



Tomato user advice for slab type Prestige 7.5 cm

Grodan Services & Solutions
V1



The 6 phases



Phase 01a

Pre-rooting beside the plant hole



Phase 01b

Planting and rooting in



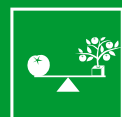
Phase 02

Rooting through and plant development



Phase 03

Growth and balance



Phase 04

Production and balance



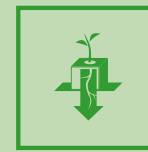
Phase 05

Maximum production



Phase 06

Final production



Phase 01a

Pre-rooting beside the plant hole

Objective phase

Continue the uniform development of a strong generative plant with good formation of the first and second clusters.

Target crop

Plants should continue to exhibit uniform growth following delivery from the propagator.

Target root zone

A successful start for the plant is determined by good root development which should remain confined to the block. Attention should be given to developing as many pin roots as possible to enable fast rooting in as soon as slab contact is required.

Pre-rooting beside the plant hole

Standing plants on the side of the plant hole focuses strength into the first and second clusters and keeps the correct generative balance in the crop. Just like in propagation, each irrigation you provide will result in a vegetative plant reaction. Therefore while the plants are stood beside the plant hole limit the number of irrigation sessions by steering on block WC%. It is best to let the block dry down to 40 - 45% before re-saturating it back to 80% (see reference table). Here you will realize the benefit of the slow uniform dry down from the Plantop blocks giving you the extra possibilities in generative steering.

We are often asked when is the right time to transfer the block onto the slab? The simple answer is when the irrigation frequency (vegetative action) is leading and you are no longer 'steering' the plant! Of course this will be dependent on block size and the number of heads per block. Larger blocks 10 x 15 cm with one plant (2 heads) will offer longer generative control possibilities compared to 10 x 10 cm with two plants (4 heads).

Cutting the drain holes

You have two options for cutting the drain holes
Option 1

Pre-draining the slab by puncturing the plastic wrapper with a small hole just above the seam will create a small reservoir of water at a uniform height in each slab throughout the greenhouse. This layer of water ensures that the propagation block will remain sufficiently & uniformly wet so in the first 48 hrs after planting (even if you have previously stood the plants beside the plant hole) only 1 or at most 2 irrigation sessions will be required to stimulate root penetration into the slab (applies to Plantop only). Watch the video below on how to do this correctly.

Stop irrigating from the moment the plant is rooted 2 - 3 cm into the underlying slab & until the final drainage hole is cut which will be after 4 - 7 days. Ideally the final drain hole should be made by cutting along the length of the plastic seam with scissors or by cutting one hole on the side of the slab at its lowest point.

You will find it easier to cut the drain hole while there is still excess water in the bottom of the slab pushing the side-walls of the plastic foil outwards.



Scan the QR code to view a short video on how to do this correctly.



Option 2

If you wish to cut the drain holes directly first drain excess water from the slab by making a small puncture just below the seam. Return to the slab once it is drained. Ideally the final drain hole should be made by cutting along the length of the plastic seam with scissors or by cutting one hole on the side of the slab at its lowest point. Watch the video below on how to do this correctly.



Scan the QR code to view a short video on how to do this correctly.

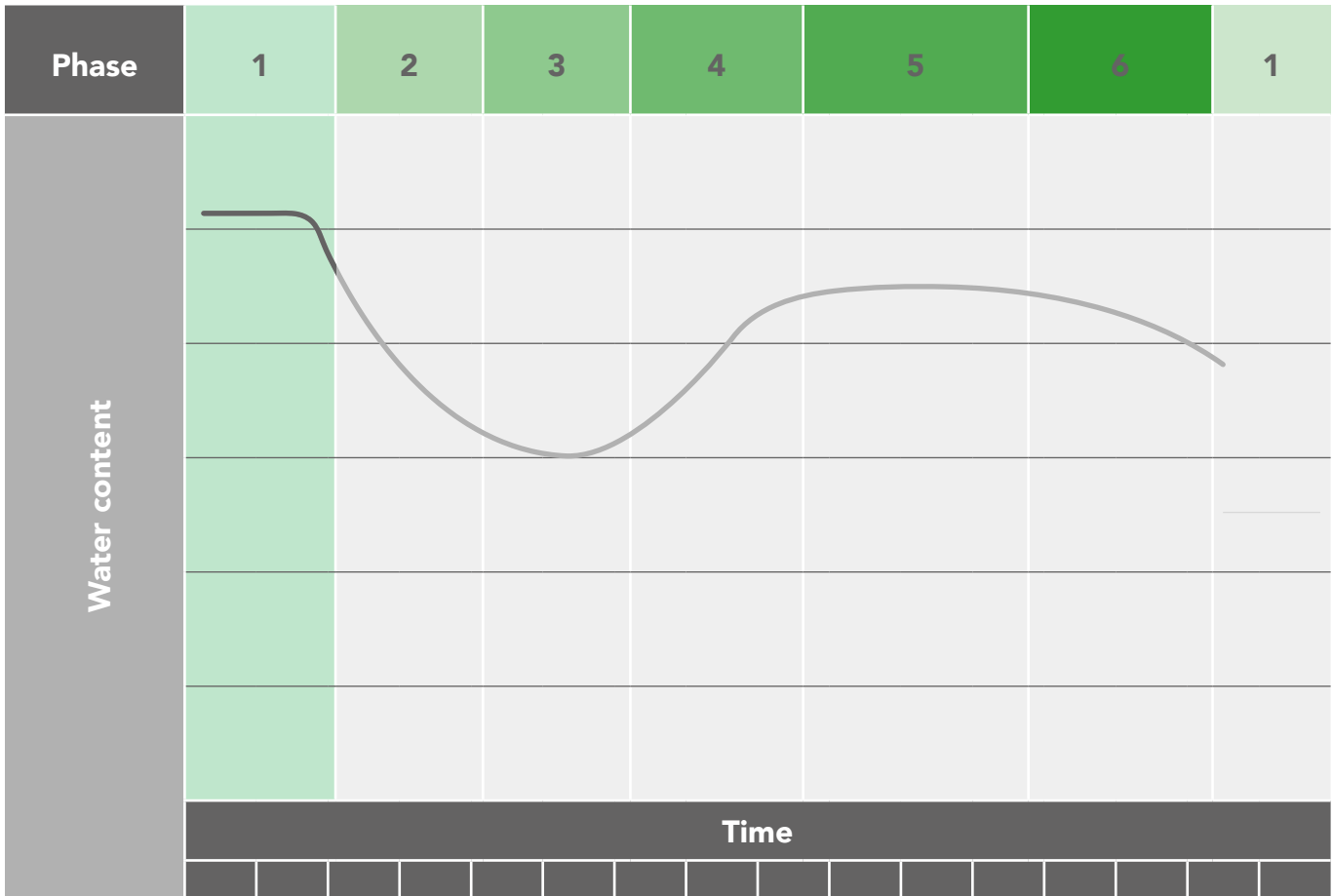


Scan the QR code to view a short video on how to do this correctly.



Start of phase

Plants arrive into greenhouse.



