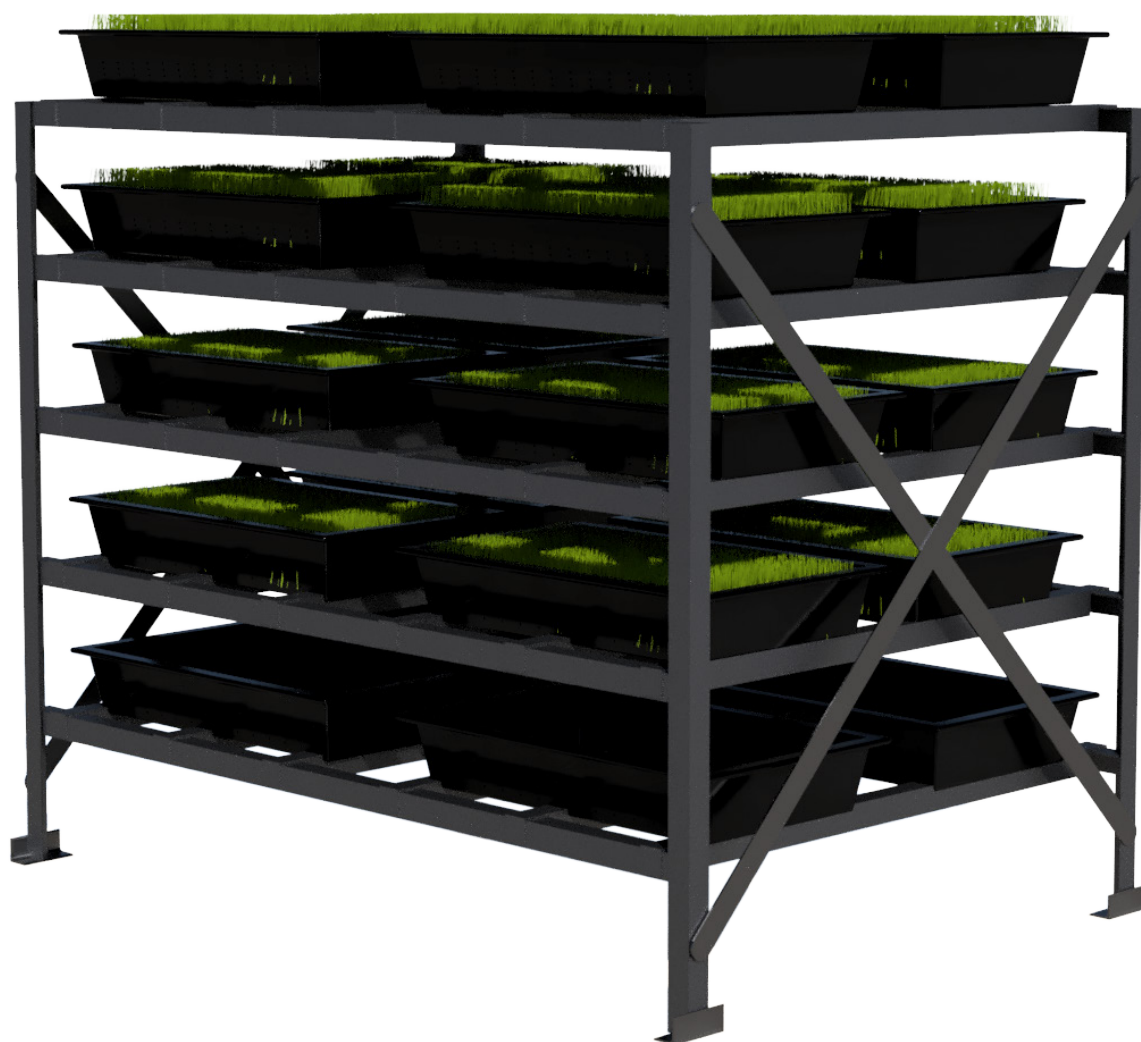

How to Build Your System

Hydroponic Individual Portable Unit
for Animal Fodder

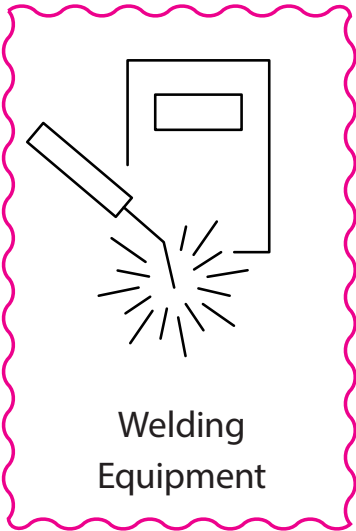


**INNOVATION
ACCELERATOR**

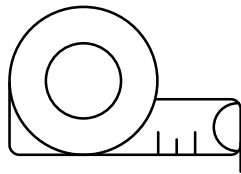
October 2018

What you need

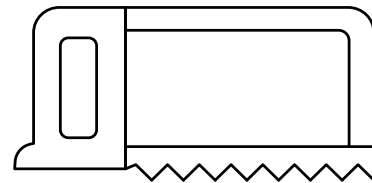
If the feet are fastened with nuts and bolts, I think we can remove welding equipment. Thoughts?



