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Plastic welding machine and tool:
hot-gas welding gun

塑料焊接机具 热风焊枪

(English Translation)

(报批稿)

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Contents

Foreword.....	II
1 Scope.....	1
2 Reference Files.....	1
3 Terms and Definitions.....	1
4 Product Descriptions.....	2
4.1 Classification	2
4.2 Type.....	2
4.3 Basic Parameters.....	2
4.4 Structure	2
5 Requirements.....	3
5.1 Safety requirements	3
5.2 Preheating time	4
5.3 Heating temperature.....	4
5.4 Air output.....	4
5.5 Noise.....	4
6 Test methods.....	4
6.1 Safety characteristics.....	4
6.2 Preheating time.....	5
6.3 Temperature detection.....	5
6.4 Air output	5
6.5 Noise.....	6
6.6 Appearance.....	6
7 Inspection Rules.....	6
7.1 Inspection classification.....	6
7.2 Ex-factory inspection.....	6
7.3 Type inspection.....	6
8 Sign, packaging, transportation and storage.....	7
8.1 Sign.....	7
8.2 Packaging.....	8
8.3 Transportation.....	8
8.4 Storage.....	8
Figure 1 — Structure diagram of welding gun.....	3
Table 1 — Basic parameter of hot-gas welding gun.....	2
Table 2 — Inspection items.....	7

Foreword

SAC/TC 162 is in charge of this English translation. In case of any doubt about the contents of English translation, the Chinese original shall be considered authoritative.

This standard was proposed by China Petroleum and Chemical Industry Federation.

This standard was prepared by SAC/TC162 National Technical Committee on Non-metallic Chemical Equipment of Standardization Administration of China.

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Plastic welding machine and tool: hot-gas welding gun

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1 Scope

This standard specified the terms and definitions, product description, requirements, test methods, inspection rules, sign, package, transport and storage of plastic welding machinery and tool.

This standard applies for the hot-gas welding gun which used for thermoplastic material such as polypropylene (PP), polyethylene (PE), polyvinyl chloride (PVC), polyvinylidene fluoride (PVDF) and melt-processable polytetrafluoroethylene (PFA).

2 Reference files

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 2894, *Safety signs and guideline for the use.*

GB 3883.1, *Safety of hand-held motor-operated electric tools— Part 1: General requirements*

GB/T 4583, *Measurement of noise emitted by electric tools—Engineering method*

GB/T 5013.4, *Rubber insulated cables of rated voltages up to and including 450/750V—Part 4: Cords and flexible cables*

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

GB/T 11918, *Plugs, socket-outlets and couplers for industrial purposes—Part 1: General requirements*

3 Terms and definitions

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

3.1

Heating element

This is a component made of ceramic orifice tube and resistance wire. When the resistance wire is electrified, it produce high temperature to heat the air entering ceramic orifice tube.

3.2

Protection tube

This is an external metal sleeve of the heating system to prevent scalding of workers.

3.3

Filter

This is a piece of cellular plastics to prevent impurities from entering the air inlet of welding gun.

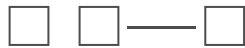
4 Product descriptions

4.1 Classification

According to its air supply mode, welding gun can be divided into external air source structure and built-in air source structure.

4.2 Type

The type of welding gun is shown as follows:



the connection mode of air nozzle: 1: plug-in type, 2: thread type

the air supply mode: WF: external air source, NF: built-in air source

Example:

NF-1 means the type of the welding gun is built-in air source and with spigot joint.

4.3 Basic parameters

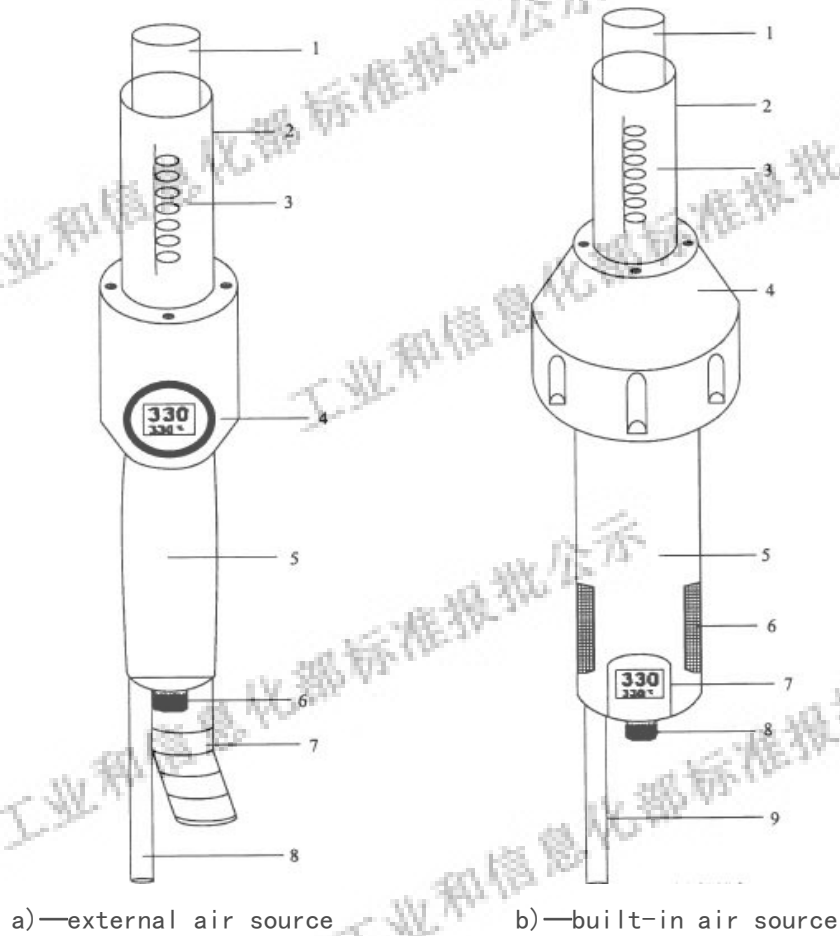
The basic parameters of welding gun see Table 1.

