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How to Make a Liquid Concentrate From DIEHARD™ HUMATE SP Soluble Humate Powder

One of the most common uses of DIEHARD™ HUMATE SP Humate is to mix it with water to form a solution that can then be applied to soil or plants through liquid systems. Although it is relatively easy to mix, there are a few important factors to consider when using the DIEHARD™ HUMATE SP HUMATE in this manner.

On average, the DIEHARD™ HUMATE SP HUMATE powder is 90% soluble in water, with the remainder being insoluble mineral content that will go into suspension when mixed with liquids. Once any agitation is stopped, the insoluble part will slowly begin to settle to the bottom of the mixing tank. Although the insoluble portion is very fine and will not clog nozzles, careful consideration should be given to the specifics of each application before adding DIEHARD™ HUMATE SP HUMATE directly into the final spray or irrigation tank. To avoid any possible issues with the sediment, it is recommended that the DIEHARD™ HUMATE SP HUMATE be mixed in a separate container from the final spray or irrigation tank and allowed to settle before it is placed into the spray or irrigation system.

The standard particle sizing of DIEHARD™ HUMATE SP HUMATE ranges between 50 and 150 microns, with a small portion of ultra-fine particles that are smaller than 50 microns. The smaller the particles, the longer it takes for them to settle out of suspension to the bottom of the tank. Although a majority of the insoluble material will settle within hours, the complete settlement process could take up to 30 days, depending on the concentration of powder being mixed into solution. The higher the concentration that is mixed, the thicker the solution will become, and the longer it will take for the ultra-fine particles to settle to the bottom of the tank.

For simplicity, all of the rates in the mixing chart at the bottom are based on the addition of powder to full gallons of water. For example, if you wanted to make 50 gallons of 6% concentrate, you would fill the tank to 50 gallons and then add 0.710 pounds of DIEHARD™ HUMATE SP HUMATE per gallon (35.5 pounds total) into the tank. The addition of DIEHARD™ HUMATE SP HUMATE will cause the total volume in the tank to increase slightly beyond 50 gallons, but the concentration will be correct. If using a non-closed mixing system, be sure to leave at least ¼ of the mixing tank's full capacity for the addition of the powder and the ability to mix it without splashing.

When mixing, any type of container will work but some type of agitation must be used. The better the agitation, the more rapid the powder will mix into solution. We suggest using room temperature water, as the DIEHARD™ HUMATE SP HUMATE will dissolve more slowly in very cold water. Always add the desired amount of water to the tank first and begin full agitation before adding any DIEHARD™ HUMATE SP HUMATE.



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If you will be manually adding the powder into a mixing tank, slowly add the DIEHARD™ HUMATE SP HUMATE into the tank, ensuring it is being pulled into solution as quickly as you are pouring it into the tank. Do not dump the powder into the tank all at once or clumps could form that will require manually breaking them up to get them to dissolve! If the powder begins to settle on top, pause adding more powder until the top of the tank is all liquid again. Once all of the powder is added, continue agitation until the solution appears uniform. The exact time required will vary greatly based on the type and strength of agitation as well as the concentration being made. The higher the concentration, the longer it will take to fully dissolve the powder.

The most effective method for making a liquid from DIEHARD™ HUMATE SP HUMATE is to use a Venturi system in conjunction with a recirculating transfer pump (pacer pump). To do this, simply connect the transfer pump (usually rated at 50 to 200 gallons per minute) to the outlet port of any holding tank and connect the output hosing from the pump to an inlet port on the same holding tank (usually near the top). If the holding tank does not have an inlet port, it is safer to create one rather than to try and hold the out put hose inside the top lid of the tank. Take a Venturi (available in most farm or irrigation supply stores) and connect it to the suction side of the transfer pump. A Venturi has a port opening that creates a pressure differential and as the liquid is pulled through the Venturi by the transfer pump, the pressure differential will pull any material added through the port and forcefully mix the material with the liquid from the holding tank. It may be necessary to add some sort of hopper or funnel that connects into the Venturi port opening so that a large enough volume of powder can be added at one time. We recommend a one cubic foot size hopper, which will hold approximately one 55-pound box of DIEHARD™ HUMATE SP HUMATE at a time. One the pump begins to circulate the liquid in the holding tank, the pressure will begin to suck the powder into solution and within minutes a complete 55-pound box of DIEHARD™ HUMATE SP HUMATE can be fully incorporated into solution.

When mixing the DIEHARD™ HUMATE SP HUMATE with any method, it is important to minimize the introduction of air into the system, or excessive foaming could occur. If using a form of paddle agitation, make sure the paddle(s) are turning as low in the tank as possible and that the water level is well above the top of the paddle blades. If using pump agitation, remove any inline filters and be sure that both the suction and return lines are fully submerged at all times or foaming may occur. It is best to have the suction line located on the bottom of the tank or as low on the side of the tank as possible. Use an appropriate pump for the size tank you are using. Generally, a pump that will circulate the entire tank every 2-5 minutes will work well. Do not attempt to use an air pump to bubble circulate the tank or excessive foaming will occur!



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Once the solution is mixed, stop the agitation and allow the product to settle (if desired). If you do not intend to allow the insoluble part to settle, we recommend that you completely use all of the finished solution you intend to spray or irrigate with so that there is nothing left in the final spray or irrigation tank to settle out. If the liquid mixing tank is left to settle, allow sufficient time for the insoluble portion to fall to the bottom of the tank (at least overnight). Then pump the liquid out from the top of the mixing tank to prevent sucking the sediment up from the bottom of the mixing tank. Once the liquid is removed down to the sediment level, clean and wash the mixing tank before making a new batch of liquid. The sediment material is excellent for mixing with composts or potting mixes and should not be considered waste!

Desired humic acid concentration	Amount of DIEHARD™ HUMATE SP HUMATE to add to each full gallon of water	Approximate time required for COMPLETE settlement
0.005%	0.25 grams	Almost no sediment by volume. Can often be mixed directly in spray or irrigation tank.
0.01%	0.50 grams	
0.1%	5.00 grams	
1%	0.112 pounds	Allow to settle overnight. For completely clean solution allow to settle for 1 to 2 days.
2%	0.226 pounds	
3%	0.343 pounds	
4%	0.462 pounds	Allow to settle overnight. For completely clean solution allow to settle for 3-7 days.
5%	0.585 pounds	
6%	0.710 pounds	
7%	0.839 pounds	Allow to settle for 2 days. For completely clean solution, allow to settle for 2 weeks.
8%	0.971 pounds	
9%	1.107 pounds	
10%	1.246 pounds	Allow to settle for 3 to 7 days. For completely clean solution, allow to settle for 30 days.
11%	1.388 pounds	
12%	1.535 pounds	