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包装用聚乙烯薄膜吹塑机组

Polyethylene film blow molding machine for packaging



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Foreword

This document is drafted in accordance with the provisions of GB/T 1.1-2020 Directives for Standardization - Part 1: Structure and Drafting Rules of Standardization Documents.

Attention is drawn to the fact that some contents of this document may involve patents. The issuing body of this document shall not be liable for identifying such patents.

This document replaces JB/T7547-1994 *High-density Polyethylene Ultra-thin Film Blow Molding Machine for Packaging*. Compared with JB/T7547—1994, in addition to structural adjustments and editorial revisions, the main technical changes are as follows:

- Revised the title (see the cover title, the cover title of the 1994 version);
- Revised the subject content and scope of application (see Chapter 1, Chapter 1 of the 1994 version);
- Revised the terms (see Chapter 3, Chapter 3 of the 1994 version);
- Deleted the product classification (see Chapter 4 of the 1994 version);—Added the model, composition, basic parameters and working conditions of the machine set (see Chapter 4);
- Revised the technical requirements (see Chapter 5, Chapter 5 of the 1994 version);
- Revised the test methods (see Chapter 6, Chapter 6 of the 1994 version);
- Revised the inspection rules (see Chapter 7, Chapter 7 of the 1994 version);
- Revised the marking, packaging, transportation and storage (see Chapter 8, Chapter 8 of the 1994 version);
- Deleted the quality guarantee period (see Chapter 9 of the 1994 version).

This document is proposed by the China Machinery Industry Federation.

This document is under the jurisdiction of the National Technical Committee on Packaging Machinery Standardization (SAC/TC 436).

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The release history of this document and the document it replaces is as follows:

- First issued as JB/T7547-1994 in 1994;
- This is the first revision.

Polyethylene film blow molding unit for packaging

1 Scope

This document defines the terms and definitions of polyethylene film blow molding machines for packaging, specifies the model, composition, basic parameters, working conditions and technical requirements, describes the corresponding test methods, and prescribes the inspection rules, nameplate, packaging, transportation and storage, etc.

This document is applicable to the manufacture of polyethylene film blow molding machines for packaging (hereinafter referred to as "the machine set").

2 Normative References

The contents of the following documents constitute indispensable provisions of this document through normative reference in the text. For dated reference documents, only the version corresponding to that date is applicable to this document; for undated reference documents, the latest version (including all modification sheets) is applicable to this document.

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

GB 2894 Safety Signs and Their Use Guidelines

GB/T 4208-2017 Degrees of Protection Provided by Enclosures (IP Code)

GB/T 4456-2008 Polyethylene Blow-molded Films for Packaging

GB/T 5226.1-2019 Mechanical Safety - Electrical Equipment of Machines - Part 1: General Requirements

GB/T 6672 Plastics - Film and Sheeting - Determination of Thickness - Mechanical Measurement Method

GB/T 6673-2001 Plastics - Film and Sheeting - Determination of Length and Width

GB/T 7311 Classification and Model Compilation Method for Packaging Machinery

GB/T 7932 Pneumatic Systems and Their Components - General Rules and Safety Requirements

GB/T 8196 Mechanical Safety - Guards - Design and Construction Requirements for Fixed and Movable Guards

GB/T 9969 General Rules for Instruction Manuals of Industrial Products

GB/T 13277.1-2023 Compressed Air - Part 1: Contaminant Cleanliness Classes

GB/T 13306 Nameplates

GB/T 13384 General Technical Requirements for Packaging of Electromechanical Products

GB/T 15706 Mechanical Safety - Design General Principles - Risk Assessment and Risk Reduction

GB/T 18831 Mechanical Safety - Interlocking Devices Associated with Guards - Design and Selection Principles

GB/T 23821-2022 Mechanical Safety - Safety Distances to Prevent Hazardous Contact by Upper and Lower Limbs

GB 25431.1 Rubber and Plastics Extruders and Extrusion Lines - Part 1: Safety Requirements for Extruders

GB/T 28117-2011 Multi-layer Co-extruded Films and Bags for Food Packaging

GB/T 36587-2018 Terms for Rubber and Plastics Machinery

JB/T 7232 Determination of Sound Power Level of Noise from Packaging Machinery - Simple Method

JB/T 8061-2011 Single Screw Plastic Extruders

JB/T 8538 Screws and Barrels for Plastics Machinery

3 Terms and Definitions

The following terms and definitions apply to this document.

