GB

NATIONAL STANDARD OF THE

PEOPLE'S REPUBLIC OF CHINA

ICS 91.140.90

CCS Q 78

GB/T 24478-2023

Replacing GB/T 24478-2009

Traction Machine of Electric Lifts

电梯曳引机

Issued on: November 27, 2023 **Implemented on: June 1, 2024**

Issued by: State Administration for Market Regulation;

Standardization Administration of the People's Republic of China.

Table of Contents

Foreword 3
1 Scope 7
2 Normative References 7
3 Terms and Definitions 8
4 Technical Requirements 9
5 Test Methods 14
6 Inspection Rules 18
7 Marking, Packaging, Transportation and Storage 20

Foreword

This document was drafted in accordance with the rules provided in GB/T 1.1-2020 *Directives for Standardization - Part 1: Rules for the Structure and Drafting of Standardizing Documents*.

This document serves as a replacement for GB/T 24478-2009 *Traction Machine of Electric Lifts*. In comparison with GB/T 24478-2009, apart from structural adjustments and editorial modifications, the main technical changes are as follows:

a) The scope of application is modified (see Chapter 1; Chapter 1 of Version 2009);

b) The terms and definitions of “rated torque of traction machine” and “maximum release voltage of brake electromagnet” are modified (see 3.2 and 3.6; 3.2 and 3.6 of Version 2009), and the term and definition of “short-circuit braking torque of permanent magnet synchronous motor” is added (see 3.4);

c) The general rule “The traction machine of electric lifts shall also comply with the relevant provisions of GB/T 7588.1-2020” is added (see 4.1);

d) The requirements for the “efficiency of permanent magnet synchronous motor” are added (see 4.3.1.7);

e) The relevant requirements for “permanent magnet synchronous motor as electrical braking device of electric lifts” are added (see 4.3.1.8);

f) The requirement that “the motor shall have overheat protection to avoid failure of components, such as: windings and permanent magnets, etc.” is added (see 4.3.1.9);

g) The requirement that the motor protection degree shall not be lower than IP2X is added (see 4.3.1.10);

h) The requirements for the braking position and torque of the “brake that also serves as the deceleration component of the upward overspeed protection device of the lift car and the brake component of the accidental movement protection device of the lift car” are added (see 4.3.2.2); the relevant requirements for the “grouping setting of brake mechanical components” are modified (see 4.3.2.3; 4.2.2.2 of Version 2009); the material requirements for the “brake pads” are modified, and the requirements for “flame retardant performance level, wear inspection and replacement warning information” are added (see 4.3.2.5; 4.2.2.2 of Version 2009);

i) The requirements for the “maximum release voltage” are modified (see 4.3.2.6; 4.2.2.3 of Version 2009); the requirements for the leakage current of the “brake coil withstand voltage test” are added (see 4.3.2.6);

Traction Machine of Electric Lifts

1 Scope

This document specifies the technical requirements, test methods, inspection rules, marking, packaging, transportation and storage of electric lift traction machines with a rated speed not greater than 10.0 m/s.

This document applies to traction machines for passenger and goods lifts.

This document does not apply to traction machines for service lifts, home lifts and inclined lifts; however, this document may be used as a reference.

This document does not apply to electric lift traction machines with hydraulically operated brakes.

2 Normative References

The contents of the following documents constitute indispensable clauses of this document through the normative references in the text. In terms of references with a specified date, only versions with a specified date are applicable to this document. In terms of references without a specified date, the latest version (including all the modifications) is applicable to this document.

GB/T 191 Packaging - Pictorial Markings for Handling of Goods

GB/T 755-2019 Rotating Electrical Machines - Rating and Performance

GB/T 1029-2021 Test Procedures for Three-phase Synchronous Machines

GB/T 1032-2012 Test Procedures for Three-phase Induction Motors

GB/T 1971 Rotating Electrical Machines - Terminal Markings and Direction of Rotation

GB/T 2900.25 Electrotechnical Terminology - Rotating Electrical Machines

GB/T 3768 Acoustics - Determination of Sound Power Levels and Sound Energy Levels of Noise Sources Using Sound Pressure - Survey Method Using an Enveloping Measurement Surface over a Reflecting Plane

GB/T 4208-2017 Degrees of Protection Provided by Enclosure (IP code)

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

4 Technical Requirements

4.1 General

The traction machine of electric lifts specified in this document shall also comply with the relevant provisions of GB/T 7588.1-2020.

4.2 Working Conditions

The working conditions of the traction machine of electric lifts meet the following requirements.

a) The altitude does not exceed 1,000 m. If the altitude exceeds 1,000 m, then, the temperature and temperature rise limit of the motor and brake shall be corrected in accordance with the provisions of 8.10 in GB/T 755-2019.

b) The ambient air temperature shall be maintained at 5 °C ~ 40 °C.

c) The relative humidity of the air at the operating location does not exceed 50% when the maximum temperature is 40 °C. At relatively low temperatures, the relative humidity may be higher. The monthly average minimum temperature of the wettest month shall not exceed 25 °C, and the monthly average maximum relative humidity of that month shall not exceed 90%. If condensation is likely to be generated on the equipment, then, corresponding measures shall be taken.

d) The fluctuation of the power supply voltage relative to the system nominal voltage shall be within the range of ±7%.

e) The ambient air shall not contain corrosive and flammable gases.