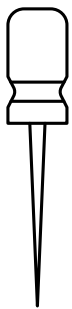
Welding
Equipment



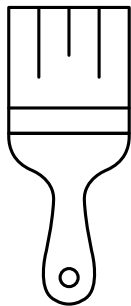
Measuring Tape



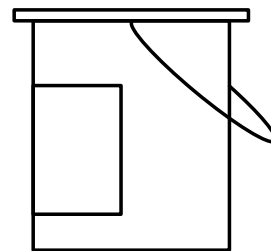
Saw
Hand Saw
Electric-Powered Saw



Piercing Tool
Drill / Awl
Metal Needle



Paintbrush



Anti-Rust Paint

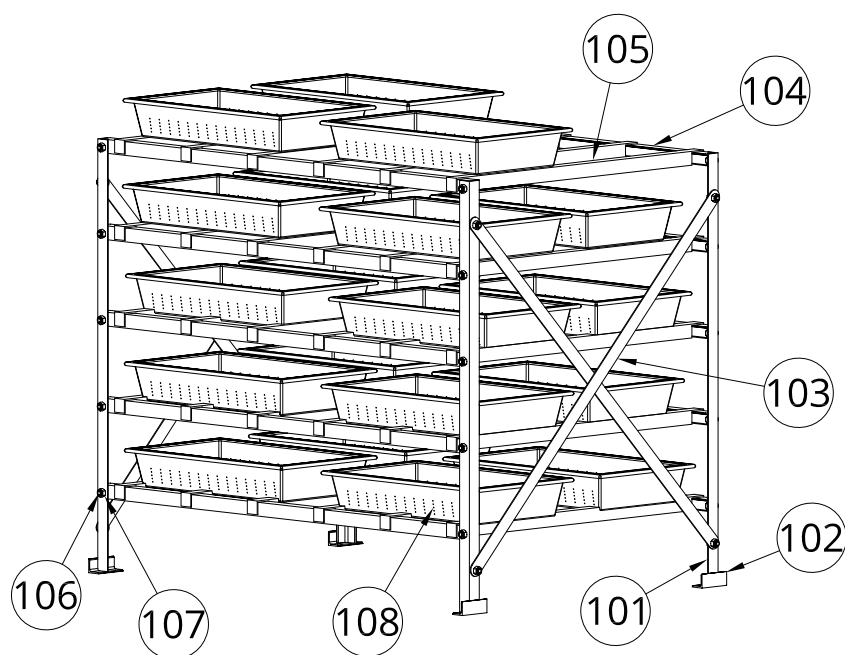


Wrench - Size 14










Abrasive Tool
Metal File
Sand Paper
Coarse Stone

Individual Unit - Parts List



Part Number	Quantity	Description
101	4	Column Angle Iron 40mm x 40mm x 4mm
102	4	Foot Angle Iron 40mm x 40mm x 4mm
103	4	Cross Beam Flat Iron 40mm x 40mm x 4mm
104	10	Long Beam Angle Iron 40mm x 40mm x 4mm
105	25	Short Beam Angle Iron 40mm x 40mm x 4mm
106	28	Size Bolts Metal
107	28	Size Nuts Metal
108	15	Grow Tray Opaque Plastic

Angle Irons & Feet

	Part 101 Column	x4
	1250mm	
	Part 102 Foot	x4
	100mm	
	Part 103 Cross Beam	x4
	1400mm	
	Part 104 Long Beam	x10
	1500mm	
	Part 105 Short Beam	x25
	1000mm	
	Part 106 Size Bolt	x28
	Part 107 Size Nut	x28



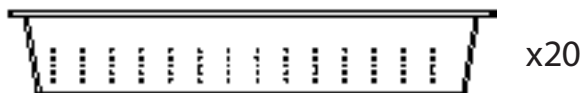
Material Selection

Alternative materials can be used for the above parts.
The following should be considered if selecting alternatives:

- The outer beams should be made from a strong material, like metal.
- The parts should not be made from a material like wood, which can rot over time from exposure to moisture or be damaged by pests, such as termites.
- The inner beams must be able to hold the total weight of your grow trays with fully grown fodder.

Grow Trays

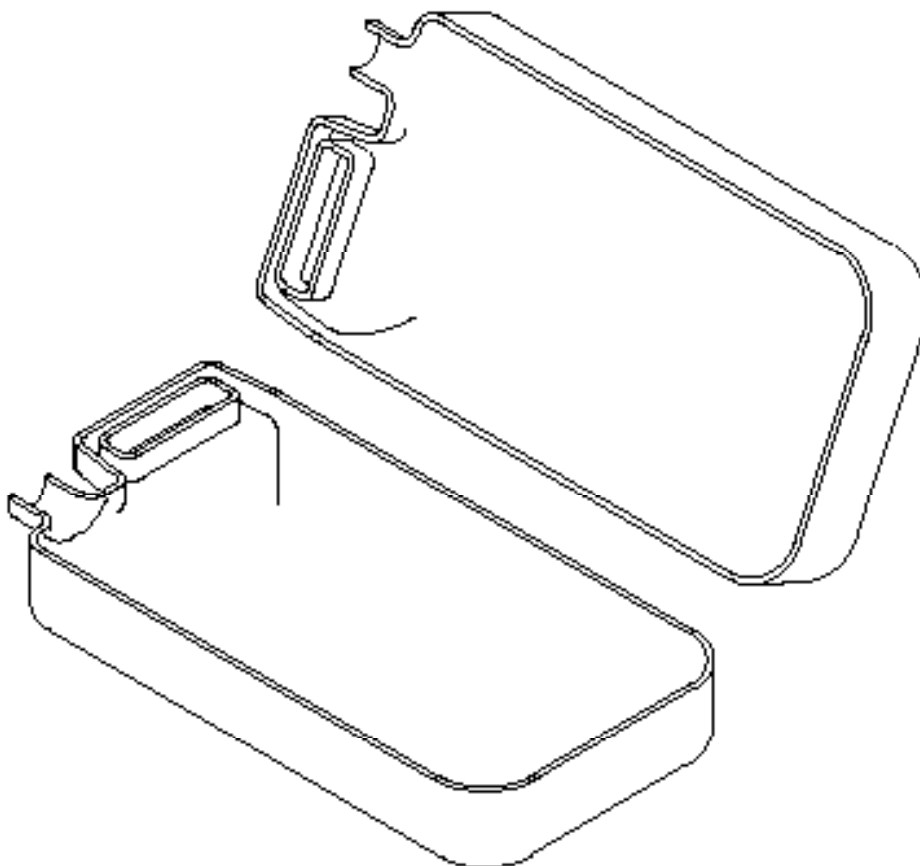
Part 108 Grow Tray



Alternatives to the Grow Tray [Part 108]

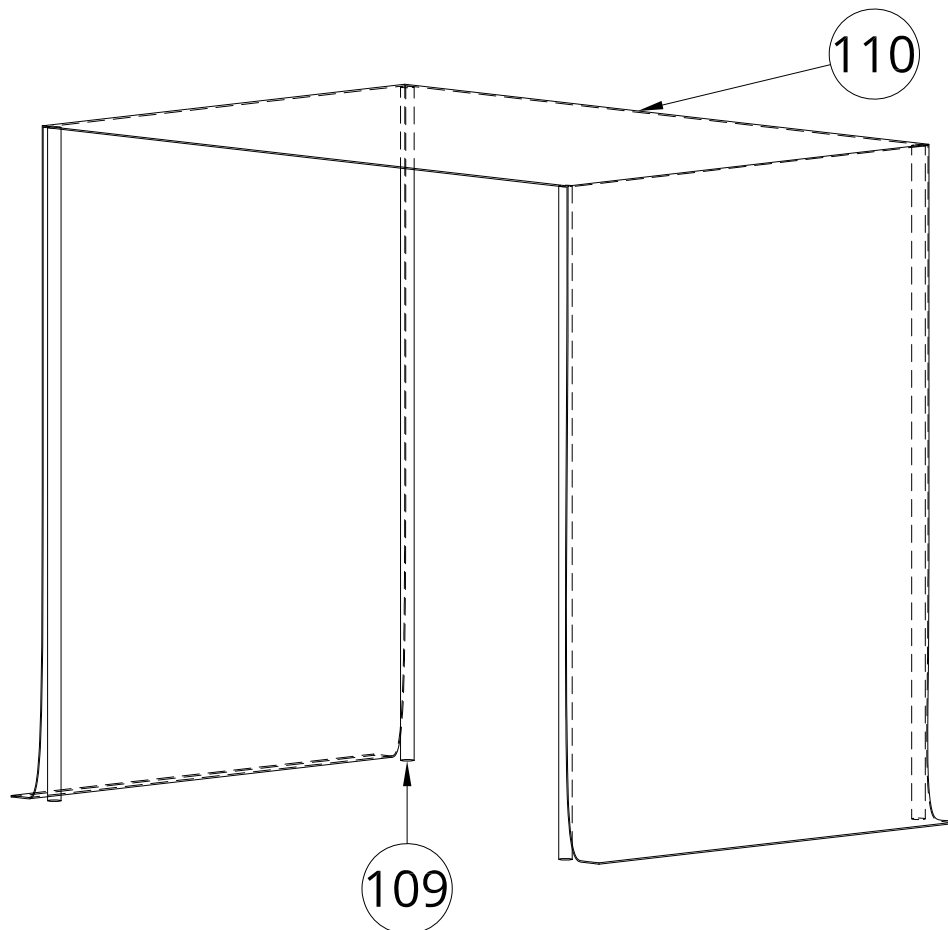
The grow trays should be an opaque plastic to prevent algae growth. They can be bought or made. Some examples of grow trays include:

- Water storage containers split in half (see below)
- Plastic bins



Shade Structure - Parts List

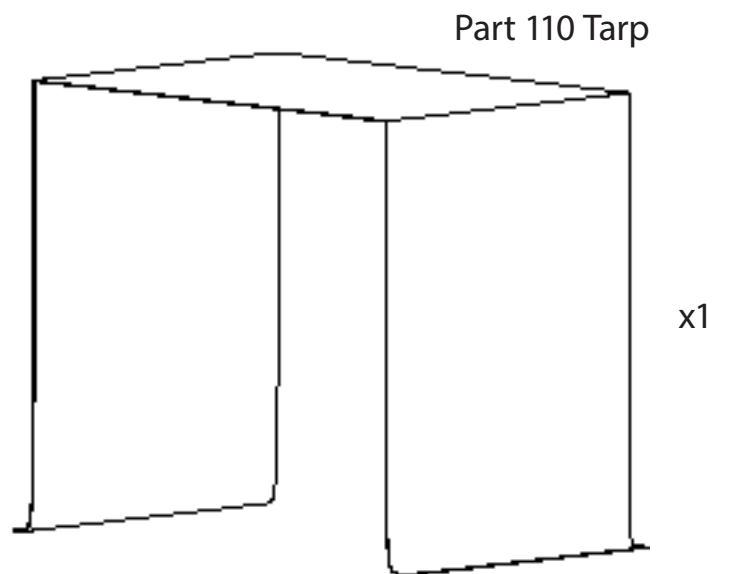
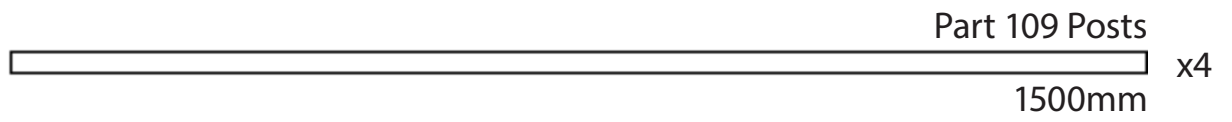
(Optional - For Outdoor Units Only)



Part Number	Quantity	Description
109	4	Posts Wood
110	1	Tarp

Posts and Tarp

(Optional - For Outdoor Units Only)

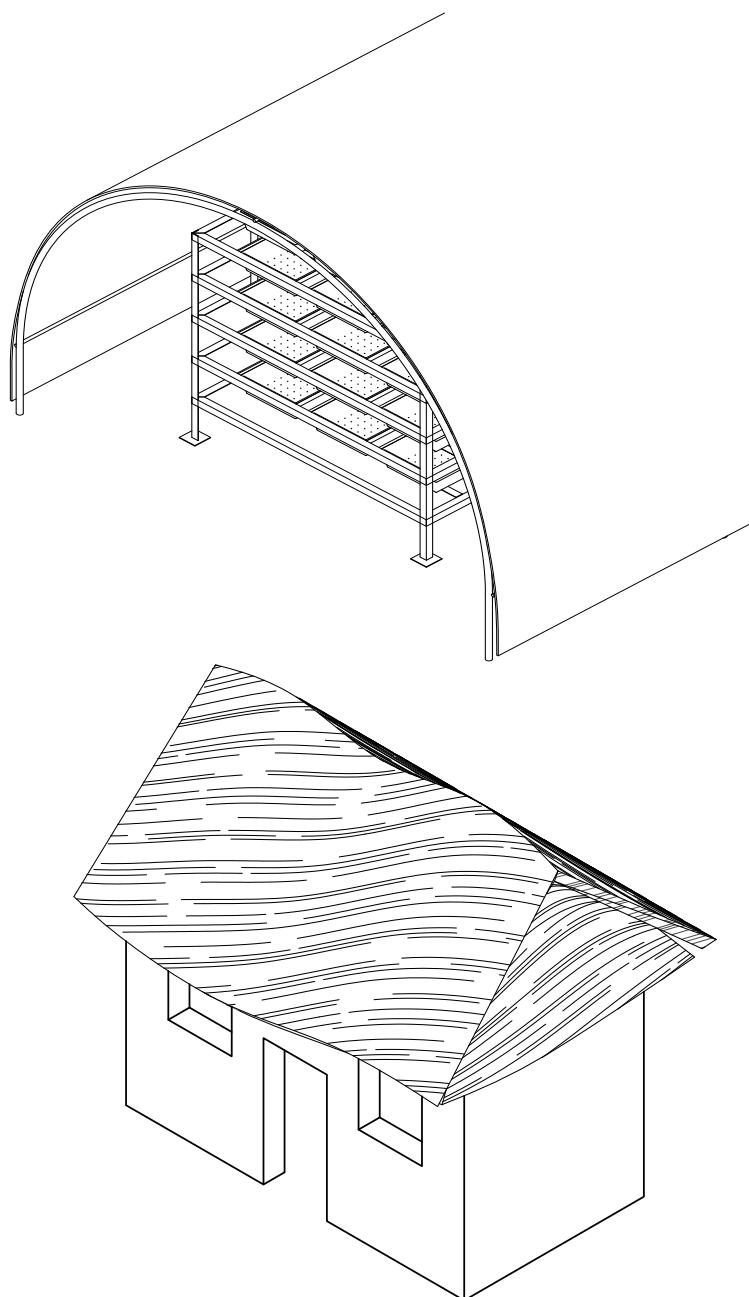




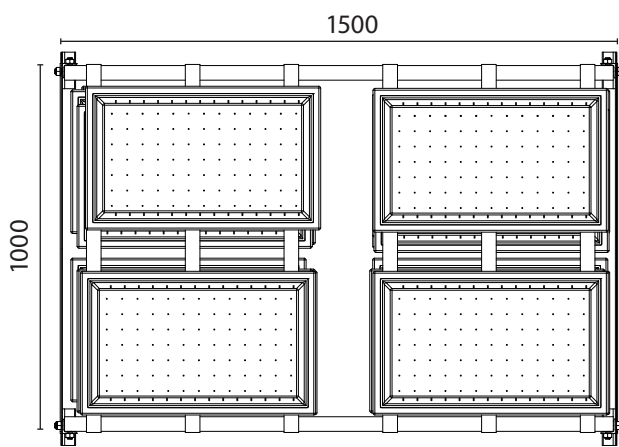
Alternative Shade Structures

Shade structures provide protection from the environment for units placed outdoors. Examples of alternative shade structures include:

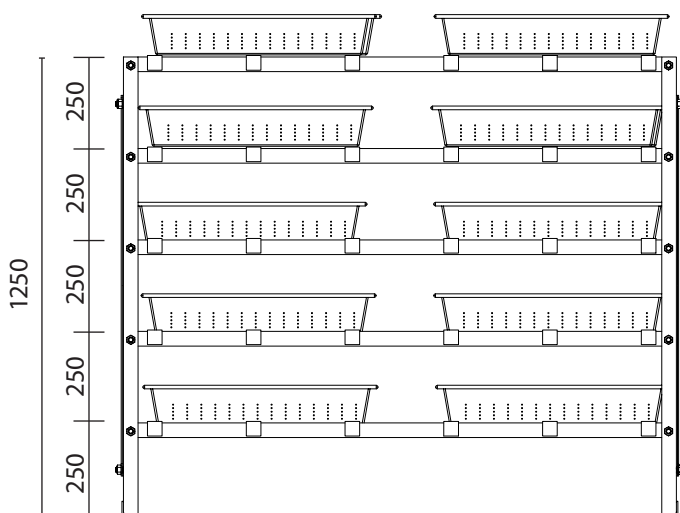
- A tent made with heavy fabric.
- Any well-ventilated building available (e.g., a house, a silo, or a school). No cover is needed if in a building.



How to size your unit

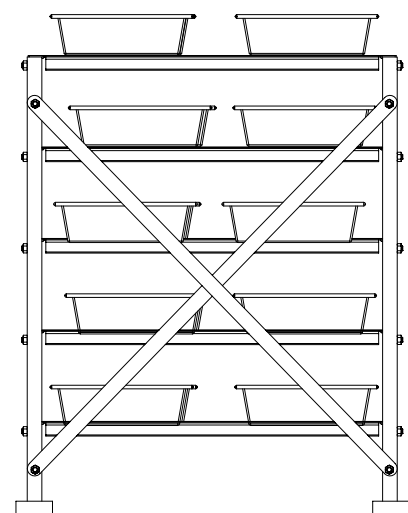


Top View



Front View

Minimum 60mm clearance
for sufficient airflow.



Side View

*All dimensions in millimeters

Where to place your unit

Clearance Requirements

Make sure your unit will fit where it will be located and transported.
For example, make sure your unit will fit through doorways.

Proximity to Water Source

Locate the unit close to a water source so that water is easily accessible.
Alternatively, a water tank could be located near your unit.

Level Ground or Platform

Locate the unit on ground that is well leveled.
If your budget allows, build a platform.

Protection from Children & the Environment

To ensure healthy and stable growth, keep unaccompanied children away from the unit. Your crops should also be protected from harsh environmental conditions, which may include:

Rain

Too much rain can cause your crops to rot.

Wind

Violent winds can tear or knock over your crops.

Sun Exposure

Avoid direct sunlight. Over exposure can cause your crops to wilt.

Dust

Avoid exposure to dust to keep your plants clean and edible.

Flood

If you are in an area that floods often, locate your unit above flood zones.

Protection from Animals

Avoid placing your unit where animals can easily access it and eat your crops.

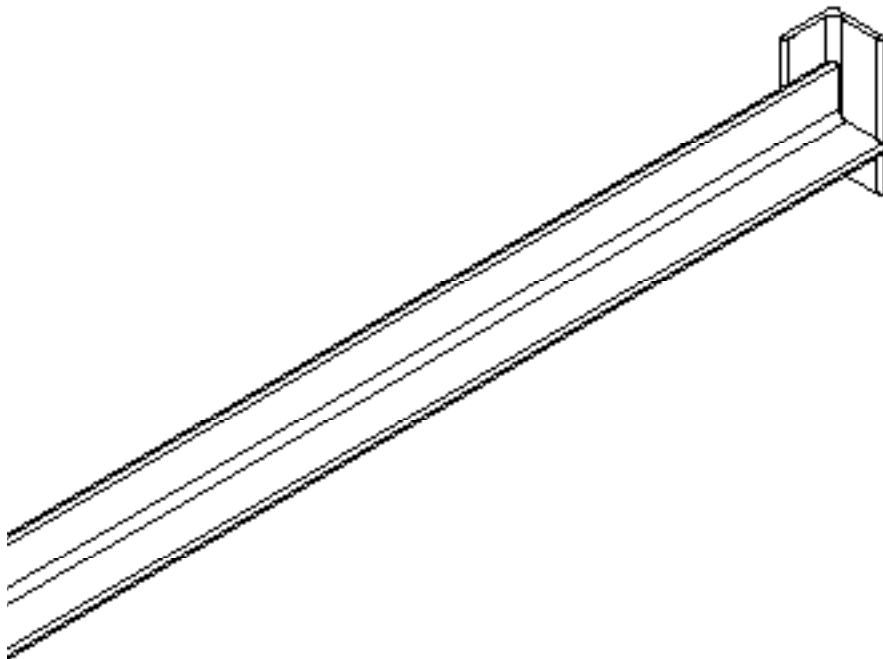
Protection from Vandalism

Avoid placing your unit where it may be vulnerable to malicious intentions (e.g., stone throwing, theft, destruction).

How to assemble your unit

Time to complete: 4 hours

1

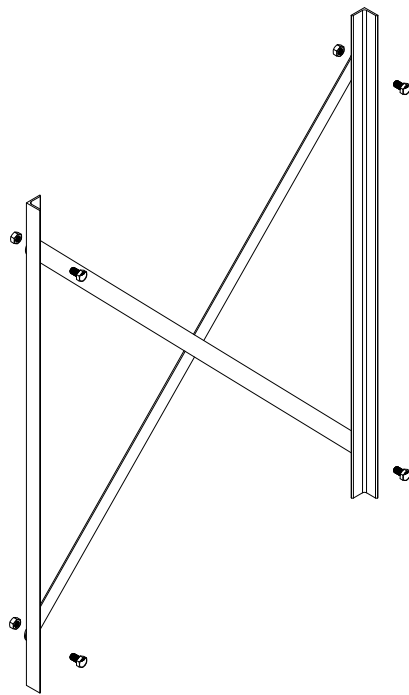


Weld one foot [Part 102] to one end of each column [Part 101] to make a total of four legs.