JB/T 7547—2025

3.1

polyethylene film blow molding machine

A combination of equipment that heats, extrudes, blows and winds plastic raw materials into films.

3.2

head

A component located at the discharge end of the extruder barrel for installing the mold.

[Source: GB/T36587-2018,3.4.101]

3.3

extruder

A machine that conveys and plasticizes materials through the rotation of a screw in the barrel, and extrudes the materials.

[Source: GB/T36587—2018,3.4.1]

3.4

multi-layer co-extrusion film

A multi-layer composite film obtained by extruding melts of multiple different or the same polymers through a common head using two or more extruders.

3.5

die

An assembly installed at the discharge port of the head to make the cross-section of the extruded material reach the required outline dimensions.

[Source: GB/T 36587-2018,3.4.113] 3.6

cone;core;inside die

An assembly installed at the discharge port of the head to make the cross-section of the extruded material reach the required inner cavity outline dimensions.

[Source: GB/T36587—2018,3.4.114] 3.7

take-off device

A device used to pull the formed products.

[Source: GB/T 36587—2018,3.4.119] 3.8

wind up unit

A device that winds materials onto reels or bobbins as required.

[Source: GB/T36587-2018,3.3.42] 3.9

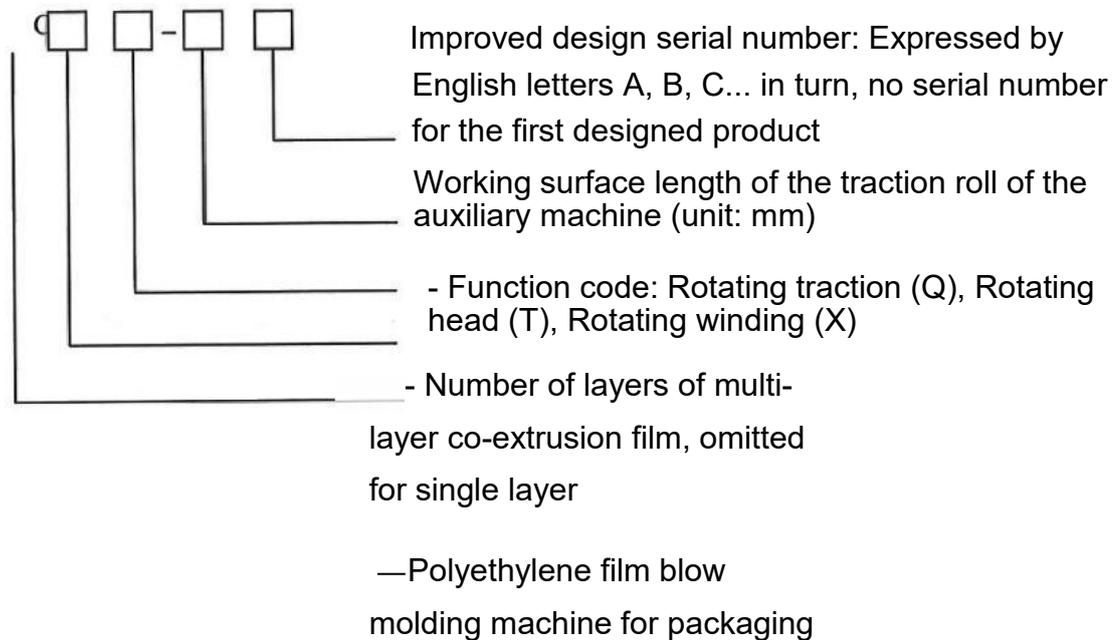
finished product

The film after blow molding.

4 Model, Composition, Basic Parameters and Working Conditions of the Machine Set

4.1 Model

The model compilation of the machine set shall be implemented in accordance with the provisions of GB/T 7311, and its structural composition is as follows:



Example:

CMB3Q-2300C refers to a three-layer co-extrusion polyethylene film blow molding machine for packaging, with the working surface length of the traction roll of the auxiliary machine being 2300mm, with rotating traction function, and the third improved design.