Table 1 — Basic parameters of hot-gas welding gun

Items	Technical Requirements
Temperature range of outlet/°C	60-600, adjustable
Air output/(L/min)	120-230, adjustable
Working noise/dB(A)	≤65

4.4 Structure

Major characteristics of welding gun are the heating pipe for heating the natural air into hot air, and a protection tube arranged outside the heating element to protect the safety of the operators. For the welding gun with built-in air source structure, filters are installed at the inlet of natural air to ensure the cleanliness of air source. The structure diagram of welding gun see Figure 1.



Description:

- | | |
|------------------------------|------------------------------|
| a) | b) |
| 1 Air nozzle connecting end; | 1 Air nozzle connecting end; |
| 2 Protection tube; | 2 Protection tube; |
| 3 Heating element; | 3 Heating element; |
| 4 Display screens; | 4 Built-in air source; |
| 5 Electrical control system; | 5 Electrical control system; |
| 6 Adjusting knob; | 6 Filter; |
| 7 Air tube; | 7 Display screens; |
| 8 Power line; | 8 Adjusting knob; |
| | 9 Power line. |

Figure 1 — Structure diagram of welding gun

5 Requirements

5.1 Safety requirements

5.1.1 The power plug socket structure of the welding gun shall conform to the requirements of GB/T 11918.

5.1.2 The performance of the cords or flexible cables connecting the welding gun to the power supply shall be in accordance with GB/T 5013.4.

5.1.3 Electrical strength of the welding gun shall be in accordance with GB 3883.1.

5.1.4 Over-current limiter of the welding gun shall conform to the requirements of GB 5226.1.

5.1.5 Live parts protection of the welding gun shall conform to the requirements of GB 3883.1.

5.1.6 In normal welding process, no matter how long the working time lasts, the temperature of the welding gun held by the operator shall not exceed 40 °C or the ambient temperature, and the temperature of the protection tube of the welding gun heating system shall not exceed 80 °C.

5.1.7 Safety signs of the welding gun shall be as specified in GB 2894.

5.2 Preheating time

The time required for the welding gun to reach the preset temperature and keep stable shall be no more than 5 minutes.

5.3 Heating temperature

5.3.1 Maximum temperature and minimum temperature

The hot air temperature at the outlet of the welding gun shall conform to the corresponding provisions in Table 1.

5.3.2 Working hot air temperature

In normal operation, the fluctuation value of hot air temperature at the exit of welding gun shall not exceed 10 °C, and the deviation between the actual value of temperature and the set temperature shall not exceed ± 10 °C.

5.4 Air output

The air outlet of the welding gun shall be in accordance with the in Table 1.

5.5 Noise

The average sound pressure level (A weighted) of working noise measured at the 1 m radius sphere with the welding gun as the center shall be in accordance with the provisions given in Table 1.

5.6 Appearance

The outer surface of the welding gun should be smooth and uniform with consistent color and luster, there shall be no bumps, holiday and wrinkles or other defects.

6 Test methods

6.1 Safety characteristics

6.1.1 The power plug and socket structure of welding gun shall be tested according to GB/T 11918.

6.1.2 The characteristics of the cords or flexible cables connecting the welding gun to the power supply shall be tested according to GB/T 5013.4.

- 6.1.3 Electric strength of the welding gun shall be tested according to GB 3883.1.
- 6.1.4 Over-current limiter of welding gun shall be tested according to GB 5226.1
- 6.1.5 Live parts protection shall be tested according to GB 3883.1.
- 6.1.6 Temperature shall be measured by digital temperature detector.
- 6.1.7 Safety signs shall be tested according to GB 2894.

6.2 Preheating time

The preheating time is measured by stopwatch and other timers.

