



Cone Calorimeter



Introduction:

Heat release quantity is the core parameters to evaluate the fire behavior of materials and products. Our Cone Calorimeter can meet all existing standards (including ISO 5660, ASTM E 1354, ASTM E 1474, ASTM E 1740, ASTM F 1550, ASTM D 6113, NFPA 264, CAN ULC 135 and BS 476 Part 15). This equipment includes these systems such as heat release, mass loss, smoke generation, etc, and allow users to buy the parts they need one by one and add into the same chamber. This flexible feature is one of its advantages.

Cone Calorimeter test theory is based on the principle that the burn calories is proportional to the amount of oxygen's consumption, 1KG oxygen consumption will produce 13.1 MJ heat. Test gas heat emission, ignition timing, oxygen consumption rate, CO/CO₂ generation rate, the gas flow will be measured all. Cone Calorimeter DAQ system can help users to easily control the entire test. 19" touch screen can help realizing the automatic testing and reducing installation space. In addition, users can also change the

sample temperature, or adjust the temperature rise time to test, after setting up the virtual temperature at real fire conditions. This method can obtain the similar test results to real fire environment.

Model: TCCT

Standards:

- ISO 5660: Reaction to fire tests - the rate of heat release, smoke generation rate and mass loss rate.
- ASTM E 1354: Standard Test Method of materials heat and visible smoke release rate.
- BS 476 Pt.15: Building materials and structures test: - Test method for heat release rate of products.

Main Features

1, Structure

1.1, 19-inch standard cabinet of integrated design, elegant, and easy to operate.

1.2, Conical Heater of 230V, 5000W, the heat output of 0 ~ 120 kW / m².

1.3, 19-inch touch-screen computer controlling the entire testing process.

1.4, Automatic ignition system, and automatic burning time calculation.

1.5, 3 pieces K-thermocouples and 3 PID temperature controllers for temperature regulation.

1.6, Split gate - To protect samples area before the test, and insure the initial measurement stability.

The operator could have extra time to detect before the test start. If there is no opening closing mechanism, the flammable samples are easy to burn too early. So this extra time is very important for the operator.

1.7, The sample holder - The sample size is 100mm x 100mm, and thickness is not exceed 50mm; The central portion of the sample about 50mm*50mm is exposed to the heating cone center and deviation is $\pm 1\%$.

1.8, Weighting system - quality is measured by the strain gauge load cell test, accuracy up to 0.1g. Equipped with swift electronic weighing parts, mechanical stop fixture can avoid moving damage, to ensure the equipment longevity. Weighing range is 0 ~ 3kg.



2, Ignition Systems

2.1, Equipped with 10kV spark ignition, as well as safety cease-fire devices. The igniter can automatic location by connecting to the close mechanism lever.

2.2, Automatic ignition, timing; expiration, and turn off the fire.

3, Exhaust systems

3.1,Exhaust systems is consisted of axial fan, stainless steel exhaust pipe,diffusion plate, exhaust fume collecting hoods, exhaust pipes, orifice flow meter and a thermometer.

3.2,All the fixture is made of stainless steel to prolong their life.Including the hoods, the gas sample sampling needle, exhaust fan (adjustable flow, 0g/s to 50g/s, the accuracy at least of 0.1g/s), and the orifice flow tester (thermocouple and differential pressure sensors). The common Work flow is 24 g/s.

4,Gas sampling system

4.1,Gas sampling system includes an annular sampler probe, suction pump, particulate filter, a cold trap, exhaust valve, water filters and CO₂ filter.

4.2,Three filters; Minimum filtration accuracy is 0.5um.

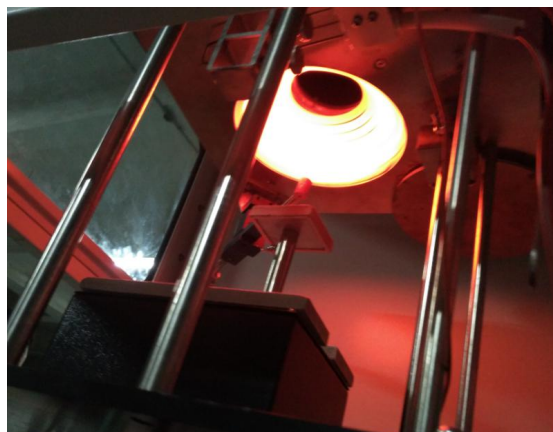
4.3,Freezing cold trap; air-conditioning compressor refrigeration systems; controlling the temperature in 0 ~ 5°C.