4.2 Composition of the Machine Set

4.2.1 Basic Equipment Configuration of the Machine Set

- a) Extruder;
- b) Head;
- c) Take-off device;
- d) Wind up unit;
- e) Electrical control system.

4.2.2 Optional Equipment Configuration of the Machine Set

- a) Weighing and feeding system;
- b) Automatic film thickness control system.

4.3 Basic Parameters

4.3.1 Names and Units of Basic Parameters of the Machine Set

- a) Rated production capacity: kg/h;
- b) Screw diameter: mm;

- c) Screw speed: r/min;
- d) Maximum extrusion capacity: kg/h;
- e) Maximum product width: mm;
- f) Air consumption: Nm³/min;
- g) Rated total power: kW;
- h) Rated voltage and frequency: V、Hz;
- i) Reference overall dimensions: Length (mm) × Width (mm) × Height (mm);
- j) Reference mass of each single machine: kg。

4.3.2 Basic Parameters of the Machine Set

The basic parameters of the machine set shall comply with the requirements in Table 1.

Table 1 Basic Parameters of the Machine Set

Length of Traction Roll L(mm)	Maximum Folded Diameter of Finished Product(mm)	Diameter of Traction Roll(mm)
$250 \leq L \leq 550$	L-50	≥ 150
$550 < L \leq 1500$	L-100	≥ 150
$1500 < L \leq 2300$	L-200	≥ 150
$L > 2300$	L-200	≥ 200

4.4 Working Conditions

4.4.1 The working environment temperature of the machine set shall be $5^{\circ}\text{C} \sim 35^{\circ}\text{C}$, the relative humidity shall not be greater than 85%, and the altitude shall not be greater than 1000m.

4.4.2 The deviation of the power supply voltage from the rated voltage shall be as follows: the voltage deviation of three-phase power supply of 20kV and below shall be $\pm 7\%$ of the nominal voltage; the voltage deviation of single-phase power supply of 220V shall be +7% and -10% of the nominal voltage.

4.4.3 The cooling water shall not contain impurities with a particle size greater than 0.1mm, the pH value of the water shall be 7~8, and the calcium carbonate content in the cooling water shall be less than 140 mg/L.

4.4.4 The compressed air shall comply with the standard grades specified in GB/T 13277.1-2023: the particle grade shall not be lower than Grade 4, the humidity and liquid water grade shall not be lower than Grade 3, and the total oil content grade shall not be lower than Grade 2; the air source pressure shall not be less than 0.6MPa.

4.4.5 The raw materials used in the production of the machine set shall meet the requirements of blow molding grade polyethylene resin.

5 Technical Requirements

5.1 General Requirements

5.1.1 The machine set shall be manufactured in accordance with the drawings and technical documents approved in accordance with the prescribed procedures.

5.1.2 The raw materials and purchased parts selected for the machine set shall have quality certificates.

5.1.3 Each single machine of the machine set shall run smoothly, and the moving parts shall act sensitively, coordinately and accurately without jamming and abnormal noise.

5.1.4 The connection of parts shall be reliable without loosening.

5.1.5 The die gap, air outlet gap of the air ring and the angle of the herringbone clamping plate of the machine set shall be easy to adjust.

5.1.6 The parts of the machine set that need heating, such as the extruder and the head, shall be provided with temperature measuring points and temperature control in each functional section.

5.1.7 The heater shall be well attached to the surface of the heated part.

5.1.8 The roll shall rotate flexibly without jamming.

5.1.9 The air circuit, lubrication system, cooling water pipeline, hydraulic system, etc. of the machine set shall be unobstructed without blockage and leakage.

5.2 Performance Requirements

5.2.1 Production Capacity

The production capacity of the machine set shall reach the rated production capacity.

5.2.2 Extruder Performance

a) The material, working surface treatment, geometric tolerance and surface roughness of the barrel and screw shall comply with the provisions of JB/T 8538.

b) For a screw with a diameter not greater than 120 mm, the barrel shall be heated to 180°C within 2h; for a screw with a diameter greater than 120 mm, the barrel shall be heated to 180°C within 3h (except for heat transfer oil heating).

c) The basic performance parameters of the extruder shall comply with the provisions of Appendix A of JB/T8061-2011.

