



使用说明书  
Operating Instruction



螺旋洗砂机  
Screw Sand Washer

上海秦路实业有限公司  
SHANGHAI KINGLINK INDUSTRY CO., LTD

## I. Application

It is applicable for sand-using areas such as construction site, sandstone factory, hydroelectric station concrete dam site, electric pole factory, etc., and also for the washing, classifying and dewatering of foundry sand, quartz sand in glassworks and pressure sand for oil well backfilling.

## II. Main technical parameters



### Technical feature

Model	2LSX-915
Spiral diameter (mm)	915
Flume length (mm)	7585
Input size(mm)	≤10
Capacity (t/h)	200
Spiral rotation speed(r/min)	21
Motor power (kw)	2*11
Water consumption (t/h)	20-160
Weight (kg)	11500
Overall dimension (mm) (L x W x H)	8420x3765x2030

**Input size can also be adjusted and designed according to customer's requirements**

## III. Working principle and structure

### A) Working principle

Sand washing machine is placed in a 15° gradient. Under the water channel, there is a sedimentation tank surrounded by three weir plates from three different directions. The spiral head sinks into the sedimentation tank, the spiral which is driven by a motor keeps rotating with the help of speed reducer, and clean water is fed from a perforated plate which is on the bottom of the sedimentation tank. This machine has such three functions as cleaning, dewatering and classifying.

**Cleaning:** sand and stone enter the sedimentation tank from feeding hopper, and rotating spiral impeller makes them turn over and grind with each other, in this way, impurities which cover the surface of sand and stone will be removed, and water vapor surround them will be destroyed, so that the aim of dewatering can be achieved. Washing water from perforated plate form ascending currents, and make light foreign materials rise with water and finally overflow from weir plates, thus completing the cleaning procedure.

**Dewatering:** Heavier sand particles will sink into the bottom of flume, and will be carried upward by spiral impeller at the side of bend plate which is on the bottom of flume. Because the flume is longer than the below horizontal line with a proper length, the dehydrated water flow into the sedimentation



tank from another side of flume bottom, while sand and stone are discharged from discharging opening under the upper end of flume bottom

Classifying: classifying of materials is achieved by adjusting the height of weir plates and spiral speed to make the substandard fine particles overflow from weir plates.

When washing the machine, first you should dismantle the 4"bolt, and then open the washtub pipe, the fine particles and impurities will be discharged from the machine.

## B) Structure Introduction

This machine is double spirals sand washing series, and it is made up by the following parts:

**1. Gearing:** it is made up by motor, big and small pulley, V-belt and gear reducing box, etc.

Gear reducer: speed ratio  $i=68.61$ , oil-bath and totally enclosed. The gear is steel circular and slant cylinder processed by heat treatment. Both ends of axle are supported by cone roller bearings. The material quality of gear reducer box is HT20-40, section liner plates are those industrial ones ( $\delta=0.5\text{mm}$ ), and are coated with sealant which can stop the reducer from leaking lubricating oil. The reasonable design and precision finishing of gear and reducer box can guarantee the gearing precision of reducer.

**2. Spiral shaft:** Spiral diameter  $D=915\text{mm}$ , spiral pitch  $S=455\text{mm}$ , number of thread  $Z=1$ , number of turns  $N=15.5$ , right-handed rotation, edging-type spiral. Spiral impeller whose material quality is Q235A, and with  $\delta=0.5\text{mm}$  steel plates, is compacted by special tool set and is welded continuously on the hollow shaft. Spiral within every spiral pitch consists of six liner plates, whose material quality is ZGMn13. This kind of liner plate possesses a good wear-resistant feature, which can wear well for a long time. When it wears to its end life, it can be changed and replaced by new one. Spiral liner plate is connected by bolt, nut and spring washer with spiral impeller, and is installed along the moving side of spiral, overlapped with spiral impeller, thus can well protect spiral impeller. The hollow shaft, which is a 219X22 seamless steel tube, promises good strength and rigidity, with flange plates welded on two ends and both connected with coupling plate and lower bearing. This structure can best satisfy the washing, classifying and dewatering needs of sand and stone.

**3. Lower bearing:** the lower end of spiral axle is below the flume waterline, and is supported by the lower bearing. All axial force of spiral axle is assumed by the roller bearing output from gear reducer. The lower bearing which is installed outside of the flume downside does not assume axial force, but radial force.

Tail shaft is connected with spiral axle, and rotates in the soft rubber seal ring when it is working.

Check ring which rotates together with tail shaft can guarantee a good sealing performance of lower bearing after a long-time use.

**4. Flume:** consists of shell, left and right weir plates, feed equipment, etc.

Flume is made of steel plate and is characteristic by a rigid and waterproof structure which is connected by electric welding. Left and right weir plates and feed equipment are connected with shell through bolt, nut and spring washer. The shell of left and right weir plates is sealed by  $\delta=3\text{mm}$  rubber plate.

