
The Correct Use of Muffle Furnace

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Classification of Muffle Furnace:

Muffle furnaces are classified into the following categories according to their heating elements, operating temperature, and controller:

- 1) According to heating elements: electric furnace wire muffle furnace, silicon carbon rod muffle furnace, silicon molybdenum rod muffle furnace;
- 2) According to the use temperature, it is generally divided into box muffle furnace below 1000 degrees, muffle furnace from 1100 degrees to 1300 degrees (silicon carbon rod muffle furnace), and silicon molybdenum rod muffle furnace above 1600
- 3) According to the controller, there are the following types: PID adjustment control muffle furnace (thyristor digital display temperature controller), program control muffle furnace (temperature programmable controller when computer)
- 4) According to the insulation materials, there are two types: ordinary refractory brick muffle furnace and ceramic fiber muffle furnace.

Matters needing attention for the installation of electric muffle furnace:

After opening the package, check whether the muffle furnace is intact and the accessories are complete.

1. The general muffle furnace does not require special installation. It only needs to be placed on a solid concrete table or shelf in the room. There should be no flammable and explosive materials around. The controller should avoid vibration and should not be placed too close to the electric furnace to prevent internal components from working properly due to overheating.
 2. Insert the thermocouple into the furnace chamber 20-50mm, and fill the gap between the hole and the thermocouple with asbestos rope. It is better to use compensation wire (or insulated steel core wire) to connect the thermocouple to the controller. Pay attention to the positive and negative poles and do not connect them reversely.
 3. An additional power switch needs to be installed at the introduction point of the power cord to control the total power supply. In order to ensure safe operation, the electric furnace and the controller must be reliably grounded.
 4. Before use, adjust the thermostat to the zero points. When using the compensation wire and the cold junction compensator, the mechanical zero points should be adjusted to the reference temperature point of the cold junction compensator. When the compensation wire is not used, the mechanical zero-point adjustment To zero scale, but the temperature indicated is the temperature difference between the measuring point and the cold end of the thermocouple.
 5. Set the temperature to the required working temperature, and then turn on the power. Turn on the work, the electric furnace is energized, and the input current, voltage, output power display, and real-time temperature display are displayed on the control panel. As the internal temperature of the electric furnace increases, the real-time temperature will also increase, this phenomenon indicates that the system is working properly.
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Muffle Furnace

Precautions for daily maintenance of customized muffle furnace:

1. When the muffle furnace is used for the first time or used again after a long-term shutdown, it must be baked. The oven time should be 200°C to 600°C for four hours. When in use, the maximum temperature of the furnace must not exceed the rated temperature, so as not to burn the electric heating element. It is forbidden to pour various liquids and easily soluble metals into the furnace. The muffle furnace is best to work below 50 °C below the maximum temperature. At this time, the furnace wire has a longer life.
2. The muffle furnace and controller must work in a place where the relative humidity does not exceed 85%, and there is no conductive dust, explosive gas, or corrosive gas. Where metal materials such as grease are required to be heated, a large amount of volatile gas will affect and corrode the surface of the electric heating element, destroying it and shortening its life. Therefore, when heating, it should be timely prevented and properly sealed containers or appropriate openings to be eliminated.
3. The muffle furnace controller should be limited to use within the ambient temperature range of 0-40°C.
4. According to the technical requirements, regularly check whether the connections of the electric furnace and the controller are good. The temperature measuring thermocouples connected to the controller may cause interference to the controller, such as the display value jump of the controller, and the increase of measurement error. The higher the furnace temperature, the more obvious this phenomenon. Therefore, the metal protection tube (enclosure) of the thermocouple must be well-grounded. If necessary, use a three-wire output thermocouple. In short, all effective measures should be taken to reduce interference.
5. Do not pull out the thermocouple suddenly at high temperatures to prevent the jacket from bursting.
6. Always keep the furnace chamber clean and remove oxides and other things in the furnace in time.
7. During use, when melting samples or burning precipitates with alkaline substances in the furnace, the operating conditions should be strictly controlled, and it is best to pre-lay a layer of refractory plates on the furnace bottom to prevent corrosion of the furnace.

Operation rules of daily use safety technology:

1. Do not exceed the maximum temperature of this resistance furnace during use.
 2. Be sure to cut off the power when loading and unloading the sample to prevent electric shock.
 3. The opening time of the furnace door should be as short as possible when loading and taking samples to prolong the service life of the electric furnace.
 4. Prohibit pouring any liquid into the furnace.
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5. It is forbidden to put the sample with water and oil into the furnace; do not use the clip with water and oil to take the sample.
6. Wear gloves when handling samples to prevent burns.
7. The sample should be placed in the middle of the furnace, neatly placed, and not placed randomly.
8. Do not touch the electric furnace and surrounding samples casually.
9. After use, power and water should be cut off.
10. Do not operate the resistance furnace without the permission of the management personnel, and strictly follow the operation rules of the equipment.

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