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Specification for electric lift

电梯技术条件

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Specification for electric lift

1 Scope

This document specifies the technical requirements, reliability, test rules, as well as marking, packaging, transportation, storage and technical files for passenger electric lifts and freight electric lifts.

This document applies to traction electric lifts with a rated speed not greater than 6.0 m/s and forced electric lifts with a rated speed not greater than 0.63 m/s. For traction electric lifts with rated speeds greater than 6.0 m/s, refer to this document. The non-applicable parts shall be determined through negotiation between the manufacturer and the purchaser.

This document does not apply to hydraulic electric lifts, utility electric lifts, household electric lifts, freight-only electric lifts and inclined electric lifts.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

GB/T 755, *Rotating electrical machines -- Rating and performance*

GB/T 7024, *Terminology of lifts, escalators, passenger conveyors*

GB/T 7588.1-2020, *Safety rules for the construction and installation of lifts -- Part 1: Passenger and goods passenger lifts*

GB/T 7588.2-2020, *Safety rules for the construction and installation of lifts -- Part 2: Design rules, calculations, examinations and tests of lift components*

GB/T 8903, *Steel wire ropes for lifts*

GB/T 10059, *Electric lifts -- Testing methods*

GB/T 10060, *Code for installation acceptance of electric lifts*

GB/T 14048.1-2012, *Low-voltage switchgear and control gear -- Part 1: General rules*

GB/T 20645, *Specific environmental condition -- Technical requirements of low-*

3.2 composite filler weight

A variety of materials are mixed in a certain proportion and then filled in a closed or partially closed box. After solidification, a counterweight block with a certain strength is formed. The counterweight block is called a composite filler weight.

3.3 press filler weight

Counterweights that are formed from metal materials such as iron filings, particle steel, and color steel tile scraps through high temperature and high pressure.

4 Technical requirements

4.1 Basic requirements

4.1.1 Electric lifts and all their components shall be correctly designed and structurally sound. They shall comply with general technical specifications for mechanical, electrical and building structures.

4.1.2 The materials from which electric lift components are made shall maintain adequate strength over their expected life. Materials harmful to the environment and human health (such as asbestos, etc.) shall not be used.

4.1.3 The entire electric lift machine and parts shall have good maintainability and facilitate inspection and maintenance, so as to ensure normal working condition during its service life.

4.2 Normal usage conditions

4.2.1 The altitude of the installation site does not exceed 1000 m. For electric lifts with an altitude exceeding 1000 m, the operating temperature rise and temperature allowable limits of the driving host shall be corrected according to the requirements of GB/T 755. For electric lifts with an altitude exceeding 2000 m, the selection of low-voltage electrical appliances shall comply with the requirements of GB/T 20645.

4.2.2 The ambient temperature in the hoistway and machine space shall be maintained between 5℃~40℃.

4.2.3 The relative humidity of the air at the installation site shall not exceed 50% when the maximum temperature is 40°C. There can be higher relative humidity at lower temperatures. For example, when the monthly average minimum temperature in the wettest month is 20°C, the monthly average maximum relative humidity in that month can reach 90%. It is necessary to consider the impact of humidity on electrical equipment, including issues such as condensation. Corresponding measures shall be taken.

c) Terminal buffer device. For energy-consuming buffers, there shall be an electrical safety device for checking and resetting. If a reduced-stroke buffer is used, it shall also have the function of monitoring deceleration at the end of the stroke.

d) Protection device when exceeding the upper limit and lower limit working position.

e) Floor door lock device and electrical interlock device:

1) When the electric lift is running normally, the landing door cannot be opened. If a landing door is open, the electric lift cannot start or continue to run (except for leveling, re-leveling and preparatory operations in the unlocking area);

2) Electrical safety devices to verify landing door locking; electrical safety devices to verify landing door closing; emergency unlocking and landing door automatic closing devices.

f) During the closing process of the power-driven automatic door, when people pass through the entrance, the protection device automatically reopens the door.