End of phase

Rooting in

Precision Growing

irrigation advice

	Phase 1a	Phase 1b	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6
	Bright day Vegetative steering			Dark day Generative steering			
Start time	+2.0 hrs after sunrise. If using block weight <300g 10 x 10 cm <350g 10 x 15 cm			+3.0 hrs after sunrise. If using block weight <270g 10 x 10 cm <300g 10 x 15 cm			
Stop time	-2.0 hrs before sunset			-3.0 - 4.0 hrs before sunset			
Target day level WC	Delay irrigation until block WC 40 - 45%			Delay irrigation until block WC 40 - 45%			
Target decrease WC overnight	Maximum 20% block WC%			Maximum 20% block WC%			
Moment 1st drain	Not applicable			Not applicable			
EC drip	3.5 - 4.0 mS/cm			3.5 - 4.5 mS/cm			
EC block	5.0 - 8.0 mS/cm			5.0 - 11.0 mS/cm			
24 hr drain	10 - 40%			0 - 20%			
Irrigation volume	2 - 4 irrigations 75 - 100 ml per 10 x 10 cm 100 - 150 ml per 10 x 15 cm			1 - 2 irrigations 100 - 200 ml per 10 x 10 cm 150 - 250 ml per 10 x 15 cm			
ml/joule	Not applicable			Not applicable			
Night irrigation	Block WC% decrease >20%			Block WC% decrease >20%			

Points of special interest

In propagation the Plantop block was typically irrigated when the block WC% reached 40%. The ebb-flood system raising it easily back to 80%. Between the irrigation moments the EC typically rising from 4.0 to 11.0 mS/cm. This procoess of controlled irrigaiton facilitated maximum generative plant developoment. This same approach should continue whilst the plants are stood beside the plant hole. For guidance on when to irrigate you can use the GroSens system. Simply remove the metal plate and insert the GroSens sensor into the block. Optimising the irrigation strategy at this stage will encourage more ‘pin roots’ to develop within the block. It will also ensure the plants continue to grow in a controlled, uniform way thus stimulating the development of strong flowers. Remember having a uniform and slow decrease in WC% between irrigation sessions whilst standing the plant besides the plant hole allows you to lower the frequency of irrigation, thereby increasing your ability to steer the crop in a generative direction.



Phase 01b

Planting and rooting in

Objective phase

Fast and uniform rooting in, so that the roots are penetrating the growing media in line with the plant size.

Target crop

Uniform growth should continue and the leaf area should increase to enable the plant to intercept as much radiation as possible. Truss development should remain strong and generative with good flower and pollen formation.

Target root zone

The pin roots should grow easily out of the block and uniformly into the substrate. It is important to supply enough water and nutrition to the blocks until the plant can rely on the available water in the slab.

Managing the root zone through planting and rooting in

If you’ve have been or are still steering beside the plant hole, when is it time to plant? The answer is simple when the rapidly drying block due to increasing plant size leading the irrigation strategy and you are no longer control. Remember every irrigation results in a vegetative plant reaction. Keep this general rule in mind. If irrigation is given too frequently >5 sessions or >400 ml per day (10 X 10 cm) - 400 - 500 ml per day (10 X 15 cm) the vegetative effect of irrigation will be leading crop development.

Other factors to consider are stage of flowering i.e. 2nd cluster flowering? The variation in measured WC% between blocks measured by GroSens (Sdev> 8) and finally the quantity of roots at the bottom of the block. If the root mass is too large it will hinder rooting in. During phase 1a when the blocks were next to the planting hole and during the rooting in phase (1b), the GroSens Sensor can be placed in the plant block. Watch the video below on how to do this correctly.

An unequal WC% between the propagation blocks should be ‘levelled’ before planting by giving a few small (50 - 150 ml) irrigations until the blocks begin to drain. The pool of water on the slab in which the block is standing will ensure (almost) complete re-saturation of the block. Give one to a two irrigations shortly after planting. This will ensure good contact between the block and the slab.

Cutting the drain holes

You have two options for cutting the drain holes
Option 1

Pre-draining the slab by puncturing the plastic wrapper with a small hole just above the seam will create a small reservoir of water at a uniform height in each slab throughout the greenhouse. This layer of water ensures that the propagation block will remain sufficiently and uniformly wet so in the first 48 hrs after planting (even if you have previously stood the plants beside the plant hole) only 1 or at most 2 irrigation sessions will be required to stimulate root penetration into the slab (applies to Plantop blocks only). Watch the video below on how to do this correctly

This way of cutting the drain holes is the preferred choice for 10 cm high slabs.

Stop irrigating from the moment the plant is rooted 2 - 3 cm into the underlying slab and until the final drain hole is cut, which will be after 4 - 7 days. Ideally the final drain hole can be made by cutting along the width of the plastic seam with scissors or by cutting one hole on the side of the slab at its lowest point.

It will find it easier to cut the drain hole while there is still excess water in the bottom of the slab effectively pushing on the side-walls of the plastic foil.



Scan the QR code to view a short video on how to do this correctly.



Option 2

If you wish to cut the drain holes directly, first drain the excess water from the slab by making a small puncture just below the plastic seam. Return to the slab once it is drained and cut one drain hole per slab, at the end of the slab or ideally by cutting along the seam across the width of the slab. Watch the video below on how to do this correctly.



Scan the QR code to view a short video on how to do this correctly.

