December 23, 2020

Checkmate has organized and summarized the following Items for the Department of Commerce and Insurance: Checkmate is seeking a Hardship Variance for 4440 Manchester Ave to NOT individually meter the building. Thus, providing a worry-free residential housing building for moderate income persons, new persons to the area and persons who are budget conscience, by simplifying the process of paying separate rent and utility bills. Checkmate and its engineering partners, along with the developer, have made environmentally and energy efficient design choices, that would in turn reduce the energy footprint of each tenant but add additional upfront expenses towards the project budget. By adhering to the State Regulations to provide separate meters for this multifamily building, not only will the owner need to reevaluate the upfront cost for energy efficient appliances and other energy efficient amenities but the state would force the client to pass the electricity bills back to first time renters, new to the area renters, and fixed or budget conscience renters.

Due to the target market, this building is also likely to house short term renters, such as College Grad Students, traveling nurses, flight attendant, traveling business consultant and/or military/public safety works who may desire the flexibility of inclusive rent. Allowing the property manager to pay the utilities will streamline the process between building tenant and Ameren and remove the need for Ameren to track and switch client's services.

1. **The Variance Policy Application**
    - Competed Application for the Hardship of separately metering the project
2. **The Solar Panel**
    - Proposal

      Our solar panels are offsetting 35% of the Common space energy cost.
        - Corridors, Elevators, Stairs, and Building Exterior Power
3. **Mechanical Units and Thermostats**
    - Spec and data Sheets
        - Programmable thermostats which offers reduced Energy Consumption
        - 13 Seer 2- and 5-Ton Energy Efficient compressor
        - 2 Ton wall mount Air Handler 24,000 BTU/HR and 5-ton Multi-Position 60,000 BTU/HR
4. **Energy efficient Appliances**
    - Data Sheets
        - Refrigerator 660khh/per year
        - Dishwasher 270 kwh/per year
        - Microwave no data
        - Range no data
        - Dryer 608kwh/per year
        - Washer 139kwh/per year

5. **Windows, Building wrap and Exterior doors**
   - Spec. Sheets
     - Double Hung 2000A Air infiltration 0.30cfm per foot at 1.6 psf Pressure
     - Fixed 2100 Air infiltration 0.30 cfm per square foot at 1.6 psf pressure

6. **Lighting**
   - LED bulbs
     - Data from Gateway Lofts Residents
     - LED Recessed can Lights @ 10 watts
     - Led Ceiling Fan @ 33 watts
     - Bathroom Backlit LED Mirror @ 14 watt (Grove Lofts)
     - Bathroom LED Exhaust Fan and Light Combo @ 12 watts

METER VARIANCE POLICY

EXHIBIT A

CUSTOMER VARIANCE APPLICATION REQUEST FORM

1. The name of the applicant seeking the variance: **Grove Lofts LLC**
2. The project's name and location: **4440 Manchester Ave**
3. The building style and number of units: **Mixed Use 2 Commercial and 60 Residential**
4. The intended purpose/function of the project:

   (Example: Housing low income, elderly residents, people with disabilities)
   Market value housing and services in Low/mod income area - plus housing for 5 persons with disabilities as well as universal design for all residents.
5. Does the owner intend to pay the electric bills? Sometimes the phrase' worry free living' is used. **Yes**
6. The party responsible for utility bill payment: **Grove Lofts LLC**
7. The additional expenditures for individual metering:

   (Example: It is estimated that it will cost approximately $$$/apartment or $$$ additionally to change from master to individual metering.) **Estimated additional $75,000.00 for individual metering plus monthly bills**
8. Provide any information on the central HVAC facilities, central water heating facilities, common areas, or a common dining room**. Split systems at the units and roof top units for common space**
9. Will this building house low-income citizens and help them locate services they need to live independently. **Yes and the building will help them in establishing credit and with Budgeting assistance to make sure their overall credit and livelihood is not affected by varying seasons or rates. The building is universally designed for all persons.**
10. Is this a low income or a HUD project and facility? **It is not LIH but it is for those who need budgeting assistance. (people on a fixed income who need consistent billing)**
11. Are the rooms relatively small compared to normal apartments? **Some units are very small however most of them are average sized.**
12. What are the added costs for the customer and the company for **individual** metering? **75K in metering and then additional billing for separate meters**.
13. Are the individual tenants rooms individually heated and cooled by a packaged unit? Is a common system used? **Residential Split System with a solar back up.**
14. Will each residence in this facility have its own kitchen? **Yes, all electric**
15. Is the water heating system looped or individually contained? **Individually**

