

# **GROW CONTAINER**



Weifang Kunsheng Agricultural Technology Co., Ltd.



#### Introduction

Grow container is a modern way of farming, which solve the contradiction between the needs of contemporary agricultural development and the scarcity of land resources. Its interior is fully equipped with devices suitable for the growth of various plants. With electricity and water connected, the devices works. Not only dose it enable vegetables to grow immune to the toll taken by bad weathers but also address some problems such as the scarcity of arable land, poor soil and imbalance of land acidity.

By surmounting these obstacles, more vegetables are expected to be produced in the areas that used to be not suitable for planting. At the same time, vegetable suppliers won't bother to go a long distance transporting these vegetables to certain markets. Study shows that most vegetables lose up to 55% of their nutrients within a week after the harvest. With this containerized soilless farming,however, it is possible to harvest vegetables before they are sold and ensure the maximum of their freshness and nutrition.

Despite the impact of climate and other environmental factors , container agriculture can help to achieve desirable production with high stability efficiency and continuity. Its systems mainly consist of:

- 1. Energy-saving insulation building materials
- 2. The equipment of multi-series cultivation modules
- 3、Nutrient liquid self-control system
- 4、 Intelligent environment control system
- 5. The formula of soilless cultivation nutrient
- 6. High-quality plant seeds
- 7. Photovoltaic power generation system (optional)





Grow container, as a miniature intelligent plant production system, has some characteristics as follow::

1. Integrated design of container equipment, light and compact decoration

2. System integration, modular equipment components

3、 Equipment installation is solid, external neat and tidy, no external hanging parts, suitable for long-distance transportation and lifting

4. Standardized interface, only one set of water supply and drainage, electrical interface and other 3 standard interfaces between container and external connection

5. Wide application area, not affected by the climate environment, can be deployed in alpine, island, arid, remote areas and other environments, to achieve a small number of people fresh vegetables self-sufficiency

6. Equipped with optional photovoltaic modules to achieve partial operation energy self-sufficiency.

7, Container agriculture is environment-friendly agriculture, completely using hydroponics, no need to spray pesticides, not only to protect people's health, but also to achieve zero pollution to nature.





## Grow container type

Containerized plant factories can be divided into the following categories according to their size, type of cultivation equipment, purposes and type of crops grown.

#### 1. According to the size

20ft Grow container: external dimensions: 6058mm (L) x 2438mm (W) x 2896mm (H)



40ft Grow container: External dimensions: 12192mm (L) x 2438mm (W) x 2896mm (H)





### 2. According to the type of plants:

grow container:

The layers of the cultivation equipment are spaced relatively short from one another, around 20-30cm.



Melon container plant: the layers of the cultivation equipment are spaced relatively high, around 100-150 cm apart.  $_{\circ}$ 





# Main technical analysis

1、Container structure

To ensure the thermal insulation performance of the container, the wall panel and bottom surface are made of thermal insulation material.

2、Container layout

Divided into two compartments: front room (front room with wardrobe, power distribution cabinet, operation cabinet, etc.); back room (cultivation area).

3. Air-conditioning embedded installation

The outdoor unit is recessed into the interior of the container, without any external equipment on the outside of the box.

4、Fresh air

The box is equipped with a fresh air machine for regular ventilation and air exchange, and the fan is controlled at regular intervals.

5. Airflow internal circulation

Wind wall side air supply and top air return.

6. Cultivation equipment

The cultivation equipment adopts the proprietary cultivation equipment to make maximum use of container space.

7、Nutrient liquid self-control

The nutrient solution circulation adopts the centralized liquid supply circulation scheme, and the automatic control adopts the upper EC and pH automatic control equipment.

8、Environmental control system

In order to meet the plant growth environment and achieve automatic environmental control, the container is equipped with a set of environmental monitoring system to monitor the temperature, humidity and carbon dioxide data inside and outside the container, and control the opening and closing of light sources, fans and pumps.

9、Carbon dioxide control system (optional)

In order to promote rapid plant growth, the container is equipped with a set of carbon dioxide supplementation system, which can automatically adjust the opening and closing of the gas supply equipment according to the indoor and outdoor carbon dioxide concentration.

10、 Light source control

The light source is automatically controlled, and the light source on the cultivation frame is automatically switched on and off on time; on the other hand, the manual control can switch on and off each group of planting module light source independently.