2

Part 103 Cross Beam

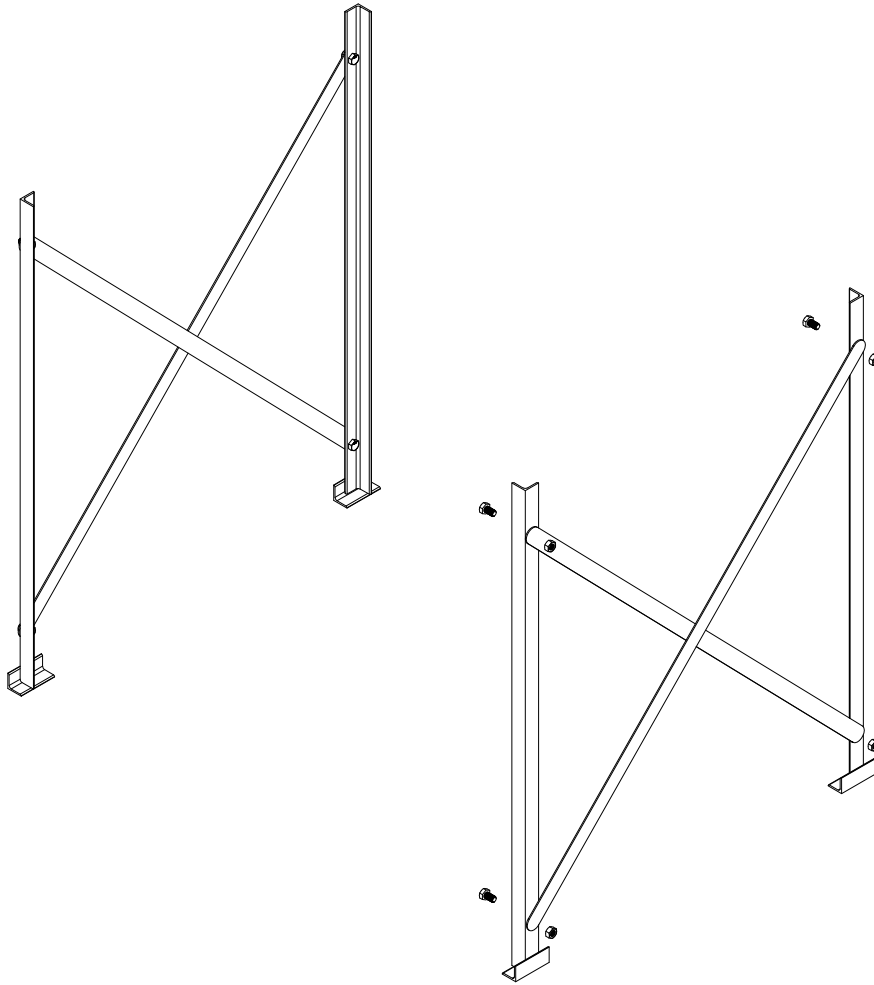
x2



Watch out for sharp
edges (e.g., nuts, bolts,
beam ends)

Fasten two legs with two cross beams [Part 103] with four nuts and bolts [Parts 106 and 107] to create the frame for the side wall.

3

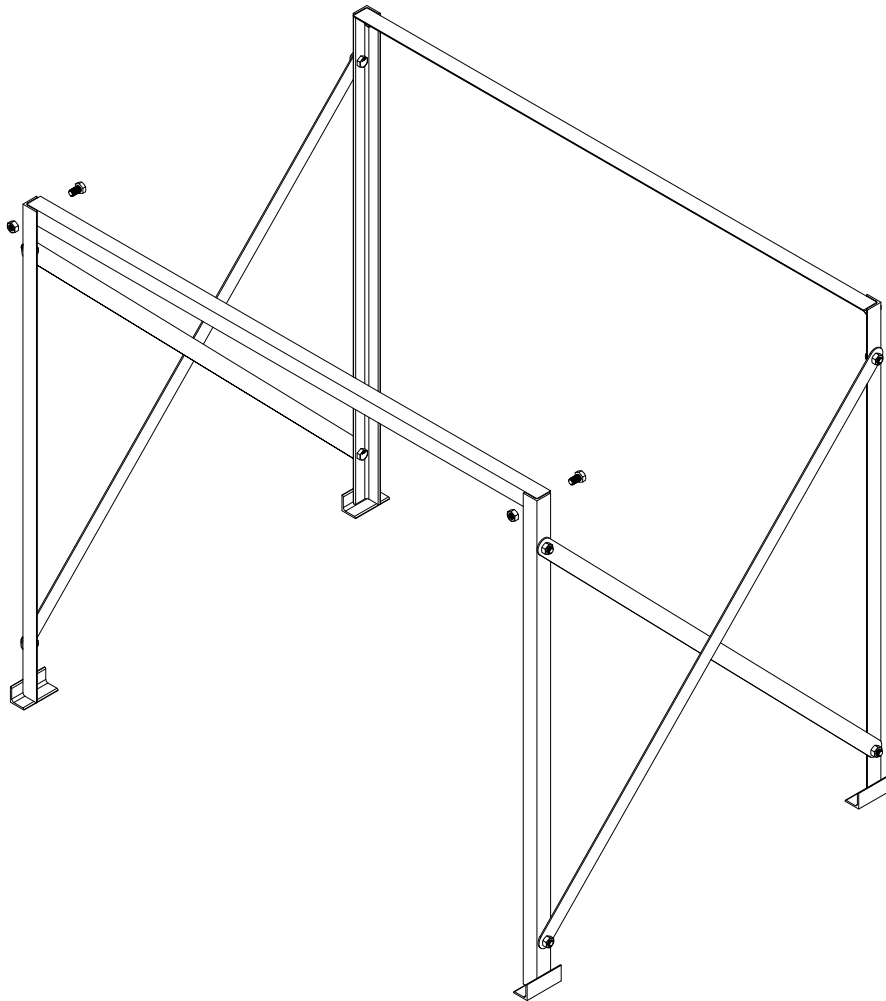


Repeat Step 2 to create the second side wall frame.

4

Part 104 Long Beam

x2



Starting from the top, fasten the long beams [Part 104] to the side wall frames.



