



Ætrium-4

Data Sheet 4/2022

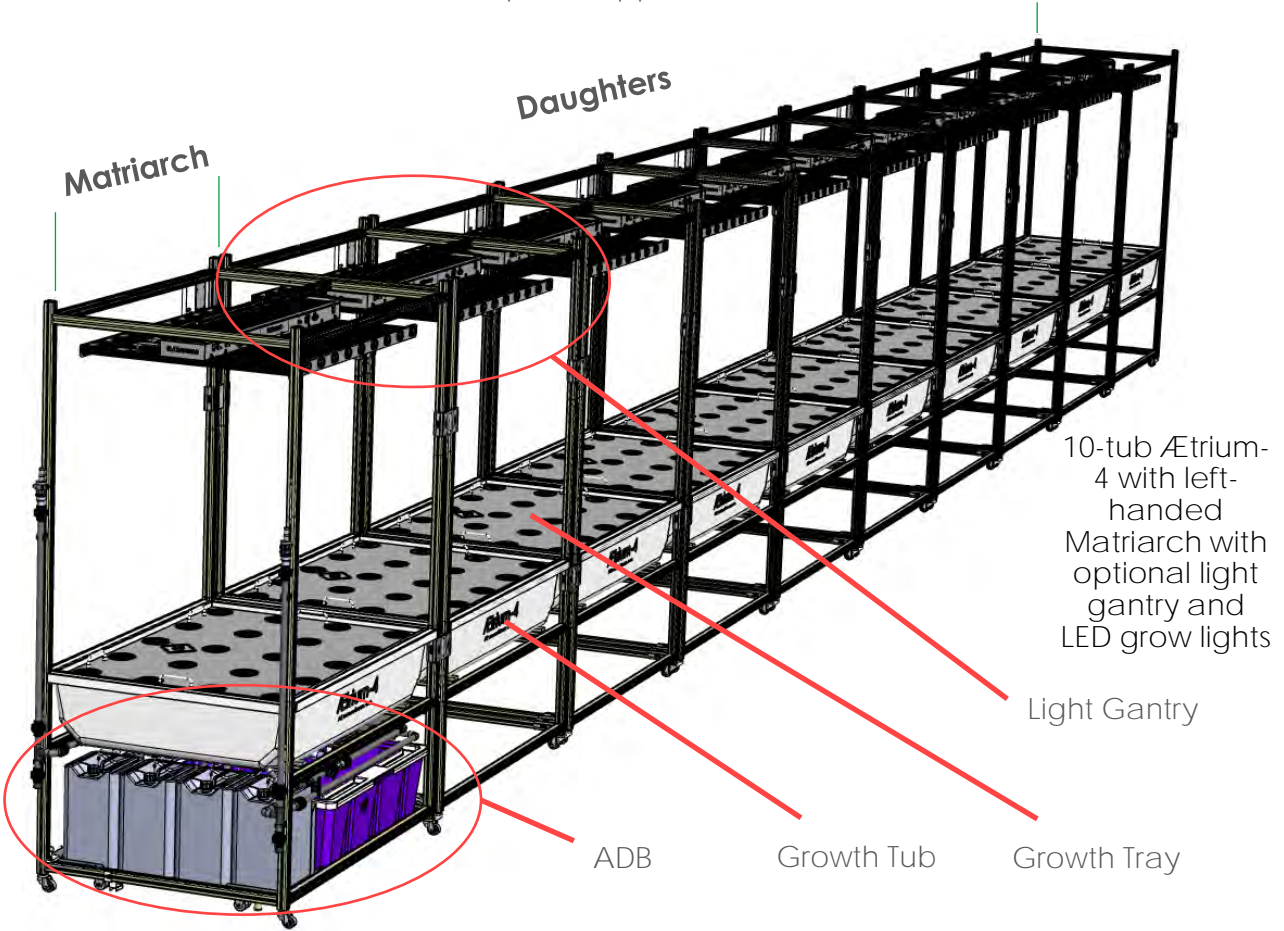
The Aetrium-4

The Aetrium-4 grows large plants for commercial harvest using advanced aeroponic technology and sensors.

