Burn resistance tester
RSD-UL94

Operation

Manual

Foreword

Thank you for purchasing our testing machine.

This manual details the operating procedures, maintenance methods and simple troubleshooting and precautions for use.

Please read this manual carefully and follow the prescribed procedures to ensure that you can operate it smoothly every time. Please keep in mind the precautions to avoid machine failure due to improper human operation. Proper maintenance methods can extend the life of the machine .

All products of our company have passed strict quality control inspection before leaving the factory, you can use it with peace of mind, if you have any difficulties or problems, please contact our company directly .

Contents

1. Overview

① This combustion test machine is designed and manufactured according to the test requirements of relevant clauses of IEC60695, GB5169, GB11020, UL94 and other standards.To simulate the influence of the flame in the early stage when a fire occurs around electrical and electronic products, so as to assess the fire risk through simulation technology

② The degree is mainly used to measure the plastic or film and other non-metallic materials components directly under horizontal or vertical combustion under the specified fire source

③ Determine the non-combustible performance of the test sample. To judge the fire resistance level of test materials (HB level, V level, 5VA/B VMT level).

④ The device adopts high-precision digital display instrument for automatic timing, temperature monitoring, large observation window, beautiful appearance, and many domestic and foreign similar.Product advantages, stable performance, easy operation and other advantages.

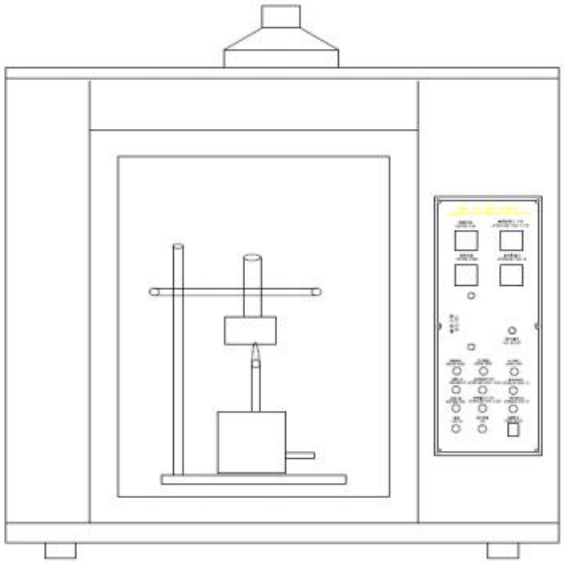
2. Main parameters

- The main structure
- It consists of control box, burning box, burning torch, solenoid valve, high pressure igniter, plastic sample fixture, natural gas pipeline and signal control line.Burners are tested using highly purified LPG or methane.
- The main technical parameters
- Burning time: 0～999S (adjustable)
- After flame time: 1～999S (adjustable)
- After burning time: 1～999 S (adjustable)
- Burning times: 1~999 times (adjustable)
- Burning angle: 0°-90° (adjustable)
- Burning angle: 0°-90° (adjustable)
- Flame height: 20mm ~ 175mm (adjustable)
- Length measurement: mm unit
- Position adjustment: The sample holder can be adjusted up and down automatically, the combustion seat can be adjusted back and forth, and the adjustment stroke is greater than 300 mm
- Dimensions (L x W x H): 113cm x 57cm x 120cm;
- Working power supply: 220V AC 50HZ

3. Working environment

- **Working environment temperature: 5 ~ 45℃**
- **Relative temperature of working environment: ≤85%**
- **Workplace: a place free of violent shaking, shock, vibration and corrosive air**