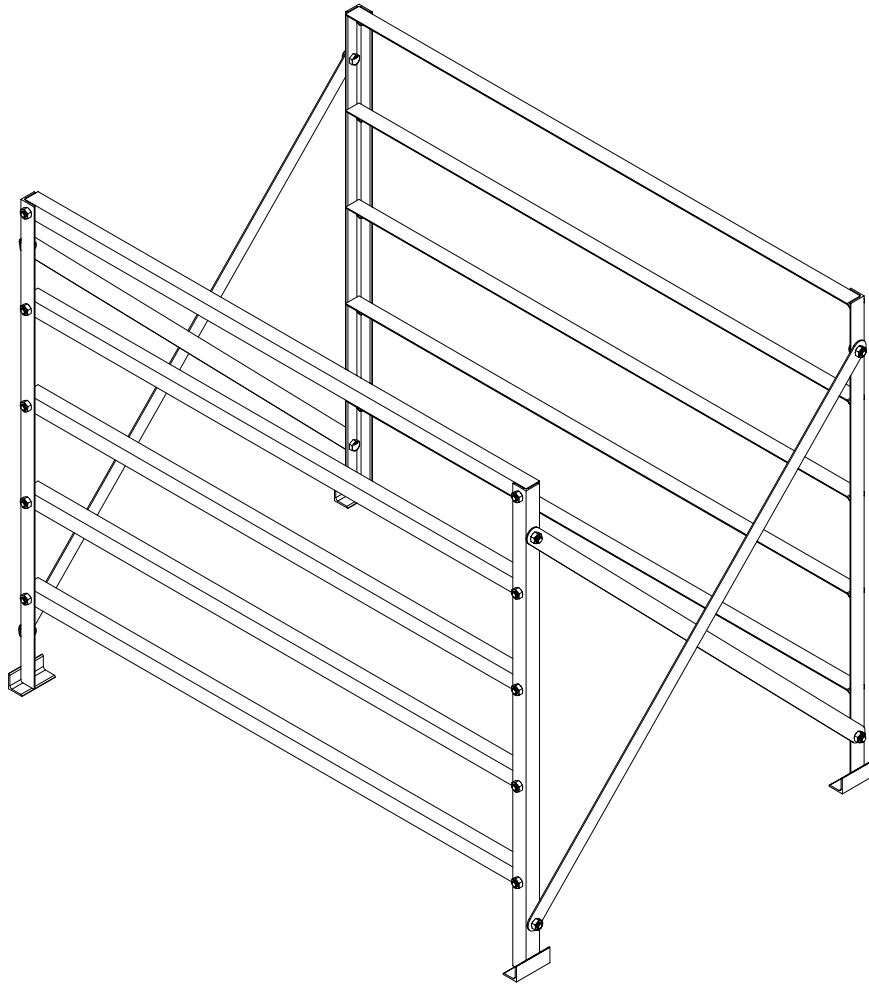
Fasten all connections tightly to make rack stable.

Make sure the long beams are level.

5

Part 104 Long Beam

x2



Fastening the remaining long beams to the side wall frames.



Fasten all connections
tightly to make rack stable.

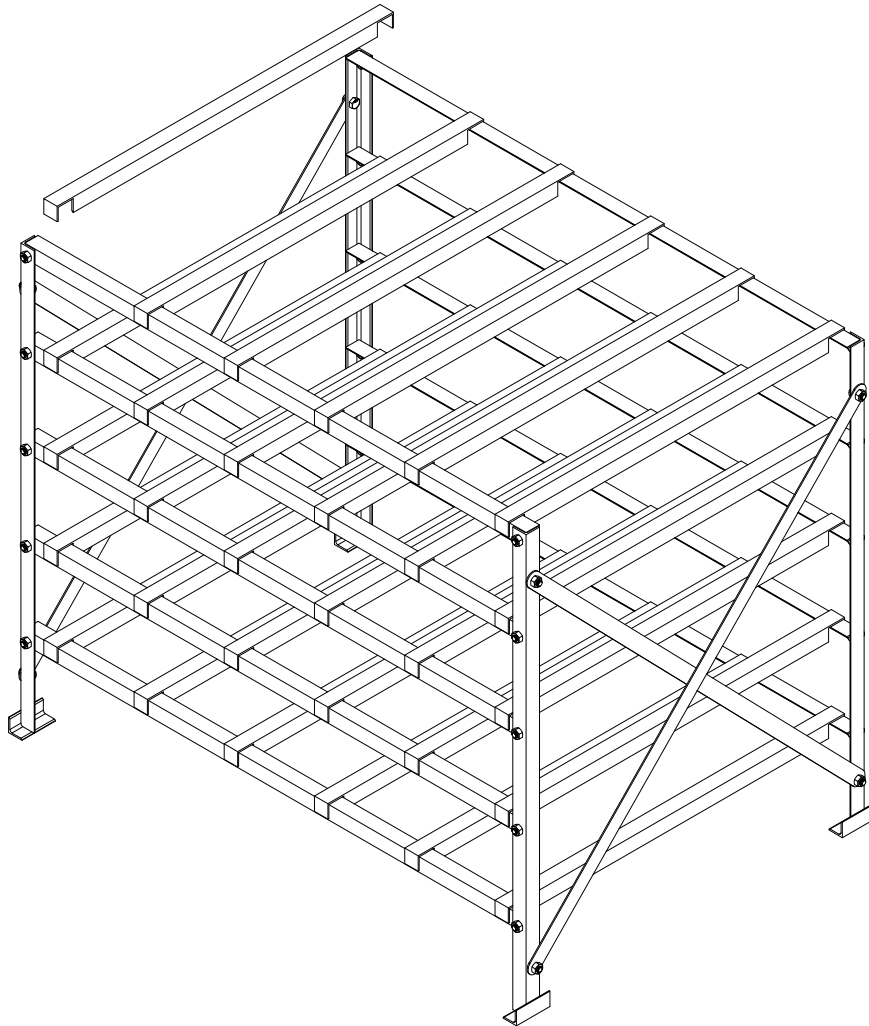
Make sure the long beams
are level.