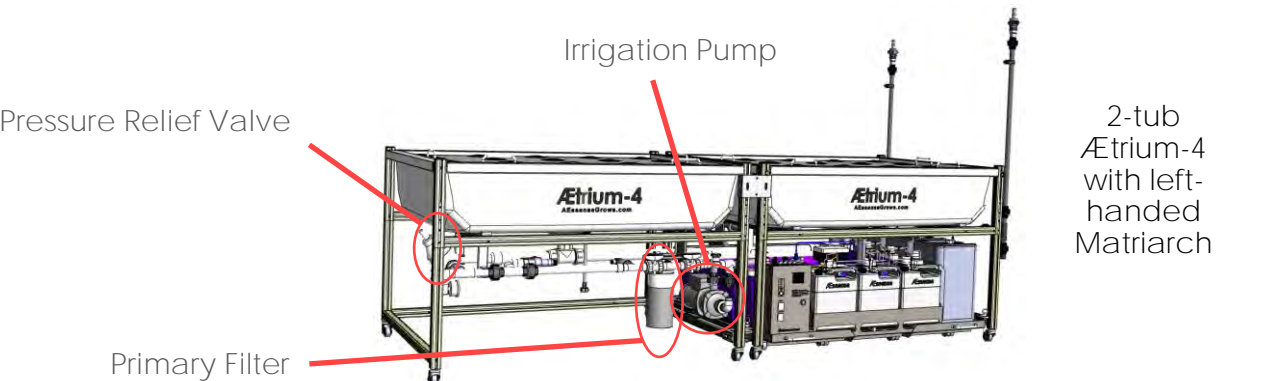
Aetrium-4 Components

Each Aetrium-4 row contains 1 **Matriarch** and 1 to 9 **Daughters**. The Aetrium Dosing Base (ADB) located under the **Matriarch** is the main engine of the Aetrium-4. It controls all water, air, and electrical operations.

Plants are cultivated in the **Growth Trays** located on top of the **Growth Tubs** which include the spray manifold system. The optional **Light Gantries** provide hard points for installing grow lights. If lights are suspended from the ceiling the optional trellis supports allow installation of trellis screen for plant support.



10-tub Aetrium-4 with left-handed Matriarch with optional light gantry and LED grow lights



2-tub Aetrium-4 with left-handed Matriarch

AEtrium Dosing Base (ADB) Components

The **ADB** may be left handed or right handed depending on the orientation of the **Matriarch**. It consists of the **Power Distribution Unit (PDU)**, a water **Reservoir**, **Dosing Bottles**, **Peristaltic Pumps**, and the **Water Sensing Electronics (WSE)**. The ADB is connected to the **AEtrium System Detector (ASD)** and the **Irrigation pump**.

Power Distribution Unit (PDU)

The **PDU** wirelessly links the **ADB** over a Wi-Fi access point to the server that runs the **Guardian™ Grow Manager (GGM)**. It gathers information from the **ASD** (AEtrium System Detector) and the **WSE** (Water Sensing Electronics) to directly control the **Irrigation Pump**, the mixing pump, the **Peristaltic (doser) Pumps** via the Stepper Motor (doser) Controllers (**SMC**), the grow lights, and external actuators. The **PDU** also controls the valves and the stir/drain pump which fill and drain the **Reservoir**.

Irrigation Pump

The **Irrigation Pump** moves the nutrient solution from the **Reservoir** through the pipes to the spray manifold within the **Growth Tubs**.

Mixer/Drain Pump

The mixer/drain pump provides for automatic draining of the reservoir or automatic mixing of the reservoir.

Reservoir

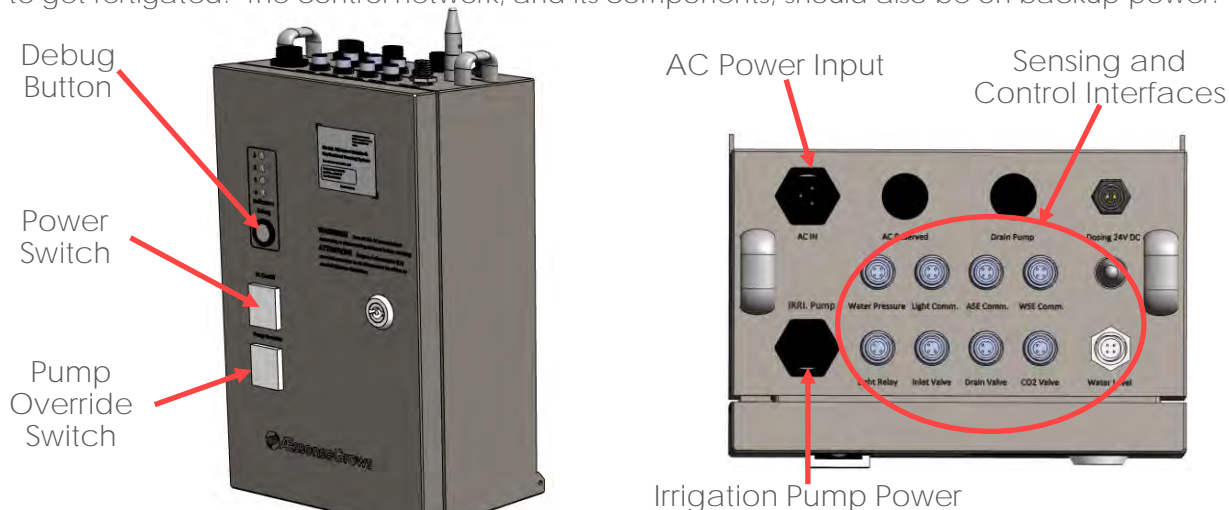
The **Reservoir** is the storage tank for the nutrient solution circulated through the **Growth Tubs**. To maintain optimal conditions of the nutrient solution to support healthy roots, a chiller is strongly recommended to control the reservoir temperature. Water chilling can be done by an optional stainless steel heat exchanger and solenoid using chilled water from a central source (automatically controlled by the GGM) or from a mechanical chiller.

