

## Tips for Successful Watering

### FIRST WATERING OF THE DAY

For growing outside, start watering at sunrise when the first light shines on the plant. For growing indoors, start watering when you turn on the lights. Saturate the GRO-BLOCK/GRO-SLAB fully to achieve a considerable amount of drainage. This way the old depleted plant food is flushed out. If you water less than daily, then flush each time you water.

### WHEN TO STOP WATERING

Stop watering two-three hours before sunset or before turning the lights off. Keeping Grodan drier at night helps prevent root problems and also produce a more generative plant (better blooming, better setting of fruits).

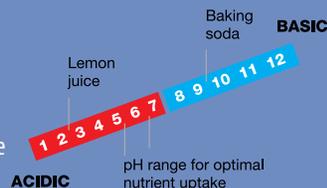
### AVOIDING PITFALLS

- Avoid drastic changes to the plants environment because such changes can shock or stress the plants. Instead, make gradual changes to variables such as nutrient solution formulations, lighting period/intensity or temperature.
- Be sure to water the blocks well, and monitor the EC and pH of the solution in the block frequently. This is even more crucial for non-top irrigation applications such as Ebb and Flood systems. The best way to retrieve solution samples from stone wool is with a plastic syringe, available at your local authorized Grodan supplier.
- As a general rule, it is not necessary to water newly transplanted Grodan GRO-BLOCK for the first few days.
- Always use pH adjusted water with plant food.
- Never let the Grodan go bone dry.
- When there's no light, don't water - the plants are resting.
- Make sure that the GRO-SLAB or GRO-BLOCK can drain freely, avoiding situations where stone wool is sitting in standing water.
- Consider preventative spraying with an OMRI insecticide soap on a regular basis. It is much easier to prevent problems today than to wait and treat an infestation down the road.

## Basic Concepts of E.C., PPM and pH Levels

E.C. (Electrical Conductivity)		APPROX. PPM
0.5-1.5	PROPAGATION	250-750
1.5-2.0	MATURE PLANT STARVING	750-1,000
2.0-3.6	OPTIMAL	1,000-1,800
3.6-5.0	TOO MUCH	1,800-2,500
5.0 PLUS	PLANT DAMAGE	2,500 PLUS

As propagated plants grow into larger GRO-BLOCKS, they will often experience a period of rapid growth. The resulting growth often causes an increase in pH and EC or what is sometimes measured in PPM. Check reservoir often and adjust accordingly.



For a flower-only plant, you can use a lower nutrient strength (around 1200-1400 ppm) for a mature plant. This produces larger flowers because they are water-filled. Higher nutrient levels produce smaller flowers but better quality.

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# WATER

## Watering and pH Conditioning



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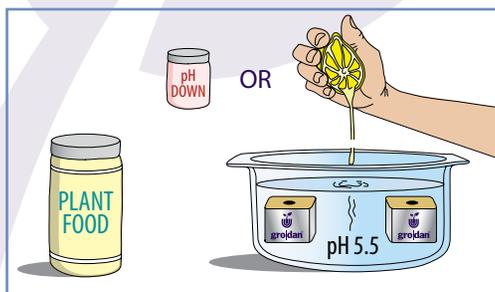
## Grodan Stone Wool - pH Neutral

When stone wool is initially soaked, a spike in pH occurs because of the residual lime crust on the fibers. This has caused some to assume that Grodan is alkaline and that one must continuously adjust the pH inside the wool, but it is simply not true.

### How to pH Condition (Watch video on our Website)

1. Saturate stone wool in no lower than pH 5.5 water for about 30 minutes. Conditioning Grodan products lower than pH 5 may damage the stone wool fibers. To be safe, DO NOT go below pH 5.5. Remember, optimum plant growth occurs between pH 5.5 - 6.5.
2. Flush the stonewool with nutrient solution also at pH 5.5 just before planting or sowing. Allow product to drain to waste.
3. Place the unit in your system and you are ready to grow.

To lower the pH naturally, add the juice from half a lemon to one gallon of water. This will lower the pH by one point, for example from pH 7 to pH 6.



### Why Does pH Change in the Stock Tank?

- When the plant grows the pH increases because of the root activity involving nutrient uptake. So when pH goes up, it is a good sign. It means the plant is actively growing.
- With most plants during the fruit and flower setting, the pH will briefly drop in the reservoir, signifying it is time to change to a bloom solution.
- Routinely check the pH in the stock tank to make sure it stays within the correct range.

## Quick and Easy Watering Guidelines

Product	Plant Age	Ebb and Flood System	Drip/Top Irrigation	Outdoor Hand Watering
GRO-BLOCKS	Young plants Older plants	Only when block is half dry 1-2 times per day	Once per day 2-6 times per day	Once per day till you see drain water Time to pot up into a container
HUGO	Young plants Older plants	Mist daily. Flood only when half dry 1-2 times day	Once per day 2-6 times per day	Once every 2-3 days 1-3 times per day
GRO-SLABS	Young plants Older plants	Once every 3-5 days 1-3 times per day	Once per day 2-6 times per day	N/A N/A
Granulate or GROW-CUBES	For indoors, choose GROW-CUBES as they are less likely to be over-watered. For outdoors, choose GRO-WOOL as it will stay wetter longer. In 5 gallon container of Granulate, water young plants weekly and older plants every 3 days.			

### IMPORTANT - AVOID THIS COMMON MISTAKE WITH YOUNG PLANTS:

**Be careful to not keep plugs and blocks too wet when you are rooting in a young plant because at this stage 75% of the lifetime root mass (number of root hairs) are formed. If the block is too wet, the plant cannot produce the root mass it needs later for a good result. A simple guideline is to ONLY water young plants when the plug/block feels halfway dry.**

### How Much Should One Water?

Determining how much to water depends on many factors such as light intensity, heat and/or humidity, plant size and type, and type of system being used.

**Generally, it is better to water Grodan stone wool less not more.**

- When plants are growing under strong light with top irrigation, plants require less volume, but more frequent watering cycles. Water at 15% of the stone wool volume per plant with frequent watering.
- When plants are growing under lower light, plants prefer greater volume, but less frequency of watering. For these, water at 65% of the stone wool volume per plant with much less frequent watering.

Of course, in an ebb and flood system the only choice is to use 100% water volume each time the system is flooded.

*If you want a more active plant, less water is better. Too much water causes plants to get lazy and weak, producing less roots. Think about how sluggish you would feel if you ate three full courses of food at every meal!*

### Kick the Bucket Method

The easiest way to determine if container plants (in Grodan) need water is to simply kick the container slightly. If the pot moves, it's time to water!

### How Much Water Does HUGO Need?

The stone wool volume of Hugo is 3.2 L. /108.2 oz. per block.

- If the plant is growing under 1000 watt light (or direct sun), plan to water 0.48 L (16.23 oz.) each time you water (15% of block volume).
- If the plant is growing under 400 watt or lower light, plan to water 2.8 L (70.3 oz.) each time (65% of block volume).

To access Grodan recommendations on how much to water other specific Grodan products in various systems, visit [grodan101.com](http://grodan101.com).

### How to Measure When to Water

When using top irrigation, there is a way to determine whether to add an extra watering cycle during the day. Right after the last cycle of the day, use a syringe to extract a water sample from the block. Test the sample, and if the pH or EC is too high, add an extra cycle the next day.