METER VARIANCE POLICY

16. Are there 'community' or common use areas such as dining room, meeting halls, etc. such as would be in place for an elderly community? **Yes, Fitness and shared meeting space 2nd floor sundeck and rooftop sundeck**
17. Is the facility a retirement project or a 'luxury' apartment complex, you can look at size of the rooms for intent. **Market value apartments complex, it is intended for those low to mod income persons who need budgeting assistance.**
18. Does the facility provide 'Incidental Activities of Daily Living' (IADS's) or assist in 'Activities of Daily Living' ADL's? **No**
19. Any other information or comments that would be important to include in the application: **Similar to 4400 Manchester Ave**.
20. Is there a nurse or physician that will be on staff at the facility? **No**

StraightUp SOLAR

Prepared For

Grove Lofts
314-446-4558
Design5@CheckmateDesign.com

Our Mission:

StraightUp Solar empowers communities to create a sustainable future through lasting partnerships that provide Missouri & Illinois' premier solar integrations and customer service at a competitive price.

NABCEP CERTIFIED PV Installation Professional

Budgetary for Grove Lofts Solar

Prepared By

Dan Hancock
636-222-3938
dan.hancock@straightupsolar.com

11/23/2020

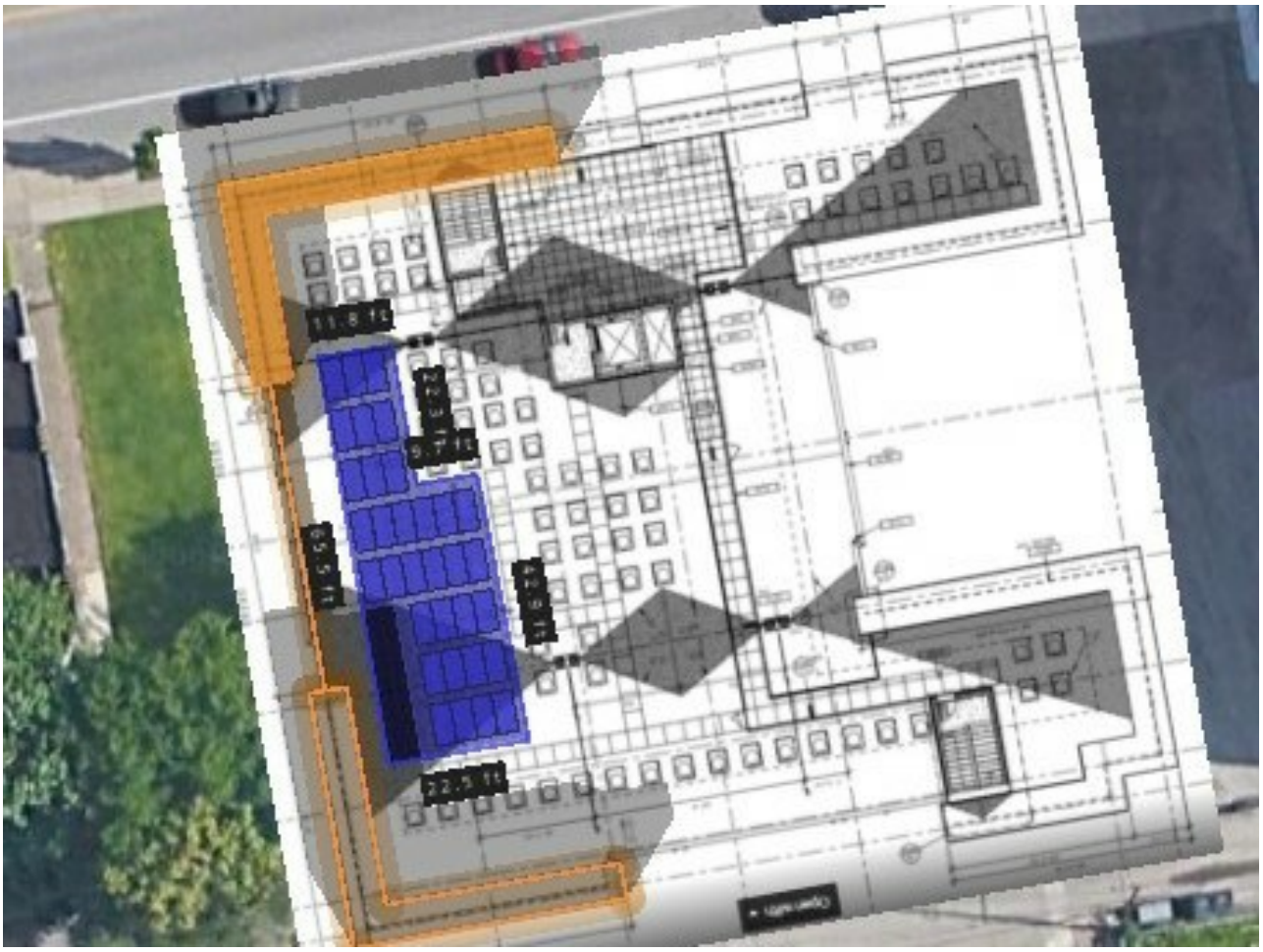
AMICUS SOLAR COOPERATIVE STRONGER TOGETHER.

