

Hybrid Koi Ponds.....What Are They?

Definition of the word HYBRID: *A functional unit in which two or more different technologies are combined to satisfy a given requirement.*

There are hybrid cars, hybrid plants, hybrid grasses, hybrid this and hybrid that.....and now hybrid koi ponds. Hybrid koi pond construction has been on the rise for the past few years and has become somewhat of a marketing “buzz” word in this and other industries. I guess hybrid koi ponds sounds far better than what I have been calling them for years, “Frankenstein ponds”. I have always had the need to borrow a little technology from this industry and that industry in order to find ways to do things more efficient not only mechanically but also biologically. Most of these hybrid koi pond construction projects that we have built have been for some of our previous water garden pond construction customers. These customers have become attached to their koi and when enlarging their current water garden pond they want the look of a water garden pond and they also want the technologies in filtration used in traditional koi pond construction.

Hybrid koi ponds are designed and built to accomplish a specific goal, need or want without being true to any one mindset, technology or methodology. This type of pond construction is normally 3 feet to 4 feet in depth and all other variances such as design, filtration system, construction methodology and construction materials can be instituted, omitted or merged as needed in order to achieve a specific goal just as long as the koi pond’s water quality and clarity are not compromised.

As this industry grows, new technologies will be developed for this specific industry while other technologies will be adapted or assimilated from other industries. These adaptations of technologies will create a larger share of the pie for hybrid koi pond construction within this industry in the near future. With a well-planned hybrid koi pond construction project you can have your cake and eat it too!

Now that we have decided to install a hybrid koi pond, we must now decide on the construction method that will be used. The most popular construction methods are EPDM rubber liners, which are the least expensive, shotcrete (high-pressure sprayed on concrete just as in swimming pool construction), polyurea (a sprayed on rubber-like liner) or concrete block. Concrete block construction is also very popular with koi hobbyist as this could be a do-it-yourself type project and the cost is far below shotcrete and polyurea spray liners. For the sake of ease, availability to the masses and affordability let’s use [.45 mil EPDM rubber liner](#). Ethylene Propylene Diene Monomer commonly referred to, as EPDM rubber liner, is available at water garden centers and most do-it-yourself big box stores.

For this pond we will build a pond that will have a length of sixteen feet and a width of eleven feet with a depth of four feet. Water garden ponds have rocks, gravel and aquatic plants in them but traditional koi ponds have no rocks, gravel or aquatic plants in them at all. This hybrid koi pond will have rocks, gravel and plants installed down to the plant shelves as it is done in water garden pond construction but will be left bare liner at the four foot depth as it is done in traditional koi pond construction. For filtration we will install a [mechanical skimmer](#) and a [biological waterfall filter](#), which are used in water garden pond construction. We will also incorporate filtration equipment used in traditional koi pond construction such as an [external pump](#), [bottom drain](#), [ultraviolet sterilization unit](#) (commonly called UV lights), a few directional flow-jets, a [settling chamber](#) and a [pressurized media filter](#). **NOTE: It is recommended to go to a professional that is do-it-yourself friendly so that they can help you design a filtration system and provide a diagram of how it all should be connected. Most professionals that are do-it-yourself friendly may charge a fee for this consultation and some professionals reimburse either part or the whole fee if you purchase the equipment and materials from them. Either way, this help is well worth the price.** If you decide to not seek professional advice then at this point you should put on paper what type of filtration system you will be using and draw a diagram of how the filtration equipment will be connected to each other.

Installing A Hybrid Koi Pond

You must always check your state and local building codes to determine if you will need a permit and what are the requirements that must be followed if a permit is required when building a water feature. Next, call a service company that will locate any phone, power and/or cable lines and sewer pipes that might be in your digging area. Once these steps are done you are clear to start. Always wear safety equipment as necessary and follow all of the manufacturer's instructions. If the directions are not clear, call and get clarification before you continue.

