

Gold Well

(Patent Pending)

Vortex Drop Riffle Sluice



GOLD WELL MANUAL



Gold Well Manual

(The sluice that thinks it's a concentrator!)

Operation and Maintenance

CAUTION:

The sluice is constructed of sheet metal and machined parts and has sharp edges. Familiarize yourself with your sluice when you first get it and note where sharp edges are. Typically under the rear of the drop pan and the vortex riffles themselves are places to be cautious when handling it. Be careful when transporting it or using it to avoid injury. Hose clamps that may be supplied on hose kits can be sharp. Please be careful when handling the hose. Inspect unit for sharp edges before use.

READ THROUGH THE ENTIRE MANUAL FOR TIPS AND IMPORTANT INFORMATION. A THOROUGH UNDERSTANDING OF WHAT IS IN THIS MANUAL WILL HELP YOU GET THE MOST OF YOUR GOLD WELL SLUICE/CONCENTRATOR!

IMPORTANT!

6" waterfall heads should be removed prior to uprighting sluice to empty! Caution! If the waterfall head is still attached, it may pivot forward when standing vertically, trapping fingers and injuring you!

How It Works

(The simple explanation)

The Gold Well (Vortex Drop Riffle Sluice) works by creating a gentle, vertically oriented vortex. This vortex keeps material in the spiral shaped Wells in motion, causing light material to be flushed out easily and concentrating heavy material. When a piece of gold crosses this vortex, it finds no stable bed to rest on and like a heavy object dropped in a bucket full of ball bearings being vibrated around, it drops to the bottom, where it stays, because there are minimal forces at work in the bottom of the pocket..

Horizontal grooves are not designed to trap gold, they are mixing Wells. The slots create turbulence sufficient to cause light material to be forced up into the upper laminar flow regions of the water flow so they will be quickly removed by the water stream flowing through the sluice. The heavier materials move more slowly through the sluice, along the bottom where it is forced to cross the spiral Wells where it is trapped. The horizontal wells will of course however trap larger pieces of gold.

Construction & Operation

6" sluices are made of 6061-T6 aluminum which is very durable. 12" sluices are considered production or commercial sluices and are manufactured with 7075-T6 aluminum, one of the toughest alloys of aluminum available. Its operation is the familiar gravity sluice type operation with some subtle and important differences. Most notable is that the sluice does not generally require as much water flow as other typical sluices, and that the angle of operation for successful capture of gold is extremely forgiving, making it easy even for novices to set up and operate effectively.

DO NOT OPERATE THIS SLUICE TO THE SPECIFICATIONS OF OTHER TYPE SLUICES AS IT MAY NOT PERFORM AS WELL AS IT COULD!

IMPORTANT INFORMATION FOR OWNERS WHO ARE GOING TO PROVIDE THEIR OWN PUMPS, VALVING AND HOSES ON THE 6" SLUICES

Some who purchase the sluice may decide to use a pump and hoses they already have or opt for purchasing those parts locally where they live instead of purchasing the optional pump and hose kit available from us. For those who do choose to do so the following things should be considered:

- A) Any valves or Wye (Y) adapters should be at least 5/8" and preferably 3/4" I.D. (inside diameter). Smaller diameter hosing, adapters, wyes and valves will reduce the flow volume AND increase the flow velocity of the water in the system, possibly resulting in insufficient water to operate the sluice properly or a water velocity that is too high and may possibly wash gold out of the sluice.
- B) Pumps should be bilge or trash type pumps, designed to pump water that may contain debris (unless of course your water is city water or very clean). Other types of water pumps may work but may deteriorate much faster pumping dirty water containing abrasive fine sediments and organic material that may be recirculated in a closed system.

Adjustment of the Sluice

There are four basic adjustments to consider when using any sluice, including the Gold Well sluice. They are LEVEL, ANGLE, WATER FLOW and MATERIAL FEED RATE. The Gold Well Sluice should be leveled, then set at an appropriate angle for the water volume/flow velocity and material feed rate for the material being processed.

Level (Level Indication Groove)

Every foot along the sluice, at the junction between two collection bed plates (the plates with the spirals in them) is a small V shaped groove between two rows of spirals closer together than the rest. When processing material, you should see a small amount of black sands accumulate there. This is an indication groove. When set up properly, the black sands from one side to the other of the sluice should appear fairly even in this groove, appearing like a dotted line. If it is more pronounced on one side than the other, the sluice is not level and should be leveled up. It could also be caused by a difference in the water flow from one side to the other of the sluice.

