GUJARAT LIFTS AND ESCALATORS RULES, 2001

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In exercise of the powers conferred by section 24 of the Gujarat Lifts and Escalators Act, 2000 (Gujarat 4 of 2000), the Government of Gujarat hereby makes the following rules, namely:-

CHAPTER 1
PRELIMINARY

1. Short title and commencement :-
These Rules may be called the Gujarat Lifts and Escalators Rules, 2001 .

2. Definitions :-
(1) In these rules, unless the context otherwise requires:

(b) "Annexure" means an annexure appended to these rules;

(c) "automatic control" means a method of operation by which a momentary pressure on a push button sets the cars in motion and causes it to stop automatically at any required lift landing;

(d) "bottom car clearance" means the clear vertical distance from the pit floor to the lowest structural or mechanical part, equipment or device installed beneath the car platform, except the girders, shoes, rollers, safety jaw blocks and platform aprons or guards located within three hundred millimeters, measured from the side of the car platform when the car rests its fully compressed buffers;

(e) "bottom car run by" means the distance between the car buffer striker plate and the striking surface of the car buffer when the car is in level with the bottom terminal landing;

(f) "bottom Counterweight run by" means the distance between the counterweight buffer striker plate and the striking surface of the counterweight buffer when the car floor is in level within the top terminal landing;

(g) "bottom over-travel" means the distance provided for the car to travel below the level of the bottom lift landing when the lift car is stopped by the normal terminal stopping device;

(h) "buffer" means a device designed to stop a descending car or counter weight beyond its normal limit of travel by storing or by absorbing and dissipating the kinetic energy of the car or counterweight;

(i) "call Indicator" means a visual and audible device in the car to

indicate to the attendant the lift landings from which calls have been made;

(j) "car apron" or "landing apron" means a protective screen to the under-side of the car platform or lift landing as the case may be, to prevent an object from being trapped between the car platform and the lift landing;

(k) "car-door electric contact" means an electric device the function of which is to prevent operation of the driving machine by the normal operating device unless the car door is in the closed position;

(l) "car body work" means the enclosing body work of the lift car which comprises the sides and roof and is built upon the car platform;

(m) "car frame" means the supporting frame or sling to which the platform of the lift car, its safety gear, guide shoes and suspension ropes are attached;

(n) "car platform" means the part of the car which forms the floor and directly supports the load;

(o) "car switch control" means a method of control whereby the movement on the lift-car is directly under the lift operator by means of a switch in the lift car;

(p) "control" means the system governing starting, stopping direction of motion, acceleration, speed and retardation of member;

(q) "collective control" means automatic operation by which calls made by pressing push buttons in the car and at lift landings are registered and answered by the car stopping in floor sequence at each lift landing for which calls have been registered, irrespective of the order in which the calls have been made and until all calls have had attention;

(r) "counter weight" means a weight or series of weights to counterbalance the weight of the lift car and part of the rated load;

(s) "deflector sheave" means an pulley used to change the angle or the direction of a rope lead;

(t) "door-center opening sliding" means a door which slides horizontally and consists of two or more panels which open from the center and are usually so interconnected that they move

simultaneously;

(u) "door-imperforated" means a door which is not having any perforations other than those required for vision panel of maximum size 100 Square centimeter;

(v) "door-single slide" means a single panel door which slides horizontally;

(w) "door-two speed sliding" means door slides horizontally and consists of two panels, one of which moves at twice the speed of the other;

(x) "door-vertical biparting" means door which slides vertically and consists of two panels or sets of panels that move away from each other to open and are so inter connected that they move simultaneously;

(y) "door-vertical lifting" means a single panel door which slides in the same plane vertically up to open;

(z) "door-swing" means a swinging type single panel door which is manually and closed by means of spring closer when released;

(ab) "door closer" means a device which automatically closes a manually opened door;

(ac) "door operator device" means a door operated device for opening and closing doors;

(ad) "earthed or connected with earth" means connected with the general mass of earth in such a manner as to ensure at all times an immediate discharge of energy without danger;

(ae) "electrical and mechanical Interlock" means an arrangement provided to the operation of the car;

(af) "electro-mechanical lock" means a device which combines in one unit, electrical and a mechanical inter lock arrangement used jointly for the landing and/or car doors;

(ag) "emergency stop push or switch" means a push button or switch provided inside the car designed to open the control circuit to cause the lift car to stop during emergency;

(ah) "floor leveling switch" means a switch for bringing the car to level at slow speed in case of double speed or variable speed machines;

(ai) "floor-selector" means a mechanism forming a part of the control equipment, in automatic lift, designed to operate controls which cause the lift car to stop at the required landings;

(aj) "floor stopping switch" means a switch or combination of switches arranged to bring the car to rest automatically at or near any pre-selected landing;

(ak) "gate lock" or "door lock" means a device as defined in clause (af) for application to a lift-landing or lift car door or gate, as the case may be and so designed that the door or gate only be opened when the lift-car is in the landing zone or by a special key;

(al) "gear less machine" means a lift machine in which the motive power is transmitted to the driving sheave from the motor without intermediate reduction gearing and has the brake drum mounted directly on the motor shaft;

(am) "goods lift" means a lift designed primarily for the transport of goods but which may carry a lift attendant or other persons necessary for the loading or unloading of goods;

(an) "guide rails" means the members used to guide the movement of a lift car or counter in a vertical direction;

(ao) "guide rails bracket" means the part of a guide fixing which carries the guide seating or bolts and guide clips, and serves to secure them to building or structure;

(ap) "guide rails fixing" means the complete assembly comprising the guide rails bracket and its fastenings;

(aq) "guide rails shoe" means an attachment to the car frame or counter weight for the purpose of guiding the lift car or counter weight frame;

(ar) "geared machine" means a machine in which the power is to the sheave through worm, or worm and spur reduction gearing;

(as) "hospital lift" means a lift normally installed in a hospital/ dispensary/ clinic and designed to accommodate one number bed/stretcher along its depth, with sufficient space around to carry a minimum of three attendants in edition to the lift operator;

(at) "landing call push" means a push button fitted at a lift landing, either for calling the lift car, or for actuating the car indicator;

(au) "landing door" means the hinged or sliding portion of a lift well enclosure, controlling access to a lift car at a lift landing;

(av) "landing zone" means a space extending from a horizontal plane 40 centimeters below a landing to a plane 40 centimeters above the landing;

(aw) "leveling device of a lift car" means any mechanism which either automatically or under the control of the operator, moves the car within the leveling zone towards the landing only, and automatically stops it at the landing;

(ax) "leveling zone" means the limited distance above or below a lift within which the leveling device may cause movement of the car towards the landing;

(ay) "lift landing" means that portion of a building or structure used for the reception and discharge of passengers or goods or both into or from a lift car;

(az) "lift machine" means the part of the lift equipment comprising the motor (s) and the control gear therewith, reduction gear (if any), brake (s) and winding drum or sheave, by which the lift car is raised or lowered;

(bc) "lift pit" means the space in the lift well below the level of the lift landing served;

(bd) "lift well" means the unobstructed space within an enclosure provided for the vertical movement of the lift car (s) and any counterweight (s) including the lift pit and the space for top clearance;

(be) "lift well enclosure" means any structure which separates the lift well from its surroundings;

(bf) "lifting beam" means a beam, mounted immediately below the lift machine room ceiling, to which lifting tackle can be fixed for raising or lowering parts of the lift machine;

(bg) "operation" means the method of actuating the control of lift machine;

(bh) "operating device" means a car switch, push button or other device employed to actuate the control;

(bi) "overhead beams" means the members, usually of steel, which

immediately support the lift equipment at the top of the lift well;

(bj) "over speed governor" means a device which brings the lift car and/or counterweight to rest by operating the safety gear in the event of the speed in a descending direction exceeding a predetermined limit;

(bk) "passenger lift" means a lift designed for the transport of passengers;

(bl) "position and/or direction indicator" means a device which indicates on the lift landing or in the lift car or both the position of the lift car in the lift well or the direction or both in which the lift car is traveling;

(bm) "rated load" means the maximum load which the lift car is designed and installed to carry safely at its rated speed;

(bn) "rated speed" means the speed attained by the lift car in the upward and downward direction with rated load in the lift car;

(bo) "retiring cam or retiring ram" means a device which prevents the landing doors from being unlocked by the lift car unless it stops at a landing;

(bp) "roping multiple" means a system of roping where in order to obtain a multiplying factor from the machine to the car, multiple falls of rope are run around sheaves on the car or counterweight or both. It includes toping arrangements of 2 to 1, 3 to 1 etc.;

(bq) "safety gear" means a mechanical device attached to the lift car or counterweight to the in the event of free fall, or, if governor operated, of over-speed in the descending direction;