5.2.3 Pressure Resistance Performance of the Head

When the melt pressure at the extruder head is not less than 50MPa, there shall be no melt leakage on the sealing surface of each part of the head.

5.2.4 Temperature Control Performance

After the preheating temperature of the machine set reaches the set temperature value and stabilizes, the deviation between the measured temperature value of the temperature measuring point and the set value shall not exceed $\pm 3^{\circ}\text{C}$.

5.2.5 Performance of the Wind up Unit

After the film is edge-trimmed and wound, the deviation of the film roll end face shall not exceed $\pm 2\text{mm}$.

5.2.6 Quality Requirements for Finished Products

- a) The width and thickness deviations shall comply with the provisions of 4.1.1 and 4.1.2 in GB/T 4456-2008 respectively, and the qualification rates shall not be less than 98% and 96% respectively;
- b) The appearance shall comply with the provisions of 4.2 in GB/T 4456-2008;
- c) The peel strength of the multi-layer co-extrusion film shall comply with the provisions of 5.3.1 in GB/T 28117-2011.

5.2.7 Noise

The operating noise of the machine set shall not be greater than 85dB(A).

5.3 Electrical Safety Requirements

5.3.1 The electrical control system of the machine set shall comply with the provisions of GB/T5226.1-2019, be safe and reliable with accurate control; each electrical wiring shall be firmly connected and numbered, the operation buttons shall be flexible, and the indicator lights shall display normally; there shall be an emergency stop device, the effective operation of the emergency stop actuator shall terminate the subsequent commands, and the operation command shall remain valid until it is reset; the reset shall only be operated manually at the position where the emergency operation command is triggered; the reset of the emergency stop command shall not restart the machine, but only allow restarting.

5.3.2 The insulation resistance measured when applying DC500V between the power circuit conductor and the protective bonding circuit shall not be less than $1\text{M}\Omega$.

5.3.3 All exposed conductive parts of the machine set shall be connected to the protective bonding circuit in accordance with the provisions of 8.2 in GB/T5226.1-2019. The connection between the grounding terminal or grounding contact and the grounding metal part shall have a low resistance value, which shall not exceed 0.1Ω .

5.3.4 The power circuit conductor and the protective bonding circuit of the machine set shall withstand a voltage withstand test for at least 1s.

5.3.5 The protection grade of the electrical cabinet and control box shall not be lower than IP54 specified in GB/T4208-2017.

5.4 Mechanical Safety Requirements

5.4.1 The design and manufacture of the safety protection devices of the machine set shall comply with the provisions of GB/T 15706, GB/T 8196 and GB/T 18831.

5.4.2 The safety protection of the extruder shall comply with the provisions of GB25431.1.

5.4.3 When the moving parts such as gears, transmission belts, chains, friction wheels and traction rolls of the machine set are exposed, protective devices shall be provided, and their design shall comply with the provisions of GB/T 8196.

5.4.4 If the machine set has potential hazards such as entanglement, entrapment, clamping, crushing or may cause personal injury, safety protection devices shall be provided, and their safety distances shall comply with the provisions of 4.2, 4.3 and 4.4 in GB/T23821-2022.

5.4.5 If the sharp edges of the cutters or parts of the machine set have the risk of cutting or laceration, protective measures shall be taken.

5.4.6 The machine set shall be provided with clear and eye-catching safety or warning signs for high temperature, extrusion, winding, falling, etc.; parts or pipelines with a surface temperature $\geq 65^{\circ}\text{C}$ shall be provided with thermal insulation measures, and obvious high temperature warning signs shall be provided if thermal insulation measures are inconvenient; the safety signs shall comply with the provisions of GB 2894.

5.4.7 The connection of parts in the machine set shall be reliable to prevent loosening. The reciprocating mechanism shall be provided with a limit device for the extreme position.

5.4.8 The machine set shall be provided with acousto-optic warning signals before start-up, when an abnormality occurs during operation, and when the melt pressure of the extruder exceeds 60 MPa.

5.4.9 The safety performance of the pneumatic system shall comply with the provisions of GB/T 7932.

5.5 Assembly Quality of Key Parts

5.5.1 The diameter clearance between the screw and the barrel shall comply with the provisions of 4.3.1 in JB/T 8061-2011.

