

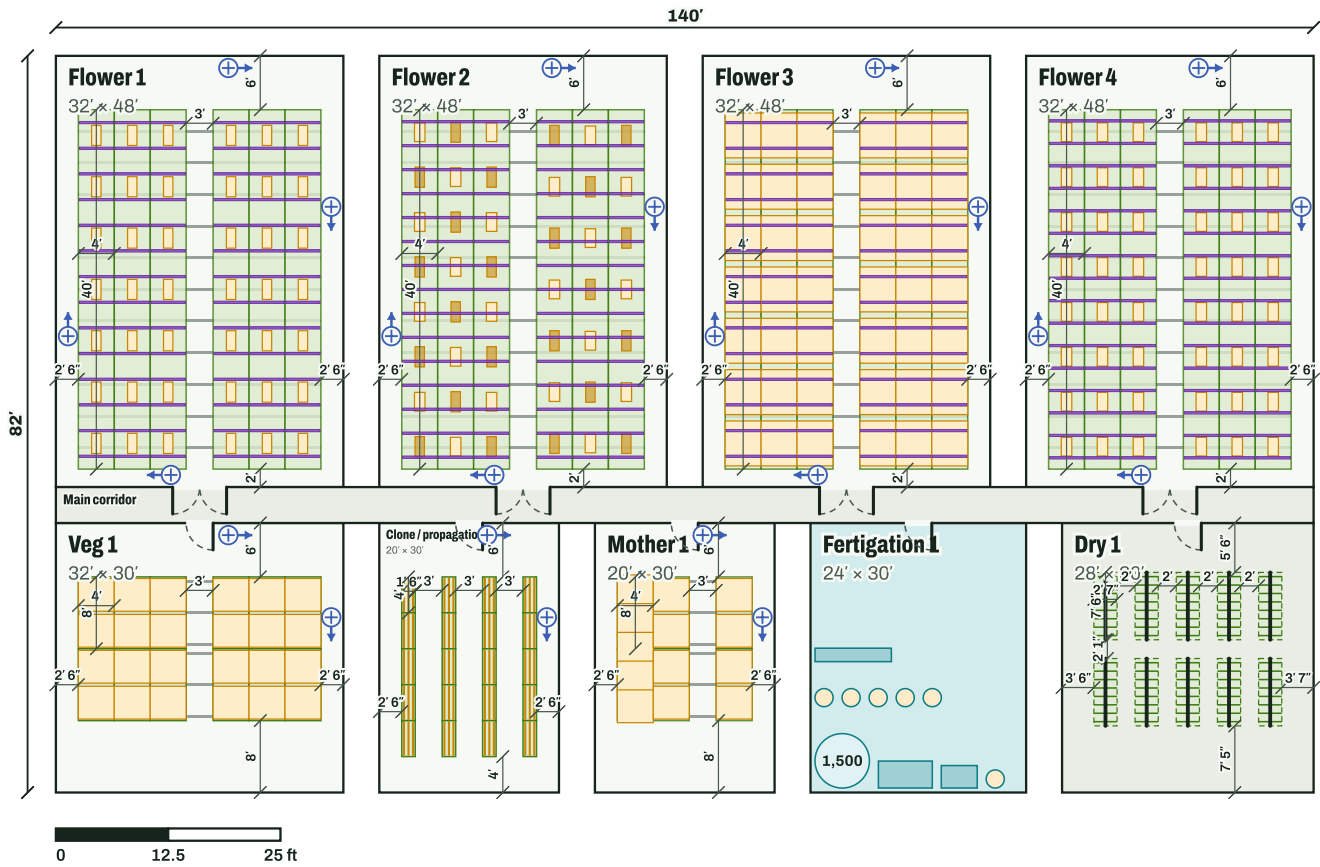
Demo Cultivation – 4 flower rooms

Demo Cultivation Co., Orlando, FL 32801

Facility design summary

October 28, 2026

5,664^{sf} Canopy	14,934 Plants
502 Fixtures	246.6^{kw} Lighting load 841,502 BTU/hr of heat; 263.8 kW nameplate for circuits
89.6^{tons} Cooling (prelim.)	13,460^{ppd} Dehumidification, full buildout (prelim.) every room, as standalone dehumidifiers rated at 80°F / 60%
13^{ppd} Dehumidifiers, rated (prelim.) Fertigation 1	400.1^{pints/h} Heat pump water removal at peak (prelim.) Flower 1, Flower 2, Flower 3, Flower 4, Veg 1, Clone / propagation 1, Mother 1 and Dry 1
644^{gal/day} Irrigation	927^{GPD} RO size needed 909 gal/day source water, 136 gal/day to drain



Hydro Supply Co.
Facility design

Demo Cultivation – 4 flower rooms

Site plan

Client

Demo Cultivation Co.

Site address

Orlando, FL 32801

Date

October 28, 2026

Prepared by

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Rooms

10

Room floor area

10,424 sf

Canopy

5,664 sf

Plants

14,934

Light fixtures

502

Lighting load

246.6 kW

Bench or rack

Light fixture

Door and swing

Fan

Dimension, ft and in

Planning layout for equipment sizing. Not a construction drawing: confirm every dimension on site before building.