(br) "safety gear-instantaneous" means a mechanical device in which the action on the guide rails is effected by means of serrated rollers or cams or wedges applied instantaneously in an emergency;

(bs) "safety gear-progressive" means a mechanical device in which the action on the guide rails is effected by means of serrated rollers or cams or wedges applied progressively in an emergency:

(bt) "section" means a section of the Act;

(bu) "service lift" means a lift with a car which moves in guides in vertical direction, has net floor area of one square meters, total inside height of 1.25 meters, whether or not provided with fixed or

removable sheaves and capacity not exceeding 250 Kilograms and is exclusively used for carrying materials and shall not carry any person;

(by) "sheave" means a rope wheel, the rim of which is grooved to receive the suspension ropes but to which the ropes are not rigidly attached any by means Of which power is transmitted from the lift machine to the ropes;

(bw) "slack rope switch" means switch provided to open the control circuit in case of slacking of rope (s);

(bx) "stroke of buffer" means the distance, the contact end of the spring can move under a compressive load until the spring is compressed solid;

(by) "suspension ropes" means the ropes by which the car and counterweight are suspended;

(bz) "terminal slow down switch" means a switch to cut off the energizing current for release so as to bring the car automatically to stop from over runs at high speeds or a switch provided for double speed machine to cut off the supply of relays controlling the high speed at terminal landings;

(cd) "terminal stopping device-normal" means a device for cutting all the energizing current in case of car traveling beyond the top or bottom landings or a device which cuts off the energizing current so as to bring the car to a stop at the top and bottom level;

(ce) "terminal stopping device-final" means a device which automatically causes the power to be discontinued to an electric lift driving machine motor and brake, independent of the functioning of normal terminal stopping device, the operating device or any emergency terminal stopping device, after the car has passed a terminal landings;

(cf) "top car clearance" means the shortest vertical distance between the top of the car cross head and the nearest part of the overhead structure or any other obstruction when the car floor is in level with the top terminal landings;

(cg) "top counterweight clearance" means the shortest vertical distance between top most part of the counterweight structure and the nearest part of the overhead structure on any other obstruction when the car is in level with the bottom terminal landing;

(ch) "travel" means the vertical distance between the bottom and top lift landings served in case of lift and the vertical distance between bottom terminal landing and the top terminal landing in case of an escalator;

(ci) "trailing cable" means a flexible cable providing electrical connection between the lift car and a fixed point or points.

(2) All other words and expressions used herein and not defined have the meanings respectively assigned to them in the Act.

CHAPTER 2
GENERAL REQUIREMENTS

3. Permission for installing lift or escalator or for making additions or alterations to the installed lift or escalator :-

(3) The regulations of the concerned local authority or urban development authority relating to providing the lift or escalator, as the case may be, shall be complied with by the owner making the application under sub rule (1).

4. Licence to use lift or escalator :-

(3) On receipt of a report from such officer given after due in inspection to the effect that the lift or escalator installation conforms to the requirements of the Act and the rules made there under, the Chief Inspector may grant the licence to work the lift in form set out in Annexure VI in case of a lift and in form set out in Annexure-VII, in case of an escalator and it shall be subject to the terms and conditions set out therein.

5. Aplication for licence in case of existing lifts and escalators :-
Every owner of a place in which a lift or escalator has been installed before the date of the commencement of the Act shall, within three months from such date, apply in form set out in Annexure VIII for a licence in case of a lift and in form set out in Annexure IX, in case of an escalator for operating such lift or an escalator and shall also furnish further information as may be required in this behalf by the Chief Inspector.

6. Grant of licence in case of existing lifts and escalators :-
On receipt of an application under Rule 5, the Chief Inspector, after making or causing to be made such enquiry as he may deem necessary, may grant a licence in form set out in Annexure-VI in

case of lift and in form set out in Annexure-VII, in case of an escalator or such terms and conditions as may be prescribed.

7. Restrictions on granting licence for operating lifts or escalators :-

No licence for operating a lift or an escalator shall be granted unless the requirements laid down in Chapter III or IV, as the case may be, have been complied with in respect of such lift or escalator: Provided that lift or an escalator, which has been installed before the commencement Act, for which the requirement of the rules in Chapter-III or IV, as the case may be, can not, in the opinion of the Chief Inspector, be strictly complied with within reasonable expenditure and with all reasonable efforts, may be granted licence not withstanding the deficiencies, if the Chief Inspector is satisfied that the working of the lifts or escalators is not likely to be caused danger to any person.

8. Renewal of licence :-

Every licence for operating a lift or an escalator shall be renewable at an interval of every three years. Application for renewal of the licence in the form set out in Annexure X together with the licence, the challan showing the payment of the renewal fee as prescribed in rule 16 and a report made under Section 16 shall be submitted to the Chief Inspector not less than thirty days before the date on which the period of validity of the licence is due to expire. In the event of the holder of a licence failing to renew the licence in the said manner and before the date of it expiry, the licence shall become void and a fresh licence shall have to be obtained.

9. Terms on which lift or escalator shall be operated :-

Every lift or escalator shall be operated subject to the following terms and conditions:

(c) It shall be the responsibility of owner of the lift or escalator to maintain the lift or an escalator and its installation in accordance with the requirement laid down in these rules;

(f) The owner shall not operate or cause the lift or an escalator to be operated which is not in safe working condition;

(h) If any part, enclosure gate of fastening of a lift or escalator is damaged or broken, the owner shall immediately get it repaired and put it in satisfactory working condition. The owner shall be responsible to keep the safety gears and over speed governors in good order and all parts of the lift or escalator free of dust or dirt.

The owner shall not weld any broken or damaged parts which are subject to tension, torsion, or bending or parts on which the lift car escalator is supported;

(i) The owner shall forthwith replace all controlling, lifting and balance weight ropes chain and wires, which indicate excessive wear or splintering;

(j) the owner shall record details of every repair made to the lift or escalator in a log book, which shall be maintained for each lift or escalator installation separately;

(k) The owner shall remedy immediately every defect noticed in lift or escalator installation reported by the lift attendant or any other person;

10. Order for repairing the lift or escalator and prohibiting the use thereof :-

An order under sub section (2) of Section 10 shall be issued as early as possible in the form set out in Annexure-XII and shall be served on the owner, agent or occupier of the premises or other person responsible for the working of the lift or escalator and the person on whom the order is served, shall comply with the order within the time as may be specified therein and shall report the compliance in writing to the officer by whom the order is served.

11. Authorization for erection, maintenance and inspection of lifts or escalators :-

(4) Person desirous of carrying out the work of erection and maintenance, maintenance or inspection and testing of escalators shall required to obtain separate authorization for each purpose;

(5) The authorization granted under this rule shall be valid for the calendar year during which it is granted and shall be renewable every year subject to compliance of terms and conditions prescribed for the purpose;

12. Appointment of lift attendant :-

A lift attendant for a passenger and hospital lift operating in every premise other than residential premise shall be appointed in writing by the owner of such lift and such attendant shall be on duty for the whole period during which the lift is put into use. No person shall be eligible for appointment as a lift attendant unless he possesses the education up to 4th standard, is mentally and

physically fit and is conversant with the proper operation of the lift as well as rescue operation in case of emergency and has attained the age of 18 years. The name of such attendant shall be reported to the officer authorized in this behalf by the State Government from time to time:

Provided that in case of lift operating in a residential premise, the appointment of such lift attendant shall be necessary only when the lift is put into attendant mode.

13. Intimation of accidentsr :-

Where any accident occurs in the operation of any lift or escalator which results or is likely to have resulted in loss of human life or injury to any person, the owner or any agent appointed by the owner under sub section (1) of Section 14 shall inform the Inspector immediately about the occurrence of the event of accident and a detailed report in the form set out in Annexure XVI be submitted within 48 hours of knowledge of occurrence of fatal and all other accidents.

14. Unused lifts or escalators :-

(1) Where a lift or an escalator installed at any place eases to be used as lift or escalator, the owner or his agent, if any, shall forthwith give a notice thereof in writing to the Inspector and shall either remove it or maintain it in such safe condition so as to prevent any danger to the persons after disconnection it entirely from all sources of power.

(2) All gates and doors in case of such unused lift shall be efficiently locked so as to prevent the entry of unauthorized persons to the lift well and the owner or his agent shall, if ordered by the Inspector so to do, take such other precautions as are considered necessary by the Inspector to prevent the danger from such unused lift or escalator.