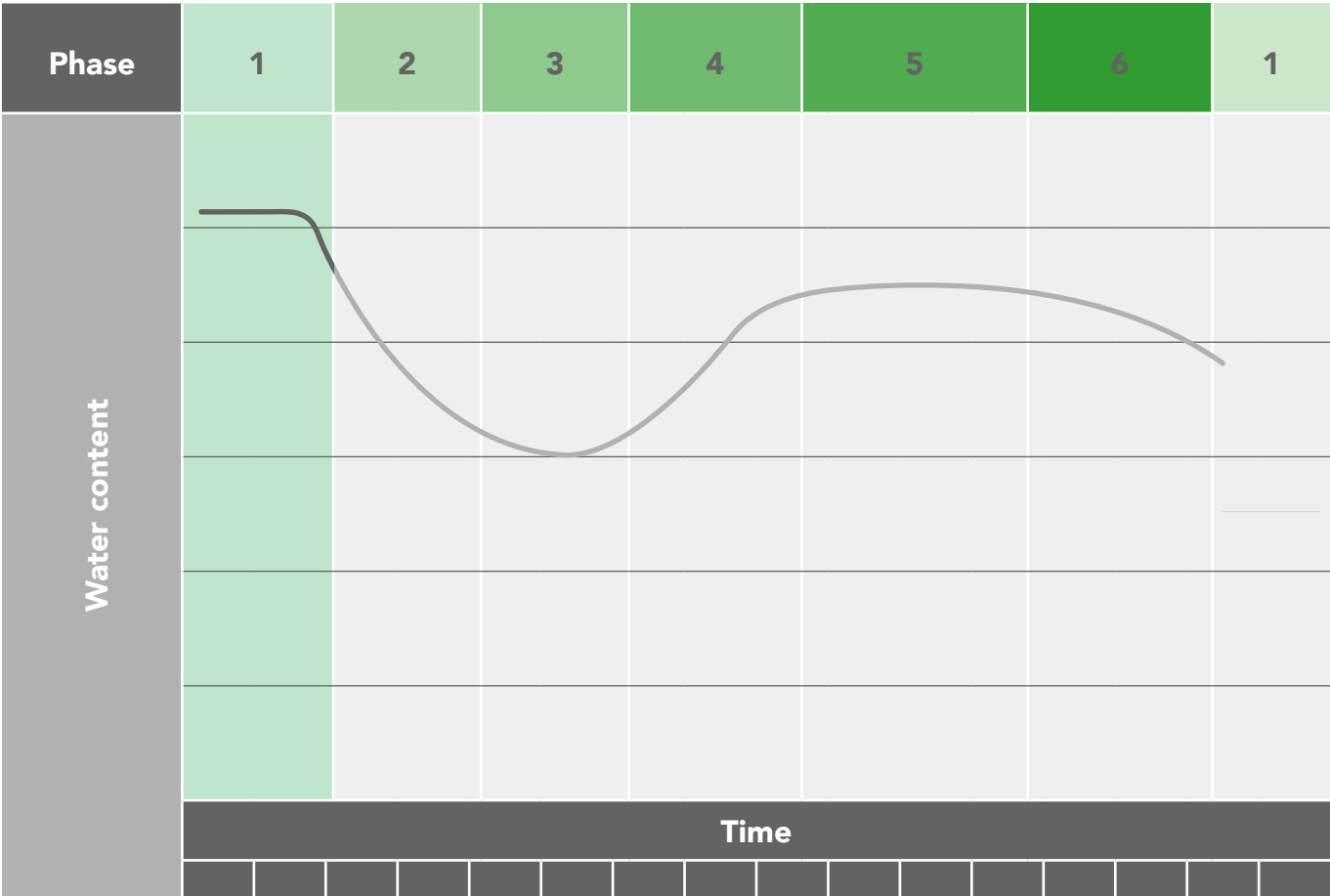


Scan the QR code to view a short video on how to do this correctly.



Start of phase

Rooting in.



End of phase

Roots have penetrated substrate by several centimeters

Precision Growing

irrigation advice

	Phase 1a	Phase 1b	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6
	Bright day Vegetative steering			Dark day Generative steering			
Start time	+2.0 hrs after sunrise			+3.0 hrs after sunrise			
Stop time	-2.0 - 3.0 hrs before sunset			-3.0 - 4.0 hrs before sunset			
Target day level WC	Slab >75% Block >50%			Slab >75% Block >50%			
Target decrease WC overnight	Not applicable			Not applicable			
Moment 1st drain	Not applicable			Not applicable			
EC drip	3.5 - 4.0 mS/cm			3.5 - 4.0 mS/cm			
EC slab	Block: 5.0 - 8.0 mS/cm Slab: 3.0 - 3.5 mS/cm			Block: 5.0 - 11.0 mS/cm Slab: 3.0 - 3.5 mS/cm			
24 hr drain	Not applicable			Not applicable			
Irrigation volume	200 - 250 ml/m²			250 - 400 ml/m²			
ml/joule	Not applicable			Not applicable			
Night irrigation	If used in line with techniques of ‘the new way of growing’ (HNT). These should cease by second flowering cluster			If used in line with techniques of ‘the new way of growing’ (HNT). These should cease by second flowering cluster			

Points of special interest

Before planting, it is essential to fully saturate all the slabs with nutrient solution for at least 24 hours before the drain hole is cut. This ensures that even the fine pore spaces between the NG2.0 fibres are filled with water. There are two ways to cut the drain hole. Watch the video below on how to do this correctly. Prestige 7.5 cm is designed to promote generative plant development providing maximum synergy between root zone and climate strategies. In order to facilitate maximum generative - vegetative steering of WC% and EC in the root zone throughout the duration of the cultivation you are advised to cut one drain hole per slab. Remember with Prestige 7.5 cm it is perfectly safe to recycle the drain water from the moment the drain holes are cut. This will help reduce unwanted emission of fertilizer to the environment.



Phase 02

Rooting through and plant development

Objective phase

Continuation of uniform and controlled plant development and the realisation of a root system that fills the entire volume of the growing media.

Target crop

Work on plant development and increasing the leaf area to capture the available radiation and keep the required vegetative – generative balance in the plant relative to the fruit load and light levels.

Target root zone

Establish complete root penetration in the entire volume of the growing media. This will enable the plant to take up all the water and nutrition it will need for maximum summer production and quality.



Managing the root zone during rooting through and plant development

The crop is now rooted into the slab so ensure your GroSens sensor is positioned in the slab correctly. Watch the video below on how to do this correctly.

Moving forwards, until cluster 7 or 8 is flowering the required minimum decrease in WC% overnight can be determined by the following rule-of-thumb: the number of the flowering cluster plus 2%. So if you're flowering on cluster 4 + 2% = 6% minimum decrease in WC% overnight. If the decrease is less than this please look to your start or stop times of irrigation and cross check these with the advised values in the reference table.

Although the shortest day of the year is just behind us the daily radiation sums are still low. On brighter days you will need to give enough water for growth. Please remember, in this phase there is a distinct difference between controlled generative growth and the creation of a weak crop, which you interpret as generative.

In the coming weeks you will clearly experience the superior functional performance of Grodan growing media with respect to EC control. The generative balance in the crop should be maintained by late start & early stop times and by steering toward a stable but structurally high substrate EC. To ensure EC stability in combination with a short irrigation day ensure the irrigation session size is 4.0 - 4.5% (ml/m²) of the substrate volume (l/m²). Again your GroSens system is the perfect tool to monitor how substrate EC is developing day to day.

To get an appreciation of the uniformity of WC% and EC between the slabs the GroSens handheld system or the Reader with a GroSens sensor in 'kit mode' is a perfect tool. Watch the video below on how to do this correctly.



Scan the QR code to view a short video on how to do this correctly.