6.3 Temperature detection

6.3.1 Maximum and minimum temperature measurements:

- a) Heat for 10 minutes at maximum power;
- b) The thermocouple of the digital temperature detector is inserted into the air outlet at a depth of 5mm, and the temperature is adjusted to the highest set temperature;
- c) Shake the thermocouple at a depth of 5mm and read the maximum temperature displayed by the digital temperature detector;
- d) Turn off the heating function and keep the fan running for 10 minutes;
- e) The thermocouple of the digital temperature detector is inserted into the air outlet at a depth of 5 mm, and the temperature is adjusted to the lowest set temperature;
- f) Shake the thermocouple at a depth of 5mm and read out the minimum temperature displayed by the digital temperature detector.

6.3.2 Working hot air temperature measurement:

- a) The welding gun is in normal working status and manually adjusted to set temperature;
- b) After heating for 10 minutes, the thermocouple of the digital temperature detector is inserted into the air outlet at a depth of 5 mm, then read the temperature displayed by the digital temperature detector;
- c) test for 5 minutes continuously, the temperature is recorded every half minute;
- d) Calculate the difference between the maximum value and the minimum value of all recorded values, which is the fluctuation value;
- e) Calculate the difference between all recorded values and set values, which is the deviation.

6.4 Air output

The welding gun is setted in the maximum air outflow state, and read the air output of the welding gun with air flow meter.

6.5 Noise

The working noise of the welding gun shall be tested according to GB/T 4583.

6.6 Appearance

Appearance shall be inspected by visual and sense methods.

7 Inspection Rules

7.1 Inspection classification

Welding gun inspection includes factory inspection and type inspection.

7.2 Ex-factory inspection

Ex-factory inspection items are shown in Table 2. Each welding gun shall be inspected according to the items determined in Table 2 before it leaves the factory. Any performance index of the welding gun is unacceptable, it is judged to be unqualified.

7.3 Type inspection

7.3.1 Type inspection items

The type inspection items shall include all the items in Table 2. In case of the following cases, type inspection should be conducted:

- a) When a new or an old products manufactured by another factories;
- b) After formal production, if the structure, material and process change greatly, it may affect the characteristics of the product;
- c) In normal production, regularly or after accumulated of certain production, a periodic inspection should be carried out, usually once every four years;
- d) When the product resumes production after long-term suspension of production;
- e) When there is a big difference between the factory inspection results and the last type inspection results;
- f) When the State Quality Supervision Authority puts forward the requirements for type inspection;
- g) User requests a type checking.

Table 2 — Inspection items

Serial number	Inspection items	Ex-factory inspection	Type inspection	Technical requirement clause number	Test method clause number	
1	Safety requirements	Power plug socket	√	√	5.1.1	6.1.1
2		Power connection the cords or flexible cables	√	√	5.1.2	6.1.2
3		Electrical strength	√	√	5.1.3	6.1.3
4		Over-current limiter	√	√	5.1.4	6.1.4
5		Live parts	√	√	5.1.5	6.1.5
6		Holding position of welding gun and temperature of anti-scalding sleeve	√	√	5.1.6	6.1.6
7		Safety sign of welding gun	√	√	5.1.7	6.1.7
8	Preheating time	√	√	5.2	6.2	
9	Heating temperature	Maximum and minimum temperatures	√	√	5.3.1	6.3.1
10		Working hot air temperature	√	√	5.3.2	6.3.2
11	Air output	-	√	5.4	6.4	
12	Noise	-	√	5.5	6.5	
13	Appearance	√	√	5.6	6.6	

Note: - means no inspection, √ means inspection.

7.3.2 Type inspection judgment

The product shall be judged in accordance with the requirements of Clause 5. If there is a non-conformity, double quantities of products shall be extracted from the same type of products, and the projects shall be re-inspected. If any one of the items is unacceptable, the hot-gas welding gun is unqualified.

8 Sign, packaging, transportation and storage

8.1 Sign

8.1.1 The labels shall be fixed at the welding gun's obvious position.

8.1.2 Welding gun label shall include the following contents:

- a) Product name;
- b) Model;

- c) Power requirements (rated voltage, rated power);
- d) Manufacturer's name or trademark;
- e) Serial number or product number.

8.1.3 The following contents shall be printed on the packaging box:

- a) Product name and model;
- b) Gross weight, shape and size;
- c) Pictorial marking for packaging handling.

8.2 Packaging

8.2.1 The inner packaging shall keep the welding gun fixed firmly; the outer packing can be made of plastic or metal boxes.

8.2.2 The following documents shall be covered in the packaging box:

- a) Product qualification certificate;
- b) Instructions for the use of products;
- c) Packing list;
- d) List of spare parts and accessories.

8.3 Transportation

In the course of transportation, protect the products against severe impact and heavy heap, no any throw in loading and unloading.

8.4 Storage

The Welding gun shall be stored indoors on ventilated, dry, non-corrosive gas shelves.