4.4,Suction pump, Flow rate is 33L/min, vacuum is 700mmHg, and pressure is 2.5 bar.

4.5,Drying cylinder,which filter the water and impurities.

4.6,The flow controller to control the inspiratory air flow.

4.7,The sampler has 12 holes and gas flow in the opposite direction;these holds built-in dust filter and 685mm from hoods.



5,Measurement System

5.1,Paramagnetic oxygen analyzer, the range is 0-25%; linear response; imported oxygen sensor.

5.2,With a laser system to measure the smoke density, using a photodiode, 0.5 mW helium-neon laser, primary and backup photodetectors. Also equipped with the positioning bracket and 0.3,0.8 neutral density filter used for calibration.

5.3,High-precision load sensor measures the weight changes of the test material during test process.The test range is 0~3000g, and resolution ratio is 0.01g. The required test sample weight is less than 500g.

5.4,Temperature control system: PID temperature control, 3 dia1mm thermocouples to measure temperature of the radiation cone, In addition with a 1 mm armoured thermocouple measuring the temperature 100mm above the orifice plate.

5.6,Exhaust flow: This data is caculated by the differential pressure of the sharp edge holes on both sides of the exhaust pipe,which inner dia is 57mm±1mm,and cooperate with micro differential pressure transmitter.Located at 350mm above fan transducer,the pressure transmitter is connected to the control system,so as to automatic control of wind speed.

6,Calibration Systems

6.1,The United States imported Metherm thermopile type heat flow meter is used to set on the surface radiation level. Equipped with water cooling system to protecting the security of heat flow meter. - Design range is 0~100k W / m², the accuracy of heat flow meter is ±3%, repeatability is ±0.5%.

6.2,The burner correction system use purity of 99.5% methane to calibrate the instrument heat release rate; methane mass flow meter precise control of the flow of methane.

6.3,Equipped with a water cooling system for heat flow meter.

6.4,Equipped with a square calibration burner.

7,Operating systems

7.1,Labview control system, which easy to operate, and precise to control.It could show the apparatus status; Calibrate the device and store the results; Collect the test data; Calculate the necessary parameters; display results according to the requirements of standard; take the average value by multiple tests.

7.2,PC via RS485 interface communication module and PLC communication link for data transmission and motion control;

7.3,PID temperature control module and power adjustment module links, thermostatically regulated by a programmable controller;

7.4,Signal acquisition and processing module connected with the air volume control module circuit, output by a programmable logic controller,Intelligent adjust the preset speed.Mechanical rotating module links PLC I/O port, to control the closure of rotary.

7.5,The system provides query capabilities. The system automatically test sample number and temperature profile data stored in the database system;

8,Technical parameters

8.1,Conical heater rated power is 5000W, heat output is 0 ~ 100 kW / m².

8.2,The sample weighing range is 0 ~ 3000g; precision is 0.1g.

8.3,Paramagn etic oxygen analyzer, the concentration range is 0~25%, an oxygen analyzer is linear response, imported oxygen sensor; 10% to 90% response time of less than 12s; output noise does not exceed 50ppm;. Reproduce the measured values lower than 100ppm,

8.4,Infrared CO₂ analyzer range: 0 to 10%; accuracy of ± 0.01%;

8.5,Exhaust fan flow 0 ~ 50g / s adjustable, precision 0.1g / s

8.6,The compressor works: cold trap: 0 to 5 degrees;

8.7,Import diaphragm pump, flow rate: 33 l / min

8.8,Thermopile type heat flow meter designed range 0 ^ 100k W / m², heat flow meter accuracy is ± 3%; repeatability is ± 0.5%

8.9,The standard detector color accuracy ± 5%, output linearity (transmission) <1%, absolute permeability <1%;

9,Test data:

9.1,The heat release rate, total oxygen consumption; CO₂ generation amount;

9.2,lignition time, Flue gas flow, C coefficient, extinguish time;

9.3,The critical ignition heat

9.4,Mass loss rate

9.5,Smoke release rate