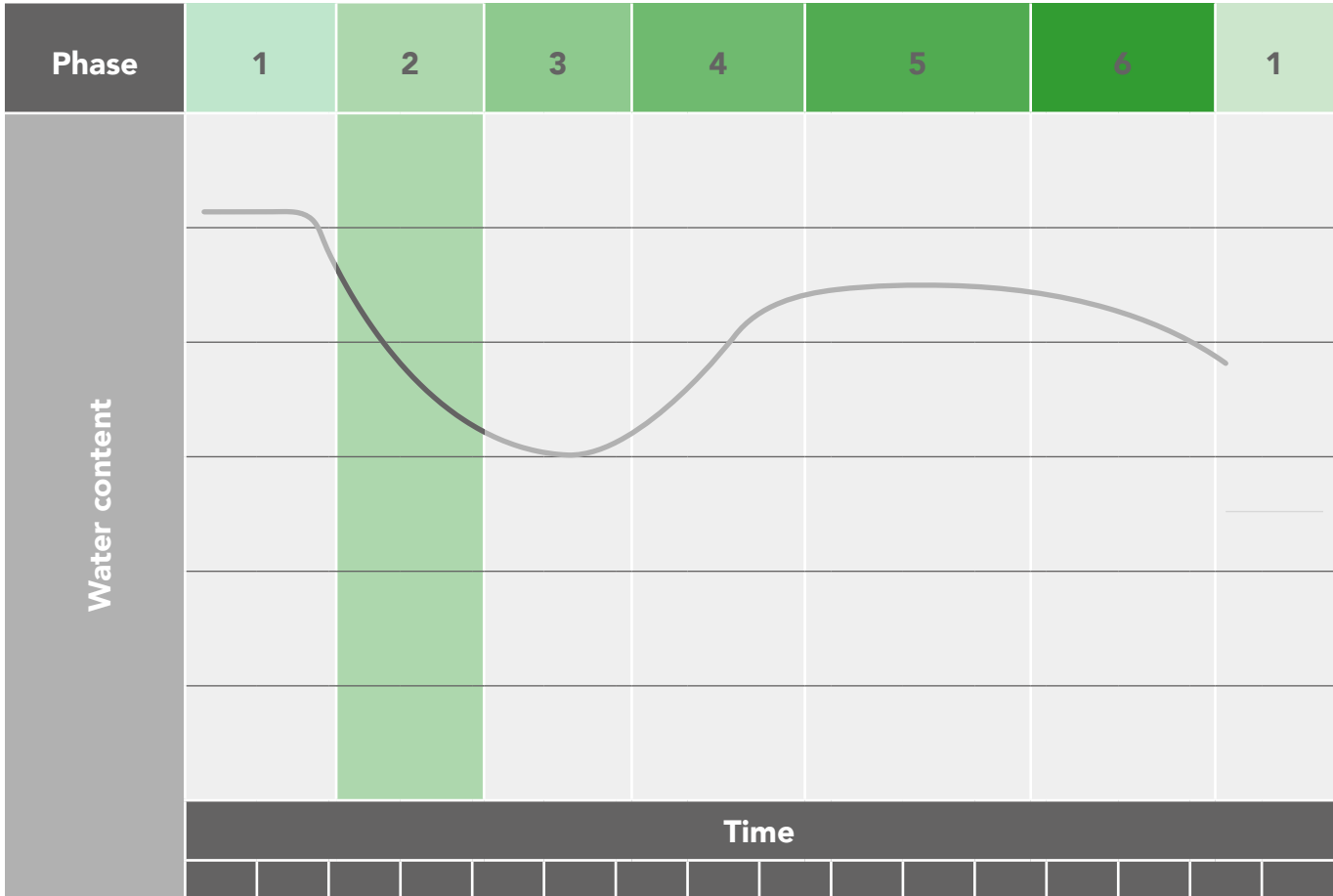


Scan the QR code to view a short video on how to do this correctly.



Start of phase

Roots have penetrated substrate by several centimeters.



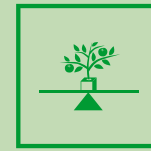
End of phase
4th truss is flowering

Precision Growing irrigation advice

	Phase 1a	Phase 1b	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6
	Bright day Vegetative steering			Dark day Generative steering			
Start time	+2.0 hrs after sunrise			+3.0 hrs after sunrise			
Stop time	-2.0 hrs before sunset			-3.0 - 4.0 hrs before sunset			
Target day level WC	60%			55 - 60%			
Target decrease WC overnight	6 - 8%			8 - 10%			
Moment 1st drain	Before 12.00 hrs			After 12.00 hrs			
EC drip	3.5 - 4.0 mS/cm			3.8 - 4.2 mS/cm			
EC slab	5.0 - 7.0 mS/cm			6.0 - 9.0 mS/cm			
24 hr drain	15 - 25%			0 - 20%			
Irrigation volume	Start of phase: 250 - 350 ml/m² End of phase: 300 - 400 ml/m²			Start of phase: 250 - 400 ml/m² End of phase: 350 - 500 ml/m²			
ml/joule	Not applicable			Not applicable			
Night irrigation	No			No			

Points of special interest

The concept of Precision Growing combines variety, climate and irrigation strategies in an optimal way. In Phase 2 work on gradually reducing the day level WC% and increasing the growing media EC until the 4th cluster is in flower. The uniformity of WC% and EC over the height of the growing media while steering towards a low WC% in this phase is attributed to NG2.0 fibre technology. This strategy will further enhance root penetration throughout the entire volume of the growing media. Importantly towards the end of this phase you will require minimal irrigation volumes to stabilize and refresh the EC. Consequently “flushing” the growing media is not required, thereby you are able to facilitate maximum generative steering.



Phase 03

Growth and balance

Objective phase

Avoid shocks in development by retaining the right balance in fruit load and growing power in the plant to ensure optimum cluster development. The combination of harvest of the first fruits and new fruit setting (as fruit load continues to increase) must be in line with assimilates supply which is variable and strongly depending on the weather.

Target crop

Growth should remain constant and uniform. The 24 hrs temperature should be adjusted to the light levels to ensure optimum partitioning of available assimilates for plant and fruit growth.

Target root zone

Root quality and activity should be retained to ensure controlled and uniform re-growth of the crop from the harvest of the first clusters. The decrease of WC% during the night will provide a good indication for the level of plant activity during the day.



Managing the root zone through growth and balance

The fourth or fifth cluster is now flowering. Fruit on the first and second clusters is increasing in size and irrigation is now required to level EC and raise the WC% of the growing media. But do not think that control over EC comes with “flushing” the slabs. This will result in a very vegetative crop reaction, especially with the extensive use of the climate screen.

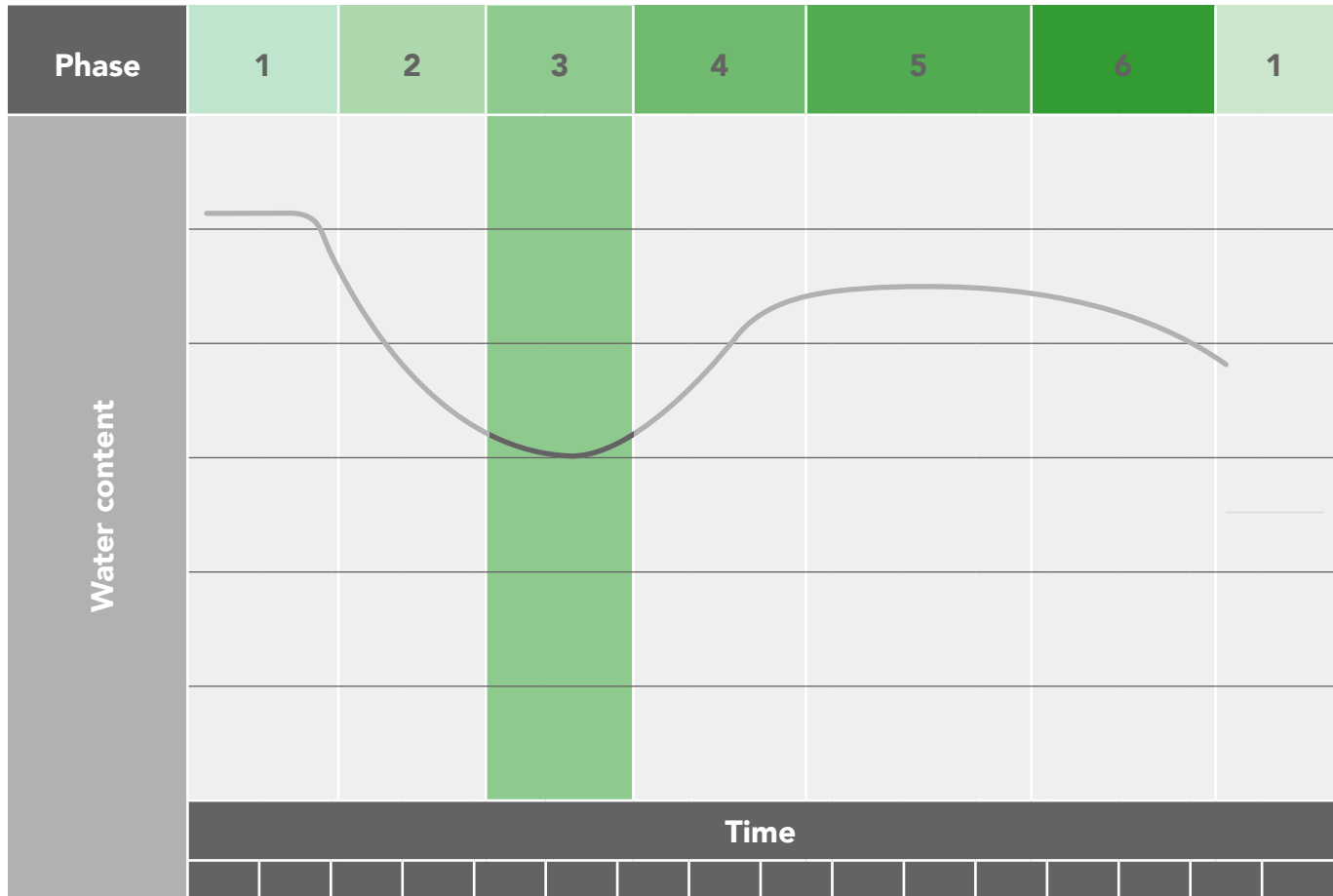
Now is the time to ensure that your irrigation strategy is set up on the basis of the astronomical clock and radiation sum. The first irrigation should be given 80 - 100 J/cm2 or no later than 3 hrs after sunrise. On darker days if the radiation sum is not met start with large irrigation volumes (4 - 6% of the growing media volume) aiming to realize drain about 2.5 - 3.0 hrs after the first irrigation. Large irrigation volumes during this period will also help limit the degree to which the maximum day level WC% is raised.

