

# Tomato Rockwool Block Standard Use Guide

## Standardized Operation & Root-Zone Management

**Purpose:** This guide provides standardized management guidance for transplanting tomato propagation plugs into rockwool growing blocks. The objective is to support uniform and healthy root establishment throughout the block through even pre-saturation, a stable root-zone environment, appropriate dry-back, and continuous observation, while reducing risks caused by improper pre-treatment, irrigation, or transplanting.

**Application:** Commercial tomato propagation and standardized use of rockwool growing blocks. The basic management principles may also be referenced for other crops, but EC, irrigation, and environmental parameters should be adjusted according to crop requirements and local conditions.

### 1. Preparation: Pre-saturation and Substrate Stabilization

Rockwool is an inert growing medium and is dry and nutrient-free in its initial state. Proper pre-saturation is essential for uniform water and nutrient supply after the propagation plug is placed into the block, and provides the foundation for subsequent water content (WC), EC, and root-zone management.

#### 1.1 Nutrient Solution Preparation

- EC: 1.5–2.5 mS/cm may be used as a general starting range. Tomato EC should not be treated as a rigid fixed value; adjust it according to the grower's existing propagation recipe, seedling age, cultivar, light conditions, and target plant balance. Where a proven tomato propagation program already exists, prioritize the existing nutrient formulation during the initial stage.
- Pre-saturation irrigation/soaking solution pH: 5.2–5.5. This value refers to the pH of the nutrient solution applied to the block and is not the same as the final pH inside the root zone.
- Nutrient solution temperature: Avoid applying noticeably cold nutrient solution directly to young plants. Minimize temperature differences between the nutrient solution and the root-zone environment to reduce sudden temperature stress on roots.

## 1.2 Wetting and Full Saturation

Arrange the growing blocks evenly. Bottom wetting, soaking, or uniform overhead wetting may be used to allow the nutrient solution to penetrate the entire block. The goal is not merely a wet surface, but to avoid a dry core, dry spots, or obvious differences between areas.

- Apply the solution evenly, preferably in multiple passes, allowing sufficient time for water to penetrate the rockwool.
- Randomly select 5–10 blocks from different areas of the propagation bench. After free drainage, weigh and record them to establish an initial saturated reference weight for the batch. Subsequent weight changes can help indicate moisture trends.
- For large propagation areas, sample representative positions such as front/middle/back and left/center/right to confirm uniform initial wetting.
- Do not squeeze the rockwool blocks by hand. Compression may alter the fiber structure and pore space, affecting subsequent water and air distribution.

## 1.3 Substrate Stabilization and pH Confirmation

After pre-saturation, allow adequate time for the blocks to stabilize so the nutrient solution can fully occupy the pore space and the internal pH can move toward a suitable, relatively stable condition. The required time does not need to be fixed at 24–48 hours; measurement results should be the primary basis for judgment.

- Before transplanting plugs, randomly select representative blocks from different positions to check substrate pH. If root-zone solution testing is used, use dedicated sampling blocks and keep the sampling method consistent; avoid squeezing normal production blocks or designated monitoring blocks.
- Proceed with transplanting plugs once differences between locations are small and substrate pH has entered an appropriate, stable range.

**Core principle: Determine whether pre-treatment is complete based on water uniformity and pH stability, rather than relying only on a fixed waiting time.**

## 2. Transplanting Plugs: Establishing a Continuous Moisture Path

When tomato seedlings have reached the appropriate stage and the roots can securely hold the propagation plug together, transfer the plant and plug as one unit into a fully pre-saturated and stabilized growing block.

- Place the propagation plug smoothly and completely into the planting hole without forcing or compressing it.
- Ensure good contact between the bottom and sides of the propagation plug and the growing block. Avoid obvious gaps or large air pockets. Good physical contact helps establish a continuous moisture pathway and supports new roots entering the block.
- For grafted tomato plants, avoid unnecessary contact between the scion stem and the wet growing medium.