Sensors

The **Water Pressure Sensors (WTP)**, the **Water Sensing Module (WSE)**, and the **AEtrium System Detector (ASD)** provide accurate feedback to the GGM on water pressure, level, pH, water temperature, electrical conductivity, air temperature, relative humidity, CO₂ level, and light intensity (ON/OFF).

Backup Power

In areas where one could suffer from loss of mains power it is highly recommended that the **Matriarch/ADB** be supplied with power from a backup source to assure that the plants continue to get fertigated. The control network, and its components, should also be on backup power.

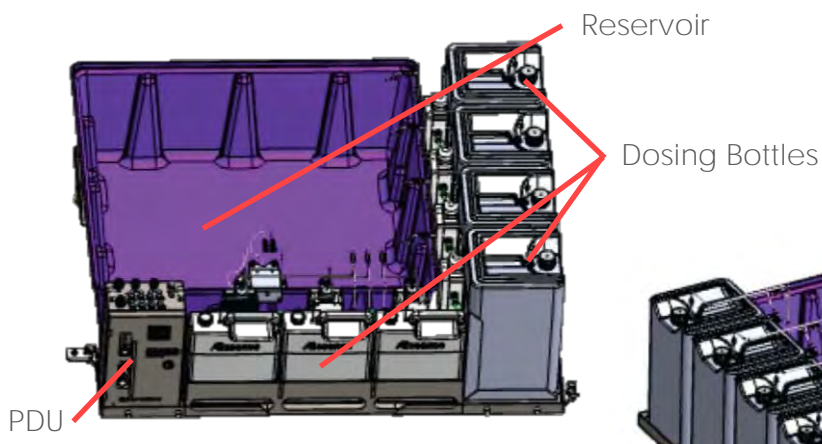


Power Distribution Unit (PDU)

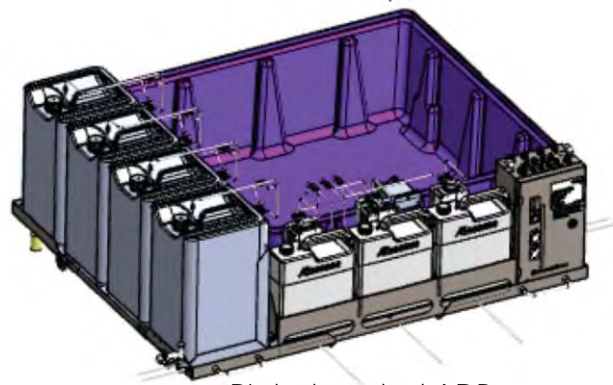
AEtrium-4 Datasheet

Specifications subject to change without notice

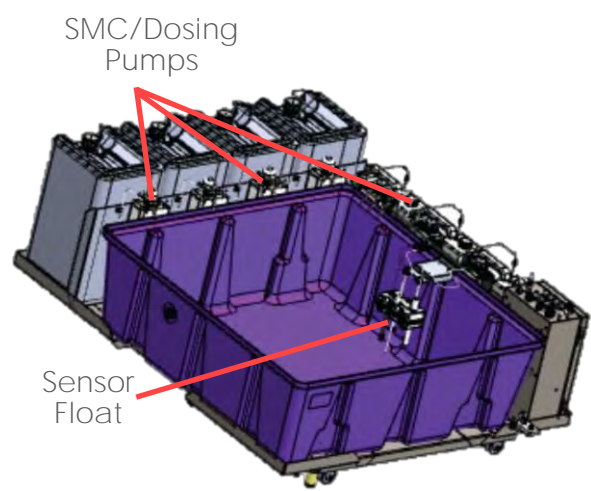
Ætrium Dosing Base (ADB) Components



Left-handed ADB



Right-handed ADB



Ætrium-4 configuration	Length	Width	Dry weight ¹
2 tubs	9'5" (2885 mm)	3'7" (1090 mm)	496 lbs (225 kg)
3 tubs	14'3" (4340 mm)	3'7" (1090 mm)	622 lbs (282 kg)
4 tubs	19' (5805 mm)	3'7" (1090 mm)	748 lbs (339 kg)
5 tubs	23' 10" (7270 mm)	3'7" (1090 mm)	874 lbs (396 kg)
6 tubs	28' 8" (8735 mm)	3'7" (1090 mm)	1,000 lbs (453 kg)
7 tubs	33' 6" (10200 mm)	3'7" (1090 mm)	1,126 lbs (510 kg)
8 tubs	38' 3" (11665 mm)	3'7" (1090 mm)	1,252 lbs (567 kg)
9 tubs	43' 1" (13130 mm)	3'7" (1090 mm)	1,378 lbs (624 kg)
10 tubs	47' 11" (14595 mm)	3'7" (1090 mm)	1,504 lbs (681 kg)