MOSEIA Missouri Solar Energy Industries Association

isea illinois solar energy association

Certified B Corporation

1 PV System Layout



This solar layout was created based on satellite imagery. When you move forward with StraightUp Solar, our technical design and engineering team will conduct a site visit, then create a design package that will be submitted to your utility and the permitting authorities. Based on product availability and engineering review, equipment type and/or quantity may be adjusted.

General Information
Facility: Facility #1
Address: 4440 Manchester Ave St. Louis MO 63110

Solar PV System Rating
Power Rating: 12,375 W-DC
Power Rating: 9,000 W-AC

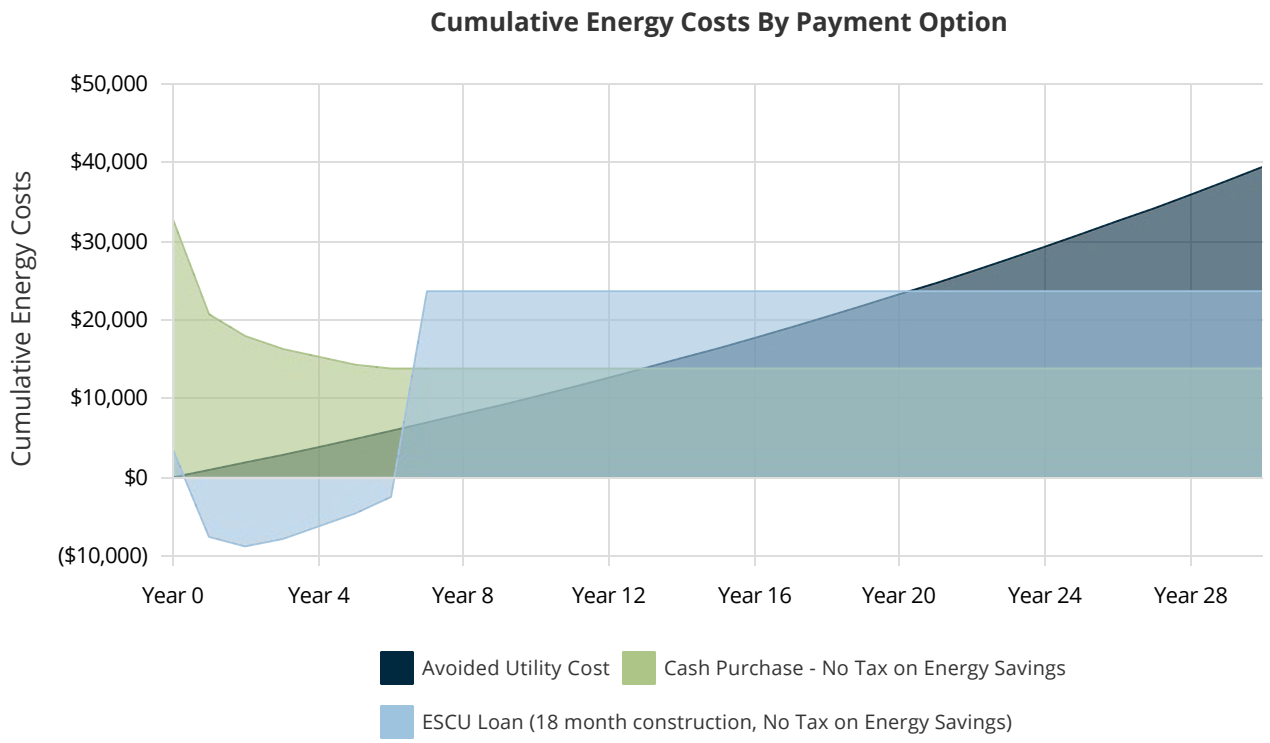
Solar PV Equipment Description
Solar Panels: (33) REC REC375TP2SM 72XV
Inverters: (1) SolarEdge SE9KUS

