Aeroponics design pdf

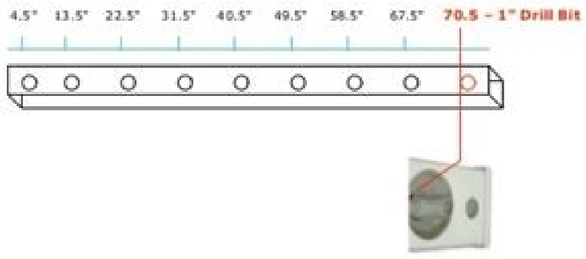
Putting it all Together:

After you have purchased all the required items listed above you are ready to start assembling the system. Start with the Grow Chambers and Misting Lines and then move on to the Reservoir, Distributor Line, and Elevator Stands.

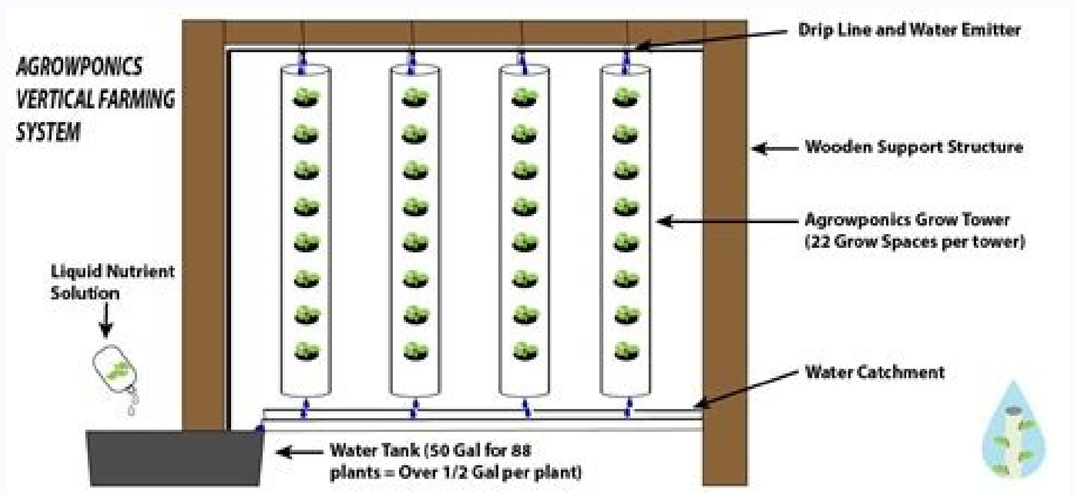
Making the Grow Chambers and Misting Lines:

Step One: You will need – Fence Posts, Nylon Drain, 4 Fence Caps, Silicone Caulk, 3" Drill Bit, 3/8" Drill Bit, Drill

- Lay the four fence posts side by side and make each of these markings and then drill them out with the 3" drill bit, except for the hole at 70.5", making sure you are in the center of the fence post (like in the picture above).



- The hole located at 70.5" should be drilled *straight* through the opposite side. This hole is for the returned nutrient solution. After drilling the 1" hole through both sides of the fence install the Nylon Drain in the hole on the backside of the grow chamber.



Is aeroponics profitable. Aeroponics system design. Aeroponics system design pdf. Building an inexpensive hydroponics/aeroponics system. Homemade aeroponics design. Aeroponics how to. High pressure aeroponics system design. Aeroponics 3d design.