5.5.2 When placed horizontally, the head of a single-point supported screw is allowed to touch the bottom of the barrel, but the screw and the barrel shall not be scratched or jammed when running after adding lubricating oil.

5.5.3 The height difference of the upper surface at the discharge port of the head die and core shall be less than 0.12 mm.

5.5.4 The traction pinch roll, guide roll and fan shall rotate in the correct direction and run normally.

5.5.5 The pressure roll of the take-off device shall be adjustable flexibly and fit well with the traction roll within the working length range.

5.5.6 The connecting surfaces of all fastening parts shall fit well without loosening.

5.5.7 If there are parts in the machine set that are difficult to oil after assembly, lubricating oil (grease) or anti-rust oil shall be applied first during the assembly process.

5.6 Appearance Quality Requirements

5.6.1 The outer surface of each single machine part of the machine set shall be flat and smooth without burrs and sharp edges.

5.6.2 The parts of the machine set subjected to surface treatment shall be flat and smooth with uniform color, without obvious scratches, dirt, flow marks, blistering, delamination, rust and other defects.

5.6.3 The control panel and various marks of the machine set shall be correct, clear and eye-catching.

5.7 Requirements for Instruction Manuals

5.7.1 The compilation of the instruction manuals for each part of the machine set shall comply with the provisions of GB/T9969.

5.7.2 The instruction manual of the machine set shall include the operation, cleaning, maintenance and repair, spare parts manual and safety protection measures of the machine set and other relevant contents.

6 Test Methods

6.1 Test Conditions

6.1.1 The test conditions shall comply with the provisions of 4.4.

6.1.2 The raw material for the test shall be blow molding grade polyethylene resin with an MI of 0.05~2.0g/10min.

6.2 Inspection of General Requirements

6.2.1 No-load Running Test

After the total assembly of the machine set is completed, the extruder shall undergo a no-load running test for not less than 3 min at a screw speed not greater than 5r/min, the transmission system shall undergo a no-load running test for not less than 30min,

and the air supply and water supply systems shall undergo a no-load running test for not less than 10 min to check the operation of the machine.

6.2.2 Sealing Inspection of Air Circuit, Lubrication System, Cooling Water Pipeline and Hydraulic System

The sealing inspection shall be carried out by the following methods:

- a) Apply high-foam detergent to the sealing parts and pipeline joints of pneumatic components to observe whether there is air leakage;
- b) Gently wipe around the seals and pipeline joints of the lubrication system with absorbent cotton to observe whether there is oil stain on the absorbent cotton;
- c) Visually inspect each cooling water pipeline of the machine set to observe whether there is water leakage;
- d) Gently wipe around the seals and pipeline joints of the hydraulic system with absorbent cotton to observe whether there is oil stain on the absorbent cotton.

6.3 Performance Tests

6.3.1 Production Capacity Test

When the machine set is working normally, produce finished products with a thickness of 0.06mm for 15 consecutive minutes, count the weight of the finished products completed, and carry out the test twice in total. Calculate the production capacity according to Formula (1), and the results of the two tests shall all meet the requirements.

$$P = \frac{m}{t} \dots\dots\dots (1)$$

Where:

P—Production capacity, unit: kilogram per hour (kg/h);

m—Total weight of the finished products completed, unit: kilogram (kg);

t—Actual continuous production time, unit: hour (h).

6.3.2 Extruder Performance Test

- a) The material, working surface treatment, geometric tolerance and surface roughness of the barrel and screw shall be tested in accordance with the provisions of JB/T8538;
- b) The heating system and basic performance parameters of the extruder shall be tested in accordance with the provisions of JB/T8061-2011.

6.3.3 Pressure Resistance Performance Test of the Head

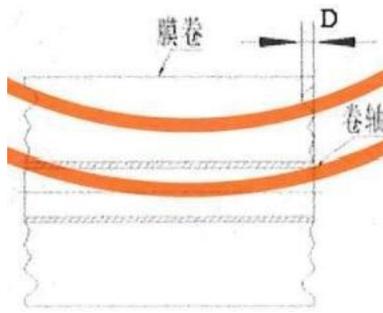
Under the rated production capacity of the machine set, when the melt pressure at the extruder head is not less than 50MPa, run continuously for 30min, and visually inspect the outer surface of the head to check for melt leakage.