15. Change of name in the licence and issue of duplicate thereof :-

16. Fees for licensees, inspection and authorization :-

(8) Fee for the inspection made at the request of the owner of the premises to whom licence for working of the lift or escalator has been granted (i) For lifts Rs.500/- (ii) For escalators Rs.2500/-;

(9) In the case of second or subsequent inspection, examination or

test made due to the neglect or failure of the owner or the agent to carry out within the stipulated time any work specified in any written order of the officer authorized in this behalf by the State Government or a breach of any of the provision of the Act or rules, the fees at one half of the rates prescribed in the sub rule (3) or (4), as the case may be, shall be levied;

(10) The fees in respect of licence or the certificate of authorization payable under this rule shall be paid along with the application for the purpose, whereas the fee for the inspection payable under this rule shall be paid prior to or at the time of inspection or within ten days from the date of such inspection. The demand of the inspection fee shall be made in form, set out in Annexure XVII;

(11) The fees leviable under this rule shall be paid by way of challan under the appropriate head of account prescribed from time to time and the original chalan shall be forwarded to the Chief Inspector.

17. Conformity with the Indian Standard Specifications :-
All materials, fittings, appliances, etc., used in lift or escalator installations shall conform to the relevant specifications of the Bureau of Indian Standard wherever they exit. In cases of materials for which Indian Standard do not exist, the materials shall be of approved workmanship and quality. The various guide lines prescribed by the Bureau Indian Standard in this regard shall also be followed by the person to whom they are applicable.

18. Conformity with National Building Code :-
The provisions of the National Building Code of India relating to the installation of the lifts and escalators shall be followed.

19. Installation, operation and maintenance of lifts or escalators :-
Every lift or escalator shall be of sufficient mechanical strength for the purpose for which it is intended and shall be installed, protected, operated and maintained in such manner so as to prevent danger.

20. Conformity with Indian Electricity Act and Rules :-
All electrical works in connection with installation of electrical lifts or escalators shall be carried out in accordance with the provisions of The Indian Electricity Act, 1910 and the Indian Electricity Rules, 1956.

21. Factor of safety :-

The factor of safety for any fabricated part of the lift or escalator shall not be less than five. Higher factor of safety for various other mechanical parts shall be applicable wherever specified by the Bureau of Indian Standards.

22. Instructions for restoration of persons suffering form electric shocks :-

Instructions in English or Hindi and Gujarati for the restoration of persons suffering from electric shock, shall be affixed by the owner or his agent in a conspicuous place in the lift or escalator machine room in which the electricity is used.

23. Initial and periodical inspection and testing of lifts or escalators :-

24. Quiet operation of lift or escalator :-

Every precaution shall be taken with lift or escalator to ensure the quiet operation of the lift or escalator, doors and machinery.

25. Separate electrical connection :-

A separate electrical connection or a separate independent circuit, as the case may be, shall be provided exclusively for the use of lift or escalator.

CHAPTER 3
LIFTS

26. Lifts wells :-

(1) Every lift well intended for the installation of the lift or any equipment necessary for its maintenance shall be exclusively reserved for that purpose and all not be used for any other purpose:

(2) The inner sides of a lift well shall, so far as practicable, form a smooth, continuous flush surface devoid of projections or recesses. Where any projections extending inwards from the general surface of the enclosure at or near openings or landing cannot be rendered flush, then they shall be leveled on the underside to an angle of not less than 60 degree from the horizontal by means of metal plates, cement rendering, or other suitable fire resisting materials;

(4) Where there is more than one lift in common well, a suitable separator screen through out the whole height of lift well having adequate strength shall be fixed in the lift well to protect the

person working in the lift well or in the lift car, from accidental contact with counter weights and other lift car at any stage of their travel:

(5) No room, passenger way or thoroughfare shall be provided under any lift well except in case of the lift having counter weight fitted with over speed governor safety device;

(6) Where a lift car leveling device is operative with the lift car gate opening such interior surfaces shall always form a smooth flush surface below each landing level for a depth to at least the depth of the car leveling zone plus distance through which the lift car may travel of its own momentum when power is cut off:

(7) Sufficient space shall be provided between the guides for the car and the side walls of the lift well enclosure to allow safe and easy access to the parts of the safety gear for their maintenance and repairs:

(8) A notice with the word "lift" shall be placed on the outside of each landing door.

27. Lift well enclosures :-

(1) Except as provided in sub-rule (2) every lift well shall be protected by a substantial fire resisting enclosure extending on all sides and fitted with gates or doors. The enclosure shall be so constructed that no person may fall down in the lift well or come into contact with any moving part of the lift when the gates of doors are shut:

(2) Where fire-resistance construction cannot be provided, the lift well shall be enclosed to a height of not less than 2.00 meters or such grater height as may be recommended by the Chief Inspector;

(3) Where wire grill or similar construction is used, the mesh or opening shall not be greater than 3 centimeters and the lift well enclosure shall be of sufficient strength to resist accidental impacts by users of the staircase of adjoining floors, and in the case of goods lift, by movements of materials in the vicinity;

(4) Where the clearance between the inside of an open type lift well enclosure and any moving or movable part of the lift equipment or apparatus is less than 5 centimeters, the openings in the enclosure shall be further protected by netting of square mesh not greater than 10 millimeters and of wire not smaller than 1

millimeter or in a manner approved in writing by the Chief Inspector;

(5) There shall be no opening in the lift well enclosure permitting access to the lift car by passing under the counterweight;

(6) In the construction of lift well enclosure glass shall not be used. However condition may be relaxed in case of specially designed, well protected, fully transparent laminated type, sandwich safety glass construction or poly carbonate material sheet construction as may be permitted by the Chief Inspector. A certificate from the qualified structural engineer regarding the proper fixation in respect of such type of construction shall be submitted along with the application for renewal of licence;

(7) Lift wells and wells for the counterweigtht, if located independently of the lift well, shall be adequately protected by means of suitable enclosure work which shall be extended on all sides from floor to ceiling;

(8) In all counter-weight wells located independently of the main lift well, suitable access shall be provided for the inspection, maintenance and repairs to counter-weights, wire ropes and their anchorages, guides and guide supports;

(9) All such doors giving access to such counter-weight wells shall be provided with electro-mechanical locking devices;

(10) No counter weight shall be allowed to travel in any lift well or part of any lift well other than that to which it belongs;

(11) The lift well enclosure on the sides facing any lift car entrance shall so far as is practicable, be not more than 25 millimeters from the edge of the lift car platform;

(12) The walls enclosing lift well in the buildings having height more than 30 meters shall have fire resistance of not less than two hours. The lift well shall have permanent vents immediately under the machine room not less than 0.2 square meter in clear area;

(13) The lift well for fire lift (a lift to enable fire brigade personnel to get to the upper floors with the minimum delay and to be used exclusively by firemen in an emergency and directly accessible to every landing on every floor), in the building having more than 30 meters height shall be segregated from the other lift wells by means of brick masonry or R.C.C. wall of a fire resistance of not

less than two hours;

(14) Fire lift in a building having more than 24 meters travel, shall work at or above the speed of 1.0 meter per second so as to reach the top floor from ground level within one minute;

(15) Thickness of the lift enclosure wall shall be of minimum 150 millimeters for R.C.C structure or 250 millimeters for brick construction;

28. Lift pit :-

(1) A pit of adequate depth shall be provided for every lift below the level of its lowest landing;

(2) The lift pit shall be so constructed as to be capable of withstanding the impact of the lift car with the rated load or the impact of the counter-weight when either is descending at rated speed or at governor tripping speed in case governor operated safety gear is used;

(3) Where pit depth exceed 2 meter, suitable access shall be provided by a ladder or any other suitable device and light point with a switch along with a car control switch at entrance level shall also be provided for facility of maintenance and repair work.