Using 4" PVC tubing works great, and it's inexpensive too Here is a good example of a NON recovery drip system While the concept of the aeroponic system is quite simple, it's actually the most technical of all 6 types of hydroponic systems. However it's still fairly easy to build your own basic aeroponic system, and a lot of home growers like growing in them as well, and even get really good results using this type of hydroponic system. Like with any other type of hydroponic system, you can use many different kinds of materials to build it, as well as many different types of design setups to fit in your space. Your really only limited by the space you have, and your imagination. Some advantages to using an aeroponic systems are they typically use little to no growing media. The roots get maximum oxygen, and the plants grow more rapidly as a result. Aeroponic systems also generally use less water than any other type of hydroponic system (especially true aeroponic systems). Also harvesting is usually easier, especially for root crops. However there are a few downsides to aeroponic systems as well. Besides being a bit more expensive to build. The mister/sprinkler heads can clog from build up of the dissolved mineral elements in the nutrient solution. So make sure to have extras on hand to swap out when they do clog while you clean them. Also because the plants roots are hanging in mid air by design in aeroponic systems, the plants roots are much more vulnerable to drying out if there is any interruption in the watering cycle. Therefor, even any temporary power outage (for any reason) could cause your plants to die much more quickly than any other type of hydroponic system. Also there's a reduced margin for error with the nutrient levels in aeroponic systems, especially the true high pressure systems. What you'll need to build your own basic Aeroponic system: Container to hold the nutrient solution (a reservoir).Submersible fountain/pond pump.Tubing to distribute water from the reservoir pump to the mister heads in the growing chamber.Enclosed growing chamber for the root zone.Mister/sprinkler heads.Water tight container for the growing chamber where the plants root systems will be.Tubing to return the excess nutrient solution back to the reservoir. Timer (preferably a cycle timer) to turn on and off the pump. How the aeroponic system operates is a fairly easy concept. First the purpose of the roots hang in mid air is so they can get the maximum amount of oxygen that they can get. The high volume of oxygen the roots get allows the plans to grow faster than they would otherwise, and the main benefit to this type of hydroponic system. Second, there is typically very little if any growing media is used, exposing all the plants roots. The plants are suspended either by small baskets, or closed cell foam plugs that compress around the plants stem. These baskets or foam plugs fit in small holes at the top of the growing chamber. The roots hang down inside the growing chamber where they get sprayed with nutrient solution from mister heads at regular short cycles. The regular watering cycles keep the roots moist and from drying out, as well as provides the nutrients the plants need to grow. The growing chamber the roots are in should be light proof, and almost air tight. It does need to allow fresh air in so the roots can get plenty of oxygen, but you don't want water to spill out, or pests to get in. Also you want the root chamber to hold in humidity. Ultimately what you want is the roots to get plenty of moisture, fresh oxygen, and nutrients. A a well designed aeroponics system provides a good balance of all three of those elements to the roots at the same time. Lastly, a major factor in aeroponic systems is the water droplet size. Roots sprayed with a fine mist will grow much faster, bushier, and with more surface area to absorb nutrients and oxygen with than roots sprayed with small streams of water like from small sprinkler heads. That translates into the plant canopy growing more rapidly as well. Aeroponic system types are categorized by the water droplet size. There are three types of Aeroponic SystemsLow pressure Aeroponic Systems (soakaponics)Also termed "soakaponics" low pressure aeroponic systems are what most people are familiar with when they think of aeroponics. That's mainly because most all aeroponic systems sold at stores selling hydroponics supply's are low pressure systems. While the low pressure systems work very nicely, the large water droplet size is much different than in the high pressure systems. The main reason the low pressure aeroponic systems are so popular is that they don't require much more in the way of cost or special equipment than other types of hydroponic systems. The simplicity and low cost of low pressure systems makes this type of aeroponic system very attractive to many home growers. While you don't need any special equipment or a special water pump. The standard fountain/pond pumps will do just fine. You do however want a pump that's stronger than you would for any other type of hydroponic system. That's the main and most important difference. That's because the pressure in the system will drop some with each sprinkler head you add. Fountain and pond pumps don't give a psi (pressure) rating, but the more GPH (gallons per hour) it can