6.3.4 Temperature Control Performance Test

10 minutes after the preheating temperature of the machine set reaches the set temperature value, use a temperature measuring instrument with an accuracy of not less than 1% to detect the actual temperature value of each temperature measuring point of the head and compare it with the temperature set value of the area.

6.3.5 Performance Test of the Wind up Unit

When the machine set is working normally, randomly select 3 rolls of finished products with an interval of more than 30min for each selection, and measure the maximum value of the depression or protrusion of the two end faces of the film roll with a depth gauge with an accuracy of 0.02 mm (see Figure 1), which is recorded as the end face deviation value.



Index number explanation:

D - end face deviation value.

Figure 1 Deviation Value of Film Roll End Face

6.3.6 Finished Product Width and Thickness Deviation Test

Carry out in accordance with the provisions of 5.3 and 5.4 in GB/T4456-2008.

6.3.7 Qualification Rate Test of Finished Product Width Deviation

When the machine set is working normally, take samples 50 times with an interval of 3min for each sampling, measure in accordance with the method specified in 3.1 of GB/T 6673-2001, and calculate the qualification rate according to Formula (2).

$$W = \frac{n}{50} \times 100\% \dots\dots\dots (2)$$

Where:

W—Qualification rate of finished product width deviation%;

n—Number of qualified finished products, unit: piece.

6.3.8 Qualification Rate Test of Finished Product Thickness Deviation

When the machine set is working normally, take samples 50 times with an interval of 3min for each sampling, measure in accordance with the method specified in GB/T6672, the total number of measuring points of the taken samples shall be more than 100, and calculate the qualification rate according to Formula (3).

$$T = \frac{N_1}{N} \times 100\% \dots\dots\dots (3)$$

Where:

T—Qualification rate of finished product thickness deviation%;

N₁— Number of qualified points, unit: piece;

N—Total number of sampling points, unit: piece.

6.3.9 Finished Product Appearance Inspection

Carry out visual inspection under natural light.

6.3.10 Finished Product Peel Strength Test

Carry out in accordance with the method specified in 6.4.2 of GB/T 28117-2011.

6.3.11 Noise Test

Carry out in accordance with the provisions of JB/T7232.

6.4 Electrical Safety Tests

6.4.1 Inspect the electrical control system of the machine set in accordance with the provisions of GB/T 5226.1-2019.

6.4.2 Measure the insulation resistance with an insulation resistance meter in accordance with the provisions of 18.3 in GB/T 5226.1-2019.

6.4.3 Conduct a voltage withstand test with a voltage withstand tester in accordance with the provisions of 18.4 in GB/T 5226.1-2019, and the maximum test voltage shall be the larger of twice the rated power supply voltage or 1000V.

6.4.4 Cut off the power supply of the electrical device, take a constant current from a power supply with a no-load voltage not exceeding 12V (AC or DC), and the current is equal to 1.5 times the rated current or 25A (whichever is larger), and let the current pass between the grounding terminal and each accessible metal part. Measure the

voltage drop between the grounding terminal and each accessible metal part, and calculate the resistance value from the current and voltage drop.

6.4.5 Detect the enclosure protection grade of the electrical cabinet and control box in accordance with the method specified in GB/T4208—2017.

6.5 Inspection of Mechanical Safety

6.5.1 Inspect the safety protection devices of each part when the machine set is running.

6.5.2 Inspect the marks and signs of each part of the machine set.

6.5.3 Inspect the connection of parts and the limit device of the reciprocating mechanism when the machine set is running.

6.5.4 Inspect the acousto-optic warning signals of the machine set.

6.5.5 Inspect the safety performance of the pneumatic system.

6.6 Inspection of Assembly Quality of Key Parts

Inspect the assembly quality of the key parts of each single machine of the machine set.

6.7 Inspection of Appearance Quality

Visually inspect the appearance quality of each single machine of the machine set.

6.8 Inspection of Instruction Manuals

Inspect the instruction manual of the machine set in accordance with the provisions of GB/T9969.