1. Not including ASD, Light Gantries, Trellis Support, Trellis Bars, V-wheels or uni-directional wheels

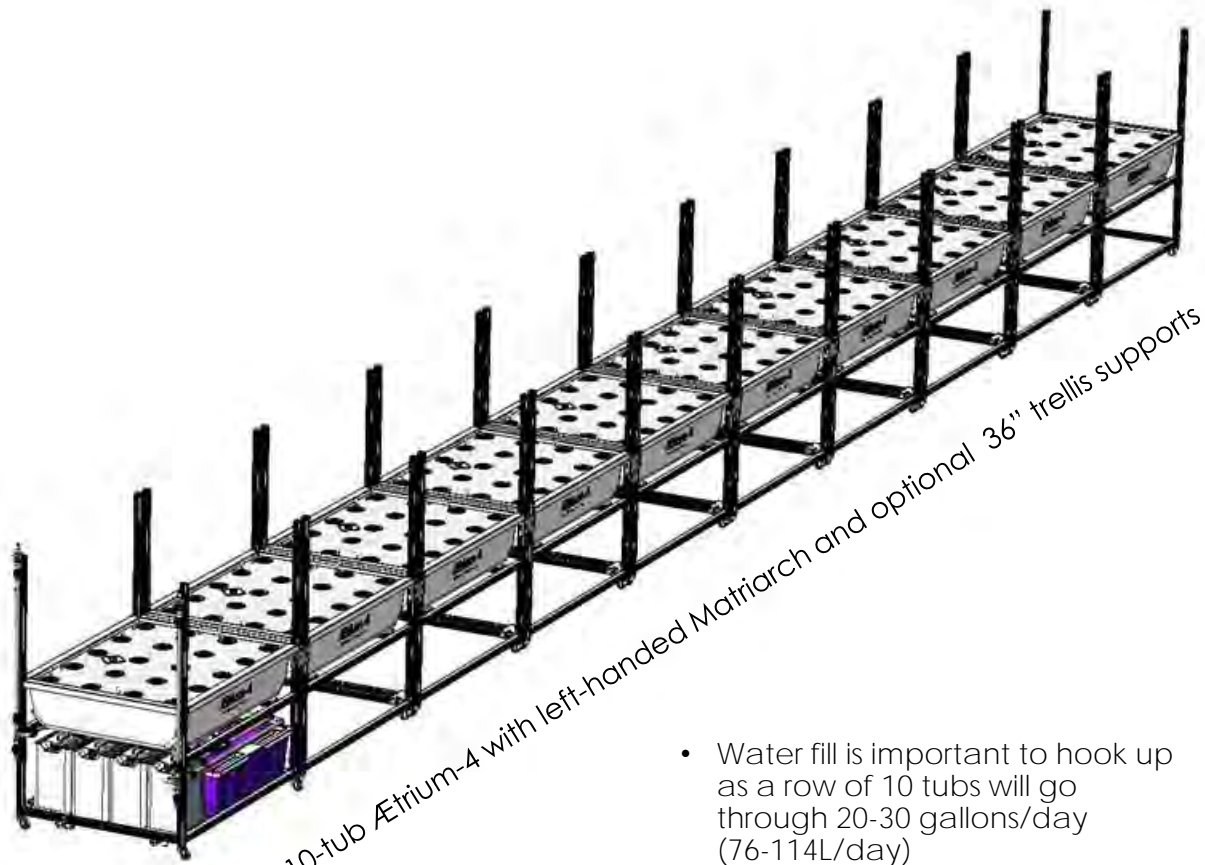
Ætrium-4 Specifications

Description	Min	Typ	Max
Recommended Ceiling Height	8' (2438mm)	12' (3658mm)	Unlimited
Offset from walls (front back sides)	30" (762mm)	36" (914mm)	Unlimited
Floor Slope	Floor must not be more than ¼" out of level over 10' non-cumulative		
Power Cord Length (good for 18' ceiling height & 3' aisle)	26' 4" (8000mm)		
Input voltage ¹	-	120 V _{AC}	-
Input frequency ¹	-	60 Hz	-
Current draw ¹ (120 V _{AC})	-	5-tub: 9.2A ² 10-tub: 12.5A ²	-
Wattage:			
5 tub ADB	10W	1,100W	
10 tub ADB	10W	1,600W	
Heat output	-	928 BTU/h ³	-
Total daily energy consumption ⁵	-	6.5 kWh ³	-
Total daily heat generation ⁵	-	22,200 BTU ³	-
Irrigation Pump flow rate	-	-	27 gal/min (102 lpm)
Irrigation Pump duty cycle range	0%	20%	100%
Water Consumption/Loss to transpiration (per Ætrium-4 tub/day ⁹)	2 (7.6L)	3 (11.4L)	
UL/CSA Certification ⁷	reference E491725		
CE Certificate Number	8227170919		