Angle

The sluice has been tested through a wide range of angles, and performs admirably throughout that range. The ranges tested were 5 degrees through 25 degrees. The Gold Well has even been operated at a 45 degree angle and still captured gold, including fine gold. But for most purposes the angle of use should probably fall in the range of 10 to 25 degrees, depending on needs. (For reference, 1 _" per foot of length = 5 degrees. 3 _" per foot of length = 15 degrees)

Steeper angles produce a higher water velocity and a lower quantity of material at cleanout with a faster throughput of material. Shallower angles will result in a lower velocity forcing a lower feed rate of material but may be optimal for extremely fine gold such as recovery from tailing piles. There is no absolute rule of thumb here. Simply, the sluice placed at any angle between 5 and 20 degrees will perform admirably and recover gold of all practical sizes extremely well. 10 to 15 degrees will give a good feed rate and water velocity combination that will fit most needs. 5 degrees will serve well for processing materials such as crushed rock or tailings which contain a lot of ultra-fine gold.

The relationship between angle and flow rate of the water will ultimately determine the proper feed rate at that combination of conditions. Spend some time testing your new sluice at different angles and feed rates to become familiar with how it works and what works best for you.

Leg Kit

The angle of the 6" width sluices may be changed by elevating or lowering the sluice using the legs. The legs are removable for storage or transportation. Just pull out the top quick release pins and remove the legs.

Adjustment of the angle is merely a matter of making an approximate adjustment using the holes in the leg. Put the quick release pin in the appropriate hole that give you the desired height and then make a fine adjustment by rotating the foot to get a precise level. Counter-clockwise to extend the foot (make it higher) and clockwise to lower it. After emptying the sluice it should be checked again for level.

NOTE: On sluices fitted with a waterbar that were acquired before the new leg kits were designed, the new leg kits will require placement and drilling of the appropriate holes to attach it. This is accomplished by removing the screws at the rear of the sluice, positioning the leg kit bracket and leg bar (they should be assembled), and then drilling thru with a 3/16" drill all the holes that do not line up with an existing hole.

Water Flow

Once the desired angle and level are established for the sluice, you will want to adjust your water flow. The flow is in the proper range when particles in the vortex pockets show circular motion. To do this you should set the water flow rate low, add a few scoops of dirt, then while watching the Gold Well pockets, slowly increase the flow rate UNTIL you see the material in the Gold Wells begin to rotate. This then will be the minimum water flow that you want to maintain in your Gold Well Sluice for proper operation. The water flow volume will be different for different materials. If the bulk of the material you are processing is light, you may want to run enough through the sluice first to get some heavy black sands built up, then adjust your water flow for the black sands, not the lighter silicon dioxide sands (generally the light colored sands).

Water flow through the sluice should be between 2 and 8 gallons per minute per inch width of sluice.

So a 6 inch sluice should have a water flow of 12 and 30 gallons per minute. The water flow should not go below this. So a 12" sluice should have 24 to 96 gallons per minute supplied, but have been run as high as 150 GPM. **Remember:** Although your valve or throttle or pump speed control may have a 'wide open' position, wide open may not be the best flow rate for the material you are processing. Just as you would not peg the throttle on your car to wide open all the time just because it can be, you would not run maximum flow of a pump unless it is appropriate for your needs and the material that you are processing.

6" and 12" Attachment Quick Release Pin Holes

The sluice or attachments may already have holes located in the sides for the waterfall head and other attachments to be attached by the quick release pins. However these are GENERIC locations for the attachments, and you may determine that another location may be better suited for your needs! Do not feel that you are stuck with the locations that are already drilled in the sluice. Simply locate the attachment that you want to be located in a different location, hold it in place and using a 1/4" drill, drill thru the side of the highbanker or sluice creating a new set of holes where you need or want them to be!

When using the waterfall head on the lower generic pin location on 6" sluices (the hole set located 1 1/2" from the top on the sides), given sufficient water flow, will create a bit of pressuring and increase the local water flow velocity on the drop pan, aiding in getting material to get moving off the drop pan, similar to how the water bars (their only advantage) could be directed to 'blast' the material and get it going down the sluice. At low flow rates this effect will not be noticeable however.

NOTE: If your sluice has a hole below centerline of the side, this is a hole for a future attachment, and it **MAY** be used as a waterfall box position, however it was not intended for that purpose. Any future attachments that utilize this hole will indicate such. This note may be disregarded on sluices that do **NOT** have a hole below centerline.

Waterfall Head

IMPORTANT!