## 3. Root Establishment: Balancing Water, Oxygen, and Plant Demand

After the plug is placed in the growing block, the goal is to encourage roots to progressively explore and use the entire block while maintaining a dynamic balance of water, oxygen, EC, and temperature in the root zone. Avoid two extremes: prolonged near-saturation and excessive dry-back that causes visible water stress.

### 3.1 Spacing Management

Blocks may initially be arranged relatively close together to improve bench utilization and maintain a uniform crop environment. As the canopy expands, increase spacing according to leaf overlap, light conditions, and target plant architecture to avoid prolonged crowding, light competition, excessive internode elongation, and stretched seedlings.

### 3.2 Irrigation and Dry-back Strategy

During the early stage after transplanting into the block, avoid frequent heavy irrigation that keeps the rockwool close to full saturation for long periods. As roots progressively enter the block, establish appropriate daytime and nighttime dry-back based on plant transpiration, light conditions, block weight/WC changes, and root development.

- The purpose of dry-back is not to cause visible wilting or severe water stress. It is to maintain adequate water supply while allowing air to re-enter part of the pore space and support a healthy water–oxygen balance.
- Do not treat 15%–20% dry-back as a fixed standard for all tomato seedlings. Adjust the dry-back level progressively according to block characteristics, seedling age, weather, transpiration, and root development.
- Irrigation should follow plant activity rather than the clock alone. Under low-light and low-transpiration conditions, avoid using the same irrigation frequency as under high-light conditions.
- Where possible, use precise drip irrigation or an appropriate bottom-feeding method to reduce prolonged wetness around the stem base.

### 3.3 Nutrient Solution and Root-Zone Monitoring

Nutrient management should consider irrigation solution EC/pH, root-zone or drainage EC/pH, changes in block moisture, and plant condition together. A single EC value cannot replace an integrated assessment of the crop and root zone.

- If root-zone EC continues to rise, first check whether irrigation frequency, shot volume, transpiration level, and supply EC are properly matched.
- If blocks remain too wet for extended periods and root development is slow, check for excessive irrigation frequency, insufficient light/transpiration, and uneven water supply between locations.
- Keep root-zone temperature as stable as possible and avoid cold-water irrigation or rapid temperature changes.

### 3.4 Routine Observation and Representative Monitoring

In commercial propagation, overall average crop appearance may not reveal localized differences in irrigation or environment. Select a small number of representative observation points according to bench size and use them to continuously compare moisture, root development, and plant status across different areas.

- Observation points should cover representative positions such as the front, middle, back, and edges of the bench, and should remain in relatively fixed locations.
- Routine observations should focus on block weight or WC changes, irrigation EC/pH, root-zone or drainage EC/pH, root-zone temperature, root color and distribution, plant height, stem diameter, and internode length.

- Take consistent photographs or records at key stages such as after pre-saturation, during root establishment, during rapid growth, and before final transplanting to help evaluate trends.
- If localized abnormalities occur, first compare water supply, block weight, and environmental conditions between the affected and normal areas before attributing the issue to the growing medium.

## 4. Hardening and Preparation Before Final Transplanting

### 4.1 Hardening

Before moving plants from the propagation area to the production greenhouse, transition them gradually according to differences between the two environments. The priority is to reduce sudden changes in temperature, light, humidity, and irrigation conditions—not simply to make the plants progressively drier. Base irrigation adjustments on plant condition and root-zone moisture.

### 4.2 Transplant Readiness

At the appropriate transplant stage, roots should have grown well from the propagation plug into the growing block and formed a relatively uniform, active distribution of new roots throughout the block. Healthy new roots may be visible at the bottom and sides, but severe root circling, browning, or obvious aging should be avoided.