Set up the strategy so that the decrease in WC% overnight after a dark day is at least the same but preferably greater (i.e. 12%) than the decrease after a sunny day (i.e. 10%). irrigating too long on the dark days will create strong vegetative crops, stopping too soon on the sunny days will create weak generative crops.

Use the sunny days to refresh the nutrient solution in the slab. Do not lower the irrigation EC to lower the slab EC. Instead realize some extra drain.

Start of phase

4th truss is flowering.



End of phase

After first harvest

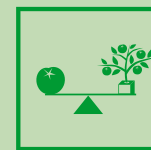
Precision Growing

irrigation advice

	Phase 1a	Phase 1b	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6
	Bright day Vegetative steering				Dark day Generative steering		
Start time	+1.0 - 2.0 hrs after sunrise 60 - 100 J/cm² or 150 W/m²				+3.0 - 4.0 hrs after sunrise. When WC% falls 1.5 - 2.0% from sunrise		
Stop time	-1.0 - 2.0 hrs before sunset. Ideally leaving or 100 - 180 J/cm² and a light intensity threshold 200 - 250 W/m² to sunset				-3.0 - 4.0 hrs before sunset		
Target day level WC	60% and increasing with light				55% and increasing with light		
Target decrease WC overnight	8%				8 - 10%		
Moment 1st drain	400 J/cm² or 600 W/m²				Less than 4 irrigations		
EC drip	3.0 - 3.3 mS/cm				3.5 - 3.8 mS/cm		
EC slab	4.0 - 5.0 mS/cm				4.5 - 5.5 mS/cm		
24 hr drain	20 - 30%				10 - 20%		
Irrigation volume	300 - 400 ml/m²				350 - 450 ml/m²		
ml/joule	Not applicable				Not applicable		
Night irrigation	Only if additional vegetative steering is required				No		

Points of special interest

The growth of new roots and root tips should be encouraged by adjusting the start and stop times of irrigation, especially on darker days. The irrigation and slab EC's are important steering tools to maintain plant balance and fruit quality in this phase. The NG2.0 technology allows the irrigation EC to be maintained sufficiently high while the slab EC remains stable with minimal drain volumes. This makes it possible to start irrigation later and stop earlier especially on the darker days. Importantly it means that you do not have to "chase" the EC of the growing media by applying additional irrigation water and creating unnecessary and unwanted vegetative crop development.



Phase 04

Production and balance

Objective phase

Realise controlled and uniform re-growth of the crop following the first harvests.

Target crop

Prepare the crop for summer creating the right balance as the plant load and production continue to increase.

Target root zone

To support increasing transpiration levels the root zone environment needs to be prepared. The recommended WC% and EC levels for late spring and summer should now be realised.

Managing the root zone through production and balance

First harvests have now been taken and solar radiation is increasing rapidly towards the longest day.

From now on the irrigation strategy can become more structured. Remember there are 4 key irrigation stages during the day:

- Period 1:** Start time after sunrise - on Joules for a sunny day or delayed on (max rest) time for a dark day.
- Period 2:** Moment of drain & EC reduction
- Period 3:** Maintaining WC% in the slab in the afternoon
- Period 4:** Irrigation is based on plant activity in the late afternoon

Period 1
Start the irrigation on the basis of the astronomical clock from sunrise using range 80 - 100 J/cm². This will be approximately 2.0 hrs after sunrise when 150 W/m² of radiation is measured.

Only start irrigation when the crop begins to transpire. Remember new 'hair roots' are created between sunrise and the moment of 1st irrigation. Starting too early will damage root quality for the summer. Hair roots absorb water and nutrients very efficiently and are needed to cool the crop when light intensity is >600W/m².

Often the start time on dark days is too early and this is the biggest mistake made in the irrigation strategy so create settings which show clear differences in start times between sunny and dark mornings. On darker days irrigation should be delayed. Use a maximum rest time setting in the strategy commencing 3.0 - 3.5 hrs after sunrise.

Period 2
From start to the moment of first drain use relatively large irrigation volumes i.e. 4.0 ml/J and aim to achieve drain around than 600 W/m² or 400 J/cm². On a sunny day this will be 4.0 - 4.5 hrs after sunrise.

On a dark mornings with a delayed irrigation start time the moment of drain must be reached in time. The maximum rest time setting in P2 should be adjusted to achieve this within 5.0 - 6.0 hrs after sunrise.

Period 3
This is sometimes referred to as the 'balancing period' (stabilizing) the WC% in the growing media. Aim to start the period 3 5 - 6.0 hrs after sunrise. In this period keep the radiation sum start the same as that selected in period 1. This keeps the frequency of irrigation relative to light sum the same for the plant. However reduce the irrigation volume to supply i.e. 3.0 ml/J. Increase the maximum rest time as the moment of re-saturation will have been reached on a dark morning.

High initial drain percentages (35 - 60%) will be achieved caused by the large(er) irrigation volumes used at the start of irrigation day. This ensures optimal EC control so that the crop can transpire stress free in the afternoon when radiation is highest.

Check this by looking at the EC of the growing media (from GroSens sensor) and radiation sum lines on your climate computer remembering "EC lowest when radiation highest".