6

Part 105 Short Beam

x25

1500mm

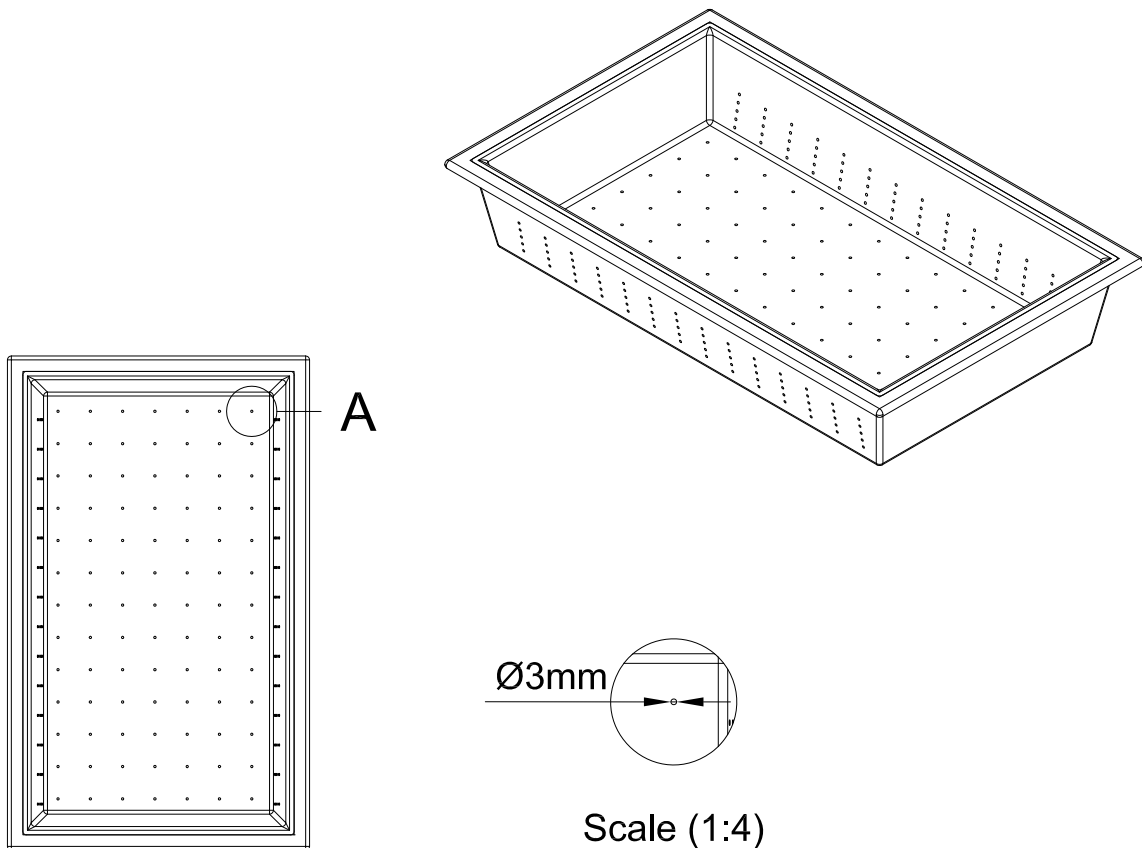
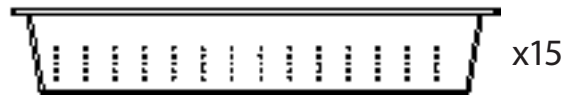


Place the short beams [Part 105] onto the long beams.



Make sure the beams are level

Part 108 Grow Tray



With the piercing tool, make holes through the bottom and sides of the grow tray [Part 108].

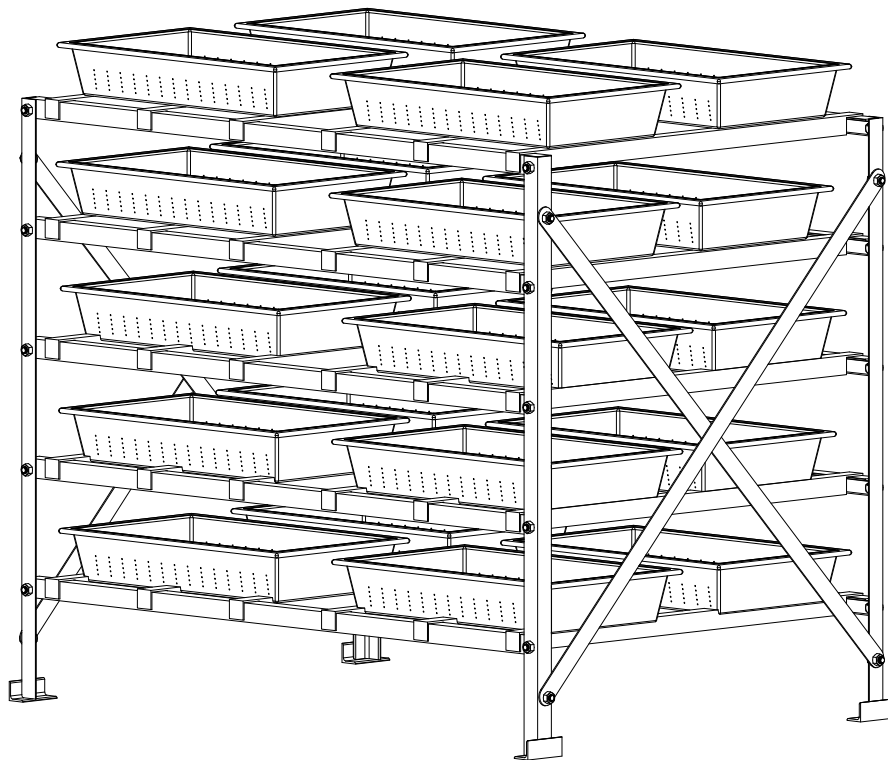


Notes about the grow tray holes

Hole diameter shown is approximate.

The holes are needed to drain the water so the crops do not get molded.

Size holes so that seeds do not fall out of the grow trays.