Description	Value
Operating temperature	34-104°F (1-40°C)
Storage temperature	34-176°F (1-80°C)
Water temperature	Range: 32-122°F (0-50°C) Resolution: 1°F (0.1°C)
Water pH	Range: 0-14 pH Resolution: 0.01 pH
Water Electrical Conductivity (EC)	Range: Range: 2-20,000 µS/cm
Supplied water (EC)	<250µS/cm ⁸
Tray dimensions (inner) (L x W)	51" x 38" (1300 mm x 970 mm)
Tray dimensions (outer) (L x W)	56" x 43" (1420 mm x 1090 mm)
Tray area	16.7 sq ft (1.55 m ²)

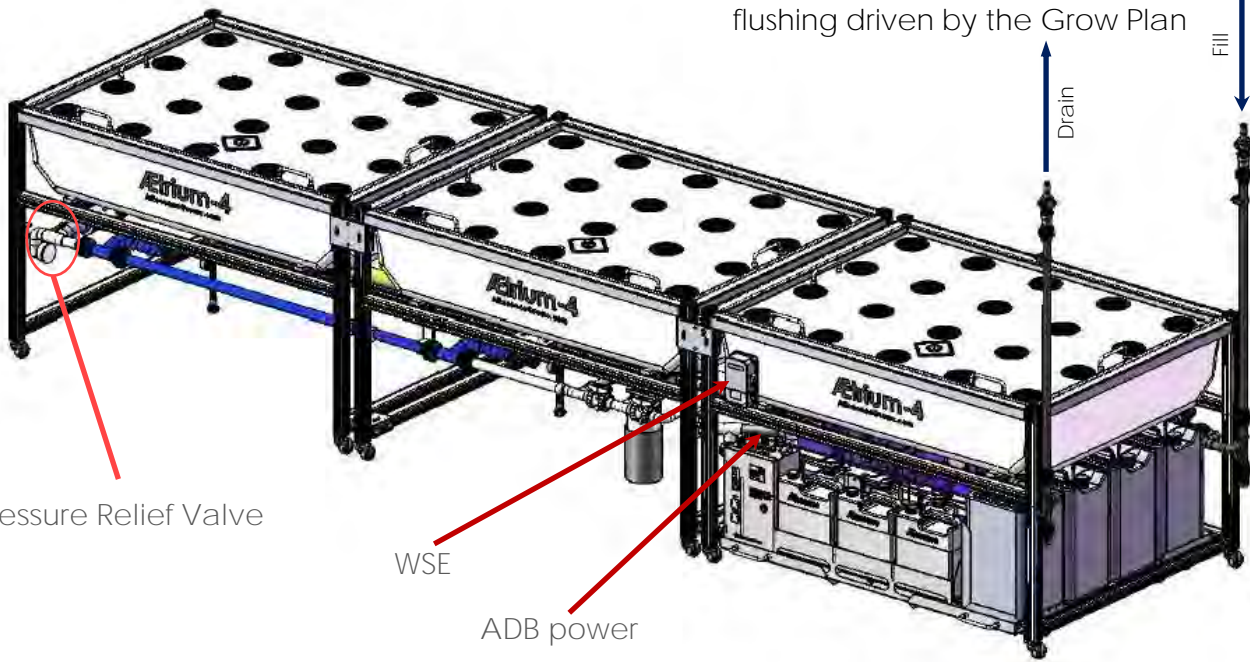
- North America only
- In-rush current after the irrigation pump is turned on
- 20% irrigation duty cycle (Irrigation Pump on for 1 min, off for 4 mins)
- 100% irrigation duty cycle (Irrigation Pump always on)
- Uninterrupted operation for 24 hours
- Wired communication line based on RS-485
- UL certificate number: 20180604-E491725
- It is highly recommended that one do a complete analysis of the supplied water prior to commencing cultivation. One may need to condition the water to reduce the conductivity of it for best cultivation results.
- Dependent on the crop, density, cultural practices, and environmental conditions
- On supplied casters, unidirectional wheels add 2" (50mm) to the total height