6" waterfall heads should be removed prior to uprighting sluice to empty! Caution!
If the waterfall head is still attached, it may pivot forward when standing vertically,
trapping fingers and injuring you!

The waterfall head is a relatively simple device which removes the velocity of the water imparted to it by the pump. It virtually eliminates large waves and water fluctuations that traverse down the sluice, creating a good uniform flow of water that is consistent. Since the waterfall head attachment is basically a wide-open structure internally, it is nearly impossible to clog up (and if somehow it is clogged, it is very easily cleaned out). Virtually any material that can be pushed through the hose feeding the waterfall head will come back out of the waterfall head, allowing all day operation without having to stop and unplug holes or filters.

There are 2 screws located on either side of the waterfall head that have washers on them. These screws are the capture screws that retain the small rod that the flapper inside pivots on. Do not remove these screws unless you are doing some kind of servicing. There is no tensioning the flapper

by increasing or decreasing the tightness of these screws. They have no other function beyond keeping the rod inside in place.

The waterfall head is not designed for pressurization.

If over-pressuring occurs, it partially defeats the purpose of the waterfall head. A sure sign of pressurization is a lot of water pouring out from around the lid. A small drip or leak around the lid is normal if you are running at high volumes, however. The difference of pressurization and just running a high volume of water is the amount of leakage showing up around the lid seals.

The seals on it are not pressure seals. If pressurization occurs, reduce the volume of water you are supplying to the unit. If a larger amount of water is required for your operation than the waterfall box is rated for without pressurization, consider purchasing a dredge crash box instead, as that will remove the pump water velocity for the most part and allow a lot higher input volume of water.

At the end of the day after running with dirty water, or occasionally even when running water from a clean source, open the waterfall box and lift the flapper and inspect it for buildup of debris and sediments. Simply wash the unit out with clean water when needed. If used with salt water, the unit should be thoroughly flushed out with clean water as soon as practical.

When running large quantities of water through the Gold Well, be sure that you don't get too high of a velocity accompanying the water that it scours out the pockets. Some scouring in the first row of spiral riffles to two is normal with high volume. But scouring should not occur more than a few rows. Remember that although the Gold Well is excellent at capturing gold, (even fine gold,) that even it can be cleaned out with a fire hose blasting it!! The Gold Well does not have the high volume water requirement of standard type sluices, yet may operate with large quantities of water properly when needed. Do not operate the Gold Well in accordance with the specifications of OTHER sluices.

HighBanker Attachment (6" & 12")

The 6" highbanker has holes located in the side for attachment of a waterfall head or dredge crash box. Simply locate the attachment and align with the holes and insert the quick release pins. The 12" highbanker is attached via an attachment box which has holes in it for attachment to the sluice. In the same fashion as the 6" sluice, simply slip the attachment box over the sluice and insert the quick release pins.

The classifier screen is removed simply by loosening the screws at the front of the classifier screen (you do not have to remove the screws.) The screen is spring loaded. Pick the classifier screen up in the front so that the 1/2" lip is free and pull toward the front, releasing the tension on the spring, then simply lower the back a bit and unhook the screen. To re-install it reverse the procedure.

You may make classifiers out of any kind of sheet perforated materials, such as perforated metal, expanded metal and screen. Stainless classifiers will give superior corrosion resistance and life. However any kind of metal may be used provided it is not too thin that it bends when in use. Check on

our website for additional sizes of classifiers as they come available.

The highbanker may be run in a normal empty-off-the-back direction, or it may be turned so that it empties into the sluice. Of course this would defeat the use of a highbanker to classify if the larger rocks dump back into the sluice, and so a deflection plate or screen is needed, to divert rocks off to the side after crossing the classifier, to work properly in that configuration. This configuration however will lose the least water in a recirculating system where water is scarce and can not be wasted. (See photo elsewhere in manual.)

Stream Flare

Attachment of the stream flare for either a 6" or 12" sluice is merely a matter of removing the screws holding in the back of the 2 part drop pan in the sluice and installing screws into the obvious locations. The existing adhesive that seals the back of the pan will need to be cut through with a sharp knife and removed most likely.

Depending how often you want to change from one type operation to another will determine if you will want to use the wing nuts included or not to attach the stream flare. The 'tab' at the front of the stream flare should overlap on TOP of the drop pan in the sluice. If a water tight seal is needed there you might consider placing a thin sheet of some compressible material between the stream flare and the sluice drop pan, or some thin self-adhesive weatherstrip that can be found at most hardware stores.