Solar PV Equipment Typical Lifespan
Solar Panels: Greater than 30 Years
Inverters: 12 Years

2 Project Summary

Payment Options	Cash Purchase - No Tax on Energy Savings	ESCU Loan (18 month construction, No Tax on Energy Savings)
Upfront Payment	$32,750	-
Electric Bill Savings Year 1	-	$927
30-Year ROI	-	452.4%
Total Payments	$32,750	-
Rebates and Incentives	$18,932	$18,932
Net Payments	$13,818	-
30-Year Electric Bill Savings	$39,481	$39,481
30-Year IRR	6.35%	-209.86%
30-Year LCOE PV	$0.03	-
30-Year NPV	$3,256	$3,221
Payback Period	12.9 Years	20.3 Years

Combined Solar PV Rating
Power Rating: 12,375 W-DC
Power Rating: 10,890 W-AC-CEC



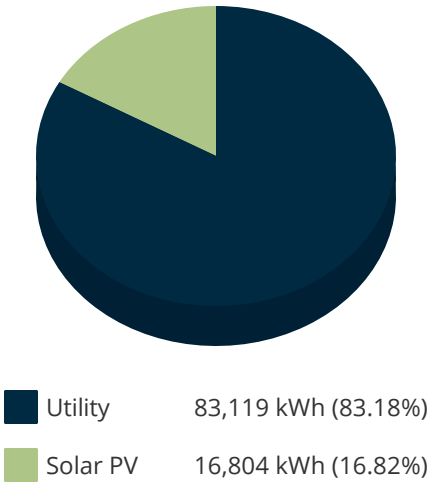
3.1.1 PV System Details

General Information
Facility: Facility #1
Address: 4440 Manchester Ave St. Louis MO 63110