Description	Value
Max. plant count per tray	20
Reservoir capacity	50 gal (190 l)
Dosing Bottle capacity (bottles #1 - #4)	5 gal (20 l)
Dosing Bottle capacity (bottles #5 - #7)	1 gal (4 l)
Maximum pH up solution	30% potassium hydroxide (KOH) or equivalent
Maximum pH down solution	10% nitric acid (HNO ₃) or equivalent
# of Dosing Bottles/Peristaltic Doser Pumps	7
Primary Filter material	Polypropylene frame 304 Stainless mesh
Primary Filter size	80 mesh (0.18mm)
Automatic Drain pump: the ADU can automatically complete a change out of the fertigation solution	
Max. drain pumping height	14.7' (4.5 m)
Flow rate	1.7 gal/min (6.4 lpm)
Connection Hose Barb (uses 5/8" garden hose)	5/8" OD (16mm OD)
Automatic Water Fill: the ADU automatically senses water level and will add water using a provided solenoid when water levels slip below allowable levels	
Water Fill	30-50psi @2.2gpm (2-3bar, 8.3lpm)
Input Flow/pressure	
Connection Hose Barb (uses 5/8" garden hose)	5/8" OD (16mm OD)
Light comm. interface	AES Link ⁶
Relay comm. interface	24VDC
ADB dimensions (L x W x H)	51.6" x 42.5" x 19.7" (1310 mm x 1080 mm x 500 mm)
ADB dry weight	220 lbs (100 kg)
Ætrium-4 height	35" (889 mm)
Ætrium-4 height ¹⁰ (with trellis support)	5' 10" (1760 mm)
Ætrium-4 height ¹⁰ (with 8' light gantries)	7' 7" (2308 mm)
Ætrium-4 height ¹⁰ (with 10' light gantries)	9' 7" (2914 mm)
Daughter weight	126 lbs (57 kg)
8' Light Gantry weight	44 lbs (20 kg)
Trellis Support weight	14 lbs (6.4 kg)
Trellis Bars weight	20 lbs (9.1 kg)



10-tub Aetrium-4 with left-handed Matriarch and optional 36" trellis supports

- Water fill is important to hook up as a row of 10 tubs will go through 20-30 gallons/day (76-114L/day)
- Water drain allows automated flushing driven by the Grow Plan



Pressure Relief Valve

WSE

ADB power

3-tub Aetrium-4 with left-handed Matriarch

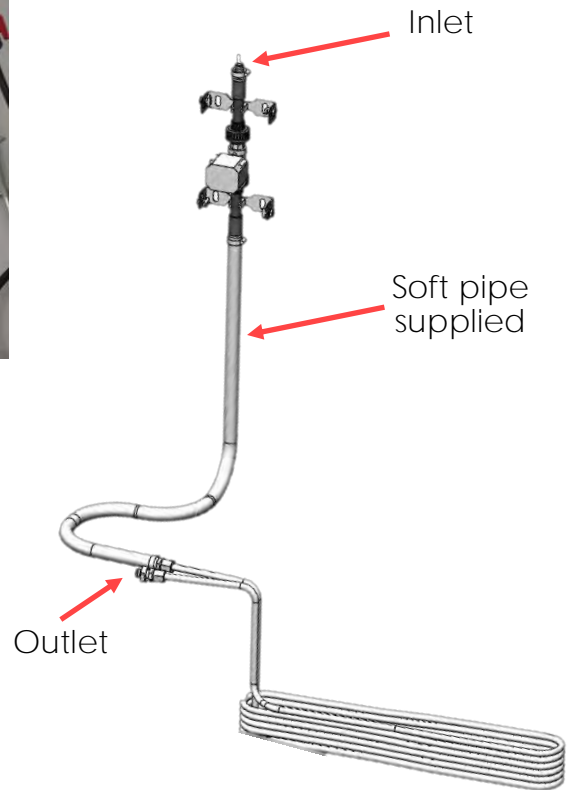
Ætrium-4 Liquid Line Connections



Supply Water
(flex PVC pipe
or similar,
customer
supplied)

Drain Water
(flex PVC pipe
or similar,
customer
supplied)

- Note: now the supply and drain line both terminate at the front of the AÆtrium-4 Matriarch
- Flexible lines allow the AÆtrium-4 rows to move back and forth



Description	Value
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Cooling Coil: the optional cooling coil can help to control reservoir temperature below the room temperature

Chilled water supply
(chilled water must be supplied by the customer) <45°F (7°C)

Flow rate 2.6-3.2 gal/min (10-12lpm)

Connection Hose Barb (uses 5/8" garden hose) 5/8" OD (16mm OD)

Heat Generated
(@ferrigation frequency of 1/5min up to 1/15min) 1,150 BTU/hr for a 10 tub row

