BGD 757

Lab Horizontal Sand Mill

Operation Instruction

Biuged

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About Us

Biuged Precise Instruments (Guangzhou) Co.,Ltd. has been focusing on developing and innovating high-quality and high-precision instruments for 50 years. We are the biggest and most professional manufacturer of testing instruments for paint, coating, ink and printing field in China. All our products are in according with ISO, ASTM, EN standards etc and get CE Certification.

Originally founded in 1963, Biuged have grown to an internationally recognized company with many worldwide customers base which includes the world's leading paint and coatings manufactures.

At the same time, Biuged has a young, motivate and vibrant team. Our R&D department continually investigates new product design ideas, in conjunction with the major standards committees. In order to supply up to date instrumentation for the Quality Control of coatings, we always apply the advanced contemporary techniques and experience to our new products. Our manufacturing department ensures that all our products are built to the highest quality, every instrument undergoing rigourous calibration and testing before it leaves our premises.

Moreover, Biuged has own independent Calibrate laboratory and more than 40 agents and offices all over the world. We are also the major member of Chinese Standardization Technology Committee of Paint and Pigment.

Produce the highest cost-effective products and offer the most professional service are Biuged mission. Satisfying our customers' needs are our ultimate wishes.

Factory

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Please read the operation instruction carefully before using the instrument

First of all, thank you very much for choosing **BGD757 Lab Horizontal Sand Mill (disc type)**. In order to ensure the safe and normal use of this instrument, please carefully read the operation instruction and strictly abide by the operation rules of the instruction before use, so as to avoid danger, reduce maintenance cost and shutdown time, ensure the reliability of the instrument and prolong the service life of the instrument.

Before installing the machine, in addition to selecting spare parts and paying attention to the processing quality, we also provide complete design results to maximize the efficiency and maintain the best condition of the instrument.

Our instruments ensure their safety. If the instrument is operated improperly or does not know how to operate, it will be prone to accidents. Therefore, some precautions are described as follows. Please abide by them.

1) The operator of the instrument can operate the instrument only after being trained and familiar with the instrument operation instruction.

2) When the instrument is in normal operation, it is forbidden to open the door and the rear cover panel of the bearing chock (at the motor).

3) The instrument must be shut down and powered off during maintenance and repair.

4) Non professional personnel are not allowed to disassemble the grinding chamber and idle the instrument. If maintenance is required, it must be repaired by our factory or call the after-sales personnel, otherwise the consequences will be borne by ourselves.

5) Before startup, adjust various parameters according to the requirements of the operation instruction.

6) The instrument shall be reliably grounded to avoid the danger caused by static.

Before operating the instrument, be sure to fully understand all the matters described in the operation instruction, and please operate the instrument in accordance with the contents of the operation instruction.

According to the characteristics of our instruments, they have a long service life, but we must pay attention to the faults and eliminate them. We sincerely hope that the operators can fully understand the contents described in this operation instruction before operating the instrument, including the structure, operation, maintenance and other units, so as to keep the instrument in the best condition at any time and ensure the service life of the instrument forever.

1. Safety instructions

1、The instrument are manufactured according to the latest technology and comply with all industrial safety regulations.(VDE, DIN, VDI)

2、In addition to the contents mentioned in the operation instruction, the general common sense requirements and various accident prevention regulations should also be observed. For example, regulations on the handling of hazardous materials or the requirements for protective clothing.

3、Only operate the instrument in strict accordance with the safety procedures described in the operation instruction and confirm that there are no technical problems. We should always be alert to potential safety hazards.

4、The instrument supplier will not be responsible for the damage caused by the properties and reaction of the processing materials, and all the responsibility shall be borne by the user.

5、Strictly abide by relevant safety regulations and place them in a prominent position.

6、The spare parts used for instrument must meet the technical requirements of the supplier, and the losses caused by self processing and replacement shall be borne by the user.

7、Only when all protective devices, such as emergency brake switch, safety protection limit switch, noise reduction device and ventilation facilities are complete and in normal working state, can the instrument be operated.

8、Start the instrument only after confirming that it will not hurt others.

9、When stopping for maintenance or repair, it must be ensured that the instrument will not restart. Set up warning signs beside the instrument, and make its power cut off and stop.

10、When installing at positions above height, ladders, working platforms or other tools meeting safety requirements shall be used, do not tread on instrument parts.

11、Avoid scalding when contacting hot products and instrument parts (such as hot pipes, or heated parts, grinding cylinders and couplings). The above principles also apply to ultra-low temperature grinding cylinders and pipes.

12、Before washing the instrument with water or other cleaning agents, all openings of the instrument should be covered to prevent moisture. In particular, protect the motor and control cabinet. Recover after cleaning.