Once you've chosen a location for the hybrid koi pond, spray paint on the ground the design/shape of the koi pond. Set the [biological waterfall filter](#) and [mechanical skimmer](#) units where you want them to be located. The waterfall and skimmer units should be on opposite ends of the pond. The first one to be installed is the waterfall filter unit. The area where the waterfall filter unit will be installed must be level and compacted in order to make sure that there is no ground settlement in the future. To check the level of the waterfall unit place a level on top of the waterfall unit from side to side and front to back and adjust accordingly by adding or removing dirt from under the waterfall filter unit. Attach the plumbing (2 inch PVC is normally used for this type of installation) to the back of the waterfall filter unit by gluing the pipe in place. Lay the excess pipe towards the where the skimmer will be placed and we will come back to finish installing this pipe to the [external pump](#) later. Next, begin excavating the pond area down

to a depth of 10 inches. While excavating, throw all the dirt to the area where you will be building your waterfalls often compacting the dirt around the waterfall filter unit and also checking its level and adjusting as necessary as discussed earlier. Once the entire pond has been dug to 10 inches, use your spray paint and design where you want to have shelves for planting areas. Once you have spray painted your plant shelves in place, continue digging to a depth of 4 feet making sure not to disturb the 10-inch plant shelf areas that you just painted. Once the rest of the pond is dug to the 4-foot depth, you should be left with plant shelf areas that are 10 inches in depth and the rest of the pond should be 4 foot in depth.

The next step is to install the mechanical skimmer at the opposite end of the pond in reference to the waterfalls. Place the skimmer on the edge of the pond where it will be installed and spray-paint around it so that you can dig a hole that will be slightly larger than the skimmer itself. Dig the hole so that the skimmer's top edge is 2 to 3 inches above ground level. Once dug, set the skimmer in the hole and use a string level to check for proper depth. Attach the string level to the skimmer at 1 inch below the skimmer's side opening. This is where the water level to the pond will be entering the skimmer. No extend the string to the opposite side of the pond and place the level on the string. Move the string up or down until the bubble on the level is centered. This is where the water level will be. If the water level is too high then you must lower the skimmer and if the water level is too low then you must raise the skimmer. Adjust the skimmer as necessary and check the water level again. Use the string level to also check that sides of the pond are also at the right height. Adjust the pond's side edges by adding or removing dirt as necessary. Once the skimmer is adjusted into place, backfill around it with dirt and compact lightly as to not warp its shape. With the skimmer level and in place, it is time to install the bottom drain.

Before installing the [bottom drain](#) you need to create a slight pitch/grade to wards the center of the pond from all sides of the pond. Doing this with a flat blade shovel is the easiest way. Creating this pitch towards the center of the pond will create a flow into the bottom drain, which will be very conducive for the fish waste to exit the pond, and into the filtration system where it can be removed from the system. Once this step is completed dig an area that is slightly deeper and wider than the bottom drain unit. Next, dig a 4-inch wide trench from the bottom drain area to where the external filtration system will be located. Glue a piece of 3 inch PVC to the bottom drain and backfill around the bottom drain so that the top of the bottom drain is level with the pond's bottom surface. Compact well so that the bottom drain unit does not settle later. Continue to lay and attach 3 inch PVC pipe from the PVC pipe you just attached to the bottom drain all the way to down the trench to where the external filtration system will be located. This pipe will be connected to the settling chamber at a later time. Proceed to backfill and cover with dirt the 3 inch PVC pipe that is attached to the bottom drain but only the section that is inside the pond and a couple of feet past the pond. By leaving the rest of the trench open, it can be used to run other pipes

and cables from the filtration area to the pond without having to dig more trenches.

The [.45 mil EPDM liner](#) is installed next. With help, unfold the liner inside pond and pull as necessary to remove most of the wrinkles making sure not to step on the plant shelves to prevent them from collapsing. Work all the excess liner towards the outside of the pond. The excess liner will be cut later, once the pond is full of water. The liner now needs to be attached to the skimmer's faceplate, the bottom drain unit and the waterfall filter unit. All attach pretty much in the same manner. Always make sure that the area the liner will be attached to be dry and clean. Once the liner is in place, attach the liner to the bottom drain unit as per the manufacturer's instructions. Usually you just clean and dry the area, add a small amount of silicone, place the liner over the unit and screw on an attachment ring, let it dry and trim the liner that is inside the bottom drain unit so that the water can flow in. The same steps are used to attach the liner to the skimmer and waterfall filter unit. It is a good idea to leave a little excess liner folded just below where the liner attaches to the units just in case you make a mistake you will have a little extra slack in the liner to try again.