put out closer to the "max head height" the stronger (more pressure) the pump has. You will want enough sprinkler heads that the spray overlaps, and completely covers the entire root zone. Even as the plants get bigger and the root mass gets bigger. As the root mass gets big, it's often hard for the spray from the sprinkler heads to penetrate the thick root mass. If you design your low pressure aeroponic system so the roots are sprayed from above the root mass or near the top of it, the water will trickle down through the root mass much better than trying to spray them from below. High pressure Aeroponic Systems (true aeroponic systems)While the low pressure systems are the most common, high pressure aeroponic systems are the "true aeroponic" systems. That's because it takes the higher pressure (60-90 psi) to properly atomize the water into a fine mist with a very small water droplet size. This fine mist allows the roots to get a lot more oxygen than in low pressure systems. However it's more complicated and expensive to build a high pressure aeroponic system. What you'll need to build your own true high pressure Aeroponic system:Accumulator tank (to act as the pressurized reservoir tank).Solenoid valve (to open and close the feed line to the mister heads).Cycle timer (to open and close the solenoid valve).Fine spray mister heads (to spray the roots with a fine mist).Small air compressor (to pressurize the accumulator tank).Enclosed growing chamber for the root zone. A collection reservoir to collect the runoff if you plan to recirculate the nutrient solution. While the basic design of the growing chamber and plant support can remain the same as with low pressure systems. The water (nutrient solution) delivery system is much different. Because of how often a pump would need to turn on and off (100's to 1,000's of times a day) it would ware out very quickly. So the water pump is eliminated in high pressure aeroponic systems. To do that they pressurize the reservoir. The easiest way to do that is by using an accumulator tank similar to the type used in RO (reverse osmosis) water systems. It's basically nothing more than a tank with a rubber divider/diaphragm in the center, creating two sides. Water (nutrient solutions) goes in one side, and compressed air goes in the other. The air is filled until the pressure reaches about 60 to 90 psi. That pressure pushes against the rubber diaphragm and pressurizes the reservoir side with the nutrient solution in it to the same psi. A water line runs from the reservoir to the mister heads in the enclosed growing chamber to mist the roots. A Solenoid valve is used to open and close the water flow through the line to the mister heads. The Solenoid valve open and close timing is controlled by a cycle timer. The cycle timer can open and close the Solenoid for as little as one second, to as long as the grower wants. Typically it's open/on for just a few seconds at a time, and off for only minutes before it sprays again. The cycle timer opens and closes the solenoid watering the plants roots with mist on this type of "on/off cycle" all day long.Ultrasonic foggersUltrasonic foggers have also been used to create a mist in aeroponic systems, however with mixed results. Ultrasonic foggers are most commonly used to create visual displays in ponds, as well as on stage. They are also often sold around halloween with the halloween decorations too. While they do create a mist with a very small water droplet size, there is very little actual moisture in the mist/fog. The mist created from ultrasonic foggers also tends to drop to the bottom of the container. Making it hard to make sure the roots are completely covered by the mist all the time. Another issue with using foggers is that the plates tend to clog with mineral build up. The only plates that have shown to work with any reliability are the more expensive Teflon heads. They can sometimes be cleaned using white vinegar, or water and pH down, and wiping them off with a Q-tip. Some growers have combined using ultrasonic foggers along with the low pressure aeroponic design in the same system. . See Our List of Free Build Your Own Hydroponic system Design Plans In today's article, we'll be taking a look at Aeroponics: A fairly complicated form of active hydroponics in which plant roots, held by a growing medium, are suspended in air above a nutrient solution reservoir and are misted at optimal time intervals for quick growth. Aeroponic Advantages: 1.) Smaller nutrient water droplets means faster absorption by plant roots and faster plant growth overall. 2.) Less water and energy usage than traditional gardening and most other hydroponic techniques. 3.) Inexpensive. 4.) Little to no maintenance required overtime Table of Contents: How Do Aeroponic Systems Work? The majority of hydroponic techniques function by supplying a steady stream of nutrient solution to plant roots. Aeroponic systems, on the other hand, suspend plant roots above a growing reservoir (or tank) where they are then sprayed or misted with nutrient solution at specific time intervals. This requires a certain level of automation and is why aeroponics is considered to be the most technologically advanced form of hydroponics. You see, there are three basic hydroponic techniques: 1.) Liquid Culture Hydroponics: A technique that implements an automated water pump and a reservoir tank to continuously provide plant roots liquid nutrient solution. Notice how the nutrient solution is re-used and continuously pumped to the plant roots. This system requires upkeep, mainly monitoring the pH levels of the nutrient solution and sometimes re-supplying the system with fresh nutrient solution. 