Room

Type

Size, ft

sf

Flower 1

Flower

32 x 48

1,536

Flower 2

Flower

32 x 48

1,536

Flower 3

Flower

32 x 48

1,536

Flower 4

Flower

32 x 48

1,536

Veg 1

Veg

32 x 30

960

Clone / propagation 1

Clone / propagation

20 x 30

600

Mother 1

Mother

20 x 30

600

Dry 1

Dry

28 x 30

840

Fertigation 1

Fertigation

24 x 30

720

Main corridor

Hallway

140 x 4

560

Room schedule

Room	Type	Size	Benching	Medium	Canopy	Plants	Fixtures	Light cycle	Runs/yr	PPFD	kW lit	Cooling	Dehu	Water/day
Flower 1	Flower	32.0' × 48.0'	6 × 4' × 40' V-Track, 1 tier	Rockwool, 4" block on 6" block	960 sf	252	42 × Matrix Vega 1000W Dyna + 84 × Flexstar Under Canopy 120W R8W	12/12	5.2	1,001 DLI 43.2 +288 under	45.4 52.1 rated	16.3 t	71.2 pints/h	107 gal
Flower 2	Flower	32.0' × 48.0'	6 × 4' × 40' V-Track, 1 tier	Rockwool, 4" block on 6" block	960 sf	270	45 × Matrix DE 1000W (HPS) + 90 × Flexstar Under Canopy 120W R8W	12/12	5.2	1,009 DLI 43.6 +309 under	54.0 57.7 rated	19.1 t	76.1 pints/h	114 gal
Flower 3	Flower	32.0' × 48.0'	6 × 4' × 40' V-Track, 1 tier	Rockwool, 4" block on 6" block	960 sf	252	42 × Matrix M8 Dyna 4-Channel 1000W + 84 × Flexstar Under Canopy 120W R8W	12/12	5.2	1,001 DLI 43.2 +288 under	45.4 52.1 rated	16.3 t	71.2 pints/h	107 gal
Flower 4	Flower	32.0' × 48.0'	6 × 4' × 40' V-Track, 1 tier	Rockwool, 4" block on 6" block	960 sf	288	48 × Matrix DE 1000W (HPS) + 96 × Flexstar Under Canopy 120W R8W	12/12	5.2	1,006 DLI 43.5 +329 under	63.6	22.3 t	81.1 pints/h	122 gal
Veg 1	Veg	32.0' × 30.0'	12 × 4' × 8' V-Track, 3 tiers	Rockwool, 4" block	1,152 sf	2,304	72 × Matrix M4 400W	18/6	11.8	686 DLI 44.5	28.8	10.2 t	63.9 pints/h	146 gal
Clone / propagation 1	Clone / propagation	20.0' × 30.0'	20 × 1.5' × 4' racks, 4 tiers	Rockwool, 1" plug in tray	480 sf	11,520	240 × Matrix 18W Clone Bar	18/6	22.8	181 DLI 11.7	4.3	2.0 t	20.1 pints/h	46 gal
Mother 1	Mother	20.0' × 30.0'	6 × 4' × 8' V-Track, 1 tier	Rockwool, 4" block	192 sf	48	13 × Matrix M4 400W	18/6	—	743 DLI 48.2	5.2	2.3 t	2.0 pints/h	3 gal
Dry 1	Dry	28.0' × 30.0'	10 ceiling-hung hang racks, 3 levels	—	—	holds 1,440	—	—	—	—	—	0.5 t	14.5 pints/h	—
Fertigation 1	Fertigation	24.0' × 30.0'	—	—	—	—	—	—	—	—	—	0.3 t	13 ppd	—
Main corridor	Hallway	140.0' × 4.0'	—	—	—	—	—	—	—	—	—	0.3 t	10 ppd	—

Equipment schedule

Room	Item	Brand and model	Specs	Qty
Flower 1	Lights	Matrix Vega 1000W Dyna	840 W lit, 1,000 W nameplate (840 W main + 105 W far-red (7 min after lights-off) + 55 W UV (not used)), 2,500 μmol/s	42