g) Traction electric lift car upward overspeed protection device.

h) Emergency operating device, including a device that opens the brake of the driving host and a device that moves the car to a nearby landing.

i) Bistable red stop device, that is installed in the pulley room (if any), on the car roof, in the pit, on the inspection operation control device, next to the driving host, and on the emergency and test operation screens. If there is a main switch or other stopping device within 1 m from the driving host or within 1 m from the emergency and test operation screen, there is no need to set a stopping device next to the driving host or on the emergency and test operation screen.

j) When setting up two or more maintenance operation control devices, ensure interlocking between them:

1) If only one of the maintenance operation control devices switches to the "inspection" state, the electric lift can be made to run by pressing the button on the maintenance operation control device;

2) If two or more inspection operation control devices are switched to the "inspection" state, operating any one of the inspection operation control devices will not cause the car to run, unless the same function buttons on all maintenance operation control devices switched to the "inspection" state are operated at the same time.

k) Emergency alarm and intercom system. Emergency alarm devices or two-way intercom systems shall be installed in places where people working in the car or in the hoistway are in danger of being trapped.

l) Overload protection device.

m) Other braking devices (functions) for traction electric lifts. When the main engine brake is used as the deceleration component of the car upward overspeed protection device of the traction electric lift or the braking component of the car accidental movement protection device.

n) Driving host brake monitoring function.

o) Car accidental movement protection device.

p) Landing door and car door bypass devices.

q) Door contact circuit monitoring function.

r) Car door opening restriction device or car door lock device.

s) Voice announcement system in the electric lift car. At least when the electric lift is trapped due to power outage or malfunction, the car position is corrected (except for re-leveling), the electric lift automatic rescue operating device (if any) is activated and the electric lift exits normal service after receiving a fire signal, a voice announcement shall be made, so as to prompt and comfort passengers in the car.

t) Suspension device abnormal elongation inspection device. When the suspension device uses a covered rope (strap), two wire ropes or two chains.

u) Bearing body monitoring device, service life monitoring device and abnormal lateral movement prevention device (if any). When the suspension device uses covered ropes (straps).

v) Mechanical devices, movable stops and electrical safety devices. The machine is in the hoistway. When the working area is set on the car roof, inside the car or in the pit, the maintenance and inspection of the machine shall be carried out in the working area. If any loss of control or unexpected movement of the car due to maintenance and inspection may cause danger to maintenance or inspection personnel, mechanical devices are provided to prevent any dangerous movement of the car and electrical installation devices are provided to prevent any dangerous movement of the car. When the working area is set on a platform that enters the running path of the car or counterweight (or balance weight), a mechanical device is set to lock the car or a movable stop device is set to limit the running range of the car. Set up electrical safety devices.

4.4 Appearance quality requirements

4.4.1 The surfaces and decorations of car doors, landing doors and visible parts shall be smooth. The painted part shall be smooth, uniform in color and beautiful. The paint

f) When a group of braking components fails, the remaining braking components shall be able to decelerate, stop and maintain a stopped state for the car carrying the rated load and going down at the rated speed, as well as the car going up at the rated speed without the load. It shall be possible to independently test each set of brake components from outside the hoistway.

g) The status of the brake shall be monitored and at least meet one of the following requirements. If it is detected that any group of brakes fails or the function of monitoring the brakes is canceled, the electric lift shall not be put into normal operation.

1) For monitoring the braking force of each group of brakes, the monitoring time interval shall not be greater than 24 h.

2) For monitoring the action of brake mechanical components, monitor the correct lifting (corresponding to brake release) or release of each group of brake mechanical components every time the brake is activated.

h) The temperature rise of the brake coil shall not be greater than the requirements of GB/T 24478.