The next step will be to place the natural stone boulders inside the pond. Start by placing larger boulders at the bottom of the pond against the pond's vertical wall. Place the stones side by side until you have created a stone ring along the bottom edge of the pond. Next, stack more stones side by side on top of the stone ring you just completed. As you stack the pond walls with stones go placing [underwater lights](#) in key positions that will illuminate the pond in the evening to create a dramatic effect. Leave enough extra low-voltage wire so that you can remove the lights from their position and bring them above water once the pond is full so that you can replace the bulbs without having to drain your pond. Take all the extra cable that is required to do this and coil it around the low-voltage underwater light fixture and place it where you want it to go. Once you place the underwater light, place a few rocks around the underwater light so that it won't move or float out of place when the pond is full of water. Take the low-voltage cables from a few of the underwater lights and join them together. Next, attach them to a longer cable and run it in the trench towards the filtration area where this and the other cable from the waterfall underwater lights will be attached onto a [low-voltage transformer](#). Depending on the amount of underwater lights, the wattage of each underwater light and the length of low-voltage cable used from the low-voltage transformer to the low-voltage underwater lights in the pond and waterfalls will all determine what size gauge of low-voltage cable will be needed and how many low-voltage underwater lights can be on each run. The term 'run' is used for the length of low-voltage cable from the transformer to the low-voltage underwater lights. For more information refer to the HOW-TO Library in the section [HOW-TO Install Underwater Lights](#) Continue stacking stones until you reach the edge of the plant shelf. Now, place stones against the plant shelf wall, from the bottom of the plant shelf to the top of the pond surface. **NOTE: It is very important to make sure that when you are**

stacking the stones that they are securely placed and do not wobble or are loose to prevent them from collapsing and falling down so take your time.

Next, place decorative river rock on the flat areas of your plant shelves making sure to cover the low-voltage cable. You only want to add enough gravel to cover the liner. You DO NOT want a thick layer of gravel, as this will create a filtration issue in the future. Do not put gravel at the bottom of the pond. The shelves will have gravel and [aquatic plants](#) as in water garden ponds and the bottom of the pond will have a bottom drain but no gravel as in traditional koi ponds. This combination of construction methodologies is part of what makes this a hybrid koi pond.

You can now move on to building the waterfalls. Stack stones on the liner in front of the waterfall filter unit. When doing so, you should consider that the water that will be falling on the rock that you just placed will be coming from a rock above and will fall on this specific rock on a specific place and then fall to the area below in a specific manner. What this means is that you have to not only be aware of how the water is going to fall off the rock that you are placing, but also how the water is going to react and how it's going to flow once it falls on the rock below. If you can keep this mindset as you are placing the stones for the waterfalls, you have a better chance at achieving the look of the waterfalls that you are looking for on your first try and won't have to tear the waterfall down and restack it. As you stack the waterfall stones go placing [underwater lights](#) in key positions that will illuminate the waterfalls in the evening to create a dramatic effect. Leave a foot or two of extra low-voltage wire so that you can move the lights around once the waterfall is operational in case you want a different lighting effect that might require moving the light. Once you place the underwater light, place a few rocks around the light so that it won't move around when the water is flowing over it. Take the low-voltage cables from a few of the light and join them together. Next, attach them to a longer cable and run it in the trench towards the filtration area where this and the other cable from the underwater lights in the pond will be attached onto a [low-voltage transformer](#). For more information refer to the HOW-TO Library in the section [HOW-TO Install Underwater Lights](#).

The pond area is completed and all that is left to do is to add the aquatic plants, fill the pond with water and trim the excess liner. All this will be done later once we install the pump and filtration system.