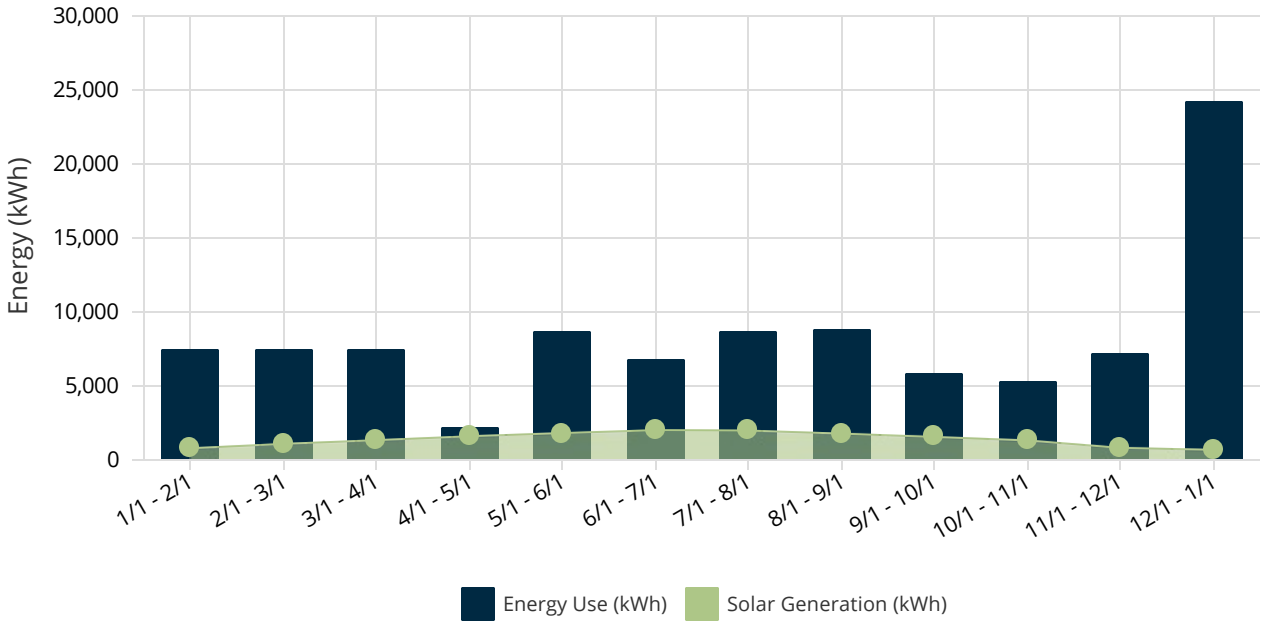
Solar PV System Cost And Incentives

Solar PV System Cost	$32,750
Ameren PV Rebate	-$3,094
Federal Tax Credit	-$7,205
State MACRS Depreciation	-$1,638
Federal Depreciation	-$6,995
Net Solar PV System Cost:	**$13,818**

Energy Consumption Mix
Annual Energy Use: 99,923 kWh



Monthly Energy Use vs Solar Generation



3.1.2 Rebates and Incentives

This section summarizes all incentives available for this project. The actual rebate and incentive amounts for this project are shown in each example.

Ameren MO $0.25 PV Rebate

PV Incentive paid upfront, priced at $0.25/Watt DC.

Total Incentive Value: $3,094

Business Energy Investment Tax Credit (ITC) - 22% (2021)

Businesses that install solar photovoltaic (PV) systems are eligible to receive an (ITC) investment tax credit, which can be used to directly offset federal tax liability on a dollar-for-dollar basis. If the tax credit exceeds your tax liability you can roll the credit into future tax periods for 20 years. Commercial projects that commence construction in 2021 are eligible to receive a 22% tax credit of the total PV system cost. The ITC steps down thereafter, projects commencing construction in 2022 and later qualify for a 10% ITC.

Total Incentive Value: $7,205

(MACRS) - Missouri

Under the Modified Cost Recovery System (MACRS), businesses may recover investments in certain property through depreciation deductions. The MACRS establishes a set of class lives for various types of property over which the property may be depreciated.

Total Incentive Value: $1,638

Federal MACRS (Modified Accelerated Cost-Recovery System)

Under the federal Modified Cost Recovery System (MACRS), businesses may recover investments in certain property through depreciation deductions. MACRS establishes a lifespan for various types of property over which the property may be depreciated. For PV systems, the taxable basis of the equipment must be reduced by 50% of any federal tax credits associated with the system.