29. Bottom and top car clearances :-

30. Bottom runby for cars and counter weights :-

31. Top Counter weight Clearances :-
The top counter weight clearance shall not be less than the sum of the following four items:

(a) The bottom car runby;

(b) The stroke of the car buffer used;

(c) 15 centimeters; and

32. Landing doorsr :-

(1) The landing doors of all lifts other than goods lift shall be imperforate;

(2) All landing openings in lift well enclosure shall be protected by doors which shall extend the full height and full width of the landing opening. The top track of a landing door shall not obstruct the entrance to the lift car;

(3) The distance between the lift well side of the car door and the lift well side of the landing door shall not exceed 13 centimeters; where the car door or the landing door consists of two or more panels, the 13 centimeters dimensions shall apply to door panel nearest to the side edge. The distance between the car and the landing sills shall not exceed 30 millimeters;

(4) The opening for the landing doors shall be not wider than that of the width of lift car. Minimum landing door opening width and height shall be 0.7m and 2m respectively;

(7) Hangers and tracks for doors together with their fixings shall be of adequate strength to withstand stresses specified in sub-rule (5). Means shall be provided to prevent hangers for all landing sliding doors from jumping the tracks or jamming, and suitable stops shall be provided to prevent the hanger carriage from leaving the end of the track;

(8) The landing doors shall be securely fixed. The landing doors which are self closing shall be equipped with safety devices fitted on lift door to prevent persons while entering or leaving the lift car:

(9) Swing doors may be used where hoist way width is not enough to accommodate sliding doors. The distance between swing door and the lift car door shall not exceed 7.5 centimeters upto a height of 600 millimeters rom the bottom of the door;

(10) Entrance frame of the swing door shall be designed to support in place the panel with its hinges or pivots, door closer if attached to the frame and interlock. It shall withstand the forces referred to in Sub-rule (5) and the forces resulting from the normal opening of the door or normal attempts to open it when locked in the closed position;

(11) All collapsible type landing doors provided in case of lifts installed prior to the commencement of these rules and for goods lift used on industrial premises shall be of a close picket type no openings shall exceed 5.5 centimeters in width between the vertical members of the doors when it is fully extended;

(12) Automatic fire door or shutter which operates by means of a fusible link or otherwise, due to the action of heat, shall not be allowed in any landing, opening or in the lift-well enclosure of any lift if such opening provides an access for exit from the building;

(13) In swing type doors the vision panels shall be so located that lift operator can have convenient vision when opening the door from the lift car side;

(14) A door open alarm shall be provided to draw attention when a car or landing door which has been left open in passenger lift;

33. Locking devices for landing doors :-

(2) The electrical and mechanical parts of all locking devices for gates or doors, shall be sufficiently strong so that reasonable wear may not cause an unsafe condition;

(3) Every electro-mechanical lock shall be suitably encased and the removal of any detachable cover fitted to such casing must not affect the operation of the locking device. Where springs are used in locking devices, they shall be of compression type only properly supported;

(4) The contacts of locking devices for landing gates and doors shall be opened positively;

(6) Contact shall be of solid type pivoted, hinged on sliding and of sturdy construction;

(7) Provision shall be made on lift operated from the car and landings to prevent the opening of any landing door when the car is passing that zone in response to a call from another landing;

(8) The levers operating the mechanical part of the locking device shall be protected from interference from the landing side of the lift enclosure;

(9) Locking devices used with multiple panel doors shall lock all panels of the doors or only one panel provided that the interconnecting mechanism of door panels is so arranged that the locking of one will prevent the movement of all panels, not withstanding the breakage of chain or rope used for interlocking the panels. When a door locking device is used on one panel of vertically by party landing door reliance shall not be pressed on gravity to keep the other panel closed.

34. Guide rails :-

(1) Car and counter weight guide rails shall be of steel in all cases except where the nature of the processes carried on in the building render them unsuitable due to acid fumes for similar causes. In

such cases prior approval of the Chief Inspector shall be obtained;

(2) For passenger and goods lifts having rated speed of more than 0.50 meter per second, the car guide rails shall have their working surfaces machined;

(3) For passenger and goods lifts having a rated speed of more than 1.5 meter per second the counter weight guide rails shall have their working surface machined;

(4) Round guide rails and cast iron guide rails shall not be used. T" section to be adopted shall be one of the sizes specified in relevant Indian Standard or any other alternative section, provided they have adequate section modulus, moment of inertia and sectional area to withstand the forces resulting from the application of the car or counterweight safety devices;

(5) Guide rails shall be continuous throughout the entire length of the lift well, and shall be so jointed and fixed to their brackets which shall be of iron or steel so that the guides shall not deflect by more than 6 millimeters under round the clock operation. Wood blocks, plugs or similar methods shall not be used for fixing guide brackets;

(6) Guide rails shall be of such length that it shall not be possible for any other car or counter weight shoes to run off the guide rails;

(7) Guide rails and their fixings shall be so arranged to withstand the action of safety gear when stopping a counter weight or a fully loaded car;

(8) Guide rails and shall be held to their fastening by clips of such design that any rotary movement of the clip will not release the guide rails;

(9) The clips used for fastening the guide rails shall be of forged steel, formed steel or malleable iron or machined mild steel. The fasteners used shall conform to the relevant Indian Standard;

(10) If the guides are attached to overhanging stairs, the method of fixing shall be such that no vertical stress is transferred form the guides to the stairs;

(11) Guide brackets and shims if any, shall be of steel and shall not be directly supported and fastened to the lift well enclosure wall unless such wall is of such construction and strength so as to

adequately withstand the thrust imposed on the guides under all conditions of the lift service. The fastenings shall be by means of bond blocks built in to the wall or expansion bolts or through bolts with metal plates of such thickness and size so as to adequately distribute the load on the wall.

35. Buffers :-

(1) Buffers of spring or oil shall be fitted under the lift car directly or on the pit floor with suitable concrete or steel foundation. Oil resistant rubber buffers may be used for lift having a rated speed not exceeding 0.25 meter per second;

(2) Buffers shall be located symmetrically with reference to the vertical center line of the car frame within a tolerance of 50 millimeters;

(3) Spring or oil buffers shall be used with lift having rated speed in excess of 0.25 meter per second and upto and including 1.5 meter per second. Oil buffers shall be used with lift having rated speed in excess of 1.5 meter second;

(5) Spring buffers shall be capable of supporting a static load equivalent to two times the weight of car and its rated load for far buffers and two times the weight of counter weight for counter weight buffers without being compressed solid;

(6) Spring buffers shall be compressed solid with a static load three times the weight of the car and its rated load for car buffers and three times the weight of counterweight for counterweight buffers;

(7) The minimum stroke of oil buffers shall be such that the car or the counter weight on striking the buffer at 115 percent of rated speed shall be brought to rest with an average retardation of not more than 10 meter per second per second;

(8) Oil buffers shall develop an average retardation not in excess of 10 meter per second per second shall develop no peak retardation grater than 25 meter per second per second having a duration exceeding 1/25 of a second with any load in the car from rated load to a minimum load of 68 Kilograms when the buffers are struck with an initial speed of not more than 115 rated speed for buffers conforming with sub rule (7);

(9) Oil buffers shall be provided with means for determining that the oil level is within the maximum allowable limits. Glass sight

gauges shall not be used;

(10) Oil buffers shall be self resetting type.

36. Counter weights :-

(1) All Counterweights section (filler weights), metal or non metal, shall be carried in a steel frame. Means shall be provided to retain counterweight sections in place and prevent displacement. In case of non metallic filler weights, the counter weight sections shall be totally enclosed in a metallic covering. Where tie rods are used, minimum two shall be provided, passing through all sections. The factor of safety of steel frame members and tie rods shall not be less than 5.

(2) All counterweights shall travel between rigid guide rails;

(3) Counterweightsshall withstand the effect of buffer impact;

(4) Every counterweight shall travel in juxta-position to its car in the same lift well;

(5) At least four replaceable guide shoes with renewable lining or set of roller guides shall be provided, two at the top and two at the bottom of the counter weight;

(6) The guide shoes of counterweight shall be fixed and adjusted so that the play in the direction of the width of the counterweight does not exceed 5 millimeters;

(7) If an independent lift car counterweight is used, it shall not be of such weight as will cause undue slackening of any of the suspension ropes during acceleration or retardation;

(8) The travel-way of the counterweight in the lift pit shall be protected by means of a suitable enclosure work up to a height of 2 meters from the floor of the pit. Provided that a gap of 30 centimeters or up to the top of the counterweight buffer, which ever is higher may be kept from the floor of the pit.

37. Lift cars :-

(1) Lift cars shall be enclosed on all sides by means of car body and doors or gates and such enclosure shall be at least 2 meter clear in height. A roof solid or perforated, capable of supporting 2 persons, that is, 2 X 68 kilograms shall be provided. Perforations shall be sufficiently close in mesh and shall reject a ball of 25 millimeters

diameter to provide reasonable protection against falling articles on any person traveling in the car. The car floor shall be of a flat non-slip surface or checkered surface.