#### 11、PLC control

The control panel displays the temperature and humidity inside and outside the container, indoor carbon dioxide concentration, water pump, light source running status and crop status; the panel is equipped with a three-dimensional diagram of the container, which can display the crop species cultivated on each set of cultivation modules and their growth stages.

12. Solar power generation system (optional)

The container can be equipped with a solar power generation system, which generates



electricity that can be used directly for the container production needs.

# Yield

20ft high container :

Internal volume of 5.898m m x 2.352m x 2.393m.

The gross weight of the distribution is generally 20T and the volume is 31.5m3.

Cultivated area measurement, total cultivated area:

1. 0.86m\* width of the central movement and operating space: 0.86m; length 5.7m

2. Cultivation beds on the right: width 0.65; length 4.05m; height 2.022m

Each cultivation bed on the right: 0.65 (width) \* 4.05 (length) = 2.63 m<sup>2</sup>

Cultivated beds on the right 3 layers, each 0.5m + 0.04m = 0.54m\*3 = 2.02m (bottom 0.4m)

Cultivated beds on the right; 3 groups \* 0.8253 sq. ft. \* 3 layers = 7.42 sq. ft.

3. Cultivated bed on the left: width 0.65; length 4.05m; height 2.022m

Cultivated bed per layer on the left: 0.65 (width) \* 4.05 (length) = 2.63 sqm

Left side cultivation bed 3 layers, each layer 0.5m + 0.04m = 0.54m \* 3 = 2.02m (bottom layer 0.4m)

Cultivated beds on the left; 3 groups \* 0.8253 square \* 3 layers = 7.42 square

- 4、 Yield (production value) measurement
  - A.50 holes per square planted \* 14.84 square = 750 plants
  - B.15 days yield (80-85g)\*750 plants = 63,750g/1000 = 63kg (15 days per crop)
  - C.24 harvests per year, 63\*24=1512 kg (annual yield)





#### 40ft container:

Volume of 12.03m x 2.35m x 2.69m.

The gross weight of the distribution is generally 22T and the volume is 68m3.

Cultivation area measurement, total cultivation area:

1. Width of the central movement and operating space: 0.7m; length: 11.5m

2. Cultivation beds on the right: width 0.7; length 10m; height 2.6m

Each group of cultivation beds on the right: 0.65 (width) \* 1.25 (length) = 0.81 sqm

4 layers of cultivated beds on the right; each layer 0.2m + 0.32m = 0.54m \* 4 = 2.16m

Cultivated bed on the right; 8 groups \* 0.81 square \* 4 layers = 25.92 square

3. Cultivated beds on the left: 0.7 wide; 10m long; 2.6m high

Each group of cultivated beds on the left: 0.65 (width) \* 1.25 (length) = 0.81 sqm (bottom 0.4m) Left side cultivation beds 4 layers, each layer 0.2m + 0.32m = 0.52m \* 4 = 2.08m (bottom layer 0.4m)

Cultivated beds on the left; 8 groups \* 0.81 square \* 4 layers = 25.92 square

4、 Yield (production value) measurement

A. 60 holes per square planting \* 51.84 square = 3108 plants

B. 15 days yield (80-85g)\*3108 plants = 264180g/1000 = 264kg (15 days per crop)

C. 24 harvests per year, 264\*24=3168 kg (annual yield)





#### 20GP grow container

Item	Name	20GP container	Remark
	Vegetable	Lettuce	
output	Daily production	3-4kg/day	Lettuce as a reference
	Water	60L/day	60L/day 80% can be directly recycled
	Nutrient solution	20L/day	Irrigation fluid, 50% recyclable
Consumption	Electricity	35kwh/day	Not including photovoltaic system power generation.
	Gas	1kg/day	with CO2 equipment
	Seed	70seeds/day	

40GP grow container

Item	Name	40HC Container	Remark
	vegetable	Lettuce	
output	Daily production	6-8kg/day	Lettuce as a reference
	Water	120L/day	60L/day 80% can be directly recycled
	Nutrient solution	40L/day	Irrigation fluid, 50% recyclable
Consumption	Electricity	70kwh/day	Not including photovoltaic system power generation
	Gas	2kg/day	with CO2 equipment
	Seed	140seeds/day	

Note: All above data is collected in our factory location situation, it may vary in different climate.