13、When hoisting the instrument, the hoisting equipment, forklift and transportation tools with the required bearing capacity must be used.

14、Even if the instrument is moved slightly, all external power supplies should be unplugged. Before restarting, reconnect the power supply according to the regulations.

15、Electrical or mechanical equipment must be carried out by or under the guidance of professionals, and work in accordance with Electrotechnical regulations and relevant protection regulations.

16、The electrical part of the instrument shall be operated and maintained according to relevant regulations to control the use state of the instrument at any time. Any problem must be handled immediately. If there are signs of damage to electrical components, do not continue to operate, otherwise it will hurt the operator or others.

17、The instrument must be powered off during inspection and maintenance.

18、Do not damage or modify the structural parts of the instrument or the parts used in the explosion-proof area or explosion-proof protection.

19、Welding, hot work and grinding on the instrument must be approved to ensure that there is no fire or explosion hazard.

20、Before opening the instrument and pipeline, remove the pressure in the grinding cylinder and sealing parts.

21、Other safety instructions in the operation instruction are marked with warning signs.

2. Storage of instrument

If the instrument is delivered to use or not used for a long time, the following matters shall be observed during this period. In addition, the precautions in the additional instructions must be observed.

Requirements for storage room:

1) The storage room must be kept dry, moisture-proof and sunscreen.

2) Temperature of storage room(0℃-50℃) need to take special account of high-precision electrical components.

- **Short term storage**

Without special protective measures, the accumulated storage time of the instrument shall not exceed 3 months. During this period, it is best to use the original packaging of the new machine to keep it dry, moisture-proof and sunscreen.

- **Long term storage**

When the instrument is stored for more than 3 months, pay attention to the following points:

- before storage:

1) The corrosive parts of the instrument shall be subject to anti-corrosion treatment.

- after storage (up to 1 year):

1) Replace the lubricating grease for the bearing and motor bearing.

2) As the rubber is easy to age, carefully check the sealing condition of the easy leakage point.

3. Description

BGD 757 Lab Horizontal Sand Mill is a small and efficient machine for grinding nano materials. It adopts a fully closed structure and a dynamic separation system, its grinding disc is the structure of ceramic disc type and can use grinding media in the range of 0.8 mm to 1.6 mm. This machine is used for wet ultra-fine grinding of solid particulate materials dispersed in liquid, and is suitable for multiple grinding or cyclic grinding and dispersing operations. This machine can make the materials achieve the effects of ultra-fine grinding and dispersion in a very short time (the fineness can reach 2um -15 um).

This machine is very suitable for high speed grinding of small batch water-basedsamples (0.5 kg ~ 1 kg) in laboratory. The machine can grind products of similar size and evenly distributed. It is characterized by simple operation and easy maintenance, convenient cleaning and low energy consumption.

Feature

◆ All materials of machine in contact with materials adopt advanced wear-resistant materials (zirconia, silicon carbide, special wear-resistant steel), with long service life and no discoloration phenomenon.

◆ Simple appearance, modular design, compact structure and convenient operation

◆ The separation method adopts dynamic separation of dynamic sheets and static sheets, which can offer self-cleaning function and no blockage phenomenon.

◆ Feed in self-circulation mode and discharge in self-suction mode without pump.

◆ The machine front install discharge valve which can reduce residuum and clean easily.

◆ Flexible working mode, less waste of materials, convenient disassembly and assembly, fast conversion of experimental formula.

Technical Parameters:

Serial number	Technical item	Model / technical parameters
1	Overall size (L×W×H) (mm)	650*400*500
2	Motor power (KW)	0.75
3	Rated current (A) (Note: the voltage is 220V)	1-1.5
4	Working speed (r/min)	0-1425
5	Spindle speed (r/min)	0-1425
6	Linear velocity (m/s)	0-4.5
7	Grind chamber volume (L)	0.35
8	Particle size of grinding media (mm)	0.8-1.6 (recommended)
9	Grinding media weight (kg)	0.8-0.9
10	Separator (discharge mesh gap) (mm)	0.4
11	Size of inlet and outlet (inches) (external nozzle)	2
12	Feed mode (L/min)	Self-circulation mode
13	Grinding structure	Ceramic blade (disc)
14	Discharging mode	Dynamic separation of dynamic sheets and static sheets (Dynamic discharge)
15	Lip seal	PTFE+Wear ring (YG8)
16	Grinding chamber water cooling	Yes
17	Feed pressure monitoring	No

18	Discharge temperature monitoring	No
19	Manual control (frequency conversion + alarm)	optional
20	Wiring specification (mm^2) (grounding resistance ≤ 9 Ω)	1.5
21	Cooling water pipe port(mm)	Quick air pipeΦ8
22	Cooling water demand (m3/H)	0.4-0.6
23	Instrument weight (KG)	About 65
Hardness description of key parts: Wear-resisting alloy steel, hardness HRC60-62 Carborundum, hardness HRA90-92 Zirconia, hardness HRA89-90		

4. Installation and commissioning

4.1 Installation requirements

(1) During installation, refer to the machine weight in the "technical parameters" (excluding the weight of materials and grinding media), and the ground load refers to the dynamic load and load distribution of the machine.