(2) Where car leveling devices are used, substantial aprons of sufficient depth shall be fitted to the car floor to ensure that no space more than the running clearances is permitted between the threshold and the landing while the car is being leveled to a floor;

(3) Where the lift car has solid enclosure and doors, provisions shall be made for a fan and for adequate ventilation. To permit switching off the power supply to the lift without switching of the fan and light, a separate circuit with control in machine room shall be provided for fan and light. Ventilation openings shall be provided in the enclosure walls above 1.8 m level and below 0.3 level. The total area of openings shall be not less than 0.035 square meter for each square meter of area of the car floor divided suitably between the top and the bottom levels. Any opening provided by a ventilating fan may be regarded as forming part of the ventilation area in that part of the car in which it is fitted;

(4) The car enclosure and doors, including their tracks of every lift car shall withstand a thrust of 345 new ton applied normally at any point, excepting any vision panel, without permanent deformation 1 Newton = 1/9.81 Kilograms

(5) A three-pin plug socket with switch for a hand lamp shall be fitted on roof of the lift car for use by persons working thereon;

(6) Lift car platforms shall be of framed construction and designed on the basis of rated loads evenly distributed. Platforms for cars for goods lifts shall be designed to suit the particular condition of loading. The minimum factor of safety shall be 5 for steel and 8 for timber;

(8) Car operating panel of every lift shall be provided with emergency stopping device operated by a push button in the car and it shall be clearly marked in red;

(9) Each lift car entrance shall be provided with a gate or door which shall cover the full height and width of the car opening. The top track of the gate or door shall not obstruct the car entrance;

(10) The car doors shall be imperforated. The door shall when closed, guard the full opening except in the case of vertical opening

car doors of goods lift, which may be limited to 2 meter and each door shall be equipped with an electric contact which shall prevent the movement of the car and the circuit shall not be completed until the leading edge of the door is within i5 millimeters of the nearest face of the door-jamb or when the leading edges of the center opening doors are within 50 millimeters of contact of each other. The contacts shall be opened positively, independent of gravity. The electric contact shall be situated or protected so as to be reasonably inaccessible from inside the car;

(11) Goods lift used in industrial premises may use collapsible door or vertically sliding car doors and these may be in mesh or perforated panel form. The dimensions of the mesh or perforations shall not exceed 10 millimeters horizontally and 60 millimeters vertically. Collapsible door for car shall be of close picket type and no openings exceeding 55 millimeters in width shall be permitted between the vertical members of the doors when they are fully extended;

(12) Each lift car gate or door shall be provided with an electric switch which will prevent the lift car from being started or kept in motion unless the car gates or door are closed. Provided that slow speed leveling of the lift car will be permitted from a position of 38 centimeters above or below the landing level with the gates or doors open;

(13) Every lift car controlled by an attendant shall be operated by a removable handle or key which shall remain at all times in the possession of the attendant. The handle or key shall automatically return to the off position when power is cut off. Landing gates of such lift cars shall also be opened only by a similar removable handle or key;

(14) Every lift car shall be fitted with a suitable light for adequate illumination of the car and the light shall be kept on during whole time the lift is available for use;

(15) Every lift car shall be provided with an emergency alarm signal which can be operated by a push button in the lift car and shall be clearly audible outside the lift well in order that assistance may be obtained in case of a breakdown or failure between the floors. Every such button shall be clearly marked;

(16) A battery operated unit for lift car light and emergency alarm signal shall be provided to provide assistance in case of failure of

power;

(17) The approach to the landing gate on each floor shall be kept lighted during the whole time the lift is available for use at night, and during the day time, if the situation so requires;

(18) In the case of lift cars having more than one entrance, the lift car gates shall be provided with electro mechanical interlocking device so that the gate can be opened only at the landing at which access to the lift car is provided;

(20) When the lift car is having automatic doors, it shall be possible to open the same manually from inside, in case of power failure.

38. Load Plate :-

(1) A load plate giving the rated load of the lift shall be fitted in each lift car in a conspicuous position. For passenger lift, the rated load shall be given in persons and kilograms. For goods lift, the rated load shall be given in kilograms or other convenient units and in persons. For the purpose of this clause, a person shall be regarded as weighing 68 kilograms;

(2) The minimum rated load of a passenger lift corresponding to the net inside car area shall be as per table given below

39. Lift car frame :-

(1) The car of every passenger or goods lift shall be carried in a steel frame which shall be sufficiently rigid and of adequate strength to withstand the operation of the safety gear without permanent deformation.

(2) The deformation of the lift car frame cross-head and the members carrying the lift car platform shall not exceed 1/1000 of their span under static conditions with contract load on the lift car platfom;

(3) Replaceable guide shoes with renewal linings shall be provided at the top and bottom of both the sides of the lift car frame;

(4) The factor of safety of the component parts of the lift car frame and their connections shall be not less than 5 based on the ultimate strength of the material and the static load imposed on them.

40. Safety gears :-

(1) Every lift shall be provided with one or more car safety devices,

attached to the lift car frame and located preferably at the lower part of the car. The safety devices shall be capable of stopping and sustaining the lift car with full rated load in the car at governor tripping speed;

(2) Every lift having a travel exceeding 5.5 meter shall be equipped with an over speed governor device which operates to apply the safety gear in the event of the speed of the lift car in the descending direction exceeding a predetermined limit;

(3) The application of the safety device shall not cause the lift car platform to become out of level in excess of 3 centimeters measured in any direction;

(4) When the safety gear is applied, no decrease in the direction in the tension of the governor rope or motion of the car in the descending direction shall release the safety gear;

(5) When a safety gear comes into operation, it shall automatically open the operating circuit, but it shall be possible for responsible person to release th safety gear, after a thorough inspection of the equipment and after taking any necessary precautions, by reversing the direction of the motion of the machine or by any other equally suitable means;

(6) The safety gear shall operate to stop and sustain the lift car in the event of failure of the suspension ropes, or in the event of the lift exceeding a pre-determined maximum over speed in the descending direction when a speed governor is fitted:

(7) Every safety gear shall operate positively and mechanically independent of any springs used in its construction;

(8) Any levels or dogs operated by shafts shall be keyed to such shafts by keys conforming to relevant Indian Standard;

(9) The design of the safety gear shall provide for its application to both guide rails, equally and simultaneously;

(10) Any additional rope used solely for purpose of operating the safety gear shall be led over independent pulleys, running on independent shafts;

(11) Bearings in safety gears and of the safety operating mechanism shall be of corrosion-resistant construction with one or both members of a bearing made of, or electroplated/coated with a

corrosion resistant material;

(12) Car and counterweight safety devices shall be actuated by separate governors. Provision shall be made to cause the application of counterweight safety gear, but at not more than 10 percent in excess of that at which the lift car safety gear applies:

(13) Slack rope safety gear of the instantaneous type may be used on counterweights within the limits specified in Table below

(14) No safety gear shall be permitted to stop an ascending lift car or counter weight. If any ascending car is to be stopped on account of over speed, a safety gear shall be fitted to the counterweight for this purpose. The governor may, however, open the motor circuit and apply the brake in the event of over speed in the ascending direction;

(15) Any drive to the car governor rope shall be effected from the car frame;

(16) Any connecting device between a governor rope and car frame (or counter weight) that is intended to be released when the safety gear is applied shall be retained in its normal position by a spring loaded device;

(17) No safety gear shall depend on the completion or maintenance of an electric circuit for its operation. All safety gears shall be applied mechanically;

(18) The gripping surfaces of the car or counterweight safety gears shall not be used to guide the lift car or counterweight but shall run free of the guide rails during normal operation of the lifts;

(19) Vibration of the lift car shall be restricted to the extent that safety gear is not operated;

(20) Safety gear, designed to stop the lift car or counterweight in a distance related to car counterweight speed, shall stop the lift car with rated load or the counterweight form governor tripping speed within the range of stopping distances given in Table below sub rule (23). The stopping distance shall mean the actual slide as observed from the markings on the guide rails made by the safety gear;

(21) The motor-control and the brake - control circuit shall be opened automatically before or at the time the safety gear is

applied;

(22) In case of a safety gear actuated by means of a rope unwinding from a drum the rope shall have at least three complete turns on the drum after the safety gear has been applied and the lift car has stopped. The minimum diameter of such drum shall be 1 3 centimeters. The device for holding the safety rope or rod in position during normal operation shall be fixed to the steel frame work of the lift car and not to the body work of the lift car. The ends of the governor rope shall be held by cleaves or other similar means, which shall effect its purpose by friction. The cleaves or other holding device shall be supported by or from the steel frame work of the car and not fixed to the body work of the lift car;

41. Governor :-

(1) Governor shall be placed where it is not struck by the lift car or counter weight in the event of over run:

(3) Any governor for a counterweight safety gear shall be adjusted to trip at a speed greater than, but not more than 10 percent above the tripping speed of the car governor;

(4) Each governor shall be marked with its tripping speed in meters per second.

(6) Governor ropes shall be not less than 6 millimeters in diameter and shall be of iron, steel or phosphor bronze and of suitable construction. When replacement of original governor ropes becomes necessary, these shall be normally of the same size, material and capacity as the ropes originally supplied by the makers of the lift. Before replacement by any other kind of rope, the suitability of such rope shall be tested to the satisfaction of the Chief Inspector;

(7) Governor ropes shall run clear of the governor jaws during normal operation of the lift;

(8) The area of contact made by the governor rope and the governor sheave shall, in conjunction with the rope tension device, provide sufficient attractive effort to cause proper operation of the governor.

