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NATIONAL STANDARD OF THE

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ICS 53.080

J 83

GB/T 35739-2017

Continuous vertical conveyor for unit goods in logistics warehousing distribution center

物流仓储配送中心成件物品连续垂直输送机

Issued on: December 29, 2017 **Implemented on: July 01, 2018**

Issued by: General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of Chinn;

Standardization Administration of the People's Republic of China.

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Continuous vertical conveyor for unit goods in logistics warehousing distribution center

1 Scope

This document specifies the terms, types, basic parameters, technical requirements, test methods, inspection rules, marks, packaging, transportation and storage for continuous vertical conveyor for unit goods.

This Standard applies to the conveyors that convey the unit goods in layers along the vertical direction (hereinafter referred to as "conveyors"). Other continuous vertical conveyors can use this Standard as reference.

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 191, *Packaging and storage marks*

GB/T 700-2006, *Carbon structural steels*

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

GB/T 1243, *Short-pitch transmission precision roller and bush chains, attachments and associated chain sprockets*

GB/T 4942.1-2006, *Degrees of protection provided by the integral design of rotating electrical machines (IP code) - Classification*

GB 5226.1-2008, *Electrical safety of machinery - Electrical equipment of machines - Part 1: General requirements*

GB/T 6892-2015, *Wrought aluminium and aluminium alloys extruded profiles for general engineering*

GB/T 8923.1-2011, *Preparation of steel substrates before application of paints and related products - Visual assessment of surface cleanliness - Part 1: Rust grades and preparation grades of uncoated steel substrates and of steel substrates after overall removal of previous*

GB/T 9286-1998, *Paints and varnishes - Cross cut test for films*

GB/T 13306, *Plates*

GB/T 13384, *General specifications for packing of mechanical and electrical product*

GB/T 19418-2003, *Arc-welded joints in steel - Guidance on quality levels for imperfections*

GB/T 21776, *Standard guide for testing coating powders and powders coatings*

GB/T 23580, *Continuous handling equipment - Safety code - Special rules*

JGJ 82, *Strength bolted connections technical regulations*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1 unit goods

A single regular item that can be conveyed or a single conveyed item formed in a container.

3.2 carrying device

A device capable of carrying an item and operating with a lift traction part.

3.3 conveying speed

The speed at which the carrying device is running.

3.4 conveying rate

The number of pieces conveyed in a unit time.

4 Types and basic parameters

4.1 Types

Conveyors are divided into type Z, type C, type E according to the conveying method, as shown in Figure 1.

5 Technical requirements

5.1 Working environment conditions

5.1.1 The working environment temperature is -5℃~+40℃.

5.1.2 The altitude of installation and use site shall not exceed 1000m. When it exceeds 1000m, the capacity of the motor shall be verified according to the provisions of GB/T 755.

5.1.3 The power supply is three-phase AC. The frequency is 50Hz. The voltage is 380V. The allowable deviation of voltage fluctuation is ±10%.

NOTE: When the working environment conditions exceed the above range, it shall be resolved through consultation between the user and the manufacturer.

5.2 Overall performance

5.2.1 The conveyor shall run smoothly without abnormal noise.

5.2.2 When the conveyor is running, there shall be no jamming and falling of goods.

5.2.3 The connection point between the carrying device and the lifting traction part in the vertical lifting section shall be in a horizontal state. There is no obvious concave phenomenon in the middle when loading.

5.2.4 The conveyor control system shall be set to three operating modes: automatic mode, manual mode, and maintenance state mode.

5.2.5 When the conveyor is running at full load, the deviation between the actual conveying speed and the designed conveying speed shall not be greater than ±5%.

5.2.6 The conveying rate of the conveyor shall meet the design requirements.

5.2.7 The noise sound pressure level of the conveyor during operation shall not exceed 75dB(A).

5.3 Main parts

5.3.1 Traction part

When metal chains are used as traction parts, the chains shall meet the requirements of GB/T 1243.

5.3.2 Carrying device

The mechanical properties of the material for the carrying device shall not be lower than Q235A specified in GB/T 700-2006 and 6061 specified in GB/T 6892-2015.

5.3.3 Lifting transmission mechanism

5.3.3.1 The chain wheels on both sides of the main drive shaft shall be installed to ensure that the sprockets are synchronized. The mechanical properties of the material for the chain wheels shall not be lower than Q235A specified in GB/T 700-2006.

5.3.3.2 The horizontal and vertical sections of the chain shall be provided with chain guide grooves. The interface between the rails shall be flush.

5.3.3.3 The chain tensioning mechanism shall be easy to adjust. Chain tension is moderate.

5.3.4 Frame

5.3.4.1 The mechanical properties of the materials such as frame columns, beams and diagonal braces shall not be lower than Q235A specified in GB/T 700-2006.

5.3.4.2 When the frame is welded, the quality level of the weld seam of the weldment shall not be lower than level C specified in GB/T 19418-2003.

5.3.4.3 When the frame is connected with high-strength bolts, the connection strength shall not be lower than the provisions in JGJ 82.