Room	Item	Brand and model	Specs	Qty
	Under-canopy	Flexstar Under Canopy 120W R8W	120 W, 360 µmol/s, 46" bar, 14 per bench	84
	Benching	Hydro Supply Co. custom benching	V-Track benches on floor tracks, 4' × 40'	6
	Benching	Floor tracks	27' long	11
	Heat pump	VKIN UCHA-60HTD	4.5 tons cooling, 29.6 pints/h	7
	Fans	Patterson E18-W-9010	18", 622 W, 3,800 CFM, wall mount	4
Flower 2	Lights	Matrix DE 1000W (HPS)	1,085 W, 2,200 µmol/s	22
	Lights	Matrix Vega 1000W Dyna	840 W lit, 1,000 W nameplate (840 W main + 105 W far-red (7 min after lights-off) + 55 W UV (not used)), 2,500 µmol/s	23
	Under-canopy	Flexstar Under Canopy 120W R8W	120 W, 360 µmol/s, 46" bar, 15 per bench	90
	Benching	Hydro Supply Co. custom benching	V-Track benches on floor tracks, 4' × 40'	6
	Benching	Floor tracks	27' long	11
	Heat pump	VKIN UCHA-60HTD	4.5 tons cooling, 29.6 pints/h	8
Flower 3	Fans	Patterson E18-W-9010	18", 622 W, 3,800 CFM, wall mount	4
	Lights	Matrix M8 Dyna 4-Channel 1000W	840 W lit, 1,000 W nameplate (840 W main + 105 W far-red (7 min after lights-off) + 55 W UV (not used)), 2,500 µmol/s	42
	Under-canopy	Flexstar Under Canopy 120W R8W	120 W, 360 µmol/s, 46" bar, 14 per bench	84
	Benching	Hydro Supply Co. custom benching	V-Track benches on floor tracks, 4' × 40'	6
	Benching	Floor tracks	27' long	11
Flower 4	Heat pump	VKIN UCHA-60HTD	4.5 tons cooling, 29.6 pints/h	7
	Fans	Patterson E18-W-9010	18", 622 W, 3,800 CFM, wall mount	4
	Lights	Matrix DE 1000W (HPS)	1,085 W, 2,200 µmol/s	48
	Under-canopy	Flexstar Under Canopy 120W R8W	120 W, 360 µmol/s, 46" bar, 16 per bench	96
	Benching	Hydro Supply Co. custom benching	V-Track benches on floor tracks, 4' × 40'	6
Veg 1	Benching	Floor tracks	27' long	11
	Heat pump	VKIN UCHA-60HTD	4.5 tons cooling, 29.6 pints/h	9
	Fans	Patterson E18-W-9010	18", 622 W, 3,800 CFM, wall mount	4
	Lights	Matrix M4 400W	400 W, 1,200 µmol/s	72
	Benching	Hydro Supply Co. V-Track vertical racks	V-Track benches on floor tracks, 4' × 8', 3 tiers	12
Clone / propagation 1	Benching	Floor tracks	27' long	6
	Heat pump	VKIN UCHA-60HTD	4.5 tons cooling, 29.6 pints/h	4
	Fans	Patterson E18-W-9010	18", 622 W, 3,800 CFM, wall mount	2
	Lights	Matrix 18W Clone Bar	18 W, 40 µmol/s	240
	Benching	Hydro Supply Co. 4-tier clone racks	Vertical racks, 1.5' × 4', 4 tiers	20
Mother 1	Heat pump	VKIN UCHA-18TDC	1.5 tons cooling, 5.8 pints/h	3
	Fans	Patterson E18-W-9010	18", 622 W, 3,800 CFM, wall mount	2
	Lights	Matrix M4 400W	400 W, 1,200 µmol/s	13
	Benching	Hydro Supply Co. custom benching	V-Track benches on floor tracks, 4' × 8'	6
	Benching	Floor tracks	15' long	6

Room	Item	Brand and model	Specs	Qty
	Heat pump	VKIN UCHA-60HTD	4.5 tons cooling, 29.6 pints/h	2
	Fans	Patterson E18-W-9010	18", 622 W, 3,800 CFM, wall mount	2
	Dry racks	DriFlower 3-level hanging rack	3 levels, holds 144 plants	10
	Heat pump	VKIN UCHA-18TDC	1.5 tons cooling, 5.8 pints/h	6
Fertigation 1	RO storage	Vertical poly tank	1,500 gal	1
	Stock tank	Vertical poly tank	55 gal, Pro Grow, Pro Bloom, Pro Core, Fade, Cleanse, pH down	6
	Injector	Model not named yet	19.2 gpm, 1:100 stock	6
	Irrigation pump	Model not named yet	19.2 gpm at 40 psi, about 0.75 hp	1
	Zone valves	Model not named yet	19.2 gpm largest zone	7
Whole facility	RO system	ANGEL ROS5	5,000 GPD rated	1

Totals for the facility

Item	Brand and model	Specs	Total qty
Lights	Matrix Vega 1000W Dyna	840 W lit, 1,000 W nameplate (840 W main + 105 W far-red (7 min after lights-off) + 55 W UV (not used)), 2,500 µmol/s	65
Lights	Matrix DE 1000W (HPS)	1,085 W, 2,200 µmol/s	70
Lights	Matrix M8 Dyna 4-Channel 1000W	840 W lit, 1,000 W nameplate (840 W main + 105 W far-red (7 min after lights-off) + 55 W UV (not used)), 2,500 µmol/s	42
Lights	Matrix M4 400W	400 W, 1,200 µmol/s	85
Lights	Matrix 18W Clone Bar	18 W, 40 µmol/s	240
Under-canopy	Flexstar Under Canopy 120W R8W	120 W, 360 µmol/s, 46" bar	354
Benching	Hydro Supply Co. custom benching	V-Track benches on floor tracks, 4' × 40'	24
Benching	Floor tracks	27' long	50
Benching	Hydro Supply Co. V-Track vertical racks	V-Track benches on floor tracks, 4' × 8', 3 tiers	12
Benching	Hydro Supply Co. 4-tier clone racks	Vertical racks, 1.5' × 4', 4 tiers	20
Benching	Hydro Supply Co. custom benching	V-Track benches on floor tracks, 4' × 8'	6
Benching	Floor tracks	15' long	6
Dry racks	DriFlower 3-level hanging rack	3 levels, holds 144 plants	10
Heat pump	VKIN UCHA-60HTD	4.5 tons cooling, 29.6 pints/h	37
Heat pump	VKIN UCHA-18TDC	1.5 tons cooling, 5.8 pints/h	9
Fans	Patterson E18-W-9010	18", 622 W, 3,800 CFM, wall mount	22
RO system	ANGEL ROS5	5,000 GPD rated	1
RO storage	Vertical poly tank	1,500 gal	1
Stock tank	Vertical poly tank	55 gal	6
Injector	Model not named yet	19.2 gpm, 1:100 stock	6
Irrigation pump	Model not named yet	19.2 gpm at 40 psi, about 0.75 hp	1
Zone valves	Model not named yet	19.2 gpm largest zone	7

Cooling and dehumidifier check

The equipment chosen covers every room.