(9) Governor jaws and their mounting shall be so designed that any cutting, tearing or deformation of the rope resulting from their application shall not prevent proper operation of the safety gear;

(10) Governor gears should have self - lubricating bearings which do not require frequent attention;

(11) The motor control circuit and the brake control circuit shall be opened before or at the time the governor trips.

42. Machine room :-

(1) All lifts shall have machine rooms immediately over the lift well, and this shall be arranged whenever possible without restriction the overhead distance required for normal safety precautions. Where the machine room is immediately over the lift well there shall be permanent and direct access from the top of lift landing. Alternative machine positions may be permitted by the Chief Inspector when there are special reasons justifying the same.

(2) All machine rooms shall be provided with adequate ventilation to dissipate the heat generated by the lift equipment. For most single and double installations, a high and low louvered convection ventilation arrangement shall be provided. For groups of three or more lift in one machine room, increased ventilations necessary and forced ventilation shall be provided:

(3) All machine rooms shall be considered as plant space, and conditions provided to permit reliable operation of electrical switch gear and space around the machine shall in no case be less then 60 centimeters;

(4) Lighting shall be provided to give at least 200 lux around the controller and machine. The machine room walls, ceiling and floor shall be faced in dust-resisting materials, tiles, etc., or painted to stop dust circulation;

(5) The machine room shall be of strong construction. The floor of the machine room shall be capable of carrying the load of the lift machinery and other equipment housed therein. Whenever a water tank is required to be constructed above or adjacent to the machine, there shall be a minimum separation of 400 millimeters between the wall or slab of the machine room and the water tank;

(6) The machine room shall be provided with reasonable access for the entry or removal of the equipments therein or of any part thereof. The height of the machine room shall be sufficient to allow any part of the equipment to be accessible and removal for repairs and replacement and in no case the height shall be less than 2.6

meters clear from the floor or the platform for machine elevator whichever is higher;

(7) The machine room shall be provided with access doors opening outwards;

(8) If the floor or platform of any machine room does not cover the entire lift well, the open sides shall be provided with hand rails or shall be guarded by other suitable means;

(9) The machine room shall not be used as a store room or for any purpose other than housing the lift machineries and its associate apparatus and equipment. No inflammable or explosive material shall be kept in the machine room:

(10) The machine room shall be kept locked which shall be accessible only to authorized persons. The key of the machine room shall be kept in the custody of the owner or his agent and shall be made readily available for repairs, maintenance or inspection;

(11) The machine room shall be provided with an insulated portable hand lamp for examining the machinery;

(12) Thickness of machine room wall shall be of minimum 150 millimeters for R.C.C. structure or 250 millimeters for Brick construction;

(13). The instructions in English or Hindi and Gujarati for the rescue of persons traveling in the lift by manual operation of brake in case of failure of lift motor or power shall conspicuously be affixed in the machine room.

43. Outline dimensions of electric lift :-

(1) The outline dimensions of machine room, pit depth, total headroom, overhead distance and sill for following four classes of lifts shall be provided as specified in Tables 1 to 4 and as indicated below:

NOTE-I: The total head room has been calculated on the basis of car height of 2.2 meter. Total maximum head room shall be 4800 Millimeters up to speed of 1.5 meter per second and 6700 Millimeters up to speed of 2.5 meter per second.

NOTE-2: In case of manually operated doors, clear entrance will be reduced by the amount of projection of handle the landing door.

NOTE-3: Four and six passenger lift shall be limited to a speed of 1 meter per second.

NOTE-4: The total minimum depth of the pit shall be 1600 millimeters to a speed up to 1.5 meter per second and 2600 millimeters to a speed up to 2.5 meter per second.

NOTE-l: The total headroom shall be calculated on the basis of car height of 2.2 meter. Total minimum head room shall be 4800 Millimeters.

NOTE-2: Clear entrance width "E" is based on vertical lifting car door and vertical bi-parting landing doors. For collapsible mid- bar doors the clear entrance width will be reduced by 200 millimeters (maximum 1800 millimeters).

NOTE-3: The total maximum depth of the pit shall be 1600 millimeters.

NOTE-1: The total head room has been calculated on the basis of a car height of 2.2 meter.

NOTE-2: In case of manually operated doors, clear entrance will be reduced by the amount of projection of handle the landing door.

NOTE-3: Although 15 persons capacity lift is not a standard one, this is included to cover lift of smaller capacity which can be used in small hospitals.

NOTE-4: The total minimum depth of the pit shall be 1800 millimeters.

(2) Pit:- The pit depth of the lift shall normally accommodate compensating chains. If compensating ropes are required, pit depth shall be increased for all loads and speed.

(3) Minimum Floor to Floor Height:- Minimum floor to floor height for horizontally sliding doors is f+750 millimeters and for vertically bi-parting doors shall 1.5f+250 millimeters, where "f is clear entrance height in millimeters.

44. Sheaves and pulleys :-

(1) Sheaves and pulleys shall be of cast iron and free from cracks, sand holes and other injurious defects. They shall have machined rope grooves. The traction sheave shall be grooved to produce proper traction and shall be sufficiently thick to provide for future

wear in the groove. The deflector sheave shall be grooved so as to provide a smooth bed for the rope. Deflector or secondary sheave assemblies where used shall be mounted in proper alignment with the traction sheave.

(2) The grooving of a diverter sheave or pulley shall have a radius larger than the radius of the rope by not less than the amount shown in table below and shall extend at least over one third of the circumference of the rope.

45. Lift machine :-

(1) No friction gearing, belt, chain, clutch or chain driven mechanism shall be used for connecting the main driving gear to the traction sheaves;

(2) The motor of each lift machine or the worm shaft shall be arranged so as to provide hand winding facilities and shall be suitably marked for the direction of up and down travel of the lift.

(3) Electric lift machine shall be provided having brakes released electrically;

(4) Traction machines for lift shall be equipped with the brakes applied automatically by means of springs of compression only or by gravity when the operating device is in the "off position or in the event of the power being cut off due to any cause:

(5) No single earth fault, short circuit or counter electromotive force shall prevent the brake from being applied during normal operation:

(6) The brake shall be designed to have a capacity sufficient to hold the car at rest with 125 percent of its rated load:

(7) No toggle or other device which is dependent upon impact operation shall be used to hold off the brake;

(8) brake of passenger and goods lift shall have at least two brake shoes and the lining used shall be of incombustible material;

(9) Means of releasing the brake in emergency shall be provided and the re-application of the brake ensured. It shall be ensured that hand winding of lift, by releasing the brake is done only by trained persons;

(10) No brake shall be released in normal operation until power has

been applied to the motor;

(11) Any emergency release device fitted to a brake shall not be capable of holding the brake in the "off position during normal operation;

(12) The sheave, drum worm wheel or spur gear of any lift machine shall be fixed to its shaft or driving unit either by means of sunk keys or splines according to Indian standards or shall be secured to a flange forming an integral part of the shaft or driving unit by means of turned tight fitting bolts. No set screw fastenings shall be used in lieu of keys or other positive connections;

(13) All machines, pulleys, over speed governors and similar units shall be so supported and held as to prevent any of these machineries or parts thereof from becoming loose or displaced affecting their safe working. Supporting beams shall be of steel or reinforced concrete.

46. Suspension :-

(1) Chains shall not be used for the suspension of a lift. No less than three independent suspension ropes shall be used for car or counterweight of any lift with traction drive;

(2) The minimum diameter of ropes for cars and counterweights of passenger and goods lift shall be 10 millimeter;

In the case of traction drive, the factor of safety shall be based on static contract load plus the weight of the lift car and accessories. In case of drum type drives, the factor of safety shall be calculated with dynamic conditions.

For the purposes of these rules, the factor of safety shall be as under: Fx n x k w Where F=minimum breaking strength of one rope: n=number of separate suspension ropes under load: k=roping factor, that is 1 for 1:1, 2 for 2:1 roping: and w=maximum static load imposed on all car ropes with the car and its rated load at any position in the lift well, in the same units as F

(5) All ropes anchored to a winding drum shall have not less than one complete and one half turns of the ropes on the winding drum when the lift car or counter weight has reached the extreme limit of its over travel;

(6) Every lift car or counter weight rope shall be free from joints;

(7) Rope compensation shall be used for any travel but it shall be

necessary for travels over 30 meters;

(8) The winding drum and the lift car and counterweight suspension ropes shall be properly secured by clamps on the inside of the drum;

(9) Means shall be provided for adjusting the lengths of the ropes to equalize the load on the individual suspension ropes;

(11) Tensioning devices for compensation ropes, governor ropes and the like shall be protected against damage due to falling objects;

(12) Each suspension rope shall be separately and independently fixed to the car and to the counterweight. The simple suspension of the lift car or the counterweight by means of a sheave or the like shall count as one suspension only.