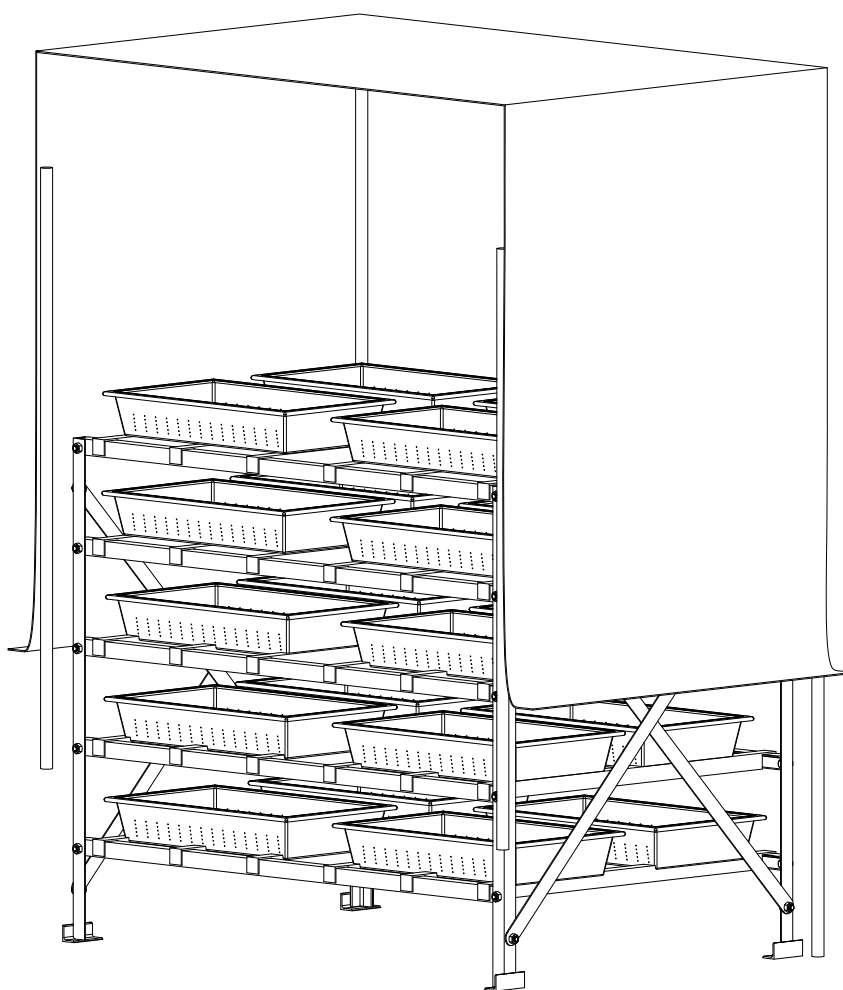
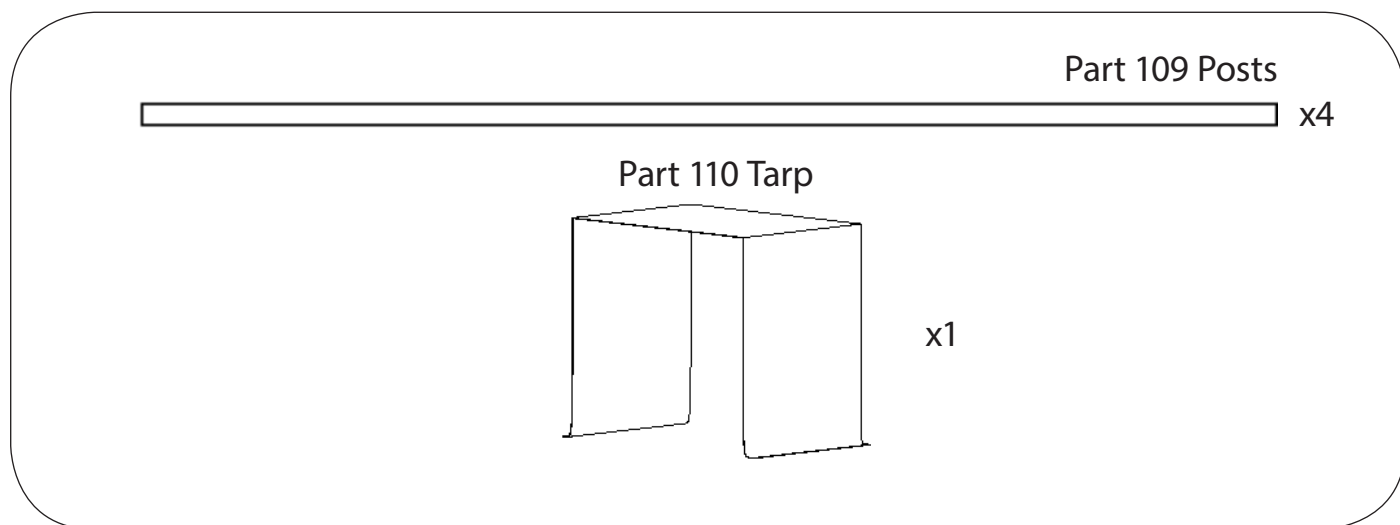
Add grow trays [Part 108] to the assembled unit. Adjust the short beams as needed to support the grow trays.

If your unit is in a well-ventilated building, unit construction is complete.

If your unit will be outdoors, continue building the shade structure.

How to Assemble Your Shade Structure

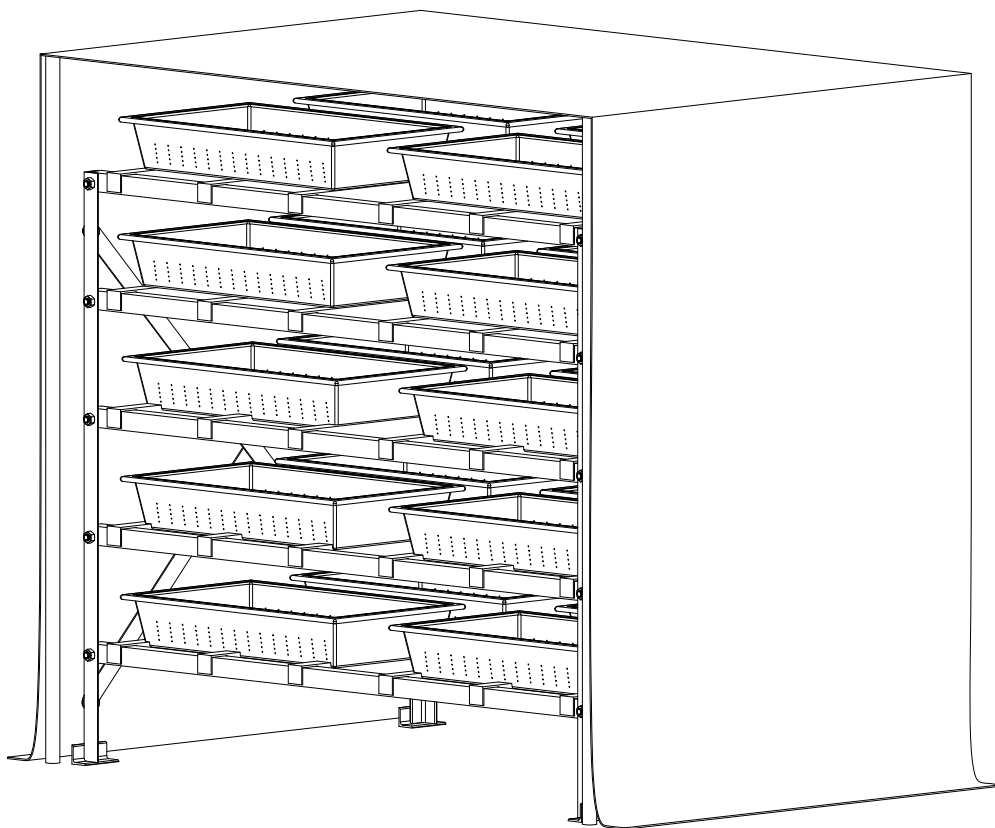
(Optional - For Outdoor Units Only)



Add the shade structure around the rack by driving wooden posts [Part 109] into the earth and covering the posts with the tarp [Part 110].

How to Assemble Your Shade Structure

(Optional - For Outdoor Units Only)



How to maintain your unit

- Check the level of the rack once a week.
- Check regularly for any rust and remove it when found.
- Clean the rack once a month to prevent growth of harmful pathogens.
- Check that the joints are intact.

INNOVATION ACCELERATOR

H₂Grow, the expert for hydroponic solutions, adapted to the needs of development or emergency contexts enables vulnerable communities to grow food anywhere to improve food-security and build resilience.

Contributors

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Contact Us

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