NOTE: On those sluices that were fitted with a waterbar style pan, or sluices made prior to the changeover that have a large hole in the side, a flat 2-part drop pan will need to be obtained in order to use the stream flare properly. The large hole in the side of the sluice side will not in any way interfere with the proper operation of the stream flare or result in material loss if operated correctly. Older units had hole locations in different places at the back of the sluice, and those that the holes do not line up with will need to be drilled properly for the stream flare.

Material Processing **(Gettin the Gold!)**

The maximum feed rate is determined primarily by the water flow rate and the angle of the sluice. Increasing angle or water volume will allow a greater volume of material to be processed per unit time. If you have a lot of extremely fine gold, however, for example processing tailings, you may want to reduce the angle and increase the flow rate to keep a reasonable feed rate. If you are used to a normal sluice, you will find that the Gold Well can process more material faster than you are used to. IF material is building up and staying for a period of time on the flat areas of the sluice between the wells, you are feeding the sluice TOO fast.

The sluice is designed to process unclassified materials provided enough water depth is delivered to the sluice to move the large material through the sluice. If sufficient water can not be delivered, either classify the materials to 3/8" or less and/or increase the sluice angle to help large material to move through the sluice. Classified materials will have the highest recovery, however, that is not to say that

unclassified material will have poor recovery. To the contrary. In all the tests done so far, even unclassified materials, the recovery rates are still in excess of 95% for most gold. In some tests involving crushed ore from a vein, where the gold was 400 mesh and finer, the recovery was around 80% but that was due to the fact that gravity type systems do not typically do well in recovery of gold that is so small it is capable of staying in suspension in the water flow.

When working with materials that 'compact' easily or are extremely sticky, such as material with a lot of clays in it or jagged crushed rock, check the Wells from time to time by taking a small probe and seeing if the material in the bottom of the Well moves around freely. If it does not move easily and is compacted, you may want to empty the sluice more often, or, add some soap to the water to keep a clay from re-adhering to itself in the sluice.

The sluice may be run at a wide range of angles. You should test the sluice at different angles to see what is best for the material that YOU are processing. Like any sluice there will be an optimum water flow and angle for the material you are working with. One way to test this is to carefully pan out some samples of processed material (dirt that has already been put through the sluice) and look for fine gold there. Another way is to re-process the dirt and see if there is gold captured on the second pass.

Cleanout

To empty the sluice, you should have a 5 gallon bucket or a small tub to stand it up in (if nearby you do not need to disconnect the pump hose) and flush it out into the bucket or tub. DO NOT spray it with an aggressive jet-like stream of water, as this may spray the water out and away from the sluice, as well as gold. Simply flood the pockets with adequate water, starting at the top and work to the bottom, then repeat until you are satisfied that all material in the sluice has been transferred to the bucket. From there you can then transfer it into a gold pan or some other final separation device. The quantity of material (black sands and unwanted silicate sands) will be about half of a cup. This greatly reduces the amount of material needing to be removed to get to your collected gold, and as a result, greatly reduces losses in the cleanup process.

Cleaning

The sluice is made from aluminum and stainless steel. It will not corrode significantly in normal environments. After use rinse the sluice in clean water to remove black sands that contain iron and cause corrosion over time. Do NOT use cleaners that contain ammonia or have a ph higher than 7 (alkaline). Use an acidic cleaner such as vinegar and water to clean the sluice up if you want to clean it or an aluminum cleaner or polish.

Waterfall heads should be opened from time to time and cleaned of sediments in the bottom. The sediments will not interfere with proper operation and will only deposit in the quiet areas in the waterfall head.

WARRANTY

We make no warranty express or implied regarding your success in capturing gold as we do not have any control over the actual operation of this device by you, or the gold content (or lack thereof) of any material that you may be processing.

The sluice is sold AS IS and is up to the consumer to determine if this device is suitable to the purpose intended by the consumer. Cosmetic defects caused in the manufacturing process and handling are not considered to be a defect in workmanship or materials. Printing on the aluminum parts by the manufacturer of the aluminum is intentionally not removed to show proof of origin of manufacture of the aluminum. I.E., the USA.

We will repair or replace any defects in the sluice at no charge once we have determined that the defect is not a result of abuse on a case by case basis. We may also choose rather than to repair your sluice to replace it or upgrade it. To have your sluice repaired under this warranty, contact us at support@hmresearch.net and request a warranty repair, or call us at (928) 684-4482

Customer pays the shipping to us, we pay the return shipping.

Warranty from HM Research

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