4.5.3 The driving host shall not have abnormal vibration and noise during operation.

4.5.4 The reduction box that drives the main engine (if any), its box dividing surface, observation window (hole) cover, etc. shall be tightly connected. No oil leakage is allowed. When the electric lift is operating normally, the oil temperature in the reduction box of the driving host and the oil leakage area per hour at the extended end of the reduction box shaft shall not exceed the requirements of GB/T 24478. Measures shall be taken to prevent the braking surface from being contaminated by lubricating oil (grease) leaked from the drive main engine.

4.5.5 The energy efficiency of permanent magnet synchronous motors for electric lifts complies with the regulations of GB 30253. The energy efficiency labels are added in accordance with relevant national regulations.

4.5.6 The motor driving the main engine shall have an overheating protection device or function.

4.5.7 The temperature rise of the stator winding of the motor driving the main engine shall not be greater than the requirements of GB/T 24478.

4.5.8 The protection of the traction sheave of the driving host shall comply with the provisions of 5.5.7 in GB/T 7588.1-2020. For the protective device of the driving host for the covered belt, it shall also be able to prevent sand particles with a diameter greater than or equal to 2.5 mm from entering between the covered belt and the traction wheel.

4.16.2 It is advisable to choose cast iron or steel counterweights. If composite filler weights or press filler weights are selected, their drop test performance must meet the following requirements.

a) After the composite filler weight is lifted as a whole to a height of 1 m and dropped freely once, or one end of the length direction is lifted to an inclination of 45° and dropped to the concrete floor three times, the number of cracks shall not exceed 3. The width of each crack shall not be greater than 1 mm. Its length shall not be greater than half the width of the counterweight block. The mass loss is no more than 2‰.

b) There shall be no cracks after the counterweight block is lifted as a whole to a height of 1 m and dropped once freely from a height of 1 m or one end of the lengthwise direction is lifted to an angle of 45° and dropped to the concrete floor three times. The mass loss is no more than 2‰.

4.16.3 If the counterweight or balance weight consists of counterweight blocks, the counterweight blocks shall be reliably fixed within the frame to prevent displacement. The uppermost and lowermost parts of the frame shall be provided with measures to prevent the composite filler weights or press filler weights from falling after rupture.

4.17 Guide rail

4.17.1 Each rail shall have at least 2 guide rail brackets. The number of brackets for non-standard length guide rails installed at the upper and lower ends of the shaft shall meet the design requirements.

4.17.2 The guide rail shall comply with the provisions of 5.7 in GB/T 7588.1-2020. It is advisable to use T-shaped guide rails that comply with the regulations of GB/T 22562 or hollow guide rails that comply with the regulations of GB/T 30977.

4.18 Pulleys for suspension

4.18.1 The protection of the pulley shall comply with the provisions of 5.5.7 in GB/T 7588.1-2020. The covered pulley guard shall also prevent the entry of sand particles with a diameter greater than or equal to 2.5 mm.

4.18.2 The pulley shall have means to prevent axial and circumferential slippage between the pulley hub and the bearing outer ring.

4.18.3 Pulleys on counterweights or balance weights, and pulleys on electric lift cars in partially enclosed shafts and glass-walled shafts that comply with 5.2.5.2.3 in GB/T 7588.1-2020 shall be made of metal.

4.18.4 Pulleys made of non-metallic materials (such as monomer cast polyamide) shall meet the following requirements:

4.21 Control cabinets, emergency and test operating panels and other electrical equipment

4.21.1 The control cabinet and other electrical equipment of the electric lift shall comply with the relevant provisions of 5.10 and 5.11 in GB/T 7588.1-2020.

4.21.2 Emergency and test operation screens shall comply with the relevant provisions of 5.2.6.6 in GB/T 7588.1-2020.

4.21.3 Apply twice the maximum voltage of the circuit between the main circuit (power) part of the control cabinet and the ground, apply 1000 V for 1 min. There shall be no breakdown or flashover.

4.21.4 Functional tests shall be carried out after the control cabinet is assembled. All functions shall comply with design requirements.