2.) Solid Media Culture Hydroponics: A technique that uses a solid medium (like gravel or rock wool) to hold plant roots in place and provide ample air and nutrient solution. Keep in mind: The majority of hydroponic techniques use a solution tank and a pump. But because Aeroponic systems operate by misting plant roots, they don't require a large solution tank or an additional pump. In fact, they don't require much space at all and are ideal for small vegetables, herbs, and spices. The picture above is from my older Aerogarden Bounty model – a classic automated aeroponic system. You can see the large built-in pump placed in the middle which is used for providing ample air and nutrient solution to plant roots. Even older AeroGarden models – specifically the original 7 pod AeroGarden – used an aeroponic automated sprayer that targeted each individual plant pod. It seems that AeroGarden found this technique to be too wasteful or energy inefficient and instead went with a single pump and a single sprayer. Plant roots are suspended from these planting pods and placed into the unit: With aeroponics, the most important factor for plant growth and root development is the size of the average water droplet being delivered to plant roots. If the average droplet is too large, then not enough oxygen is being provided to plant roots. If the average droplet is too fine, then plant roots won't be provided the optimal amount of nutrients and may begin to wilt over time. Most functional aeroponic units dispense water droplets that are between 30 – 90 microns. Different Types of Aeroponic Systems For the purpose of this article, we're going to specifically focus on two different types of aeroponic systems: TechniqueTypeDifficulty Effectivenes 1. Aeroponic Grow UnitAeroponics1/1010/10 2. FogponicsAeroponics4/108/10 The first system on the left is the AeroGarden Farm, a fully automated aeroponic growing unit that can grow up to 24 plants at one time. We recently published a detailed Aerogarden review article in which we cover the differences between each Aerogarden model. For a quick recap, Aerogarden uses a nutrient solution reservoir – located towards the bottom of each unit – to spray the optimal amount of nutrient solution onto plant roots at very specific time intervals. Aerogarden grow kits streamline aeroponics in a highly efficient way – you pick out your grow pods, you supply the unit with Aerogarden's patented nutrient solution, you then use the LCD control panel to automate the rest. A quick look inside of the AeroGarden Bounty shows us just how well an automated aeroponics system can work. The roots are given ample space to grow, although, as you can see in the picture above, after just a few weeks plant roots can become seriously interwoven! This actually isn't a problem as the Aerogarden has sensors that can detect the amount of space plant roots are occupying and can adjust nutrient levels accordingly. Fogponics, on the other hand, is a relatively new – and not very well established – aeroponic growing technique. The main difference between established, automated aeroponic designs and fogponic designs is the nutrient solution delivery mechanism. Fogponic units literally use fog to feed plant roots! Advocates for Fogponics often point out that this highly diffuse mist – seen above – can provide an even finer source of nutrient solution than other aeroponic systems. Smaller droplets are absorbed faster, which means that plants can grow a little faster. A proper fogponics system will

provide plant roots with continuous nutrient solution mist that is between 5 – 40 micrometers per droplet. This means that Fogponic systems use considerably less water and energy than traditional hydroponic systems. Aeroponic systems are ideal for growing small plants but don’t expect to be growing any shrubs or trees with these units! DIY Aeroponic System Designs I want to make one thing very clear: Most of the D.I.Y aeroponic growing system instructions that you find online are absolute garbage. You have to remember that most active hydroponic designs are really difficult to build. One needs to have a certain level of engineering expertise to even try. In order for an Aeroponic system to function properly, it must: Deliver nutrient solution to plant roots at an optimal delivery rate.Use a liquid solution that is rich in vital nutrients required for plant growth. Calculate the rate of nutrient solution consumption by plant roots. Also, you have to keep in mind, if you’re wanting to grow a variety of different vegetables, herbs, and spices, then your aeroponic design must calculate the differing consumption rates by plant species. For example, most vegetables require more nutrient solution than most herbs. Monitor humidity levels within the growing reservoir. With that being said, there are a few designs that meet the criteria above, although it’s worth emphasizing that none of these D.I.Y designs will work as well as Aerogarden’s automated design.