

## NBS Smoke Density Chamber



### Product introduction

The NBS Smoke Density Chamber test method is from the National Institute of Standards and Technology NIST (predecessor of NBS) and has been promoted and applied in many test fields. This test method can be used to detect plastic products and non-metallic materials for rail transit. Smoke density grades of non-metallic materials, wire and cable products, etc.; according to the test method, the generally applicable standards are ASTM E662, ISO 5659-2, and the NES 711 smoke density test method in the military standard; The previous building material smoke density tester method has more accurate test results, and the optical sensor uses a more precise photomultiplier tube to capture the slight change of flue gas content in the box; if other test devices are selected, such as Dräger gas detection Tube, can carry out aviation standard smoke toxicity test, and dock with FTIR Fourier transform infrared device, can complete the qualitative and quantitative analysis of flue gas content.

## Technical parameters

Temperature of sample	23±2°C
Relative humidity	50±5%
Size of sample	Length and width of sample all are 75±0.5mm, thickness is 1±0.2mm, thickness of foam and plastic is 8±0.5mm
Irradiance level of furnace	Surface of sample is 2.5±0.05W/cm <sup>2</sup>
Distance between the furnace and sample surface	38mm
Burning gas	Propane gas and the purity is ≥95
Measurement of chamber	L1110mm * W750mm * H2040mm
Smoke box size	L914mm * W610mm * H914mm
Diameter of light beam	Approx. 38mm
Test range	1) Optical transporence is 100%-0.00001%2) Smoke density grade is 0-924 for 6 shelves, automatic transmission
Test mode	Non-flaming mode and flaming mode
Accuracy of photometer	±3%
Exchange shelves accuracy	±7 for smoke density value
Power supply	3-phase is 380±10%V/AC, 50Hz

## Product Feature and Application

- 1.The inner dimensions of the chamber is 914mm±3mm long, 914mm±3mm high and 610mm±3mm deep.
- 2.The inner surface is consist of Teflon coating, which is resistant to chemical attack and corrosion and easily cleaned.
- 3.Test chamber with full width opening door, allowing easy access for sample loading and chamber cleaning.
- 4.Provided with a hinged front-mounted door with an observation window and a removed opaque door cover to the window to prevent light entering into the chamber.
- 5.Chamber walls are pre-heated for easier start-up and convenient equipment operation.

6. Safety blow-out panel, easily replaceable, allows for safe operation of test method.
  7. Two optical windows, each with a diameter of 75mm, mounted in the top and bottom of cabinet.
  8. The light measuring system is consist of Incandescent lamp and photomultiplier tube.
  9. Provided with range-extension filter in the light path, adjusting the accuracy of instrument under the any scale.
  10. Conical Heater - is wound in the form of a truncated cone, rated 2600 W at 230 V with a heat output of 50 kW/m<sup>2</sup>.
  11. Auto Split Shutter automatically opened to transmit radiation to the sample, Spark Igniter to ignite the sample.
  12. Heat Flux Meter - for setting the irradiance level at the surface of the specimens, the range from 0-100KW/m<sup>2</sup>.
  13. Furnace Heater, rated 550W at 110 V with a heat output of 25 kW/m<sup>2</sup>.
  14. The movement of sample is controlled by air cylinder automatically.
  15. Air Cooled calorimeter for setting the irradiance level at the surface of the specimens.
  16. Provided with no pilot flame and pilot flame modes. Digital display flow rate of air and propane.
  17. Gas measurement ports are provided, for optional measurements of toxic gases.
  18. 19 analysis rack, 15 touch screen panel type PC for the whole control and automatic testing.
  19. DAQ(Data Acquisition) Program controllable with the touch screen panel PC.
  20. Testing results: Light transmission, Optical density, Mass optical density(MOD), Mass loss rate, the Clear-beam correction factor etc.
- Application :It is the most widely accepted apparatus for the measurement of smoke from burning materials and measures specific optical density under flaming and non-flaming conditions. It is also used for the extraction of toxic gas.

## Product Details

1. Install an explosion-proof aluminum foil device inside the box to reduce the personal risk of the tester when an accident occurs;
2. The top of the box has a pressure relief port, which is connected with the pressure regulating volume bottle to adjust the internal pressure of the box;
3. The top of the box and the bottom of the box are equipped with cylinders that can be automatically moved for inhaling and discharging flue gas;
4. Equipped with ASTM E662 radiant furnace unit to provide 25KW/M<sup>2</sup> heat radiation output;
5. Equipped with ASTM E662 standard six-head burner, combined with radiant furnace for flaming combustion test;
6. Provide air-cooled copper plate calorimeter, which can be adjusted by using the back cooling method during testing;
7. Equipped with ISO 5659-2/GB/T8323 radiation cone device, which can provide 50KW/M<sup>2</sup>

heat radiation output;

8. Provide ISO 5659-2/GB/T8323 standard open flame burners, which can be tested with flaming flames in conjunction with radiation cones;
9. Provide SB water-cooled heat flow meter with standard measurement certificate attached;
10. Can be equipped with self-circulating cooling water source, no need for external cooling water source, easy for users to use;
11. Equipped with weighing device for MOD smoke density test and thermal weight loss test of materials;
12. The sensor range is 0-2000g, the accuracy is 0.1g;
13. Equipped with NES 711 open flame burner and mixing fan;
14. The switching between the radiant furnace and the radiation cone is connected by aviation joints, and the user can complete the replacement between different standard test devices by simply plugging and unplugging;
15. The optical box is installed on the top of the box, the light source is accepted as a side window type photomultiplier tube, S-4 frequency response, the transmittance accuracy can reach 0.0001%;
16. According to the change of the smoke density state, automatically switch to Clear, Filter and Dark three gear positions;
17. The ND2 neutral expansion filter is installed in the cassette, which is convenient for the user to self-calibrate, and can automatically switch the gear position during the test;
18. The lower part of the box is an incandescent light source, which can provide uniform spot output;
19. The smoke density test box is an integrated design, equipped with a touch screen computer, the user can use the test software, the whole process is set and controlled for the computer;
20. Comes with a printer device, the test is over, the user can print a test report according to the test software.

## Standards:

ASTM:ASTM E662

ISO:ISO 5659-2

IMO:FTPC Part 2

NES:NES 711

This equipment is satisfied with standards (ASTM E 662, BS6401, ISO 5659, NES 711, NEPA 258, etc).

Using ISO 5659 conical radiant heat furnace, We can change the heating condition from 10KW/m<sup>2</sup> to 5KW/m<sup>2</sup> by user.

In the test of NES 711, there are non-flaming test and flaming test in test conditions different from ASTM E 662.

Dimension:1560 mm (W) x 2220 mm (H) x 1060 mm(D)

Weight:210kg

## Installation requirements

Electrical: 110V AC 60Hz / 230V AC 50Hz, 30A

Ambient Temperature: Operating 10°C to 35°C

Dimensions: 1560 mm (W) x 2220 mm (H) x 1060 mm(D)

Gas Supplies: mixture of air & propane