Total Incentive Value: $6,995

3.1.3 Utility Rates

The table below shows the rates associate with your current utility rate schedule (3M (Lander Binding)). Your estimated electric bills after solar are shown on the following page.

Fixed Charges		Energy Charges		Demand Charges	
Type	3M (Lander Binding)	Type	3M (Lander Binding)	Type	3M (Lander Binding)
W Monthly	$95.07	W Tier 1 < 150	$0.07350	W NC	$2.00
S Monthly	$95.07	W Tier 2 < 350	$0.05640	S NC	$5.40
		W Tier 3 > 350	$0.04590		
		S Tier 1 < 150	$0.11290		
		S Tier 2 < 350	$0.08670		
		S Tier 3 > 350	$0.06060		

3.1.4 Current Electric Bill

The table below shows your annual electricity costs based on the most current utility rates and your previous 12 months of electrical usage.

Rate Schedule: Ameren-MO - 3M (Lander Binding)

Time Periods	Energy Use (kWh)	Max Demand (kW)	Charges			
Bill Ranges & Seasons	Total	NC / Max	Other	Energy	Demand	Total
1/1/2020 - 2/1/2020 W	7,500	12	$95	$419	$200	$714
2/1/2020 - 3/1/2020 W	7,500	12	$95	$419	$200	$714
3/1/2020 - 4/1/2020 W	7,500	12	$95	$419	$200	$714
4/1/2020 - 5/1/2020 W	2,160	12	$95	$153	$200	$448
5/1/2020 - 6/1/2020 W	8,640	12	$95	$471	$200	$766
6/1/2020 - 7/1/2020 S	6,809	12	$95	$569	$540	$1,204
7/1/2020 - 8/1/2020 S	8,615	12	$95	$679	$540	$1,314
8/1/2020 - 9/1/2020 S	8,782	12	$95	$689	$540	$1,324
9/1/2020 - 10/1/2020 S	5,785	12	$95	$507	$540	$1,142
10/1/2020 - 11/1/2020 W	5,331	12	$95	$320	$200	$615
11/1/2019 - 12/1/2019 W	7,151	12	$95	$403	$200	$698
12/1/2019 - 1/1/2020 W	24,150	40	$95	$1,358	$200	$1,653
Totals:	99,923	-	$1,141	$6,406	$3,760	$11,307

3.1.5 New Electric Bill

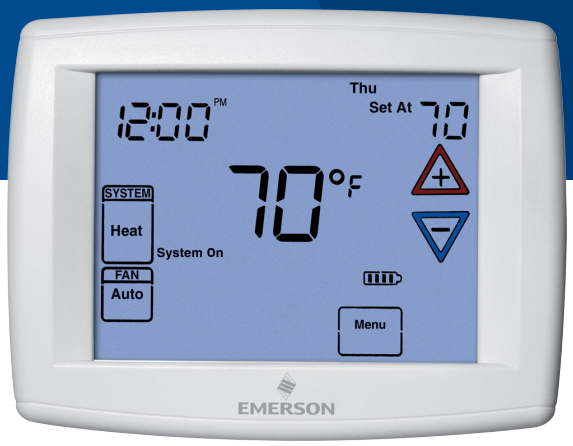
Rate Schedule: Ameren-MO - 3M (Lander Binding)