A bend plate is installed in one side of flume bottom, which creates a proper clearance among the outer edges of impeller on flume bottom, so that the spiral impeller can carry the sand particles forward. Another side of flume bottom is a drainage ditch, which will drain away water from sand and stone. This design realizes that the dehydrated water in the carrying forward process of sand and stone by spiral impeller be drained from one side of flume, but not from the back of material discharge opening.

Overflow weir plates is adjustable. By lifting one or two weir plates can shorten their effective length. At this time, if change the feed speed of washing water, water head can be increased and overflow speed of washing and classifying can be changed, so as to achieve the goal of classifying by removing the



fine particles according to specific classifying needs.

Weir plates can also make up for the oblique position caused by fitting and installation error.

Sand and stone enter into the machine through feed equipment. There are inside and outside baffles, so it can control effectively the flow quantity of materials and reduce the flow speed. When the feed equipment is installed in a correct location, sand and stone will enter into washing machine and be evenly-distributed, with the vortex being reduced, which is conducive to the holding of fine particles.

#### **IV. Machine installation, commissioning**

1. This machine main body assembled by the company before delivery. The user receives the machine, should examine each parts of machine to eliminate transportation problems that may arise.
2. Installation personnel should be familiar with the structure, performance and technical requirements. Understand the necessary procedures, and pre-installation process to develop appropriate procedures.
3. Installation site must have sufficient lifting capacity of lifting equipment. Hanging ropes should catch the hooks at both sides of machine. It is better to put a square wooden bar (120 × 120mm) between two side-plates of main body in order to prevent deformation.
4. To transport and move the machine, it must be careful, not haul on the ground to prevent the shell deformation and damage components.
5. Sand washer base should be made by reinforced concrete foundation. The foundation height, depth and size depend on local soil conditions, should be calculated before installation. Installation place should be flat, and have enough space for the installation and maintenance.
6. Preparatory work
  - 1) Check to make sure that there are no other objects in sand washer, the spiral can operate and turn freely inside the shell, no abnormal noise and so on.
  - 2) Check oil level in gear box, the oil should no less than 2 / 3 (please refer oil level mark). If the oil shortage, please add to 2/3 immediately. Gear oil is industrial gear oil, standard GB5903-86 68. The oil should be replaced once every 6 months.
  - 3) Check if there is adequate grease in bearing (EL-3 # Albany grease)
  - 4) Check if the fastening parts, inlet and outlet pipes are well connected.
7. Trial Run
  - 1) First test must be done intermittently without loading materials. If there is no abnormal circumstance, then the continuous running can be done. It is better for trial run more than 2 hours.
  - 2) During trial run, all operating components should run smoothly, without any abnormal noise and friction.
  - 3) Rotation should be stable and reliable, there should be no shock, vibration and so on.
  - 4) Gear and bearing temperature stability, the temperature rises not more than 30 ° C, the maximum temperature does not exceed 60 ° C.
  - 5) Spiral shaft and gear reducer shall no oil leakage.
  - 6) No water leakage from main body.
  8. If the test without load is OK, the normal test with load can be executed. Load test run time should be no less than 4 hours.
  9. When load test finishes, the whole machine should be re-checked. All connecting bolts, components joints, should be fixed and make necessary adjustments.



## V. Operation regulation and maintenance

1. Operators should be aware of and familiar with the equipment for safe operation.
2. When the machine is in abnormal situation, operators have the ability to take appropriate measures to deal with.
3. To start up the machine, please execute the following preparatory work:
  - 1) Read operation record, handle previous problem.
  - 2) Check all fasteners are tightened, if found loose, should be eliminated forthwith.
  - 3) Check whether the scheduled recharging gear oil and bearing grease
  - 4) Check whether the gear box temperature is normal, no abnormal operation noise in equipment.
  - 5) Prohibit to shut down the machine with load, and to continue feeding after shut down.
  - 6) When duty off, should clear obstructions in the machine and the surrounding site.
4. The machine should start up in without load condition. Machine can be stopped when the materials were excluded out of the machine.
5. During operation if any anomalies are detected, the machine should be shut down immediately, troubleshooting, then starting and running again.

## VI. Safety Precautions

1. Electrical equipment should be grounded, insulated wire should be reliable, and packed in insulative tube.
2. Before machine maintenance, firstly cut off the power.
3. Material irregularities, which might damage to the machine is strictly prohibited to be input to the machine.
4. When machine is operating, it is strictly prohibited to make any adjustment, cleaning, maintenance, etc.

## VII. Troubleshooting

Fault	Reason	Advice
The machine cannot start	1. Motor damage	Replace motor
	2. Un-sufficient voltage	Change the power supply
	3. Belt slip	Tension belt
	4. Gear failure	Gear maintenance
Abnormal noise	1. Bearing damage	Replace bearings
	2. Gear failure	Gear maintenance
	3. Spiral scrapes main body	Maintenance, adjustment
Gear box temperature anomaly	1. Deterioration of oil pollution stolen	Cleaning, replacement oil
	2. Oil shortage	Fill the oil standard 2 / 3
	3. Bearing damage	Exchange bearing
Bearing temperature too high	1. less or excessive grease	Check the mount of grease
	2. Grease stains	Clean the bearing, and then replace grease
	3. Bearing damage	Replace bearing