4. Schematic diagram of combustion testing machine



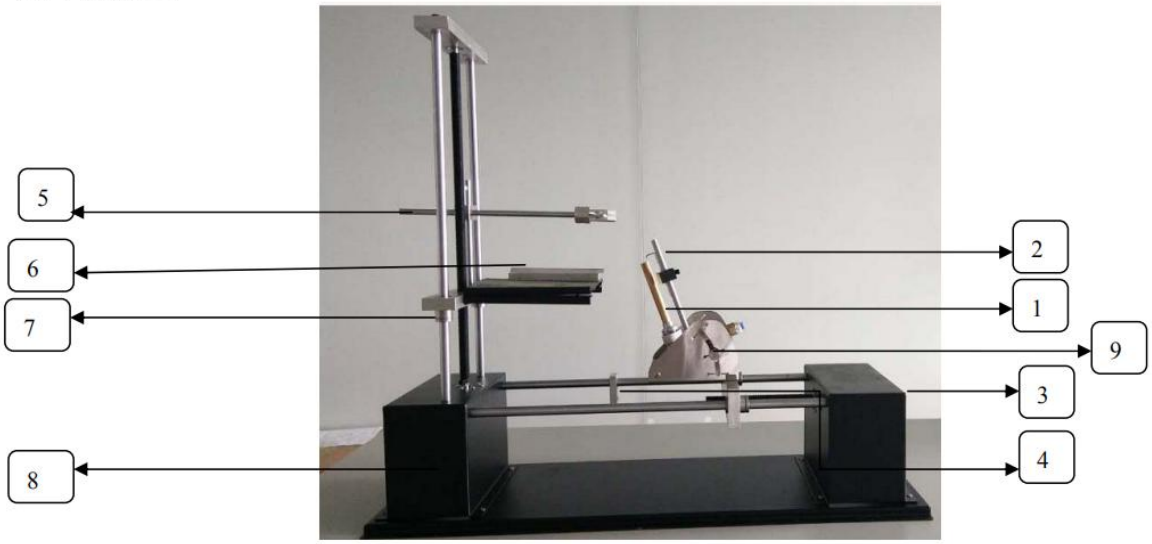
5. Description of electrical control system

- **Burning time setting**
- **Burning time Ta**
- **After flame time (T1 and T2))**
- **Afterburning time T3**
- **Combustion test data (historical report, save)**
- **Zero reset**
- **Burning times**
- **Start button**

- **Reset**
- **Ignition start**
- **Ignition stop**

6. Structure description

结构描述



1. Bunsen burner
2. Ignition needle
3. Bunsen burner mobile power system
4. Shiyan photoelectric limit switch (adjustable)
5. Vertical sample fixture
6. Horizontal sample fixture
7. Sample lifting structure
8. Sample lifting power system
9. The Bunsen burner adjustment angle knob (20 degrees, 45 degrees, 90 degrees), the angle adjustment needs to properly adjust the ignition photoelectric limit switch
10. Turn off.

7. Test operation method

① Connect the power cord of the testing machine to 220VAC 50HZ;

② Connect the combustion gas to the air inlet of the testing machine and open the valve

③ Turn on the power switch;

④ Click "Ignition Start" to automatically ignite

⑤ Use the flame height gauge to confirm the flame height to be tested, for example V-0/1/2, the flame height should be

⑥ 20mm;

