QWISE-HJ-DPJDZDS-2019

Company Standard

Hunan WISE New Material Technology Co., Ltd.

Steel Bonded Carbide sub-factory

Low pressure sintering process

Operating instructions

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Low pressure sintering

1 main raw and auxiliary materials

1.1 Main raw materials: various grades, various types of compacts, pending products.

1.2 Main auxiliary materials: graphite blocks, graphite boats, paint, hydrogen, carbon dioxide, methane, argon.

2 major equipment and tools

2.1 Main equipment: VKPGR/50/50/90 pressure/vacuum sintering furnace, loading truck.

2.2 Main tools: vacuum cleaners, platform scales.

3 job quality requirements

3.1 Work must strictly comply with equipment safety techniques and operating procedures.

3.2 The operation must comply with the provisions of the low-pressure sintering process system. When the low-pressure sintering process system changes, the operation must strictly abide by the provisions of the temporary “process card”.

3.3 The chemical composition, physical and mechanical properties and organization of each grade alloy shall be in accordance with internal control standards or relevant standards.

3.4 Chen Ping's appearance quality requirements.

3.4.1 There are no unqualified products such as under-burning, over-burning, carburizing, decarburization, bonding, pitting, and deformation.

3.4.2 The surface color of the product after sand blasting should be uniform and there is no serious oxide layer.

4 steps and essentials

4.1 Loading the boat into the furnace

4.1.1 Various series of compacts and various kinds of back-loading boats; inspect the incoming materials, remove the unqualified compacts such as corners and cracks, and check the weight; the burrs are too large and the edges are dropped. Serious compacts are returned to the semi-test group for re-examination.

4.1.2 Various series of compacts and various kinds of processed materials are loaded on a special loading vehicle according to the process requirements. The used boats are uniformly brushed and dried, and the blanks are not separated from each other. The spacing of the boats is based on the principle of not damaging the products to be burned.

4.1.3 Various series of compacts and various kinds of returned products are put into the furnace; the loaded boats are sent into the furnace with a special loading vehicle, and the sealing doors are

cleaned and the furnace doors are closed.

4.1.4 Place the card corresponding to the position in the furnace on the simulated loading platform to prepare for the opening.

4.2 Opening the furnace

4.2.1 Before starting the furnace, the furnace system (vacuum system, heating system, gas supply system, water supply system, control system, alarm system) should be thoroughly inspected. The abnormal situation should be reported to the relevant personnel and processed in time.

4.2.2 Confirmation of cooling water: Open the main water source of cooling water and the branches of cooling water in the furnace section, and ensure that the emergency water source and the main water source can be switched freely. There is no leakage in the cooling water circulation. The inlet temperature is ≤35° C and the water pressure is 1.5bar~ 3.5bar.

4.2.3 Confirmation of electricity: Under normal conditions, the main power supply, main control switch and USP are all in the normally open state; if the blank of the sintering deformer should open the GWK hot water heating power supply and related power supply.

4.2.4 Gas confirmation: All the argon, nitrogen, hydrogen, methane, carbon dioxide and compressed air required according to the process requirements are prepared in a ready state, and the gas pipelines are ensured to be unobstructed.

4.2.5 Program input and start: Program and input the SE-308 programmer according to the process requirements of the sintered product (the input and modification of the program are the responsibility of the designated personnel of the squad), and the person in charge of this process (or the section) can check and confirm that it can be started. The program automatically opens the control cabinet related buttons, determines the setpoints of the thermovacTM321, sets the overtemperature alarm temperature, and sets the process temperature for the GWK heater and each heating band, then activates the “porgrama” button.

4.3 Process operation

4.3.1 According to the "Pressure Record of Pressure/Vacuum Sintering Production (2)", check the operation status of the equipment every 60 minutes; the time of opening, heating start time, dewaxing start time, dewaxing completion time (vacuum sintering) Start time) The relevant parameters of the start time and completion time of the partial pressure, the start time and completion time of the atmosphere adjustment, the high pressure input time, the holding pressure holding time, and the cooling start time must be clearly recorded.

4.3.2 During operation, check the operation status of the vacuum system, gas supply system, water circulation system and various instruments and meters at any time. According to the alarm list of the fault alarm display TD20, the fault will be processed immediately. If it cannot be processed immediately, it should be reported to the branch or related in time. Units, and make a good record in the "Transfer of the shift".

4.4 Shutdown

4.4.1 Close the intake hand valves after the program is finished to keep the cooling water and compressed air clear.

4.4.2 When the temperature of the three heating zones is less than the set value (generally 80 ° C is appropriate), the pressure can be operated. The specific steps of the pressure operation are the same as the safety operation rules of the equipment.

4.4.3 When the pressure in the furnace is at normal pressure (950~1100 mbar), the process is finished, etc., the furnace door is slowly opened, the product is smoothly discharged with the brick

loading vehicle, and the furnace door is closed after the furnace and the furnace door are cleaned.
4.4.4 Open the wax discharge valve and use the paraffin-receiving device for the brick to carry the paraffin in the paraffin collector, and make a record on the “Transfer Diary”.
4.4.5 Record and record the quality of the sintered product in detail, and report the abnormal situation to the relevant personnel for timely disposal. Place the card correctly (pay attention to the seal of “Low Pressure Sintering”), and fill in the “Pressure Record of Pressure/Vacuum Sintering (1)” and “Diary of Handover” in a timely, accurate and complete manner.
4.5 Process parameters and management priorities
4.5.1 The furnace door opening conditions are as follows:
1 The end of the process light is on (the pressure difference is zero). 2 The temperature of the three heating zones is less than the set value. 3 The pressure in the furnace is normal pressure (950~1100 mbar).
4.5.2 The specific steps of the pressure operation are the same as the safety operation rules of this equipment.
4.5.3 A hydrogen/methane preselected button operation must be performed prior to operation of the process gas such as hydrogen/methane to ensure adequate nitrogen purge.
4.5.4 The temperature rise in the dewaxing stage must be ≤1.5 ° C/min, the pressure difference is generally controlled at 5~40 mbar, and the argon input is ≥150m1/h.
4.5.5 GWK hot water heater should be closed in time when the furnace reaches 1000 ° C.
4.5.6 High-pressure gas output The manual valve should be in the normally open state (except for the moment of high-pressure pressure).
4.5.7 Regularly replace the vacuum pump oil to clean the dewaxing pipeline and the contents of the furnace.
4.5.8 The sintering process is carried out according to Table 1 (in special cases: the sintering temperature can be adjusted by ±20 ° C and the holding time can be adjusted by ±20 min). The new grades are executed according to the temporary process of the relevant grades, but the heating rate during dewaxing should be ≤ 1.5/min.

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