Room	Result
Flower 1	Covered
Flower 2	Covered
Flower 3	Covered
Flower 4	Covered
Veg 1	Covered
Clone / propagation 1	Covered Sensible cooling isn't checked: enter the sensible capacity of VKIN UCHA-18TDC from the spec sheet (the room needs 7,225 BTU/h sensible).
Mother 1	Covered
Dry 1	Covered

Checked against the preliminary loads below; dehumidifiers at the room's hardest set point, heat pumps at room conditions, and sensible cooling (the lights' heat) against the units' rated sensible capacity.

CO₂ enrichment

Room	Target	Hours a day	lb a day	lb a month (avg)	Peak lb/h
Flower 1	1,200 ppm	12.0	11.7	285	8.5
Flower 2	1,200 ppm	12.0	11.8	286	8.5
Flower 3	1,200 ppm	12.0	11.7	285	8.5
Flower 4	1,200 ppm	12.0	11.7	286	8.5
Total			46.9	1,142	34.0

CO ₂ a year	13,701 lb
With every room enriching at once	7 × 50 lb cylinders a week
Bulk storage for two weeks between deliveries	700 lb usable
Peak flow, all rooms at lights-on	34.0 lb/h (vaporizer and regulators)

Preliminary, for sealed rooms enriched while the lights are on: the gas to bring each room to target, what leaks out or leaves with fresh air, and what the plants take up (estimated from their light). Monthly figures average the weeks without CO₂ and the turnaround. The gas supplier sizes the tank, vaporizer, regulators and piping; CO₂ monitors and alarms are required in enriched rooms.

Lighting electrical

Room	Lights at nameplate	kW	Volts	Amps	20 A circuits
Flower 1	42 × Matrix Vega 1000W Dyna, 1,000 W (4 per circuit) 84 × Flexstar Under Canopy 120W R8W, 120 W (35 per circuit)	52.1	277	197.9	14
Flower 2	22 × Matrix DE 1000W (HPS), 1,085 W (3 per circuit) 23 × Matrix Vega 1000W Dyna, 1,000 W (4 per circuit) 90 × Flexstar Under Canopy 120W R8W, 120 W (35 per circuit)	57.7	277	219.2	17
Flower 3	42 × Matrix M8 Dyna 4-Channel 1000W, 1,000 W (4 per circuit) 84 × Flexstar Under Canopy 120W R8W, 120 W (35 per circuit)	52.1	277	197.9	14
Flower 4	48 × Matrix DE 1000W (HPS), 1,085 W (3 per circuit) 96 × Flexstar Under Canopy 120W R8W, 120 W (35 per circuit)	63.6	277	241.7	19
Total		263.8			77

Room	Lights at nameplate	kW	Volts	Amps	20 A circuits
Veg 1	72 × Matrix M4 400W, 400 W (10 per circuit)	28.8	277	109.4	8
Clone / propagation 1	240 × Matrix 18W Clone Bar, 18 W (101 per circuit)	4.3	120	37.9	3
Mother 1	13 × Matrix M4 400W, 400 W (10 per circuit)	5.2	277	19.8	2
Total		263.8			77

Nameplate power, every channel counted, single-phase at each room's circuit voltage. Whole fixtures per 20 A circuit, loaded to 80% as continuous loads. Lights only: add HVAC, dehumidifiers, fans, pumps and controls from their nameplates. Preliminary; the electrical engineer sets the final panel and circuit design.

Water and RO

Fed to plants, all rooms	644 gal/day
Runoff	97 gal/day
RO water needed	772 gal/day
RO size needed (rated at 77°F)	927 GPD
Source water into the RO	909 gal/day
RO reject water to drain	136 gal/day
RO storage to plan for	772 gal
ANGEL ROS5 at 77°F feed water	5,000 GPD (100% of rating)
RO run time to make the daily need	3.7 h/day
If the RO stops, storage lasts	1.9 days
Tank drop while watering	139 of 1,500 gal

RO output falls in colder feed water; size the supply line, meter and drain for the source and reject flows.

Fertigation

Fertigation 1

Inline injection: 6 lines (Pro Grow, Pro Bloom, Pro Core, Fade, Cleanse, pH down), stock at 1:100 refilled every 7 days. Pump 19.2 gpm at 40 psi (about 0.75 hp), 644 gal fed a day. RO storage 1 × 1,500 gal.

Room	Plants	Valves	Drippers	Flow per valve	Shot	Shots every	Fed a day
Flower 1	252	1	1 per plant at 0.50 gph	2.1 gpm	6.3 min	90 min	107 gal
Flower 2	270	1	1 per plant at 0.50 gph	2.3 gpm	6.3 min	90 min	114 gal
Flower 3	252	1	1 per plant at 0.50 gph	2.1 gpm	6.3 min	90 min	107 gal
Flower 4	288	1	1 per plant at 0.50 gph	2.4 gpm	6.3 min	90 min	122 gal
Veg 1	2,304	1	1 per plant at 0.50 gph	19.2 gpm	1.9 min	180 min	146 gal
Clone / propagation 1	11,520	1	Hand or flood watered	—	—	—	46 gal
Mother 1	48	1	1 per plant at 0.50 gph	0.4 gpm	1.9 min	180 min	3 gal

Pump, tank and injector sizes are preliminary; the irrigation designer confirms pipe sizes, pressure losses and equipment models.

Climate sizing by room

Preliminary loads at summer design conditions (97°F, 79°F dew point; from Orlando, FL 32801: hourly NASA POWER weather 2021–2025, values exceeded 0.4% of hours (heating: 99.6%)). Final sizing by the project's mechanical engineer.