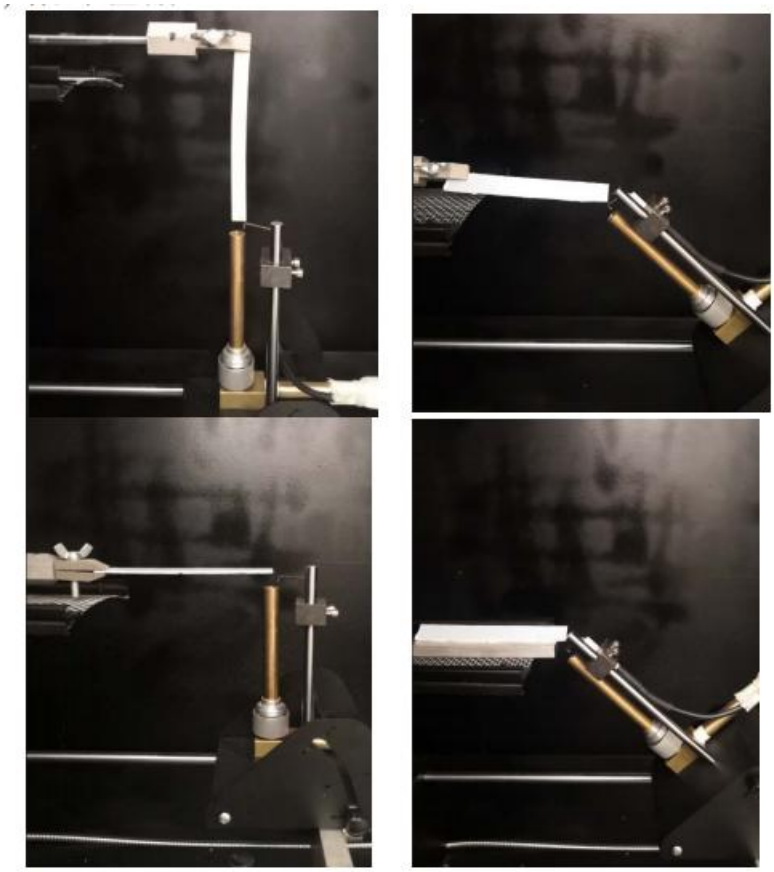
⑦ If the flame height is too high, adjust the gas flow meter clockwise and the Bunsen burner gas counterclockwise

⑧ Regulating valve;

⑨ If the flame height is too low, please adjust the gas flow counterclockwise and the Bunsen burner gas clockwise

⑩ Regulating valve;

- **Confirmation of sample position**



1) Turn on the electrical switch;
2) Click "Start" to move the Bunsen burner to the test sample;
3) Adjust the position of the proximity switch and sample fixture of the terminal to ensure that the flame can be in the accurate position
Burning sample

- **Test operation mode**

1) A and B above confirm that there is no problem,
2) Click the burning time setting and set the burning time according to the standard;
3) Click "Ignition Start" to automatically light the flame
4) Spread thin cotton on the falling object tray;

5) Click "Start", the Bunsen burner will move to the sample;
6) During the burning test of the sample, the tester needs to observe visually. Does the sample ignite?
7) If the sample ignites (open flame), when the flame is extinguished, please click "afterflame stop" as soon as possible.
Record the afterflame time of the sample;
8) If the sample has a fire core (not an open flame), when the fire core is extinguished, please click "afterburning stop" as soon as possible.
Record the afterburn time of the sample;
9) After the sample test is completed, click "Save" to save the test data to the historical report;
10) Click the "fan switch" to turn on the fan for 5 to 10 minutes;
11) Click the "lighting switch" to turn on the lighting, and the tester will clean the sample after the fall;
Remarks:
This machine can be used for a variety of standard tests, and the test time and angle can be adjusted according to the requirements of each standard.

8. Test safety matters

a. Operators should carefully read the operation manual of the instrument and master the safety knowledge of the use of flammable gas before operating this equipment. Take appropriate safety precautions at all times; this test can only be carried out if there is no gas leakage.
b. If gas leakage is found, the test should be stopped immediately. At this time, it is forbidden to ignite the ignition source and turn on the power switch, and the test equipment should be turned on
And the doors and windows of the laboratory, let the gas exhaust to the outside; in the case of less gas leakage, the exhaust fan can be turned on to speed up the exhaust Flammable gas. After the fault is eliminated, the test can be conducted again.
c. Before turning on the gas source, the pressure and flow regulating valve should be adjusted to the minimum, and then the main valve of the gas storage bottle should be opened to slowly adjust
Gas pressure and flow rate to the required value; if the pressure and flow rate are large, it may lead to the control valve damage gas when opening
leakage.
d. If different gases are used before and after, the corresponding pressure reducing valve should be selected, and the gas remaining in the gas distribution pipe should be evacuated to avoid
Avoid the danger of mixing different gases.
e. At the end of the test, the valve of the gas cylinder must be closed to allow the torch to continue to burn. After the residual gas in the pipe has been burned, then
Close the remaining valves.

f. The sealing performance of the gas pipeline and the connection port must be checked frequently. If the pipeline is aging, it should be replaced in time to ensure safety.

