

WRR MELTING POINT APPARATUS

OPERATING INSTRUCTION

Please read through these operating instruction before using

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I. APPLICATIONS AND FEATURES

According to definition of physical chemistry, the melting point of a substance means the temperature at which the substance changes from solid state to liquid state. In the fields of organic chemistry, the measurement of melting point is a basic means of recognizing the nature of substance, and is also one of the important methods of measuring purity. So the melting point meter occupies an important place in chemical industry and medicine researches. Also, the melting point meter is a kind of necessary instrument in the production of medicines, perfumes, dyestuff and other organic crystal substances.

The WRR melting point meter is designed according to the rules of pharmaceutical law. It uses the technology of temperature program-control, digital display of initial and final melting points. The temperature system uses the linearly corrected platinum resistor as the detecting element. Additionally it uses the electronic circuits to realize the speedy setting of "start temperatures" and four steps of linear heating rate for being selected. The instrument uses the capillary as the sample tube, whose size correspond to the pharmaceutical law. The user observes the melting process of the sample in the capillary through a magnifier clearly.

II. SPECIFICATIONS

Measuring range of melting point: 40°C-280°C

Digital display: LCD

Minimum reading: 0.1°C

Accuracy of melting point: $\pm 0.4^{\circ}\text{C}$ <200°C; $\pm 0.7^{\circ}\text{C}$ $\geq 200^{\circ}\text{C}$

Repeatability: 0.3°C (heating rate 1°C/min)

Accuracy of "start temperature" setting: $\pm 1^{\circ}\text{C}$

Linearly heating rate (°C/min): 0.5, 1.0, 1.5, 3 four steps

Deviation of the linearly heating rate: 10%

Heating medium: methyl-silicone oil

Level: accord with the technical requirement of 0.5 level JJG701-1990

Dimensions of capillary: Inside diameter 0.90mm-1.10mm

Thickness of diameter: 0.10mm-0.15mm

Length: 120mm

Power supply: AC220V $\pm 22\text{V}$; 50Hz $\pm 1\text{Hz}$

Power flow: 250W

Dimension (L×W×H): 270mm×310mm×400mm

Weight (net): 13kg

III. WORKING PRINCIPLES

The instrument uses a U shaped tube as the oil bath. A thread driver makes the silicone oil into flow circulatory. The platinum resistor injected in the oil bath near the bottom of capillary detects the temperature of the bath. This temperature value detected is displayed on the digital V meter after nonlinearly correcting and voltage amplifying. The oil bath temperature is controlled by a electronic circuit. The “start temperature” can be entered using the button. In other hand, this digital value is converted into analog value and sent to the adjuster with the corrected temperature value. The heating and cooling of bath is by the help of the electronic heating block and the cooling fan. When the samples is being observed through the magnifier, press the “initial melting point” key to display and store the value, when the samples are completely melting, the samples become completely transparent, press the “final melting point” key to display and store the value.

IV. CONSTRUCTIONS

The front of the instrument is showing as Fig.1.



Fig.1

Remark: over flow bottle is in the back of the instrument.

V. OPERATION

Preparation

Pour the silicone oil.

Pour the 60ml silicone oil into the oil bath tube, then take the over flow bottle on the over flow mouth.

Replace the oil bath tube (if necessary)

Take the over flow bottle and two side plates off from the body.

Take the spring off then take out off the oil bath tube carefully.

Renew the oil bath tube.

Measuring the melting point

Pressing the “PRE-T” (preset temperature) key could set the start temperature.

The start temperature we recommend as following:

Rate	Lower than MP
0.5°C/min	3°C
1°C/min	≥5°C
1.5°C/min	≥6°C
3°C/min	≥9°C

Turn on the power supply switch, LCD works.

RiseSpd V: X.X—rate of the former measurement

TempSet t: XXX.X—the preset temperature input of the former measurement.

IntTemp T: XXX.X—the current furnace temperature

Medium M: XXX—the temperature transmission medium inside the furnace.

If the E2PROM storage has problem, display

“MEMORY ERROR”

“USE DEFAULT DATA”

This moment the value is default value (V: 1.0; t: 0°C).

Set Temperature

Press the “←” or “→” key to move the cursor, press the “+” or “-” key to increase or decrease the value. Press the “PRE-T” key twice, the system will enter a heating or cooling state for PID temperature adjustment.