Flower 1

Set points by week (the bold figures set the equipment size; VPD with the leaf 2°F below the air)

Step	Lights on	VPD, lights on	Lights off	Transpiration	Water removal	Cooling
Early flower (weeks 1–3)	80°F / 65%	1.00 kPa	72°F / 65%	81.5 gal/day	70.3 pints/h	16.2 tons
Mid flower (weeks 4–6)	78°F / 55%	1.26 kPa	70°F / 55%	81.5 gal/day	70.8 pints/h	16.2 tons
Late flower (weeks 7–8)	75°F / 50%	1.29 kPa	68°F / 50%	81.5 gal/day	71.2 pints/h	16.3 tons

Cooling: 16.3 tons at the lights-on peak, sized for Late flower (weeks 7–8)

Lights 154.8k BTU/h

35,280 W overhead + 10,080 W under-canopy = 45,360 W × 3.412

Fans 8.5k BTU/h

4 × Patterson E18-W-9010 at 622 W (0.5 HP × 746 ÷ 60% motor efficiency). 2,487 W × 3.412

Outside walls 0.9k BTU/h

560 sf at R-13, 22°F hotter outside

Roof 2.9k BTU/h

1,536 sf at R-30, 22°F + 35°F sun

Outside air and leakage (heat) 0.9k BTU/h

1.08 × 36 cfm × 22°F

Outside air and leakage (moisture) 2.1k BTU/h

2.0 lb/h of water × 1,060 BTU/lb

Total with safety 195.6k BTU/h

170.1k BTU/h × 1.15 ÷ 12,000 = 16.3 tons. Split: 116.9k BTU/h sensible, 53.1k BTU/h latent (plants transpire 48.1 lb/h with lights on, using part of the lights' heat).

Dehumidification: 71.2 pints/h at peak, 115.4 installed at room conditions, set by the lights-on period of Late flower (weeks 7–8) at 75°F / 50%

Plant moisture 652 ppd

90.5 gal/day taken up × 90% released = 81.5 gal

Outside air and leakage 45 ppd

36 cfm (0.10 air changes/h) at 79°F dew point outside vs 75°F / 50% inside

Lights-on rate 1,486 ppd

85% of plant moisture over 12 h × 1.30 mid-day peak, at 75°F / 50%

Lights-off rate 248 ppd

15% over 12 h with the cooling mostly idle; dehus do it alone, at 68°F / 50%

VKIN UCHA-60HTD water removal 115.4 pints/h

7 × 16.5 pints/h at 75°F / 50%, from the maker's measured removal at 80°F/60%, 75°F/50%, 59°F/50%

Peak removal needed**71.2 pints/h**

Peak rate 61.9 pints/h $\times$ 1.15 safety; installed 115.4 pints/h covers it

Flower 2

Set points by week (the bold figures set the equipment size; VPD with the leaf 2°F below the air)

Step	Lights on	VPD, lights on	Lights off	Transpiration	Water removal	Cooling
Early flower (weeks 1–3)	80°F / 65%	1.00 kPa	72°F / 65%	87.3 gal/day	75.2 pints/h	19.0 tons
Mid flower (weeks 4–6)	78°F / 55%	1.26 kPa	70°F / 55%	87.3 gal/day	75.8 pints/h	19.0 tons
Late flower (weeks 7–8)	75°F / 50%	1.29 kPa	68°F / 50%	87.3 gal/day	76.1 pints/h	19.1 tons

Cooling: 19.1 tons at the lights-on peak, sized for Late flower (weeks 7–8)

Lights 184.2k BTU/h

43,190 W overhead + 10,800 W under-canopy = 53,990 W × 3.412

Fans 8.5k BTU/h

4 × Patterson E18-W-9010 at 622 W (0.5 HP × 746 ÷ 60% motor efficiency). 2,487 W × 3.412

Outside walls 0.9k BTU/h

560 sf at R-13, 22°F hotter outside

Roof 2.9k BTU/h

1,536 sf at R-30, 22°F + 35°F sun

Outside air and leakage (heat) 0.9k BTU/h

1.08 × 36 cfm × 22°F

Outside air and leakage (moisture) 2.1k BTU/h

2.0 lb/h of water × 1,060 BTU/lb

Total with safety 229.4k BTU/h

199.5k BTU/h × 1.15 ÷ 12,000 = 19.1 tons. Split: 142.7k BTU/h sensible, 56.8k BTU/h latent (plants transpire 51.6 lb/h with lights on, using part of the lights' heat).

Dehumidification: 76.1 pints/h at peak, 131.8 installed at room conditions, set by the lights-on period of Late flower (weeks 7–8) at 75°F / 50%

Plant moisture 698 ppd

97.0 gal/day taken up × 90% released = 87.3 gal

Outside air and leakage 45 ppd

36 cfm (0.10 air changes/h) at 79°F dew point outside vs 75°F / 50% inside

Lights-on rate 1,589 ppd

85% of plant moisture over 12 h × 1.30 mid-day peak, at 75°F / 50%

Lights-off rate 262 ppd

15% over 12 h with the cooling mostly idle; dehus do it alone, at 68°F / 50%

VKIN UCHA-60HTD water removal 131.8 pints/h

8 × 16.5 pints/h at 75°F / 50%, from the maker's measured removal at 80°F/60%, 75°F/50%, 59°F/50%