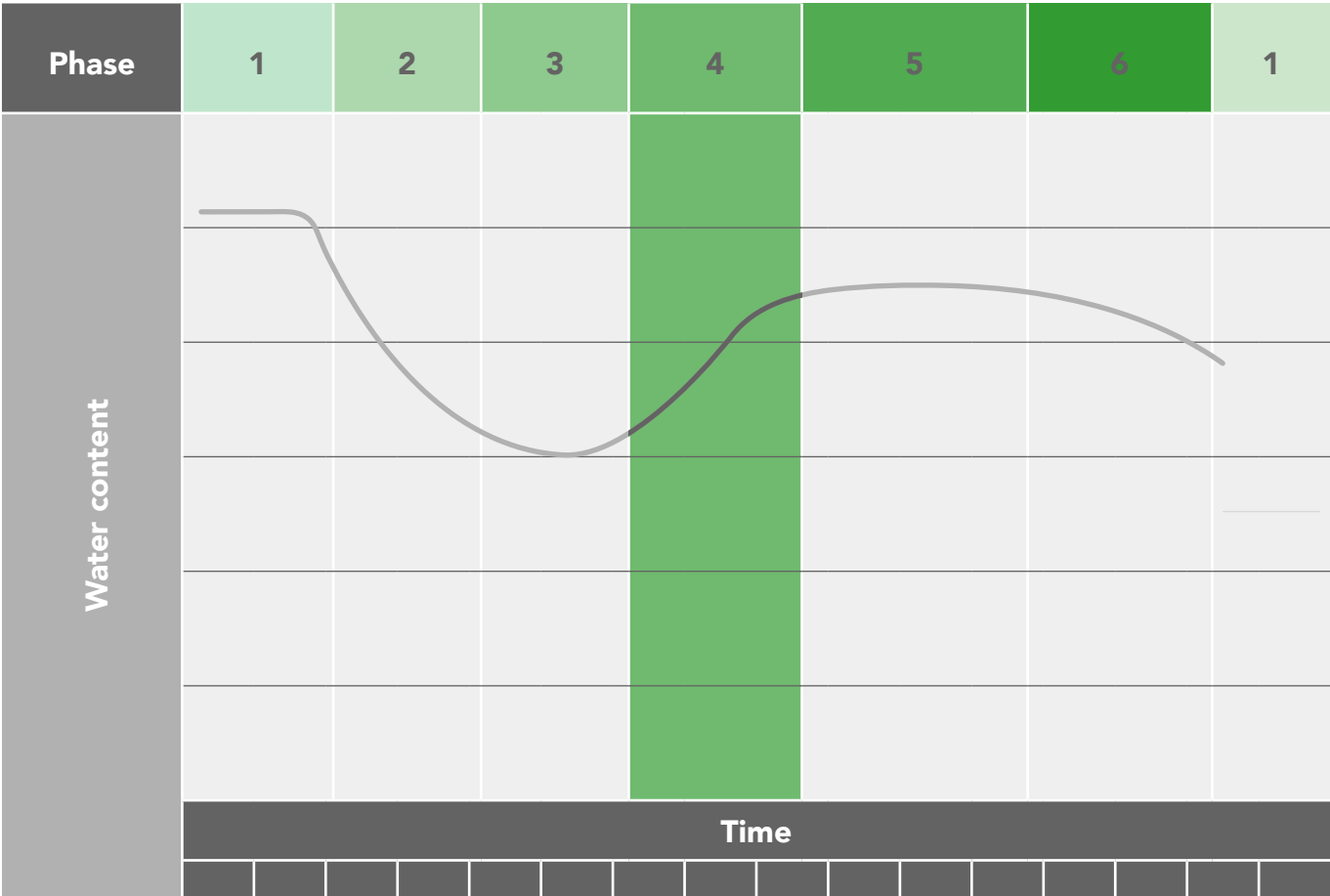
In this period when the evaporation is highest there must be a balance between irrigation supplied, drain (30 - 35%) and evaporation. A water shortage in this period is disastrous.

Period 4
Approximately 4.0 - 5.0 hrs before sunset it's a good idea to set a radiation sum (same as used in Periods 1 - 3) and radiation threshold (100 - 200 W/m²) above which irrigation will continue on the sunny days and below which irrigation will stop on the darker days. Refer to the reference table for guidance. Optionally the irrigation volume can already be set slightly smaller i.e. 2.5 ml/J which will help limit the drain percentage (20 - 30%).

From 3.0 - 4.0 hours before sunset the radiation threshold can be increased to 300 - 400 W/m² and the irrigation volume reduced to i.e. 2 ml/J such that no drain is realized in the last 1 - 3 irrigations of the day (10 - 20%). This period can continue until sunset as the radiation threshold ensures optimal stop time.

Start of phase

After first harvest.



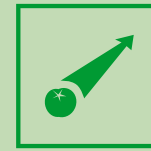
End of phase
Crop is getting into stable production

Precision Growing irrigation advice

	Phase 1a	Phase 1b	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6
	Bright day Vegetative steering				Dark day Generative steering		
Start time	+1.0 - 2.0 hrs after sunrise 60 - 100 J/cm² or 150 W/m²				+2.0 - 3.0 hrs after sunrise. When WC falls 1.5 - 2.0% from sunrise		
Stop time	-1.0 - 2.0 hrs before sunset. Ideally leaving or 100 - 180 J/cm² and a light intensity threshold 200 - 250 W/m² to sunset				-3.0 - 4.0 hrs before sunset		
Target day level WC	70 - 75%				70%		
Target decrease WC overnight	8%				8 - 10%		
Moment 1st drain	400 J/cm² or 600 W/m² or 4 - 6 irrigations				Less than 4 irrigations		
EC drip	2.8 - 3.3 mS/cm				3.0 - 3.5 mS/cm		
EC slab	3.8 - 4.5 mS/cm				4.5 - 5.2 mS/cm		
24 hr drain	25 - 30%				10 - 20%		
Irrigation volume	300 - 400 ml/m²				350 - 500 ml/m²		
ml/joule	3.0 ml/J				Not applicable		
Night irrigation	Only if additional vegetative steering is required				No		

Points of special interest

Steering the root zone between dark and bright days will encourage the crop to grow optimally for maximum production and quality. The excellent re-saturation characteristics of Prestige 7.5 cm allow the start time of irrigation to be timed in line with plant activity especially on darker days. Thanks to the use of NG2.0 fibre technology EC control is made very easy, even with minimal drain volumes and a relative short period of irrigation. This will help protect root quality as regrowth of the crop continues following the first harvests. In this phase the irrigation strategy becomes more structured. On bright days the start time of irrigation should be related to light sum (J/cm²) and/or light intensity (W/m²). This will ensure day level WC% are increased towards the levels expected for summer, but importantly they will prevent irrigation starting too soon on darker days.



Phase 05

Maximum production

Objective phase

Maintain maximum plant vigour and production potential by keeping plant and root quality in excellent health.

Target crop

Vegetative or generative steering will depend on the condition of the crop. The crop should remain strong to cope with large and extreme fluctuations in weather conditions. The set speed should match the harvest speed to maintain constant fruit load.

Target root zone

Water uptake should match the needs of the crop for maximum cooling potential to create a good climate inside the greenhouse. Good root penetration throughout the entire volume of the growing media realised in Phase 2 will help the crop to cope with extreme weather conditions.



Managing the root zone through maximum production

Start and stop times should coincide with plant transpiration. It is best to remove the maximum rest time setting from the first irrigation period and use a light only setting (see advice tables). The second irrigation period should contain a maximum rest time setting. Likewise the final irrigation period of the day should be based on light only starts. In this way on a dark day no starts will be given and on a bright day the starts continue (see advice table) and a stable decrease in WC% will be maintained.

The irrigation EC should remain $>3.0\text{mS}$ (especially with radiation $<600\text{W/m}^2$). The good irrigation efficiency of the Grodan slabs means you do not have to chase the EC of the growing media and can therefore keep irrigation under control especially in periods of changeable weather. A light reduction EC setting can be used but watch that you do not make the range too reactive, respecting the planned stop conditions.