5.3.5 Drive device

5.3.5.1 The drive device shall run smoothly without crawling. The reducer shall have no oil leakage.

5.3.5.2 The protection level of the motor shall not be lower than the IP54 specified in GB/T 4942.1-2006.

5.4 Surface coating

5.4.1 Before painting, the structural parts shall be de-rusted. The processing level shall meet the requirements of level Sa2½ and level St3 in GB/T 8923.1-2011.

5.4.2 The adhesion of the paint film shall meet the level 2 specified in GB/T 9286-1998. The surface of the coating shall be complete and uniform, with the same color and luster. There shall be no defects such as roughness, leaking paint, wrong paint, wrinkles, serious sagging.

5.4.3 The appearance and adhesion of powder coating shall meet the requirements of GB/T 21776.

5.5 Whole machine installation

5.5.1 After the whole machine is assembled, the levelness of the carrying device shall not be greater than 3mm.

length of the goods.

5.6.5 A cargo drop detection device shall be installed in the conveyor.

5.6.6 The motor shall be a brake motor with overload, overheating and overcurrent protection.

5.6.7 The conveyor shall be equipped with sound and light alarm devices. They shall comply with the provisions of 10.3 Indicator lights and displays in GB 5226.1-2008.

5.6.8 Emergency stop switches shall be set near the working position of personnel, on the operation panel (cabinet) and other appropriate positions.

5.6.9 The metal structure and electrical equipment of the conveyor shall have reliable grounding. The grounding resistance shall not be greater than 1MΩ.

5.6.10 The selection and installation of electrical equipment and components shall comply with the relevant provisions of GB 5226.1-2008.

6 Test methods

6.1 Visual inspection

Visually inspect whether the safety warning signs, entrance and exit protection devices, transmission protection devices, outer protection facilities, chain guides, and the interface between the guide rails meet the requirements.

The conveyor shall run smoothly, without crawling and abnormal noise.

The reducer has no oil leakage.

6.2 Level state testing of carrying device

Check whether the connection point between the carrying device and the traction part is in a horizontal state. Use a laser level to measure whether the carrying device and the corresponding link of the connecting chain are the same height.

6.3 Testing of conveying speed

Check the conveying speed of the conveyor. Use handheld speedometer to determine the rotational speed of inlet and outlet transmission shaft. Read the conveying speed, in meters per minute.

6.4 Testing of conveying rate

Check the conveying rate of the conveyor. During the test, the carrying device that runs horizontally is loaded with goods of rated weight. Measure the number of pieces of

GB/T 9286-1998. The measurement method for powder coating adhesion shall comply with the provisions of GB/T 21776.

6.7 Testing of machine installation

6.7.1 Verticality measurement of column

Check frame mounting verticality. Use a plumb and a ruler to detect the vertical deviation of the column of the frame as shown in Figure 2.

6.7.2 Measurement of frame diagonal difference

Check frame mounting diagonal deviation. Use a tape measure to measure the difference between the diagonals of the frame as shown in Figure 3.

6.7.3 Measurement of frame beam levelness

Check frame installation levelness. Use a level to measure the height difference of the upper plane of the frame as shown in Figure 4.

6.7.4 Synchronous testing of chain wheels on both sides of the main drive shaft

Use a laser level to measure whether the corresponding link of the chain connected to the chain wheel in any interval is the same height.

6.7.5 Testing of chain tension

Check the proper tension of the traction parts and the motor drive chain. Press the chain loose edge. The slack in the chain shall not exceed 4% of the chain span.

6.8 Safety performance test

6.8.1 Shape detection device test

When the conveyor is running, block the ultra-wide, ultra-long and ultra-high detection devices. The conveyor shall stop running immediately. The sound and light alarm device shall alarm.

6.8.2 Drop detection device

When the conveyor is in a stopped state, block the drop detection device. The conveyor is unable to start. The sound and light alarm device shall alarm.

6.8.3 Conveyor braking ability test

Check if the conveyor motor is a brake motor. When detecting the shutdown, the carrying device does not coast.

6.8.4 Sound and light alarm device test

requirements.

7.2.2 Type inspection items are shown in Table 6.

8 Marks, packaging, transportation and storage

8.1 Marks

Signage shall be fixed at a prominent position on the conveyor. The signage shall comply with the provisions of GB/T 13306, and at least indicate the following contents:

a) Manufacturer's name;

b) Product name;

c) Model;

d) Basic parameters;

e) Exit-factory serial number;

f) Production date.

8.2 Packaging

8.2.1 Conveyor packaging shall comply with the provisions of GB/T 13384.

8.2.2 The graphic signs of packaging and storage shall comply with the relevant provisions of GB/T 191.

8.2.3 Anti-rust measures shall be taken for the exposed machined surface.

8.2.4 At least the following accompanying documents shall be attached to the delivery of the conveyor:

a) Exit-factory certificate;

b) Instructions for use;

c) Packing list;

d) List of spare parts.

8.3 Transportation and storage

8.3.1 Each package of the conveyor shall be bundled firmly. Rainproof measures shall be taken.

8.3.2 The transportation of the conveyor shall meet the relevant requirements of railway,

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