9. Common faults and treatment

- This equipment must have reliable electrical ground circuit protection.
- When the ignition is just started, there is air remaining in the trachea, and it can only be ignited normally after the air in the trachea is emptied.
- The flowmeter should be adjusted gradually from small to large, and the flow rate is too large to ignite。

Failure phenomenon	Reason	Treatment measures
Ignition without high-pressure ignition	1. Poor contact between high voltage lead and ignition pin. 2. The ignition needle is too far or too close to the burner.	Check the high voltage lead and adjust the ignition needle and flame The distance between the mouths (about 5-10 mm).
There is high-pressure ignition but not Can ignite	1. The gas flowmeter switch is not turned on. 2. The gas connection pipe joint is loose or falling off. 3. The ignition needle is not aligned with the corresponding position of the burner Set. 4. Air remains in the trachea.	1. Check the air pipe connector and adjust the position of the ignition needle Set. 2. Wait for the air in the trachea to evacuate fire.
Can ignite but instantly extinguish	Fire 1. The gas pressure is too high. 2. The air convection is too large.	1. Adjust the pressure valve at the base of the combustion tube, counterclockwise Rotation reduces its pressure. 2. Adjust the combustion tube air regulator.

10. Maintenance and care

The machine should be kept clean and dry, and often cleaned.2. Regularly use anti-rust cleaner to protect the surface of structural parts3. Pay special attention to safety when using this burner, and avoid placing flammable and explosive materials around.4. After the test, the burning dust and sinter should be cleaned in time to avoid

corrosion of the cabinet.5. The machine should be kept and tested by professionals, and it should be grounded.

11. Combustion test method and judgment

● UL94 HB Class Fire Test (Horizontal Burning Test)

A. Sample requirements:

1) Flake: cutting, melting casting, extruding and other methods are available, with smooth edges, clean surface and uniform density;

2) Size: length × width: 125±5mm × 13.0±0.5mm, the minimum thickness sample to be tested needs to be provided

And 3mm (-0.0, 0.2) thickness samples, if the minimum thickness of the sample is greater than 3mm or the maximum thickness

Less than 3mm, you can not provide 3mm samples; the maximum thickness of the sample does not exceed 13mm, the maximum

The width does not exceed 13.5mm, and the corner radius does not exceed 1.3mm;

3) Series: If there are multiple models of color, density, etc., corresponding representative samples shall be provided;

4) Quantity: Minimum 2 sets of samples, 3 samples per set

B. Test procedure

1) Line drawing: 25±1mm, 100±1mm;

2) Clamping: clamp the end of the sample near 100mm, keep the length direction horizontal, and the width directionThe horizontal plane is 45º±2º, and the wire mesh is fixed 100±1mm below the sample;

3) Flame: flame height 20±1mm;

4) Combustion: The flame furnace is inclined at 45º, and the flame is placed at a depth of 6mm for 30±1 second or burned to 25mmTime to remove the flame furnace;

5) Timing: start the timing when the flame burns to 25±1mm, and count the time it takes to stop burningAnd burnt length;

6) Calculation: V=60L/t, V is the burning speed (mm/min), L is the burned length (mm), and t is Burning time (s).

C. Test record

1) Whether the flame is burning to 25±1mm or 100±1mm;

2) The flame burns to between 25±1mm and 100±1mm, record the burned length (L) and burnTime spent in this length (t);

3) If the flame burns through 100±1mm, record from 25±1mm to 100±1mmTime spent

4) Calculate the burning speed.