Peak removal needed

76.1 pints/h

Peak rate 66.2 pints/h × 1.15 safety; installed 131.8 pints/h covers it

Flower 3

Set points by week (the bold figures set the equipment size; VPD with the leaf 2°F below the air)

Step	Lights on	VPD, lights on	Lights off	Transpiration	Water removal	Cooling
Early flower (weeks 1–3)	80°F / 65%	1.00 kPa	72°F / 65%	81.5 gal/day	70.3 pints/h	16.2 tons
Mid flower (weeks 4–6)	78°F / 55%	1.26 kPa	70°F / 55%	81.5 gal/day	70.8 pints/h	16.2 tons
Late flower (weeks 7–8)	75°F / 50%	1.29 kPa	68°F / 50%	81.5 gal/day	71.2 pints/h	16.3 tons

Cooling: 16.3 tons at the lights-on peak, sized for Late flower (weeks 7–8)

Lights 154.8k BTU/h

35,280 W overhead + 10,080 W under-canopy = 45,360 W × 3.412

Fans 8.5k BTU/h

4 × Patterson E18-W-9010 at 622 W (0.5 HP × 746 ÷ 60% motor efficiency). 2,487 W × 3.412

Outside walls 0.9k BTU/h

560 sf at R-13, 22°F hotter outside

Roof 2.9k BTU/h

1,536 sf at R-30, 22°F + 35°F sun

Outside air and leakage (heat) 0.9k BTU/h

1.08 × 36 cfm × 22°F

Outside air and leakage (moisture) 2.1k BTU/h

2.0 lb/h of water × 1,060 BTU/lb

Total with safety 195.6k BTU/h

170.1k BTU/h × 1.15 ÷ 12,000 = 16.3 tons. Split: 116.9k BTU/h sensible, 53.1k BTU/h latent (plants transpire 48.1 lb/h with lights on, using part of the lights' heat).

Dehumidification: 71.2 pints/h at peak, 115.4 installed at room conditions, set by the lights-on period of Late flower (weeks 7–8) at 75°F / 50%

Plant moisture 652 ppd

90.5 gal/day taken up × 90% released = 81.5 gal

Outside air and leakage 45 ppd

36 cfm (0.10 air changes/h) at 79°F dew point outside vs 75°F / 50% inside

Lights-on rate 1,486 ppd

85% of plant moisture over 12 h × 1.30 mid-day peak, at 75°F / 50%

Lights-off rate 248 ppd

15% over 12 h with the cooling mostly idle; dehus do it alone, at 68°F / 50%

VKIN UCHA-60HTD water removal 115.4 pints/h

7 × 16.5 pints/h at 75°F / 50%, from the maker's measured removal at 80°F/60%, 75°F/50%, 59°F/50%

Peak removal needed**71.2 pints/h**

Peak rate 61.9 pints/h $\times$ 1.15 safety; installed 115.4 pints/h covers it

Flower 4

Set points by week (the bold figures set the equipment size; VPD with the leaf 2°F below the air)

Step	Lights on	VPD, lights on	Lights off	Transpiration	Water removal	Cooling
Early flower (weeks 1–3)	80°F / 65%	1.00 kPa	72°F / 65%	93.1 gal/day	80.2 pints/h	22.1 tons
Mid flower (weeks 4–6)	78°F / 55%	1.26 kPa	70°F / 55%	93.1 gal/day	80.7 pints/h	22.2 tons
Late flower (weeks 7–8)	75°F / 50%	1.29 kPa	68°F / 50%	93.1 gal/day	81.1 pints/h	22.3 tons

Cooling: 22.3 tons at the lights-on peak, sized for Late flower (weeks 7–8)

Lights 217.0k BTU/h

52,080 W overhead + 11,520 W under-canopy = 63,600 W × 3.412

Fans 8.5k BTU/h

4 × Patterson E18-W-9010 at 622 W (0.5 HP × 746 ÷ 60% motor efficiency). 2,487 W × 3.412

Outside walls 0.9k BTU/h

560 sf at R-13, 22°F hotter outside

Roof 2.9k BTU/h

1,536 sf at R-30, 22°F + 35°F sun

Outside air and leakage (heat) 0.9k BTU/h

1.08 × 36 cfm × 22°F

Outside air and leakage (moisture) 2.1k BTU/h

2.0 lb/h of water × 1,060 BTU/lb

Total with safety 267.1k BTU/h

232.3k BTU/h × 1.15 ÷ 12,000 = 22.3 tons. Split: 171.9k BTU/h sensible, 60.4k BTU/h latent (plants transpire 55.0 lb/h with lights on, using part of the lights' heat).

Dehumidification: 81.1 pints/h at peak, 148.3 installed at room conditions, set by the lights-on period of Late flower (weeks 7–8) at 75°F / 50%

Plant moisture 745 ppd

103.5 gal/day taken up × 90% released = 93.1 gal

Outside air and leakage 45 ppd

36 cfm (0.10 air changes/h) at 79°F dew point outside vs 75°F / 50% inside

Lights-on rate 1,692 ppd

85% of plant moisture over 12 h × 1.30 mid-day peak, at 75°F / 50%

Lights-off rate 276 ppd

15% over 12 h with the cooling mostly idle; dehus do it alone, at 68°F / 50%

VKIN UCHA-60HTD water removal 148.3 pints/h

9 × 16.5 pints/h at 75°F / 50%, from the maker's measured removal at 80°F/60%, 75°F/50%, 59°F/50%