4.21.5 On the machine room electric lift control cabinet and the machine room-less electric lift emergency and test operation screen, there shall be instructions on the test operation methods of the car upward overspeed protection device and the car accidental movement protection device.

4.21.6 The number of starts of the covered rope (belt) electric lift shall be checked through the control cabinet or other electrical equipment. When the preset number of electric lift starts is exceeded, there shall be a corresponding prompt.

4.21.7 Emergency alarm devices and intercom systems shall meet the following requirements:

a) Set up a remote alarm system for emergency relief that meets the requirements of GB/T 24475. Ensure there is a two-way intercom system for continuous communication with rescue services;

b) If the electric lift stroke is greater than 30 m or there is no direct dialogue between the car and the emergency operation location, an intercom system or similar device powered by emergency power supply shall be installed between the car and the emergency operation location.

4.22 Energy performance

4.22.1 The main energy and auxiliary energy of the entire electric lift machine shall be measured in the running state, idle state and standby state. The measurement method is carried out according to the provisions of GB/T 30559.1.

4.22.2 The energy consumption of the entire electric lift machine shall be calculated as the total energy consumption per day and year. Electric lift energy performance

classification is performed based on the calculation results. The calculation method and energy performance classification are carried out in accordance with the provisions of GB/T 30559.2.

4.23 Additional requirements for electric lifts suitable for persons with disabilities

If the electric lift is suitable for use by disabled people, it shall comply with the regulations of GB/T 24477 and GB/T 30560.

4.24 Additional requirements for seismic design

If a building requires electric lifts to meet the characteristics of earthquakes, the seismic design of the electric lift shall be compatible with the building's seismic design standards and comply with the provisions of GB/T 31095.

4.25 Additional requirements for electric lift characteristics in case of fire

If a building requires electric lifts to meet fire characteristics, the electric lifts shall comply with the regulations of GB/T 24479.

4.26 Additional requirements for fireman's electric lifts

If the electric lift is a firefighter electric lift, it shall also comply with the regulations of GB/T 26465.

4.27 Additional requirements for explosion-proof electric lifts

If the electric lift is an explosion-proof electric lift, it shall also comply with the regulations of GB/T 31094.

4.28 Operational assessment before delivery

After the electric lift is installed, system inspection and adjustment shall be carried out. Carry out trial operation test. A simulation trial run can be carried out first. Any problems discovered during the simulated trial run inspection will be promptly adjusted and corrected. Then conduct the slow train trial run, express train trial run, and load operation test, respectively.

The car operates 1,000 times each under no-load and rated load conditions according to the number of starts per hour and load duration specified in the product design (not less than 8 h per day). The electric lift shall run smoothly, brake reliably, and run continuously without faults.

6 Test rules

6.1 Test methods

The test methods for electric lifts shall be carried out in accordance with the provisions of GB/T 10059.

6.2 Exit-factory inspection

The exit-factory inspection of electric lifts shall be carried out in accordance with the product standards of the manufacturer.

6.3 Inspection before delivery

Inspections before the electric lift is delivered for use shall be carried out in accordance with 4.28 and 6.3 of GB/T 7588.1-2020 and the relevant provisions of GB/T 10060.

6.4 Type inspection

6.4.1 Type inspection shall be carried out under any of the following circumstances:

a) When the manufacturer manufactures for the first time;

b) When the main parameters of the product exceed the original applicable range;

c) When product configuration changes;

d) When other problems occur that affect product safety performance.

6.4.2 Type inspection items shall include Chapter 4, Chapter 5 and the relevant content of GB/T 7588.2-2020.

7 Marks, packaging, transportation, storage and technical files

7.1 Marks

7.1.1 Electric lifts shall be equipped with product marks. The mark is set in an obvious position in the car and shall comply with the provisions of 5.4.2.3.2 in GB/T 7588.1-2020. For freight electric lifts, they shall also comply with the provisions of 5.4.2.3.3 in GB/T 7588.1-2020.

7.1.2 The nameplates of components (such as speed limiters, buffers, safety gears, door

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