47. Controllers and operating devices :-

(1) A manually operated mains disconnecting switch shall be installed in the main circuit cables of electric lift machines or motor generator sets. This switch shall be placed close to and visible from the machine or motor generator set controls;

(2) When there are more than one lift machine in machine room, each machine shall have a separate disconnecting switch. These switches shall be numbered to correspond to the number of the driving machine which they control and they shall be conveniently situated with respect to the driving machine;

(3) When any type of contact is used on the controller switches, for disconnecting the main circuit, at least two independent current breaks shall be incorporated in the design. In the event of an earth fault with any door open, the lift shall not work;

(4) Operation of a spring or springs in tension or the completion of another electric circuit shall not depend on to break the circuit to stop the lift at terminal landings;

(5) The interruption of the electrical circuit shall stop and prevent the movement of the car;

(6) Each lift machine operated by a poly-phase A.C. motor shall be protected against phase reversal or failure. This protection shall be extended to motor generator set driving D.C. or A.C. motor;

(7) All control circuits shall be independently protected by fuses or miniature circuit broker;

(8) The voltage of any controller operating circuit shall not exceed 250 volts. The control circuit shall be suitably protected independent of the main circuit and it shall be so arranged that an earth fault or open circuit shall not create an unsafe condition;

(9) It shall not be possible to start the lift car under normal operation unless every landing door and car door is in the closed position;

(10) In case of lift with car switch control, the handle of the car switch shall be so arranged as to return to stop position automatically when released;

(12) Every lift having winding drum machine shall be provided with a switch or device of adequate capacity which shall automatically cut off electric supply and shall stop the machine in the event the lifting ropes of the lift car become slack either due to any obstruction of the lift car in its travel in the descending direction or due to any other cause whatsoever;

(13) Emergency stop switches for short circuiting the landing door lock circuit shall be prohibited;

(14) An emergency stop switch, of manually opened and closed type, shall be provided on the top of every lift car and in the lift pit and shall be marked conspicuously;

(15) Drum drive machine shall not be used for speed exceeding 0.5 meter per second;

(16) All lift traveling at a speed of 1 meter per second and above shall be provided with floor leveling device;

(17) Signal bells or similar apparatus, which can be operated from any floor in connection with an indicator in the lift car, shall be provided on all lift operated by lift operators;

(18) The operation of the fire lift in building having more than 30 meters height, shall be a simple toggle or two button switch situated in a glass box painted with red color adjacent to the lift at entrance level on the ground floor. When the switch is ON, the landing call points shall become inoperative and car shall report to the ground floor and the same shall remain on car control only.

When the switch is "OFF", the lift shall return to normal working;

(19) Floor position indicator shall be provided in the lift car as well as at every landing;

(20) Car top shall be provided with a suitable wire mesh guard to provide safety to persons working thereon for maintenance of lift.

48. Terminal stopping and final limit switches :-

(1) Every electric lift shall be provided with upper and lower normal terminal limit switches arranged to stop the car automatically within the limits of top car clearance and bottom run by (over travel) from any speed attained in normal operation. Such limit switches shall act independently of the operating device, the ultimate or final limit switch and the buffers;

(2) Normal terminal limit switch shall be fitted in the lift car or in the lift well or in the machine room, and such switches shall be brought into operation by the movement of the lift car;

(3) When terminal limit switches are situated in the machine room, they shall be mounted on and operated by stopping device mechanically connected to and driven by the lift car without friction An automatic safety switch shall be provided to stop the machine in case of failure of tape, rope or other similar device;

(4) Electric lifts shall be provided with ultimate or final limit switches arranged to stop the car automatically within the top and bottom clearances independent of the normal operating device and the terminal limit switches. The switches and the oil buffer shall be so arranged that the opening of the switch and the engagement of the buffer shall be as nearly simultaneous as possible. When spring buffers are employed, the switch shall open before the buffers are engaged;

(5) Final limit switches shall act to prevent movement of the lift car under power in both directions of travel and shall, after operation, remain open until the car has been moved by a winding to a position within the limits of normal travel;

(6) Final limit switches shall not be mounted on the lift car and shall be operated by the movement of the lift car in the lift well;

(7) Final limit switches shall not control the same switches on the controller as those controlled by the normal terminal limit switches

unless two or more separate and independent switches are provided:

(8) All normal terminal stopping switches whether mounted on the lift car or in the lift well shall be of enclosed type and shall be securely mounted. The contacts of all terminal stopping devices shall be opened positively and mechanically by the movement of the lift car. Note:-In the case of electric lift using floor controller or other similar devices for automatic stopping at the floor landing, only one set of floor stopping contacts shall be necessary for each terminal landing provided these contacts and the means of operating them comply with the requirements for terminal stopping devices;

(9) Every lift having a winding drum machine shall have two final terminal stopping devices, one being operated by the machine and the other by the movement of the lift car.

49. Electrical wiring and apparatus :-

(1) The electric supply line and apparatus of the lift shall be of sufficient ratings of power, insulation and estimated fault current and of sufficient mechanical strength for the duty which they may be required to perform. Over current protection for power and control circuits, shall be provided;

(2) Each lift shall be capable of being isolated from the main supply by suitable locking arrangement;

(3) For banks of interconnected lifts, a separate sub circuit is required for the common supervisory system, in order that any one car may be shut down without isolating the supervisory control of the remainder;

(4) Machine rooms enclosing lift equipment shall be provided with adequate illumination controlled by a switch fixed adjacent to its the entrance. At least one socket outlet, suitable for lamps or tools, shall be provided in this room;

(5) The supply to the car light shall be from a separate circuit, and controlled by an independent switch located in the machine room. For multiple lifts with a common machine room a separate supply shall be provided for each car. The car lighting shall be independent of the power supply mains;

(6) Three pin sockets with switch and a light point shall be

provided on each floor. The power supply for this shall be controlled by a switch provided in the lift well and accessible from the terminal floor entrance;

(7) When the alarum system is connected to a transformer or trickle charger, the supply shall be taken from the machine room lighting or when available, from the building fire alarm system;

(8) All electric supply lines and apparatus in connection with the lift installation shall be so constructed, installed, protected and maintained so that there may be no danger to persons therefrom:

(9) A battery operated telephone shall be provided in the lift car and for the purpose, a cabinet shall be fitted in the car and wiring shall be provided from car to terminal box adjacent to the lift well. Such telephone shall be receivable at the ground floor;

(10) All metal casings or metallic coverings containing or protecting any electric supply lines or apparatus shall be efficiently earthed;

(11) No bare conductor shall be used in any lift car as may cause danger to persons;

(12) A danger notice in Hindi or English and Gujarati with a sign of skull and bones shall be affixed on the i)door of the machine room, ii)lift motor and iii)lift controller.

50. Testing at site :-

(2) A lift is designed to operate and transport the rated load at the required duty cycle, and shall not, by intention, or habitually, be used to carry overloads. During test, as a safeguard to cover variable supply and temperature conditions, a lift shall be checked for the car to complete one round trip with rated load plus 10 percent at nominal supply voltage and nominal ambient temperature;

(3) No new lift shall be brought into use unless the lift has been tested to determine whether its safety gear, brakes, terminal stopping devices, buffers, over-speed governor, etc. operate satisfactorily;

51. Other precautions :-

(1) Adequate precaution shall be taken to guard against any possibility of a lift being operated by unauthorized persons. Precautions shall also be taken to prevent a lift from being operated

by any person when it is not intended for use;

(2) No person shall remain in the pit while the lift is working. Adequate precautions shall be taken to protect persons working in the pit from accidental contact with counterweight;

(3) While a lift is under examination or repairs, suitable steps shall be taken to ensure that the lift is not operated inadvertently by any person working in the lift;

(4) No explosive or other inflammable material shall be carried in the lift car as may cause danger to the safety of persons.

CHAPTER 4
ESCALATORS

52. Angle of inclination :-
The angle of inclination of an escalator shall normally be not in excess of 30 degrees from the horizontal. In exceptional circumstances, it may be permitted upto 35 degrees but vertical rise in any case should not exceed 6 meters;

53. Width of escalator :-
The width between balustrades shall be measured on the incline at a point 68.5 centimeter vertically above the nose line of the steps, and shall not be less than the width of the step. It shall not exceed the width of the step by more than 33 centimeter with a maximum of 16.5 centimeter on either side of the escalator.