Peak removal needed

81.1 pints/h

Peak rate 70.5 pints/h × 1.15 safety; installed 148.3 pints/h covers it

Veg 1

Cooling: 10.2 tons at the lights-on peak

Lights

98.3k BTU/h

28,800 W × 3.412

Fans

4.2k BTU/h

2 × Patterson E18-W-9010 at 622 W (0.5 HP × 746 ÷ 60% motor efficiency). 1,243 W × 3.412

Outside walls

0.6k BTU/h

434 sf at R-13, 17°F hotter outside

Roof

1.7k BTU/h

960 sf at R-30, 17°F + 35°F sun

Outside air and leakage (heat)

0.4k BTU/h

1.08 × 22 cfm × 17°F

Outside air and leakage (moisture)

0.8k BTU/h

0.7 lb/h of water × 1,060 BTU/lb

Total with safety

121.8k BTU/h

105.9k BTU/h × 1.15 ÷ 12,000 = 10.2 tons. Split: 58.5k BTU/h sensible, 47.4k BTU/h latent (plants transpire 44.0 lb/h with lights on, using part of the lights' heat).

Dehumidification: 63.9 pints/h at peak, 130.8 installed at room conditions, set by the lights-on period

Plant moisture

894 ppd

124.2 gal/day taken up × 90% released = 111.7 gal

Outside air and leakage

17 ppd

22 cfm (0.10 air changes/h) at 79°F dew point outside vs 80°F / 65% inside

Lights-on rate

1,334 ppd

85% of plant moisture over 18 h × 1.30 mid-day peak, at 80°F / 65%

Lights-off rate

559 ppd

15% over 6 h with the cooling mostly idle; dehus do it alone, at 74°F / 65%

VKIN UCHA-60HTD water removal

130.8 pints/h

4 × 32.7 pints/h at 80°F / 65%, from the maker's measured removal at 80°F/60%, 75°F/50%, 59°F/50%

Peak removal needed

63.9 pints/h

Peak rate 55.6 pints/h × 1.15 safety; installed 130.8 pints/h covers it

Clone / propagation 1

Cooling: 2.0 tons at the lights-on peak

Lights	14.7k BTU/h
4,320 W × 3.412	

Fans	4.2k BTU/h
2 × Patterson E18-W-9010 at 622 W (0.5 HP × 746 ÷ 60% motor efficiency). 1,243 W × 3.412	

Outside walls	0.5k BTU/h
350 sf at R-13, 19°F hotter outside	

Roof	1.1k BTU/h
600 sf at R-30, 19°F + 35°F sun	

Outside air and leakage (heat)	0.3k BTU/h
1.08 × 14 cfm × 19°F	

Outside air and leakage (moisture)	0.4k BTU/h
0.4 lb/h of water × 1,060 BTU/lb	

Total with safety	24.5k BTU/h
21.3k BTU/h × 1.15 ÷ 12,000 = 2.0 tons. Split: 6.3k BTU/h sensible, 15.0k BTU/h latent (plants transpire 13.8 lb/h with lights on, using part of the lights' heat).	

Dehumidification: 20.1 pints/h at peak, 20.6 installed at room conditions, set by the lights-on period

Plant moisture	279 ppd
38.8 gal/day taken up × 90% released = 34.9 gal	

Outside air and leakage	9 ppd
14 cfm (0.10 air changes/h) at 79°F dew point outside vs 78°F / 75% inside	

Lights-on rate	420 ppd
85% of plant moisture over 18 h × 1.30 mid-day peak, at 78°F / 75%	

Lights-off rate	179 ppd
15% over 6 h with the cooling mostly idle; dehus do it alone, at 75°F / 75%	

VKIN UCHA-18TDC water removal	20.6 pints/h
3 × 5.8 pints/h rated at 81°F / 60% → 6.9 at 78°F / 75% (room dew point 69.4°F vs 65.4°F at rating, scaled along VKIN's measured UCHA-60HTD curve). Ask the maker for the figure at these conditions.	

Peak removal needed	20.1 pints/h
Peak rate 17.5 pints/h × 1.15 safety; installed 20.6 pints/h covers it	

Mother 1

Cooling: 2.3 tons at the lights-on peak

Lights 5,200 W × 3.412	17.7k BTU/h
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Fans 2 × Patterson E18-W-9010 at 622 W (0.5 HP × 746 ÷ 60% motor efficiency). 1,243 W × 3.412	4.2k BTU/h
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Outside walls 350 sf at R-13, 19°F hotter outside	0.5k BTU/h
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Roof 600 sf at R-30, 19°F + 35°F sun	1.1k BTU/h
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Outside air and leakage (heat) 1.08 × 14 cfm × 19°F	0.3k BTU/h
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Outside air and leakage (moisture) 0.6 lb/h of water × 1,060 BTU/lb	0.6k BTU/h
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Total with safety 24.5k BTU/h × 1.15 ÷ 12,000 = 2.3 tons. Split: 22.9k BTU/h sensible, 1.6k BTU/h latent (plants transpire 0.9 lb/h with lights on, using part of the lights' heat).	28.1k BTU/h
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Dehumidification: 2.0 pints/h at peak, 54.1 installed at room conditions, set by the lights-on period

