automatic calorimeter for coal mining and chemical industry

Automatic calorimeters are widely used in power plants, coal mines, commodity inspection, environmental protection, geological exploration, metallurgy, papermaking, chemical industry, scientific research and education and other fields, for the determination of the calorific value of various combustible substances.

Automatic Calorimeter provides key data for fuel performance evaluation, energy efficiency calculations and feedstock selection by accurately measuring the amount of heat released by the fuel during complete combustion.

Main Features of the Automatic Calorimeter

1. multi-probe temperature sensing technology: the automatic calorimeter adopts multi-probe temperature sensing technology, which is capable of real-time monitoring of the inner cylinder water temperature, the outer cylinder water temperature, the room temperature as well as the water temperature of the temperature-controlled water tank. The independent measurement of each probe ensures the accuracy of temperature monitoring, and effectively avoids the influence of temperature fluctuation on the experimental results under different experimental conditions.

2. constant temperature water circulation system: the automatic calorimeter is equipped with an efficient constant temperature water circulation system, which can realize two working modes: with temperature and fixed temperature. In the temperature mode, the water temperature follows the room temperature, which can solve the problem of temperature instability caused by the heat exchange between the outer cylinder water and the indoor air in the constant temperature mode and ensure the accuracy of the test.
3. automatic oxygen filling and deflating device: the automatic calorimeter is equipped with self-developed automatic oxygen filling and deflating device and automatic lifting and lowering mechanism of oxygen bomb, which does not require manual intervention for oxygen filling or deflating. The highly automated design makes the operation easier and improves the experimental efficiency and safety.
4. high-precision electronic measuring cup: using high-precision probe-type electronic measuring cup, no need to weigh the water manually, the system automatically measures the amount of water in the inner cylinder. The repeatable error of water volume measurement is less than 0.5g, which means more accurate water volume control, reduces testing errors and speeds up the experiment process at the same time.
5. ignition wire automatic identification function: this function can automatically determine the working status of the ignition wire, accurately identify the bad state, to avoid experimental errors due to ignition wire failure, to ensure the smooth progress of the experiment.

6. integrated laboratory management system: the automatic calorimeter can be connected with the laboratory management system to automatically upload and backup the test data, avoiding the risk of manual recording and data loss and improving the efficiency and safety of data management.
7. suitable for a variety of samples and accessories: the instrument can be equipped with special oxygen bomb and crucible and other accessories for solid waste samples to meet the testing needs of different samples. In addition, it can also be equipped with oxygen bomb gas collection device to collect and analyze the gas generated in the oxygen bomb.

Advantages

1. high accuracy and repeatability: through the advanced probe temperature sensing technology and automated water measurement, the instrument provides high accuracy calorific value measurement, which ensures the high repeatability and stability of the test results.
2. automated operation reduces manual intervention: automatic oxygen filling and venting, ignition wire discrimination, automatic water measurement and other functions reduce manual intervention, making the experiment more efficient and simple, and also reducing the error of human operation.
3. accurate temperature control, rapid experiment: constant temperature water circulation system and multi-probe technology to ensure that the instrument can quickly and accurately adjust the water temperature, to ensure the stability of the temperature during the measurement process, further shorten the experiment time and improve the testing efficiency.

4. wide applicability: applicable to the determination of the calorific value of various combustible substances, including coal, coke, petroleum, cement, black raw materials, etc., while equipped with different accessories to meet the testing needs of different types of samples.
5. Intelligent data management: The integration with laboratory management system makes data uploading, backup and management more intelligent, avoids mistakes in manual operation, and improves the traceability and safety of experimental data.
6. sturdy and durable: the use of imported thermal insulation materials and high-strength design, the instrument has a stronger anti-interference ability and durability, can adapt to a variety of complex experimental environments, to extend the service life of the equipment.

Working Principle

Automatic Calorimeter determines the calorific value of a sample by measuring the amount of heat released when the sample is completely burned in an oxygen bomb. The sample is first placed in a sealed oxygen bomb, filled with oxygen, the instrument through the electric ignition device to ignite the sample. The combustion of the sample releases heat, which is transferred to the surrounding water through the walls of the oxygen bomb, thereby increasing the temperature of the water. By accurately measuring the change in water temperature and combining it with the known volume and specific heat capacity of the water, the instrument can calculate the calorific value of the sample. In addition, the instrument is equipped with a thermostatic water circulation system and multi-probe temperature sensing technology to ensure temperature stability and measurement accuracy.

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Model	**BC20**
Temperature Range	5°C to 40°C
Precision	≤0.1%
Temperature Resolution	0.0001°C
Heat Capacity Stability	Heat capacity variation ≤0.2% within one year
Accuracy	Better than GB|T 213-2008 Determination of Calorific Value of Coal
Single Sample Test Time	≤13 minutes (classical method), ≤10 minutes (rapid method)
Temperature Sensing Technology	yes
Oxygen Bomb Identification	no
MCPC Module	no
Visible Water Level	no
Oxygen Filling Method	automatic

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Model	**BC20**
Exhaust Method	automatic
Lifting and Lid Opening	automatic
Outer Tank Water Volume	22L
Cooling Water Volume	8L
Cooling Method	Compressor
Power Supply	220Vac, 50Hz
Power Consumption	≤0.5kW
Dimensions	830x460x470mm
Weight	77kg