7 Inspection Rules

7.1 Classification of Inspection

The inspection of the machine set is divided into factory inspection and type inspection. The inspection items, requirements and test methods shall be in accordance with the provisions in Table 2.

Table 2 Inspection Items

Serial Number	Inspection Item	Inspection Category		Requirements	Test Method	
		Type Inspection	Factory Inspection			
1	No-load test	√	√	5.1.2~5.1.8	6.2.1	
2	Inspection of the sealing of the air circuit, lubrication system, cooling water pipeline, and hydraulic system.			5.1.9	6.2.2	
3	Production capacity test		√	—	5.2.1	6.3.1(Can be tested on-site by the user)
4	Extruder performance test				5.2.2	6.3.2(Can be tested on-site by the user)
5	Head pressure resistance test				5.2.3	6.3.3(Can be tested on-site by the user)
6	Temperature control performance test				5.2.4	6.3.4(Can be tested on-site by the user)
7	Performance test of winding device				5.2.5	6.3.5(Can be tested on-site by the user)
8	Finished product width and thickness deviation test		—	5.2.6	6.3.6(Can be tested on-site by the user)	
9	Finished product width deviation pass rate test				6.3.7(Can be tested on-site by the user)	
10	Pass rate test for finished product thickness				6.3.8(Can be tested on-site by the user)	

	deviation			
11	Finished product appearance inspection			6.3.9(Can be tested on-site by the user)
12	Peel strength test of finished product			6.3.10(Can be tested on-site by the user)
13	Noise test		5.2.7	6.3.11(Can be tested on-site by the user)
14	Electrical safety test		5.3	6.4(Can be tested on-site by the user)
15	Mechanical safety inspection		5.4	6.5(Can be tested on-site by the user)
16	Key component assembly quality inspection		5.5	6.6(Can be tested on-site by the user)
17	Appearance quality inspection	√	5.6	6.7
18	Instruction manual check		5.7	6.8
“√” indicates a mandatory item, and “—” indicates a non-mandatory item.				

7.2 Factory Inspection

Each machine set shall be inspected qualified by the quality inspection department of the manufacturer and accompanied by a product qualification certificate before leaving the factory.

7.3 Type Inspection

The machine set shall undergo type inspection in any of the following cases:

a) Transfer of production to another factory or type appraisal of new product trial production;

b) After formal production, if there are great differences in structure, material and process that may affect the performance of the machine set;

c) Conduct a regular inspection once a year after accumulating a certain output during normal production;

d) Resumption of production after long-term suspension of the product;

e) Great differences between the factory inspection results and the last type inspection;

f) Type inspection requirements proposed by the national market supervision and administration authority.

7.3.2 The type inspection shall include all items in Table 2, and the machine set is qualified for type inspection only when all type inspection items are qualified.

8 Nameplate, Packaging, Transportation and Storage

8.1 Nameplate

Each machine set shall be fixed with a nameplate at an obvious position, the nameplate shall comply with the provisions of GB/T13306, and indicate the following contents:

—Product model;

—Product name;

—Product execution standard (the document number);

—Main technical parameters of the product;

—Manufacturing date and factory serial number;

—Manufacturer's name.

8.2 Packaging

8.2.1 The transportation packaging of each equipment of the machine set shall comply with the provisions of GB/T13384.

8.2.2 Before packaging, each equipment of the machine set shall drain the residual water in the pipeline, and the exposed machined surfaces shall be subjected to anti-rust treatment.

8.2.3 The packing case shall be firm and reliable to meet the requirements of transportation and handling.

8.2.4 The packing case shall be provided with reliable moisture-proof and rain-proof measures.

8.2.5 The special random tools and wearing parts of each equipment of the machine set shall be separately packaged and fixed in the packing case.

8.2.6 The technical documents shall be properly packaged and placed in the packing case, and shall include the following contents:

- Equipment qualification certificate;
- Equipment instruction manual;
- Packing list.

8.2.7 The outer surface of the packing case shall be clearly marked with shipping and transportation operation signs, and shall comply with the provisions of GB/T191.

8.3 Transportation and Storage

8.3.1 Each equipment of the machine set shall be handled with care during transportation, and shall not be inverted and collided.

8.3.2 Each equipment of the machine set shall be stored in a dry, ventilated and non-corrosive place.

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