(2) The machine shall be placed at a distance of more than 1.0m around (preferably on the workbench) to facilitate operation and production. The material barrel shall be placed with enough space to facilitate the installation and connection of cooling water pipe, air inlet pipe and wire and maintenance.

(3) It is installed in a dry room to ensure that the machine is not affected by climate and the outside world.

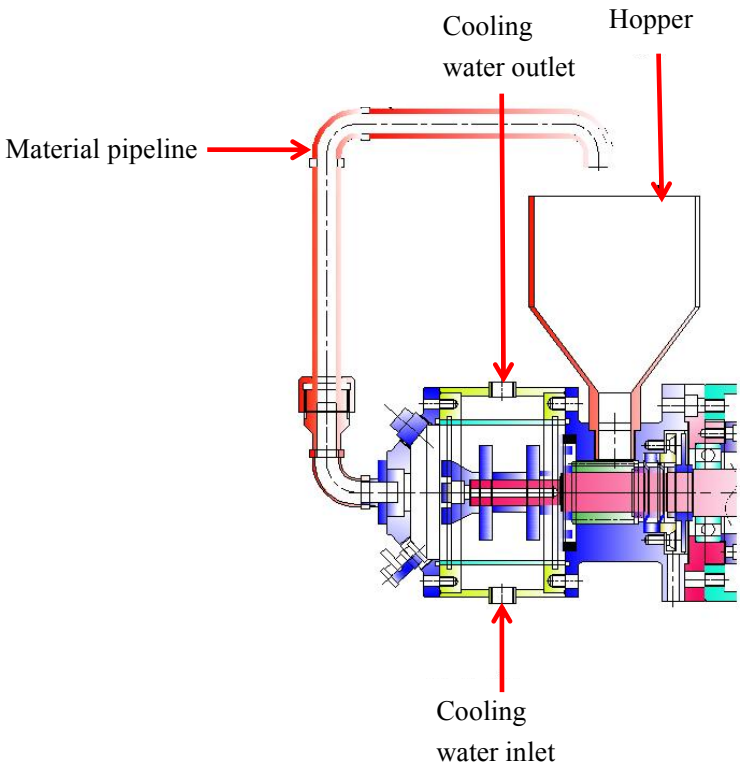
(4) The installation ambient temperature is 5 ℃ ~ 40 ℃. The temperature of all places shall not be lower than the freezing point temperature to prevent icing.

4.2 Water pipe connection

(1) Connect the main cooling water pipe of grinding chamber (quick air pipe), and pay attention to the direction of inlet and outlet from bottom to top.

(2) Turn on the cooling water switch and check whether there is leakage at each port.

(3) ⚠ Note: if the cooling water flow or pressure is too large, a pressure reducing port (return pipe) must be installed on the cooling water inlet to prevent damage to the internal cooling circulating pipe or components due to overpressure (general pressure 0.1-0.3MPa).



4.3 Material pipe connection

(1) Only use pipes that meet the material requirements.

(2) Connect the discharge and inlet pipes with all pipes of the material barrel.

(3) For the first time, the interior of the main body can be cleaned by solvent self-circulation mode.

4.4 Wire connection

(1) Note: the electrical circuit connection must be completed by a professional electrician and connected according to local standards.

(2) If the electric control box is controlled as a whole, just connect the machine to

the distribution box according to the electrical wiring diagram (see the wiring diagram of the control cabinet).

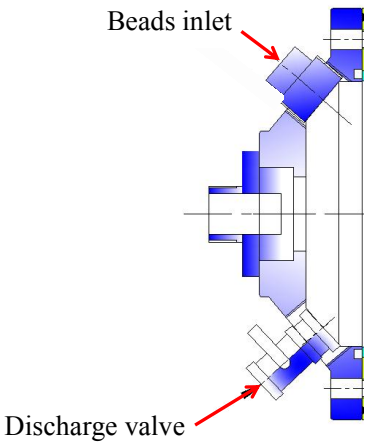
(3) If the electric box is located in an explosive and flammable area, all work must be carried out in accordance with the regulations, especially the sealing of the distribution box and the insulation of wires must be carried out in accordance with the relevant regulations, and the machine must be grounded.