An increasing EC at midday will have consequences for the plant's vigour and fruit quality (micro-cracking and blossom-end-rot if it is not controlled). In the morning start with larger irrigation volumes 4 - 5% of the volume

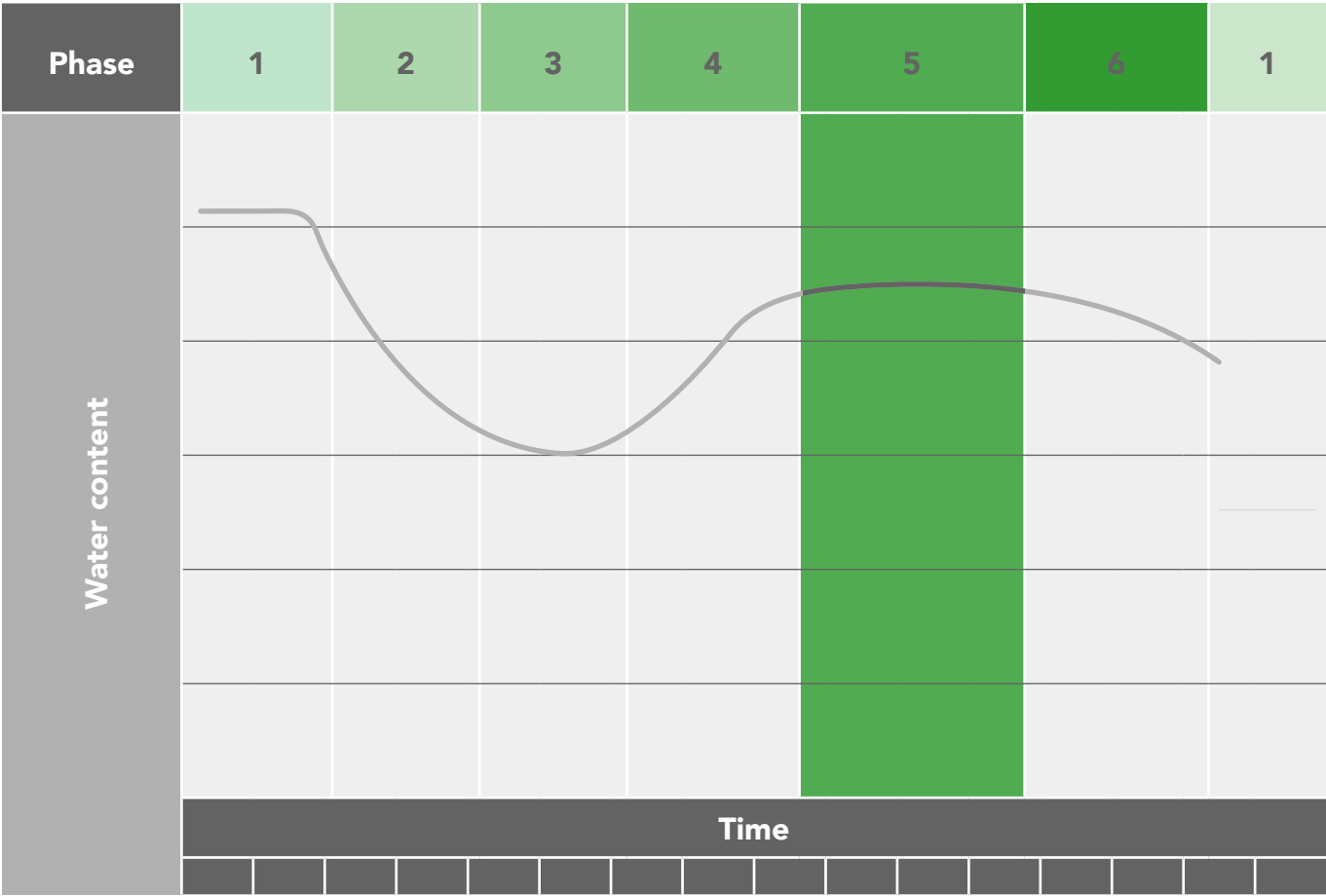
of the growing media in order to get drain in time. In the afternoon shorter more frequent irrigations 3% of substrate volume will help keep slab WC% & EC stable and controlled.

The GroSens system is an excellent tool to assess if the irrigaiton strategy needs adjusting. The standard graphic on your climate computer should contain WC%, EC, radiation sum (J/cm^2) and radiation intensity (W/m^2). If scaled correctly it is very easy to see relationships between these data points and answer the following questions:

- What was the rad sum / radiation the moment I started irrigation?
- What was the rad sum / radiation the moment EC was brought under control?
- Was EC of the growing media lowest when radiation was highest?
- What was the rad sum / radiation the moment I stopped?
- Was the decrease in WC% overnight what I expect?

Start of phase

Crop is getting into stable production.



End of phase
Head is taken out of the plant

Precision Growing irrigation advice

	Phase 1a	Phase 1b	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6
	Bright day Vegetative steering			Dark day Generative steering			
Start time	+1.0 - 2.0 hrs after sunrise 60 - 100 J/cm ² or 150 W/m ²			+2.0 - 3.0 hrs after sunrise. When WC% falls 1.5 - 2.0% from sunrise			
Stop time	-1.0 - 2.0 hrs before sunset. Ideally leaving or 100 - 180 J/cm ² and a light intensity threshold 200 - 250 W/m ² to sunset			-3.0 - 4.0 hrs before sunset			
Target day level WC	75 - 80%			70 - 75%			
Target decrease WC overnight	8%			8 - 10%			
Moment 1st drain	400 J/cm ² or 600 W/m ² or 4 - 6 irrigations			Less than 4 irrigations			
EC drip	2.8 - 3.3 mS/cm			3.0 - 3.3 mS/cm			
EC slab	3.5 - 4.5 mS/cm			4.5 - 5.0 mS/cm			
24 hr drain	25 - 40%			15 - 25%			
Irrigation volume	Morning: 350 - 400 ml/m ² Afternoon: 250 - 350 ml/m ²			350 - 450 ml/m ²			
ml/joule	3.0 ml/J			2.5 - 3.0 ml/J			
Night irrigation	Only if corrective actions are required delta WC >10%			No			

Points of special interest

The strong root system formed in previous phases should benefit the crop when transpiration is highest thus promoting strong growth and facilitating optimum production and quality. The first drain on bright days should coincide when the outside radiation reaches 600 W/m² or light sum accumulation equates to 400 J/cm² as this will ensure EC is stabilized in time within the growing media when the light intensity is at its peak.





Phase 06

Final production

Objective phase

Keep the crop in a healthy condition and use the vigour to ensure production and quality is maintained right through to the last planned harvest date.

Target crop

Maintain strength and growing power of the plant and limit the ingress of disease in the crop as the light levels diminish towards final harvest.

Target root zone

Maintain a healthy and active root system and to keep the correct nutrient balance in the root zone. Ensure the irrigation strategy compensates for the rapidly changing transpiration levels. Maintain a stable and sufficient decrease WC% during night.



Managing the root zone through final production.

In order to keep the root system healthy good oxygen penetration is important. Therefore lower the irrigation frequency and the day level slab WC% will decrease slowly. To compensate for the lower irrigation frequency increase the size of the irrigation volume per cycle. Ensure the start and stop times coincide with the astronomical clock and gradually lower the day level slab WC%.