- Optional Cooling Coil and hardware PN 300-00227-03

Left-Handed Ætrium-4 Hookups and Dimensions

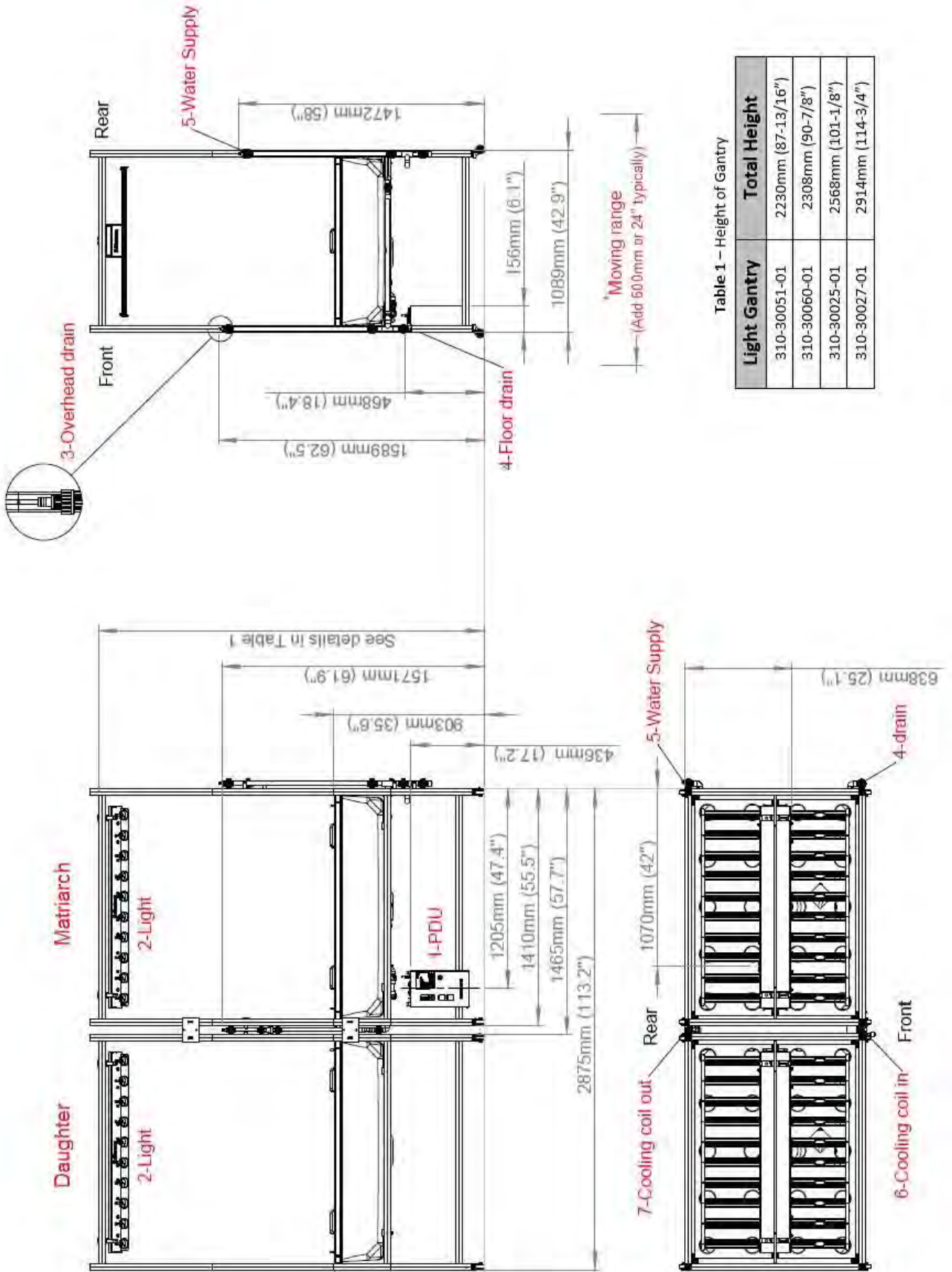
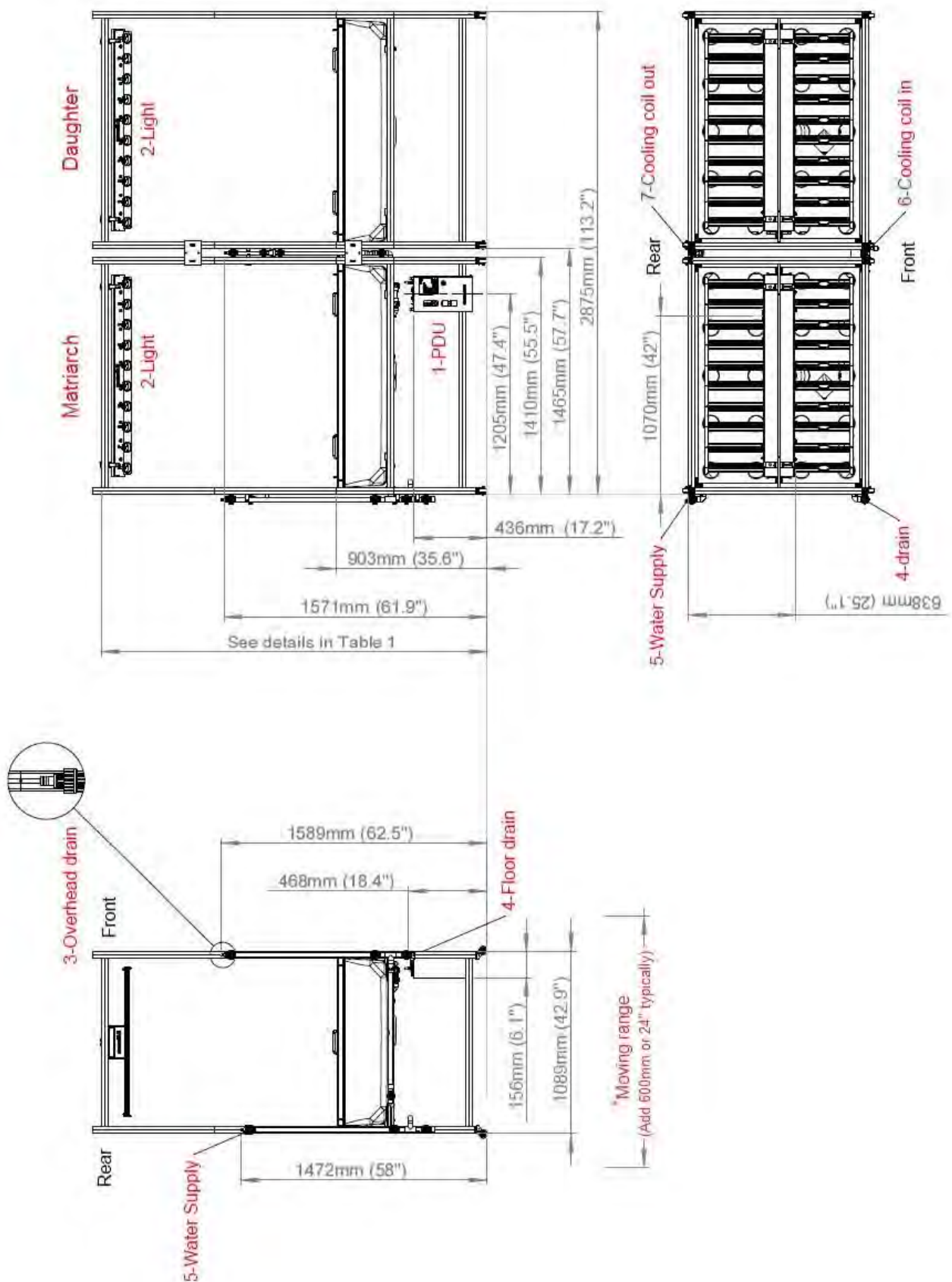