(4) Connect the main body power supply (220V, yellow and green as the ground wire). The ground wire should be grounded reliably.

(5) Start the machine and check the direction of the main motor. Pay attention to the rotation direction of the main shaft. Please follow the rotation mark on the machine, generally clockwise. If the rotation is wrong, replace any two of the three power code under the frequency converter. Pay attention to turning off the power during operation.

4.5 Filling grinding media

(1) During the first operation, the filling amount of grinding media shall not exceed the theoretical grinding filling amount (the filling amount is 70% ~ 75% of the actual capacity of the grind chamber, and add 0.8-0.9kg pure zirconia beads).



(2) Open the beads inlet and add the required grinding media into the grinding chamber one by one with a funnel.

(3) When using for the first time, please add a small amount first, so as to avoid

idling caused by high loss. If the grinding efficiency is not reached and the temperature is not high, add more appropriately.

4.6 preparation

- **Operating procedures**

(1) Check whether the connector terminal of the connecting line between the motor and the frequency converter is loose; Check whether the connector terminal between the power code and the frequency converter is loose. The test can be pulled by hand with appropriate force.

(2) Connect the main body power code (220V single-phase power supply). Note that the yellow line is the ground wire. Please be grounded reliably.

(3) After connecting the power code, turn on the power supply, frequency inverter LCD will light, version number flash, and the set frequency 0.0 is displayed at last.

(4) Connect the cooling water pipe and check whether there is water flowing out of the water inlet and outlet. Please connect the water pipe before grinding the material.

(5) Filling grinding beads: unscrew a plug above the front cover panel, and use a funnel to add the required amount of beads (0.3L zirconia beads add 0.8-0.9kg) into the grinding groove one by one. If the beads cannot flow in, the motor can be operated instantaneously (rotate the speed regulating knob for low-speed operation) to rotate the main shaft, and the beads can be smoothly filled into the groove.

(6) Cleaning: press the "REV" to clean, pour a little solvent into the material funnel, adjust the speed of the main body, and clean the inside of the grinding groove. When the rotating speed of the main body reaches a certain frequency, the material will flow into the material funnel from the upper discharge pipe and start automatic circulating

cleaning or grinding. (Note: the machine adopts self circulation grinding process, and there is no need to pump when the viscosity is below about 10000 LiPA. When the viscosity is above about 10000 LiPA, another feeding pump may be required.)

(7) Select an appropriate speed, clean the grinding groove and blades, stop the machine, and then unscrew the solvent drain valve from the ball valve under the front cover panel to discharge the residual solvent in the grinding groove before normal use.

- **Power on**

(1) Press "FWD" to run the machine, adjust the frequency adjustment knob (potentiometer) of the main body clockwise, the main body will start, and the speed will accelerate with the increase of the frequency. Slowly adjust the frequency from 00.00hz to 50.00Hz to detect the stability of machine operation. To stop, press “STOP” and turn the frequency adjustment knob counterclockwise to low frequency until the main body stops. The correct rotation direction of the machine is clockwise (referring to the rotation direction of the blade, and the rotation direction of the motor fan is counterclockwise). Because the frequency converter has many functions and complex programs, the parameters have been set at the factory. Do not press other buttons if there is no special need!!!)

(2) Pay attention to the rotation direction of the main shaft. Please follow the rotation mark on the machine, generally clockwise. If the rotation is wrong, replace any two of the three power lines under the frequency converter. Pay attention to turning off the power during operation.

- **Maintenance notices**

LONGLY MILL main body adopts modular structure design, with simple structure and complete functions. Only trained personnel can maintain and repair according to this maintenance procedure and instructions.

During general maintenance, special attention must be paid to the internal blades and handle them with care to avoid damage.Disassembly of the main body is only necessary under the following conditions.

- Replace the shaft seal: Note: the service life of the shaft seal is short at the initial stage of use, and then gradually extended, but it varies according to different products. Generally, the oil is more durable than the water. The leakage of shaft seal will leak out from a small hole under the separation chamber. At this time, the shaft seal needs to be replaced.
- When the separation device (dynamic and static sheets) is worn and must be replaced.
- Internal wear (blade) inspection after long-term use.
- The front and rear batches of products cannot be mixed completely or the grinding beads can be removed.
- When it is necessary to thoroughly clean the inside of the grinding groove and the grinding beads.
- Disassembly of the grinding groove: unscrew the fixing nut of the grinding groove counterclockwise with a hook wrench. Pay attention to drain out the residual solvent in the grinding groove before disassembly. When the grinding groove is about to be removed, place a vessel under the grinding groove to prevent the scattering of grinding beads.