Plant moisture 2.6 gal/day taken up × 90% released = 2.3 gal	19 ppd
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Outside air and leakage 14 cfm (0.10 air changes/h) at 79°F dew point outside vs 78°F / 60% inside	13 ppd
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Lights-on rate 85% of plant moisture over 18 h × 1.30 mid-day peak, at 78°F / 60%	41 ppd
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Lights-off rate 15% over 6 h with the cooling mostly idle; dehus do it alone, at 72°F / 60%	28 ppd
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VKIN UCHA-60HTD water removal 2 × 27.1 pints/h at 78°F / 60%, from the maker's measured removal at 80°F/60%, 75°F/50%, 59°F/50%	54.1 pints/h
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Peak removal needed Peak rate 1.7 pints/h × 1.15 safety; installed 54.1 pints/h covers it	2.0 pints/h
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Dry 1

Cooling: 0.5 tons at the lights-on peak

Outside walls1.1k BTU/h

406 sf at R-13, 35°F hotter outside

Roof2.0k BTU/h

840 sf at R-30, 35°F + 35°F sun

Outside air and leakage (heat)0.7k BTU/h

1.08 × 20 cfm × 35°F

Outside air and leakage (moisture)1.4k BTU/h

1.3 lb/h of water × 1,060 BTU/lb

Total with safety5.9k BTU/h

5.2k BTU/h × 1.15 ÷ 12,000 = 0.5 tons. Split: 0.0k BTU/h sensible, 5.2k BTU/h latent (plants transpire 11.8 lb/h with lights on, using part of the lights' heat).

Dehumidification: 14.5 pints/h at peak, 14.5 installed at room conditions

Plant moisture272 ppd

1,440 plants × 1.8 lb wet × 75% water ÷ 10 days × 1.5 first-days peak

Outside air and leakage30 ppd

20 cfm (0.10 air changes/h) at 79°F dew point outside vs 62°F / 58% inside

VKIN UCHA-18TDC water removal14.5 pints/h

6 × 5.8 pints/h rated at 81°F / 60% → 2.4 at 62°F / 58% (room dew point 47.1°F vs 65.4°F at rating, scaled along VKIN's measured UCHA-60HTD curve). Ask the maker for the figure at these conditions.

Peak removal needed14.5 pints/h

Peak rate 12.6 pints/h × 1.15 safety; installed 14.5 pints/h covers it

Fertigation 1

Cooling: 0.3 tons at the lights-on peak

Dehumidifier power0.2k BTU/h

67 W estimated (5 W per rated pint/day; list units for exact)

Outside walls0.5k BTU/h

378 sf at R-13, 17°F hotter outside

Roof1.2k BTU/h

720 sf at R-30, 17°F + 35°F sun

Outside air and leakage (heat)0.3k BTU/h

1.08 × 17 cfm × 17°F

Outside air and leakage (moisture)0.6k BTU/h

0.5 lb/h of water × 1,060 BTU/lb

Total with safety3.3k BTU/h

2.9k BTU/h × 1.15 ÷ 12,000 = 0.3 tons. Split: 2.3k BTU/h sensible, 0.6k BTU/h latent (plants transpire 0.0 lb/h with lights on, using part of the lights' heat).

Dehumidification: 13 pints/day rated

Plant moisture0 ppd

0.0 gal/day taken up × 95% released = 0.0 gal

Outside air and leakage13 ppd

17 cfm (0.10 air changes/h) at 79°F dew point outside vs 80°F / 65% inside

Rated capacity needed13 ppd

Daily rate × 1.15 safety ÷ 108% of rating delivered at 80°F / 65% (room dew point 67.2°F; from VKIN dehumidifier test data)

Main corridor

Cooling: 0.3 tons at the lights-on peak

Dehumidifier power0.2k BTU/h

52 W estimated (5 W per rated pint/day; list units for exact)

Outside walls1.3k BTU/h

1,008 sf at R-13, 17°F hotter outside

Roof1.0k BTU/h

560 sf at R-30, 17°F + 35°F sun

Outside air and leakage (heat)0.2k BTU/h

1.08 × 13 cfm × 17°F

Outside air and leakage (moisture)0.4k BTU/h

0.4 lb/h of water × 1,060 BTU/lb

Total with safety3.6k BTU/h

3.2k BTU/h × 1.15 ÷ 12,000 = 0.3 tons. Split: 2.7k BTU/h sensible, 0.4k BTU/h latent (plants transpire 0.0 lb/h with lights on, using part of the lights' heat).

Dehumidification: 10 pints/day rated

Plant moisture0 ppd

0.0 gal/day taken up × 95% released = 0.0 gal

Outside air and leakage10 ppd

13 cfm (0.10 air changes/h) at 79°F dew point outside vs 80°F / 65% inside

Rated capacity needed10 ppd

Daily rate × 1.15 safety ÷ 108% of rating delivered at 80°F / 65% (room dew point 67.2°F; from VKIN dehumidifier test data)

Athena per cycle and per year (Athena Pro Line with Fade)

Product	Per flower cycle (70 days)	Per year
Pro Bloom	510.3 lb	2,660.7 lb
Pro Core	336.8 lb	1,756.0 lb
Cleanse	35.6 gal	185.7 gal
Fade	31.5 gal	164.5 gal
Pro Grow	160.4 lb	836.4 lb

Per cycle is what the whole facility uses in one flower cycle of 70 days, turnaround included, with every room feeding at once (veg and mother rooms too): the amount to have on hand for each harvest.

Notes

Example report for illustration. Your report is built from your own rooms, equipment and grow plan.

Cooling, dehumidification and RO figures are preliminary estimates from lighting load, plant water use and stated assumptions. Final equipment sizing must be confirmed by the project's licensed engineer. Nutrient amounts follow the maker's published feed schedule for the chosen program; adjust to the crop.