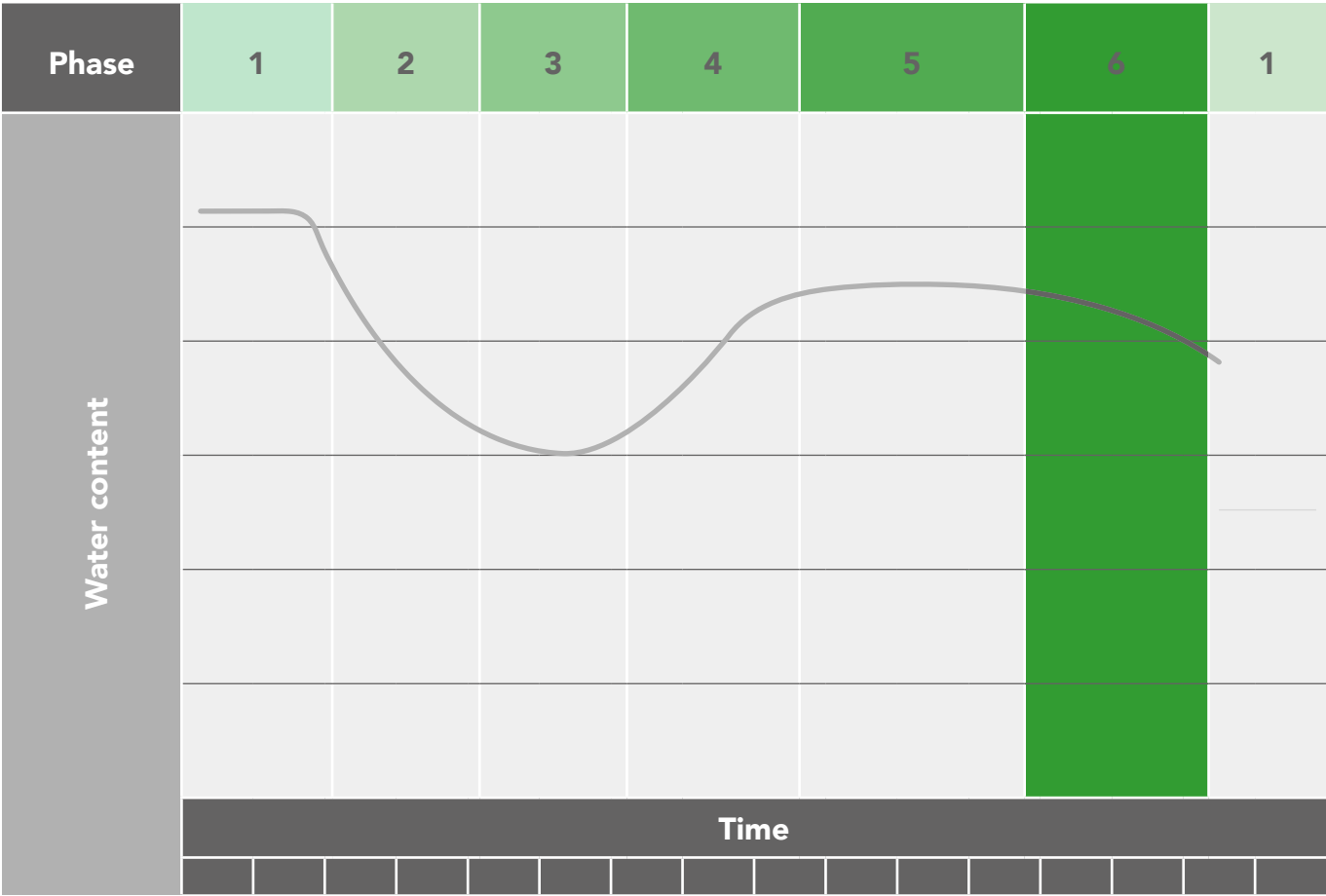
Pay attention to dark days with relatively high temperatures as the crop can evaporate more than the anticipated set radiation sum. On a sunny autumn day, the crop will only become active at +/- 100 J/cm². This is the moment for the 1st irrigation.

Often too much irrigation is given on dark days. The advice is to irrigate with minimum volumes on days >500 J/cm² and it is neither uncommon nor detrimental to the crop to achieve zero drain and let the growing media EC increase. On days where the radiation sum exceeds 1000 J/cm² irrigation should be applied 2.5 to 3.0 times the radiation sum. Such days are appropriate for leveling slab EC between 11:00 – 13:00 hrs.

Stop irrigation on dark days up to 3.0 - 4.0 hours before sunset and target a steady decline in slab WC% overnight between 7 - 8%. Overall keep the irrigation EC >3.0 mS/cm especially when radiation <600 W/m² and consider the need for light reduction EC if these settings have been very reactive during phase 5.

Start of phase

Head is taken out of the plant.



End of phase
When final harvest has taken place.

Precision Growing irrigation advice

	Phase 1a	Phase 1b	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6
	Bright day Vegetative steering			Dark day Generative steering			
Start time	+1.5 - 2.5 hrs after sunrise 80 - 100 J/cm² or 200 W/m²			+2.5 - 3.5 hrs after sunrise. When WC falls 1.5 - 2.0% from sunrise			
Stop time	-2.0 - 3.0 hrs before sunset. Ideally leaving 150 J/cm² and light intensity threshold 200 - 250 W/m² to sunset			-3.0 - 5.0 hrs before sunset			
Target day level WC	70 - 75 decreasing to 60 - 65%			70% decreasing to 60%			
Target decrease WC overnight	8 - 10%			10 - 12%			
Moment 1st drain	400 J/cm² or 600 W/m² or 4-6 irrigations			Less than 4 irrigations			
EC drip	3.0 - 3.3 mS/cm			3.3 - 3.5 mS/cm			
EC slab	3.5 - 4.5 mS/cm			4.5 - 6.0 mS/cm			
24 hr drain	25 - 30%			10 - 25%			
Irrigation volume	Morning: 350 - 450 ml/m² Afternoon: 300 - 400 ml/m²			400 - 500 ml/m²			
ml/joule	2.8 - 3.2 ml/J			2.5 - 3.0 ml/J			
Night irrigation	No			No			

Points of special interest

The steering possibilities in Prestige 7.5 cm allow the day level WC% to be lowered as the outside climate becomes increasingly vegetative. A stable decrease in WC% during the night is most important. On the darker days targeting a larger decrease in WC% will help protect root quality and keep the right generative balance in the crop. The fast re-saturation properties of Prestige 7.5 cm will mean day level WC% can be easily increased to ensure enough water and nutrition is supplied to the heads of the crop on the bright days. Importantly when daily irrigation volumes are reduced as the day length shortens EC stability can be realized due to NG2.0 technology. Consequently “flushing” is not required as the substrate EC will remain sufficiently stable (but structurally higher) thereby facilitating maximum generative steering.



Grodan 6 Phase user advice

The information contained herein (the "Information") is provided by Grodan by way of non-binding information. Grodan makes no representations or warranties of any kind, express or implied, about the completeness, accuracy, reliability or availability of the Information. Any reliance on the Information is at your own risk. The Information remains the property of Grodan. All copyrights and/or intellectual property rights in the Information belong to Grodan. You are not permitted to copy or publish the Information to the Information available to third parties without Grodan's prior written consent. To the fullest extent permitted by the applicable law, Grodan hereby disclaims any liability and in no event shall Grodan be liable for any damage including, without limitation, direct, indirect or consequential damages including loss of revenue, loss of profit, loss of opportunity or other loss arising from the use of or the inability to use the Information including damages arising from inaccuracies, omissions or errors.

Rockwool BV / Grodan

Industrieweg 15
Postbus 1160, 6040 KD Roermond
The Netherlands

Scan the QR code to get in touch.



t +31 (0)475 35 30 20
f +31 (0)475 35 37 16
e info@grodan.com
i www.grodan.com
in www.linkedin.com/company/grodan
🐦 www.twitter.com/grodan
@ [@grodaninternational](https://www.instagram.com/grodaninternational)