54. Balustrading :-

(1) Escalators shall be provided on each side with solid balustrading. On the step side the balustrading shall be smooth and substantially flush except for protective moulding parallel to the run of the steps and properly bevelled vertical mouldings projecting not more than 6.5 millimeters, that cover joints of panels;

(2) Glass panels when used in balustrade shall be laminated;

(3) There shall be no abrupt changes in the width between the balustrading on the two sides of the escalator. Where a change in width is unavoidable, such change shall not exceed 8 percent of the greatest width. In changing the direction of the balustrading resulting from a reduction in width the maximum allowable angle of change in balustrading shall not exceed 15 degree from the line of escalator travel;

(4) The clearance on either side of the steps between the steps and the adjacent skirt guard shall not be more than 5 millimeters and the sum of the clearance on both sides shall not be more than 6 millimeters:

55. Hand rail :-

(1) Each balustrade shall be provided with a hand rail moving in the same direction and at substantially the same speed as the steps.

(2)Proper arrangement shall be made to prevent trapping of an object between the handrail and the balustrading or between the steps and the balustrading;

(3) Each moving handrail shall extend at normal handrail height not less than 30 centimeters beyond the line of points of the comb plate teeth at the upper and lower landings;

(4) Hand or finger guards shall be provided at the point where the hand rail enters the balustrade;

(5) The horizontal distance between the central lines of the two hand rails, measured on the incline, shall not exceed the width between the balustrades by more than 15 centimeters with a maximum of 7.5 centimeters on either side of the escalator.

56. Step treads and landings :-

(1) Step frame shall be made of incombustible material. Step treads shall be horizontal and made of incombustible material and shall afford a secure foothold;

(2) If the landing is of concrete, it shall have edge insertions of metal, wood or other anti slip material;

(3) The depth of any step tread in the direction of travel shall be not less than 40 centimeters and the rise between treads shall be not more than 22 centimeters. The width of a step tread shall,be not less than 40 centimeters and not more than 102 centimeters;

(4) The maximum clearance between step treads on the horizontal run shall be 4 millimeters;

(5) The tread surface of each step shall be slotted in a direction parallel to the travel of the steps. Each slot shall be not more than 6.5 millimeters wide and not less than 9.5 millimeters deep and the

distance from center of adjoining slots shall be not more than 9.5 millimeters.

57. Comb platesr :-

(1) There shall be a comb plate at the entrance and at the exit of every escalator;

(2) The comb plate teeth shall be meshed with and set into slots in the tread surface so that the points of the teeth are always below the upper surface of the treads;

(3) Comb plates shall be adjustable both horizontally and vertically. Sections forming the comb plate teeth shall be readily removable without the use of special tools in case of emergency;

58. Trusses or girders :-

(2) The escalator truss or girders shall be designed to safely sustain the steps and running gear in operation. In the event of failure of the track system it shall retain the running gear in its guides.

59. Track arrangement :-
Step wheel track shall be so designed as to prevent displacement of the steps and running gear if a step chain breaks.

60. Capacity and loading :-
The rated load in kilograms on an escalator shall be computed as follows: Rated load = 2.7 WA Where W = The width in centimeter between the balustrades and A = The horizontal distance between the upper and lower comb plate teeth in meter.

61. Limits of speed :-
The rated speed of the escalator shall not be more than 38 meters per minute.

62. Application of power, driving machine, motor and brake :-

(1) The driving machine shall be connected to the main drive shaft by toothed gear, a coupling, or a chain;

(2) An electric motor shall not drive more than one escalator;

(3) Each escalator shall be provided with an electrically released, mechanically applied brake capable of stopping the up or down traveling escalator with any load upto rated load. This brake shall be located either on the driving machine or on the main drive

shaft;

(4) Where a chain is used to connect the driving machine to the main drive shaft, a brake shall be provided on this shaft. If an electrically released brake is provided on the driving machine, it may not be necessary of electrically released type.

63. Chain :-
All chains shall have a factor of safety not less than ten. Material requiring periodical heat treatment shall not be used for chains.

64. Safety Devices :-

(1). Where starting pushes or switches are within reach of the public they shall be either be the key- operated type or be enclosed in a box provided with a lock and key and shall be located within sight of the escalator steps;

(4) A broken step chain device shall be provided which shall cause the interruption of power to the driving machine if a step chain breaks and where automatic chain tension device is not provided, it shall cause the interruption if excessive sag occurs in either of the step chain;

(5) Where the driving machine is connected to the main drive shaft by a chain, a broken drive chain device shall be provided to cause the application of the brake on the main drive shaft of the drive chain parts;

(7) An electrically released brake shall automatically stop the escalator when any of the safety devices required under sub rules (2), (3), (4), and (5) of this rule come into operation.

65. Machine room :-

(1) A machine room of suitable size and construction shall be provided for the housing of the escalator machines, and associated apparatus and equipment;

(2) The machine room shall be of sound construction, weather proof and dry and shall be properly ventilated to prevent any undue rise in temperature inside the room. Necessary means shall also be provided to maintain a reasonable temperature in the machine room. The floors of the machine rooms shall be capable of carrying the load of the escalator machinery and other equipments housed therein;

(3) The machine room shall be arranged to allow reasonable access to and the removal of the equipments there in or of any part thereof. The height of machine room shall be sufficient to allow any part of the equipment to be accessible and removable for repairs and replacement;

(4) Safe and convenient access to machine room entrances shall be provided with access doors opening outwards:

(5) The machine room shall not be used as store room or for any other purpose other than housing the escalator machine and associated apparatus and equipment. No inflammable or explosive material shall be kept in the machine room;

(6) The machine room shall be kept locked, which shall be accessible only to an authorized person. The key of the machine room shall be kept in the custody of the owner or his agent and shall be made readily available for repairs, maintenance or inspection. A danger notice in Hindi or English and Gujarati with sign of skull and bones shall be affixed on the outside of the door and in a conspicuous position near the machinery.

66. Lighting of step treads :-
Step treads shall be illuminated throughout their urn. The light intensity on the tread surfaces shall be not less than 20 Lux. The illumination shall preferably be of uniform intensity and it shall not contrast materially with that of the surrounding area.

67. Access to interior of escalator :-
Reasonable access to the interior of the escalator shall be provided for inspection and maintenance.

68. Tests :-

69. Other precautions :-

(1) Adequate precaution shall be taken to guard against any possibility of an escalator being operated by unauthorized persons. Precautions shall also be taken to prevent an escalator from being operated by any person when it is not intended for use;

(2) An attendant shall be on duty in the premises where an escalator is installed during the whole period the escalator remains in use;

(3) Where an escalator is under examination or repairs, suitable

steps shall be taken to ensure that the escalatoris not operated inadvertently by any person in such a manner which may endanger the safety of persons working in the escalator;

(4) Explosive or other inflammable material shall not be carried in the escalator as may endanger the safety of persons;

(5) The escalator machine room shall be provided with a suitable fire extinguisher;

(6) Escalator pit pans shall be periodically cleaned of oil and refuse;

(7) All parts of the machine and equipment requiring lubrication shall be lubricated at regular periodical intervals with lubricants of standard grade;

(8) The sides and undersides of escalator trusses and machinery area shall be enclosed in fire resistive materials. Means shall be provided for adequate ventilation of the driving and driven machine and control spaces;

(9) Floor openings for escalator shall be protected against the passage of flame, smoke or gases in the event of fire.

CHAPTER 5
MISCELLANEOUS

70. Relaxation of rules :-

(1) The Chief Inspector may by order in writing, and subject to such conditions as he may think fit to impose, relax the provisions of any of these rules to such extent as, in his opinion, may not be applicable to such lift or escalator;

(2) In case of lift or escalator operated by power other than electricity, the Chief Inspector may, by order in writing, relax the provision of these rules to such extent as, in his opinion are inconsistent or are not applicable to such lift or escalator. Such lift or escalator must, however, comply with such instructions as may be issued in this behalf by the Inspector with the approval of the Chief Inspector;

(3) Every relaxation so directed shall be reported forthwith to, and shall be subjected to disallowance or revision by the State Government.

71. Responsibility of the owner of lift or escalator, agent and authorized person :-

Where any person is responsible for the observance of any of these rules, every agent and the person authorized under Section 13 shall also be responsible for such observance in respect of matters under their respective controls.

72. Mode of entry :-

All persons entering in pursuance of the Act or these rules, any building which is used as a human dwelling or a place of worship, shall in making such entry have due regards so far as may be compatible with exigencies of purpose for which such entry is made, to the social and religious usage of the occupants of the building entered.

73. Repeal and Saving :-

On the commencement of these rules, the Bombay Lifts Rules, 1958 in its application to the State of Gujarat shall stand repealed.

Provided that such repeal shall not affect the previous operation of the said rules and any thing done or action taken by or under the provisions of the said rules, in so far as it is not inconsistent with the provisions of these rules be deemed to have been done or taken under the corresponding provisions of these rules and shall continue in force unless and until superseded by anything done or any action taken under these rules.