Table 1 – Height of Gantry

Light Gantry	Total Height
310-30051-01	2230mm (87-13/16")
310-30060-01	2308mm (90-7/8")
310-30025-01	2568mm (101-1/8")
310-30027-01	2914mm (114-3/4")

Right-Handed Ætrium-4 Hookups and Dimensions



Typical AEtrium-4 Shipping Configuration

Major AEtrium-4 components	Dimensions (L x W x H)	Weight
Packaged and palletized Matriarch	57" x 45" x 37" (1450 mm x 1140 mm x 920 mm)	450 lbs (204 kg)
Packaged and palletized Daughters	57" x 45" x 48" (1450 mm x 1140 mm x 1210 mm)	480 lbs (218 kg)
Packaged Light Gantry	59" x 9.5" x 3.25" (1500 mm x 240 mm x 80 mm)	44 lbs (20 kg)
Packaged Trellis Support	34" x 3.25" x 3.25" (855 mm x 80 mm x 80 mm)	14 lbs (6.4 kg)
Packaged Trellis Bars	59" x 6" x 3.25" (1500 mm x 150 mm x 80 mm)	20 lbs (9.1 kg)

AEtrium-4 Shipping and installation

The AEtrium-4 Matriarchs ship assembled one per pallet. The AEtrium-4 Daughters ship 3 per pallet and require about 10-15 minutes of assembly per Daughter tub.

- Door size for installation: Grow room doors are recommended to be 48" wide to accommodate the wheeled AEtrium-4 tubs.



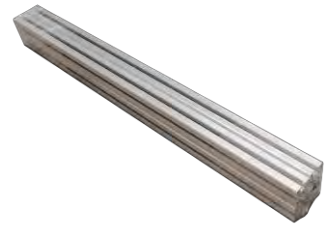
Packaged AEtrium-4 Matriarch



Packaged AEtrium-4 Daughters (3 sets)



Packaged Light Gantry (1 set)



Packaged Trellis Support (1 set)



Packaged Trellis Bars (1 set)

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