Display

“t: XXX T: XXX.X ↑”

“ Oil ”

t: XXX—start temperature of the current measurement

T: XXX.X—actual temperature

“↑” flashing —the actual temperature is lower than the setting

temperature, is heating now

‘ - ’—the actual temperature is at the range of the setting temperature

‘ ↓ ’ flashing—the actual temperature is higher than the setting temperature

The E2PROM storage will save the setting value of rate and start temperature in order to be used for next measurement. (If the storage has problem, the information hasn't been saved.)

When the difference between the temperature in the furnace and the preset temperature is ± 0.3 degrees, lasting for about 40 seconds, the system will display "-" , and the buzzer will sound, indicating that the temperature has been balanced and the user can measure the melting point.

After the temperature is stable. Insert the capillary into the bath through the capillary hole carefully, press the “Heat” key to enter the heating step.

V: X.X T: XXX.X

F1: E1:

F2: E2:

F3: E3:

V: X.X—rate of the current measurement

T: XXX.X—actual temperature

F1: —the initial melting point of first capillary

E1: —the final melting point of first capillary

F2: —the initial melting point of second capillary

E2: —the final melting point of second capillary

F3: —the initial melting point of third capillary

E3: —the final melting point of third capillary

The user could observe the condition of melt. When pressing the relevant key, the LCD will display the reading. (**Remark: the key of initial or final melting point can be press only once.**) After the readings have been recorded, the system turns to the following step automatically. (**The user wants to finish the measurement in advance, press the “PRE-T” key.**)

F: XXX.X E: XXXX.X

F1: XXX.X E1: XXX.X

F2: XXX.X E2: XXX.X

F3: XXX.X E3: XXX.X

F: XXX.X—the average value of three capillary initial MP

E: XXX.X—the average value of three capillary final MP

(When the user connects the RDTH32SC micro thermal printer to the RS-232 interface and is already in the power on printing state, the printer will automatically print the test results when the final melting operation is completed.)

Heretofore, the one time of measurement has finished, the system will automatically save the average value of the initial melting and the average value of the final melting measured this time to E2PROM. **The user should take out the capillary carefully. If you want to measure again, press “PRE-T” key.**

VI. MATTERS NEED ATTENTION

Higher melting after lower melting to be recommend.

The sample must be baked in accordance with the requirement, and pulverized in clean crushing bowl. Use the “free-falling method” to knock the capillary, so as to make a firm loading of the sample, on the other hand, loading height of the sample must be identical and conform to the definition of pharmaceutical law.

The broking of capillary must be attended when you insert or pull it.

Different linear heating rates will lead to different results.

Before inserting the capillary, it must be cleaned to avoid polluting the silicone oil.

Replace the oil bath tube if necessary, please refer to operation.

Using the instrument for a long time, the user should change the oil.

VII. MAINTENANCE AND CALIBRATION

The instrument should be used in a dry ventilated room, prevented from touching any water by all means and keep from moisture. It uses a three-core power-supply plug. The grounding terminal should be connected to the earth, which can not be replaced by the neutral line.

The capillaries used in the instrument must be the products provided by our factory. Never use the one drawn manually to prevent the capillaries from being broken due to their too high tightness.

The heating medium of No. 201-100 methyl silicone oil must be selected. The recalibration of the instrument by standard sample is necessary if you use other type oil.

The silicone oil must be replaced from time to time. The oil bath must be taken out off and cleaned carefully, then pore the new oil into the bath with the method of appendix one.

When the capillary is broken in the oil bath. You have no choice but taking out off the oil bath.

This instrument must be inspected and calibrated at definite time, sending it to our factory or our service staff coming.

Magnifier of observing window and oil bath tube should be clean, use soft fabric to clean the dust at definite time.

VIII. COMMON BREAKDOWN AND HANDLING

Breakdown Appearance	Analyses for Reason	Handling method
The lamp doesn't light.	The lamp is broken.	Change
After using several times, the reading is not accurate.	Silicone oil oxidized and deteriorated.	Change
Churning motor doesn't rotate.	The motor is broken.	Send to our repair department.
The temperature is uncontrolled.	The board is broken.	Send to our repair department.