The first thing we do before installing the filtration system is to layout all the components as they will be installed so that we know how much room it is all going to take. Refer to your diagram for help in the layout. Once the equipment has been laid out place concrete pavers on that area to add stability to the ground for the filtration system. Start installing the equipment by placing the pump in its location facing where the settling chamber will be installed. Connect the OUT port of a [3-port valve](#) to the INTAKE (suction from pond) side of the

pump. Leave the rest of the pump connections until later and move on to installing the settling chamber.

The second piece of equipment to be installed is the [settling chamber](#). The settling chamber receives its water from the bottom drain and collects all the debris from the bottom of the pond and disposes of it via the periodical turning of a valve. The water that enters the settling chamber then enters a pipe that is attached to the INTAKE (suction) side of the pump. To install the settling chamber dig a hole that is large enough to fit the chamber to the correct depth. The correct depth is determined by the water level in the pond. The use of a transit is recommended and is very easy to operate. If one is not available then place a wood stake on the ground by the skimmer and draw a line at any point that is at least 3 inches above ground level. Now measure how many inches from the mark on the stake to the spot on the skimmer that we had decided when setting the skimmer would be the water level and record this number as it will be used when determining the water level for the settling chamber. Next, place another wood stake by the settling chamber. Tie a string on the mark of the stake by the skimmer and tie the other end of the string to the stake by the settling chamber. Place your string level on the string next to the stake at the settling chamber and move the string up and down the stake until the bubble on the string level is in the center. Now mark this spot on this stake. Now you can determine where the water level will be in the settling chamber by measuring down the same amount of inches as you did at the skimmer side (you should have recorded this number earlier).

Add or remove dirt from the hole so that the water level is on the correct spot on the settling chamber based upon the manufacturer's recommendations but do not backfill with dirt yet. Using the worm clamps (like those used on your car's radiator hoses) attach the rubber coupling, which were provided with the settling chamber, to the extrusion at the very bottom of the settling chamber. **NOTE: It should be understood that when the term "connect" is used as to PVC pipes, it is intended as a procedure that includes the use of PVC primer and glue.** Use the fittings necessary (90 degree elbows, 45 degree elbows, etc.) to attach 3 inch pipe to run from the rubber coupling at the very bottom (coned end) of the settling chamber to the IN port of the 3-port valve that you installed earlier on the pump. Next, use the fittings necessary (90 degree elbows, 45 degree elbows, etc.) to attach the 3 inch PVC pipe that is connected to the bottom drain unit to the rubber coupling located on the side (lower side) of the settling chamber and tighten with the provided worm clamp. Check that the water level is still where it needs to be and adjust as necessary by adding or removing dirt from under the settling chamber. Once the water level is correct proceed to backfill around most of the settling chamber leaving exposed a two-foot wide section of the settling chamber that is closest to the pump.

Next, install the [bulkhead fitting](#) that was provided with the settling chamber on the flat spot that is located at mid-point on the side of the settling chamber and

on the inside of the settling chamber portion of the bulkhead fitting connect the two inch pieces of PVC pipe as per illustration. (See photo) Next, connect the OUT port of a second 3-port valve to the remaining IN port of the first 3-port valve. Now connect a piece of two inch PVC pipe to the same bulkhead fitting but to the side that is outside the settling chamber to one of the IN ports on second 3-port valve. Connect a series of PVC pipes to run from remaining IN port on the 3-port valve to the back of the skimmer. You can run the pipe to the skimmer in the same trench as pipe for the bottom drain. Enter the pipe through the hole at the back of the skimmer and connect a 90-degree elbow to the pipe end inside the skimmer with the elbow facing towards the bottom of the skimmer. Now connect a piece of PVC pipe to the 90-degree elbow that is a few inches short of reaching the skimmer's bottom. This PVC pipe will draw water from the skimmer and into the pump.

You have just completed the installation of the INTAKE (suction from pond) portion of the filtration system. There are many ways to plumb a pond and they can be quite complicated. Installing the INTAKE (suction from pond) in a manner such as what you just completed, allows for total control of where the water is drawn from. If you need more suction from the skimmer due to more leaves in the fall then you can close the bottom drain some and the same if you need more water from the bottom drains, you can close the skimmer intake some. This type of plumbing design also allows the use of one pump to run your filtration system and also the waste side of your settling chamber which normally requires a second pump and buried wastewater chamber.