4.3 Performance Requirements

4.3.1 Motor

4.3.1.1 For synchronous motors, when the input voltage to the motors is at the maximum value and the rotational speed of the motors is maintained at the rated value, the over-torque shall not be less than 1.5 times the rated value. For traction machines with a rated torque greater than 700 N • m or for electric lifts with a rated speed greater than 2.5 m/s, the over-torque may be agreed upon by the traction machine manufacturer and the user. When the synchronous motor is subjected to the above-mentioned torque for 15 seconds, no phenomenon that affects the normal operation of the motor shall occur.

4.3.1.2 The ratio of the stall torque of an asynchronous motor to the rated torque shall not be less than 2.2, and for the low-speed winding of a multi-speed asynchronous motor, it shall not be less than 1.4.

4.3.1.3 In accordance with the provisions of 5.1.1 in GB/T 1032-2012, the insulation resistance of the stator winding shall not be less than 0.5 MΩ in the hot state or at the end of the

overspeed protection device of the lift car and the brake component of the accidental movement protection device of the lift car, its braking torque and braking position shall also comply with the provisions of 5.6.6 and 5.6.7 in GB/T 7588.1-2020.

4.3.2.3 All mechanical components of the brake (including the electromagnet moving iron core) involved in applying the braking force to the brake wheel (disc) shall be installed in at least two groups. The electromagnet coil, static iron core and parts guiding the moving iron core of the electromechanical brake shall also be installed in at least two groups. When used on an electric lift, if one of the groups does not work due to component failure, there shall still be sufficient braking force to decelerate, stop and keep still the lift car with a rated load descending at a rated speed and the no-load lift car ascending at a rated speed.

4.3.2.4 The braking system shall have a monitoring device or function to ensure that the brake is properly lifted (or released).

4.3.2.5 Brake pads shall not contain asbestos material. The flame retardant performance of brake pads shall at least reach Level B_1 specified in GB 8624. Near the brake, there shall be warning information (such as: test methods and replacement conditions, etc.) for replacing worn brake pads.

4.3.2.6 Under the situation where 4.3.2.2 is satisfied, the minimum pull-in voltage of the brake electromagnet shall be lower than 80% of the rated voltage; the maximum release voltage of the brake electromagnet shall be lower than 40% of the rated voltage and shall not be lower than 10% of the rated voltage.

The release time of the brake shall not be greater than 0.5 s. For the traction machine brake that also serves as the deceleration component of the upward overspeed protection device of the lift car and the brake component of the accidental movement protection device of the lift car, the release time of the brake shall also be agreed upon with the traction machine user.

When an AC voltage of 1,000 V is applied between the conductive part of the brake coil and the ground for a duration of 60 s, the leakage current shall not be greater than 100 mA.

4.3.2.7 The brake shall be subjected to no less than 2 million fault-free action tests. During the test, no maintenance shall be performed. After the test, its performance shall still comply with the provisions of 4.3.2.2 and 4.3.2.6. The brake operation monitoring device (if any) shall be able to normally work.

4.3.2.8 The manual brake release device shall comply with the provisions of 5.9.2.2.2.7 in GB/T 7588.1-2020.

4.3.3 Requirements for other performance

4.3.3.1 The ratio of the pitch diameter of the traction sheave to the nominal diameter of the wire rope shall not be less than 40. For electric lift traction machines using covered rope (belt) suspension devices, the ratio of the pitch diameter of the traction sheave to the nominal diameter (or nominal thickness) of the carrier shall not be less than 40.

of use.

4.3.3.12 If the output shaft gear components of the geared traction machine are connected by bolts, then, the bolt assemblies shall have anti-falling measures.

4.4 Other Requirements

4.4.1 The protection of the traction machine shall comply with the requirements of 5.5.7 and 5.9.1.2 in GB/T 7588.1-2020. For traction machines using covered rope (belt) suspension devices, the protective device between the covered rope (belt) and the traction sheave that prevents foreign matter from entering shall be able to prevent sand particles with a diameter greater than or equal to 2.5 mm from entering. A protective device shall be installed to prevent the covered rope (belt) from jumping out of the groove or abnormally moving sideways on the traction sheave. The fixed parts of the protective device shall comply with the provisions of 0.4.21 in GB/T 7588.1-2020.

4.4.2 The encoder (if any) for the traction machine shall have anti-interference shielding and anti-collision mechanical protection.

4.4.3 The exterior coating shall be uniform; the paint film shall firmly adhere and have sufficient adhesion. Exposed rotating components shall be painted yellow, the manual release device of the traction machine brake shall be at least partially painted red, and the handwheel of the traction machine shall be at least partially painted yellow.

4.4.4 All signs and warnings shall comply with the provisions of 5.1.2 in GB/T 7588.1-2020.

4.4.5 The traction machine brake that also serves as the deceleration component of the upward overspeed protection device of the lift car and the brake component of the accidental movement protection device of the lift car shall be provided with a nameplate in accordance with the provisions of 5.6.6.12 and 5.6.7.14 in GB/T 7588.1-2020. The nameplate content shall also include the following parameters applicable to the brake component and the deceleration component:

a) Allowable system mass range;

b) Allowable rated loading capacity range;

c) Action speed range (the deceleration component of the upward overspeed protection device);

d) The maximum speed range expected before the lift car decelerates (the brake component of the accidental movement protection device of the lift car).

5 Test Methods

5.1 Motor Over- (locked-rotor) torque

This is an excerpt of the PDF (Some pages are marked off intentionally)

------ The End ------