D. HB flame rating

1) For samples with a thickness of 3.0~13mm on a span of 75mm, the burning speed is ≤40 mm/min;

2) For samples with a thickness of less than 3.0 on a span of 75mm, the burning speed is ≤75 mm/min;

3) The samples that stop burning before 100mm and meet the above conditions are of HB grade.Note: ① The sample of 3±0.2mm can pass the flame test, then this conclusion is applicable to the thickness between 1.5~3mmAll samples of ②; at least 2 sets of samples are required, each set of 3, if only one sample in the first set fails,You can use the second set of samples to retest

● UL94 V-Class Fire Test (Vertical Burning Test, V-0 / V-1 / V-2)

A. Sample requirements:

1) Flake: cutting, melting casting, extruding and other methods are available, with smooth edges, clean surface and uniform density;

2) Size: length × width: 125±5mm × 13.0±0.5mm, the minimum thickness of the test needs to be provided .Sample and maximum thickness sample; the maximum thickness of the sample does not exceed 13mm, if the minimum thickness sample Inconsistent with the result of the maximum thickness sample test, you need to provide an intermediate size sample,The intermediate size thickness span does not exceed 3.2mm; the corner radius is not greater than 1.3mm;

3) Series: If there are multiple models of color, density, etc., corresponding representative samples shall be provided;

4) Quantity: Minimum 2 sets of samples, 5 samples per set.

B. Sample pretreatment

1) 23±2C, 50±5%RH, 48 Hours min;

2) Air exchange furnace, 70±1C, placed in a desiccator after 168 hours and cooled to 4 hours at room temperature.

C. Test procedure

1) Clamping: clamp 6mm from the upper end, the length direction is downward, and the lower end of the sample is away from the upper surface of the preset cotton layer;

2) 100% pure cotton with a distance of 300±10mm and a weight of 0.08g;

3) The size is 50mm×50mm, and the maximum thickness does not exceed 6mm;

4) Flame: flame height 20±1mm.

D. Burning

The center of the flame is placed at the midpoint of the lower edge of the sample, the distance from the top of the burner to the lower end of the sample is 10±1mm,
Maintain 10±0.5 seconds, if the shape and position of the sample change during the combustion process, the burner
Adjustment, if there is a drop of molten material during the test, the burner can be tilted to 45º, burning 10±0.5
After seconds, remove the burner at least 150mm at a speed of 300mm/min, and at the same time start to record the afterflame time
t1, when the after-flame stops, it will burn again for 10±0.5 seconds, and the after-flame time t2 and
After burn time t3
Note: The determination of after-flame and after-flame can be contacted with a small piece of cotton. If it can be ignited, it will be after-flame.
When the flame goes out, the sample is ignored and another sample is used for testing. If it is because the gas emitted by the sample will

When the flame is extinguished, the burning appliance should be ignited immediately and continue to burn until the burning time reaches 10±0.5 seconds.
Remove the burning appliance

E. Test record

1) First afterflame time t1
2) Second afterflame time t2
3) Second afterburn time t3
4) Whether the sample burned out
5) Whether the particles dripped during the test ignited the cotton

Note: Only one of the five samples fails, and the second set of samples can be used for testing

Standard conditions	V-0	V-2	V-2
After flame time: T1/T2	10s	30s	30s
Total after flame time: T1+T2	50s	50s	50s
The second afterflame time plus the second afterflame time "T2+T3	30s	60s	60s
Whether the sample burned to the test clamp	No	No	No
Is cotton lit by drippings	No	No	Yes

• UL94 5V level fire test (500W 125mm Vertical Burning Test, 5VA / 5VB)

A. Sample requirements:

1) Flake: cutting, melting casting, extruding and other methods are available, with smooth edges, clean surface and uniform density;
2) Strip samples, length × width: 125±5mm × 13.0±0.5mm, provide samples with minimum thickness; block
Shaped samples, 150±5mm × 150±5mm provide the smallest thickness samples; thicker samples are also required
To provide, in case the test results are inconsistent, the maximum thickness of the sample does not exceed 13mm, and the corner radius does not exceed
Over 1.3mm;
3) Material range:

B. Sample pretreatment:

1) 23±2C, 50±5%RH, 48 Hours min;

2) Air exchange furnace, 70±1C, put it in the dryer after 168 hours, and cool at room temperature for at least 4 hours

C. Test procedure:

1) Clamping: clamp 6mm from the upper end, the length direction is vertical, and the lower end of the sample is above the table above the preset cotton layer
Surface 300±10mm, cotton is 100% pure cotton, weight is 0.08g, size is 50mm×50mm, thickness
The maximum degree is 6mm;

2) Flame: flame height 125±10mm, inner flame 40±2mm, incline 20±5º, narrow side aligned with burner;

3) Combustion: start the combustion from the corner of the sample, ensure that the internal flame contacts the sample, the burner is inclined at 20º, and burn
5±0.5 seconds, a total of 5 times of burning, if there are particles dripping during the burning process, the sample shrinks or
Stretch, adjust the burner accordingly to ensure that the inner flame contacts the sample.

D. Test record:

1) After flame time and after flame time;

2) Whether the dripping particles ignite cotton.

E. Block sample test:

1) Hold the sample horizontally;

2) The internal flame of the flame acts on the center of the bottom surface of the sample, the burner is inclined by 20±5º, and the internal flame contacts the sample;

3) Act for 5±0.5 seconds, then remove the burning and keep it for 5±0.5 seconds, stop after 5 times of action.
After all afterflame and afterburning have stopped, observe and record whether the sample is burned through

Standard condition	94-5VA	94-5VB
Afterflame time after the fifth ignition plus afterburn time	60s	60s
Does the drip ignite cotton	No	No
Whether the sample burns through	No	Yes

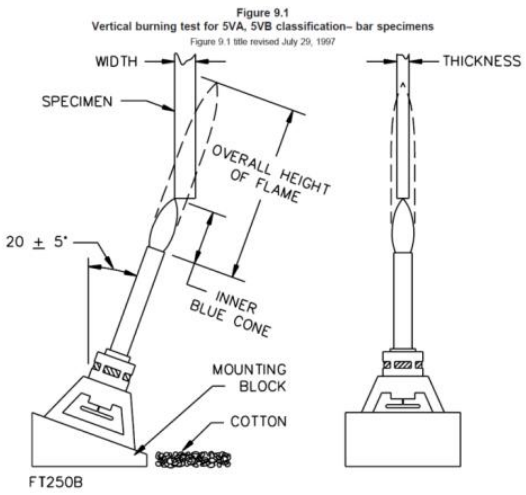


Figure 9.1
Vertical burning test for 5VA, 5VB classification– bar specimens
Figure 9.1 title revised July 29, 1997

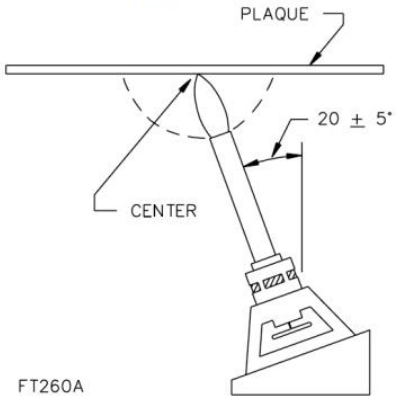


Figure 9.2
Vertical burning test for 5VA, 5VB classification– plaque specimens
Figure 9.2 title revised July 29, 1997

12. Accessories

Packing List

No.	Name	Quantity
1	trachea	1 pcs
2	Lock	2 pcs
3	Valve	1 pc
4	Falling object tray	1 pc
5	Vertical sample fixture	1 set
6	Horizontal sample fixture	1 set
7	Instructions	1 set
8	Flame height gauge	1 pc
9	Quality assurance	1 set
10	Warranty Card	1 set
11	Certificate serving of conformity	1 set