The RETURN (flow to pond) portion of the filtration system is less complicated and faster to install. To begin, connect the OUT port on a [3-port valve](#) to the RETURN (flow to pond) side of the [external pump](#). Connect two inch PVC pipe from one of the IN ports on the 3-port valve to the IN side of the [pressurized media filter](#). Next, connect PVC pipe from the OUT on the pressurized media filter to the IN on the [ultraviolet sterilization unit \(UV light\)](#). Now, connect the OUT on the UV light to the PVC pipe from the waterfall filtration unit. You can run the pipe to the [waterfall filter](#) in the same trench as the [bottom drain](#) and [mechanical skimmer](#) pipes. You have now completed the RETURN (flow to pond) portion of the filtration system.

The WASTE portion of the filtration system directs the water from the settling chamber and pressurized media filter when they are being “flushed” or “backwashed” to remove the collected fish waste from the filtration system. Select a place where you might want this water drained. **CAUTION: This water will have a foul smell and be thick with waste.** The advantage is that this water is rich in ammonia, nitrates, nitrites, etc. and is great fertilizer for your lawns and shrubs. Connect a PVC pipe from the WASTE port on the pressurized media filter and run to selected wastewater location. Next, connect a PVC pipe from the remaining IN port on the 3-port valve at the pump's RETURN (flow to pond) side and run it to the selected wastewater location.

You're almost done with the project once you install the [aquatic plants](#) onto the plant shelves. This can be done by either placing the aquatic plant on the plant shelf in its pot or by placing them in the plant shelf bare-root. If placing the aquatic plants in their pots, clear a small area of gravel on the plant shelf, place the pot on the exposed liner and then hide the pot by placing larger stones around the pot. If installing the aquatic plants bare-root, remove them from their pots and rinse off the dirt from the roots. Then, clear a small section of the gravel on the plant shelf and place the bare-root plant onto the exposed liner and cover the roots with the gravel. Some aquatic plants require that you place a few larger stones around them for support. In time the roots will attach themselves to the liner and stabilize the plant.

To finalize this hybrid koi pond construction project you need to fill the pond with water and start-up the filtration system. Once the filtration system has been running for a few minutes you want to check for leaks. If everything is running as is supposed to, you can now go back and trim the excess liner from the perimeter of the pond. When trimming off the excess liner, it is suggested that you leave a minimum of an extra foot of liner just in case anything shifts or settles in the future. Curl the extra foot of liner towards the pond's edge and bury it just below ground level or just cover it with gravel or mulch. Remember the extra liner is there when planting or decorating around the pond as to make sure not to puncture it. The final step is to bury the pipes in the trench by covering them up with dirt. Once covered, lightly water down the trench area so that the dirt will settle in place. Add more dirt if necessary and you are now the proud owner of a hybrid koi pond, congratulations!

Landscape around the koi pond and waterfall filter to your liking, attach the [underwater low-voltage lights](#) to the [low-voltage transformer](#) for a great evening effect and sit back, RELAX & ENJOY!

The Pondman's™ Views On Hybrid Koi Ponds

PRO's:

- All the best of what water garden pond construction and traditional koi pond construction have to offer
- Most require very easy and quick weekly maintenance (5 to 10 minutes)
- Most do not require a yearly complete clean-out
- Construction methods allow for any type of design (Oriental, Traditional, Mediterranean, Contemporary, etc.)
- Construction methods allow for both in-ground and above ground koi pond construction
- Natural in appearance
- Improves property value with great return on investment
- Are a do-it-yourself projects with some guidance from a professional

CON's:

- If more than 2 feet in depth they require a permit (check local & state laws)
- Most water feature contractors do not know the dynamics required to properly build a hybrid koi pond
- Are a do-it-yourself projects with some guidance from a professional
- No availability of all-inclusive do-it-yourself hybrid koi pond kits
- Higher budgets MAY be required depending on construction methods & filtration equipment
- Some MAY require a yearly complete clean-out