c) Emergency trap doors shall be opened from outside the car without a key and from inside the car with a key suited to the triangle defined in **5.3.9.3** of IS 17900 (Part 1) (*under print*).
d) Emergency trap doors shall not open towards the inside of the car.
e) Emergency trap doors in the open position shall not project beyond the edge of the car.
f) Operation of the car with the top emergency exit open is prohibited unless the operation is under the direct supervision of authorized personnel and the car speed less than or equal to 0.75 m/s and the operation is only for the purposes of carrying loads which cannot be carried in the lift car otherwise.

3.1.7.5 *Use of glass*

Deviating from **5.4.3.2.3**, **5.4.3.2.4** and **5.4.3.2.5** of IS 17900 (Part 1) (*under print*), glass shall not be used in lift cars, except for the car lights and accessories necessary for the operation of the car.

3.1.7.6 *Car emergency signal*

Lifts shall be provided with an audible signaling device and a means of two-way communication either fixed or mobile.

3.1.7.7 *Car doors or gates*

A car door or gate shall be provided at each entrance to the car. When closed, it shall guard the opening to its full height. Provided that the lift speed is not more than 1 m/s; deviating from **5.3.1.2** of IS 17900 (Part 1) (*under print*), car doors shall be solid or collapsible type, or openwork construction that will reject a ball 25 mm in diameter. Collapsible car gates shall be of a design that, when fully closed (extended position), will reject a ball 60 mm in diameter. All doors including their tracks shall withstand a thrust of 345 N applied normally at any point excepting any vision panel without permanent deformation and without the doors being sprung from their guides. For collapsible doors, this thrust may be applied at points on two adjacent pickets so as to divide the load equally. Each door or gate shall be equipped with a car door or gate electric contact conforming to the requirements of **5.3.13** of IS 17900 (Part 1) (*under print*). Operation of the car shall not be possible if the car door is not closed.

3.1.8 *Operating Devices and Control Equipment*

3.1.8.1 *Operation and operating devices*

All operating devices shall be of the enclosed electric type. Operating devices shall conform to **5.12** of IS 17900 (Part 1) (*under print*) except that these lifts need not conform to **5.12.1.1.4**, **5.12.3.3** and **5.12.5** of IS 17900 (Part 1) (*under print*).

3.1.8.2 *Floor numbers*

Wells shall have floor numbers, not less than 100 mm in height, on the well side of the enclosure or well doors.

3.1.8.3 *Capacity plate*

Every lift car shall be provided with a capacity plate in a conspicuous position inside the car as per **5.4.2.3.2** as well as **5.4.2.3.3** of IS 17900 (Part 1) (*under print*). The height of the letters and figures shall be not less than 25 mm for these plates.

3.2 The following attributes/components of the LUCB listed only for ready reference shall comply with IS 17900 (Part 1) (*under print*) and IS 17900 (Part 2) (*under print*) without any deviation and may be inspected as per IS 17900 (Part 5) (*working draft*).

3.2.1 *Car Frames and Platforms*

Car frames and platforms shall conform to IS 17900 (Part 1) (*under print*).

3.2.2 *Rated Load and Speed*

3.2.2.1 *Rated load*

The inside net platform area shall be determined by the rated load and shall conform to **5.4.2.1** of IS 17900 (Part 1) (*under print*).

3.2.2.2 *Rated speed*

The car rated speed shall not exceed 4 m/s.

3.3 Car and Counterweight Safeties

Car and counterweight safeties shall conform to **5.6.2.1** of IS 17900 (Part 1) (*under print*) and IS 17900 (Part 2) (*under print*).

3.4 Overspeed Governors

Overspeed Governors shall conform to **5.6.2.2.1** of IS 17900 (Part 1) (*under print*) and IS 17900 (Part 2) (*under print*).

3.5 Ascending Car Overspeed and Unintended Car Movement Protection

Ascending car overspeed and unintended car movement protection shall be provided in conformance with **5.6.6** and **5.6.7** respectively of IS 17900-1.

3.6 Suspension Means

Lift car, counterweight shall be suspended by Steel Wire Ropes or Coated Steel Belts as per **5.5** of IS 17900 (Part 1) (*under print*). Ropes/CSBs that have previously been installed and used on another installation shall not be reused.

3.7 Counterweights

Counterweight shall conform to **5.4.11** of IS 17900 (Part 1) (*under print*).

3.8 Car and Counterweight Buffers

Car and counterweight buffers shall conform to **5.8** of IS 17900 (Part 1) (*under print*).

3.9 Car and Counterweight Guide Rails and Guide-Rail Fastenings

Car and counterweight guide rails and guide-rail fastenings shall conform to **5.7** of IS 17900 (Part 1) (*under print*).

3.10 Driving Machines

All driving machines shall conform to **5.9.2** of IS 17900 (Part 1).