- Avoid transplanting too early: If the root system is not sufficiently established, water management becomes more difficult after moving into a larger substrate volume.
- Avoid transplanting too late: Severe root circling, yellowing, or aging at the bottom can reduce subsequent root expansion and vigor.
- When placing the block on the growing slab, ensure stable, level contact between the bottom of the block and the slab. Avoid obvious gaps so roots can expand smoothly into the slab.

## 5. Common Issues and Priority Checks

Note: If deviations occur during use, diagnose them using both representative observation data and plant performance. Avoid making major irrigation or nutrition changes based on a single symptom.

| Visible symptom              | Possible physiological / physical cause | Priority checks (SOP)                   |
|------------------------------|-----------------------------------------|-----------------------------------------|
| Block remains too wet for an | Possible water–oxygen imbalance:        | 1. Check representative block weight/WC |

|                                                                                                          |                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                 |
|----------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| extended period (WC/weight decreases slowly); new root development is slow                               | irrigation frequency or shot volume may not match plant transpiration; low light, air temperature/humidity, or VPD may reduce transpiration demand; poor drainage should also be checked. | and dry-back trend.<br>2. Check whether light, air temperature/humidity, and VPD match the current seedling stage and transpiration status.<br>3. Confirm that drainage from the bottom of the block is unobstructed.                                                                                                                           |
| Uneven root distribution, localized low root density, or dry spots                                       | May be related to uneven initial pre-saturation, insufficient plug-to-block contact, displaced drippers, or localized differences in water supply.                                        | 1. Review initial saturated weight and uniformity between areas.<br>2. Check that the propagation plug is fully seated in the planting hole, with good bottom contact and no gaps.<br>3. Check dripper/emitter position, flow rate, and any uneven flow.                                                                                        |
| Root tips brown or shrink; new-root vigor declines                                                       | Possible root-zone stress, including EC accumulation, prolonged high WC causing insufficient oxygen supply, abnormal root-zone temperature, or root disease.                              | 1. Compare supply EC with root-zone/drainage EC where possible to identify salt accumulation trends.<br>2. Check root-zone and irrigation-solution temperatures.<br>3. Review block WC/weight changes and dry-back trend to determine whether blocks remain too wet.<br>4. Observe for disease symptoms and investigate pathogens if necessary. |
| Tomato seedlings are thin and elongated, with long internodes and excessive vegetative growth            | May be related to excessive bench density, insufficient light, temperature management, or irrigation strategy favoring vegetative growth.                                                 | 1. Check leaf overlap and increase spacing in time.<br>2. Check light/DLI and day/night temperatures.<br>3. Check irrigation start time, frequency, and dry-back trend.<br>4. If excessive vegetative growth persists, have an agronomist assess whether EC or dry-back strategy should be adjusted.                                            |
| Large growth differences within the same batch; poor crop uniformity                                     | May result from uneven water supply or local microclimate differences, such as dripper flow variation, differences between bench zones, or conditions near vents and edges.               | 1. Compare data from representative front/middle/back and edge locations.<br>2. Check actual dripper flow in abnormal areas.<br>3. Compare local light, temperature/humidity, and ventilation conditions.                                                                                                                                       |
| Before transplanting, roots are severely circled at the bottom, turn from white to yellow, or lose vigor | The optimal transplant window may have been missed, or prolonged wetness and insufficient aeration at the bottom may have caused root aging and concentration at the block base.          | 1. Reassess the propagation period and optimal transplant timing.<br>2. Check drainage and aeration at the bottom of the block.<br>3. Confirm whether roots are distributed throughout the block rather than concentrated only at the bottom.                                                                                                   |

Diagnostic principle: Plant performance is jointly influenced by the growing medium, irrigation, nutrition, environment, root-zone conditions, and field operations. When deviations occur, first identify the likely cause, then make small, verifiable adjustments.

**Need further technical support?**

Growing conditions, irrigation systems and crop requirements vary between projects. If you have questions about product use, irrigation management or specific growing conditions, please contact the Grofine technical team at [info@grofine.com](mailto:info@grofine.com).