Notices in work

- Please fully disperse and mix the materials before use.
- Pay attention to avoid foreign matters, impurities and beads falling into the material funnel during use.
- There shall be no other objects around the frequency converter to cover, and keep good ventilation and heat dissipation of the frequency converter; Be careful not to splash liquid into the frequency inverter to prevent accidents.

Note: if any problem occurs, please contact us at any time.

5. Maintenance

During the daily operation of the machine, the machine must be inspected and maintained regularly. The correct maintenance of the machine can make the machine run effectively and improve the service life of the machine.

Interval	Check point	Operation and monitoring
Each shift	Electrical device (frequency converter)	Check whether the frequency converter is normal, and repair and replace it if necessary.
50-100-150h	Grinding media (zirconia beads)	Check the abrasion of grinding media and fill or replace it if necessary.
After 200 hours of operation, check regularly according to the measured values	Discharge screen mesh	Check the gap and wear of the screen mesh, and replace it in case of wear.
Each shift	Material valve	Check the opening and closing of material valves. Clean the valve and replace it if necessary.
	Pipes and accessories for materials	Check for leaks and repair any leaks immediately. Replace the sealing ring if necessary.
	Motor	Clean the dust on the main motor, improve the heat dissipation capacity of the motor and keep ventilation.
	Cooling water inlet and outlet port	Check regularly and replace the connector (bottom in and top out) to avoid water leakage.
500 hours of operation	Dynamic and static sheets separation device	Check the gap and wear of the dynamic and static sheets. If they are worn, they must be replaced.
	Bearing chock	Check the bearing chock for abnormal noise, and replace the bearing if necessary.
	Ceramic blade	Check for wear and replace if necessary.

	Lip seal	Check its wear and leakage, and replace it if necessary.
Half a year	Cooling system	Check the grinding chamber for water leakage, and replace the sealing ring if necessary.
	Circulation	Remove impurities or replace circulating water.
Every year	Processing area	Check for wear

6. General maintenance and troubleshooting

Situation	Inspection items	Reason	Troubleshooting
No feeding in circulation mode	✧ Check whether there is zirconia beads and the filling amount. ✧ Check Material viscosity .	A、There are no beads in the grinding groove B、Material viscosity is too high	Add beads Dilute the material
Insufficient grinding fineness	✧ The product cannot meet the required fineness.	A、 The hardness of the material is too high to disperse. B、 Not enough zirconia beads. C、 Broken zirconia beads or foreign matters are mixed inside.	Select high-quality materials. Add beads appropriately. Replace all beads. Extend grinding time.
The bearing chock makes abnormal noise	✧ Bearing wear and abnormal noise.	Normal wear of bearing and failure of internal grease.	Replace the bearing.
Zirconia beads leakage	✧ Disassemble the grinding chamber and check the two separation screen meshes on the front cover panel for wear. ✧ Check the use time of zirconia beads. ✧ Check the dynamic and static sheets for wear. ✧ Check whether the dispersion blade is installed reversely.	A、The separation screen meshes are worn and the gap becomes larger. B 、 The beads were not replaced regularly and became smaller due to wear. C、The dynamic and static sheets is seriously worn. D 、 The direction of disassembly and reassembly is reversed.	Replace the screen mesh with a new one. Replace with a new zirconia beads. The plane needs to be reground. Replace it in the original direction.
Zirconia beads leakage during solvent purging	✧ Check the screen mesh on the solvent drain valve for wear.	The separation screen mesh is worn and the gap becomes larger.	Replace the screen mesh with a new one.

The main shaft is locked and does not rotate, and the motor has abnormal sound	✧ Check whether the motor can rotate. ✧ Check the gap of separator. ✧ Excessive grinding media and overload.	A、There are too many materials in the grinding groove, and the motor can't drive it. B、Shut down for too long, the separator is stuck and the gap is too small	Pour a little beads out of the bead valve, and then start the motor to make it rotate. Disassembly and cleaning. Adjust the gap.
The main body cannot start	✧ Check whether the button is loose and whether the control line falls off. ✧ Electronic components are damaged.	The screws become loose. Poor contact.	Re lock. Disassemble, repair or replace with new ones.
The material overflows from the bottom of the small hole under the separation chamber	✧ Judge whether the shaft seal is worn. ✧ Judge whether the shaft sleeve is worn.	The service time is too long and the wear is normal. Wear of shaft seal and shaft sleeve.	Replace the shaft seal. Regrind the surface.