Time Periods	Energy Use (kWh)	Max Demand (kW)	Charges			
Bill Ranges & Seasons	Total	NC / Max	Other	Energy	Demand	Total
1/1/2020 - 2/1/2020 W	6,712	12	$95	$383	$200	$678
2/1/2020 - 3/1/2020 W	6,410	12	$95	$369	$200	$664
3/1/2020 - 4/1/2020 W	6,162	12	$95	$358	$200	$653
4/1/2020 - 5/1/2020 W	557	12	$95	$41	$200	$336
5/1/2020 - 6/1/2020 W	6,822	12	$95	$388	$200	$683
6/1/2020 - 7/1/2020 S	4,792	12	$95	$443	$540	$1,078
7/1/2020 - 8/1/2020 S	6,626	12	$95	$558	$540	$1,193
8/1/2020 - 9/1/2020 S	7,002	12	$95	$581	$540	$1,216
9/1/2020 - 10/1/2020 S	4,227	12	$95	$409	$540	$1,044
10/1/2020 - 11/1/2020 W	4,012	12	$95	$257	$200	$552
11/1/2019 - 12/1/2019 W	6,331	12	$95	$365	$200	$661
12/1/2019 - 1/1/2020 W	23,466	40	$95	$1,327	$200	$1,622
Totals:	83,119	-	$1,141	$5,479	$3,760	$10,380

Annual Electricity Savings: $927

Blue™ Touchscreen
Universal Thermostat

12 square-inch touchscreens offer more features, delivering a new level of comfort to your customers.



1F95-1277

Easy To Read
Large, 12 square inch display with 10 second backlight

Selectable Programming
Choice of 7 Day, 5+1+1 Day, or Non-Programmable

Dual Fuel Capable
Dual Fuel capable with Smart Fuel™ Logic Program or outdoor temperature sensor - 1F95-1291, 1F95-1277, 1F97-1277

Dual Powered
Choice of battery-powered or hardwired for all applications

Remote Sensor
Senses indoor or outdoor and at the thermostat

1F95-1291
Universal - Humidity Control

Single Stage	Mult-Stage	Heat Pump
1/1	2/2	4/2

1F95-1277
Universal - Programmable Fan/Remote Sensor

Single Stage	Mult-Stage	Heat Pump
1/1	2/2	4/2

1F97-1277
Programmable Fan/Remote Sensor

Single Stage	Mult-Stage	Heat Pump
1/1	—	2/1

WHITE-RODGERS™

EMERSON™

SPECIFICATIONS:

DIMENSIONS
4.5”H X 5.9”W X 1.2”D

SETPOINT RANGE
45° to 99° F (7° to 37° C)

RATED DIFFERENTIALS
Heat 0.6° F; Cool 1.2° F

OPERATING AMBIENT
Heat 0.6° F; Cool 1.2° F

OPERATING HUMIDITY RANGE
90% non-condensing maximum

SHIPPING TEMPERATURE RANGE
-40° to 150° F (-40° to 65° C)

ELECTRICAL RATING
Battery Power: mV to 30 VAC, NEC Class II, 50/60 Hz or DC
Hardwire: 20 to 30 VAC
1.5 Amps (load per terminal)
2.5 Amps maximum load (all terminals combined)

Standard Systems:
Single Stage gas, oil, electric
Single Stage heat pump

Millivolt Systems:
Multi-Stage gas, oil, electric (1F95-1291, 1F95-1277)
Multi-Stage heat pump (1F95-1291, 1F95-1277, 1F97-1277)

ACCESSORIES
Remote Sensors:
Indoor - F145-1328
Outdoor - F145-1378

Thermostat Guards:
Clear - F29-1098
Metal - F29-0220 (solid base)
Metal - F29-0222 (ring base)

Wall Plates:
F61-2600 (8.1”W x 5.4”H)
F61-2634 (6.5”W x 5”H)

TERMINAL DESIGNATIONS

1F95-1291 RC RH C W/E W2 Y Y2 O/B L G + S — 6 DHM HM

1F95-1277 RC RH C W/E W2 Y Y2 O/B L G + S — 6

1F97-1277 RC RH C W/E Y O/B L G + S — 6

SINGLE STAGE	MULTISTAGE	HEAT PUMP	MODEL	PROGRAMS		APPLICATIONS					SELECTABLE PERFORMANCE FEATURES											COMFORTABLE AND CONVENIENCE FEATURES										
Stage Heat/Cool by System			Model Number	Program Options	Periods Per Day Options	Gas/Oil/Electric	3 Wire Zone	Millivolt	Humidity Control (H) Humidity (D) Dehumidity	Power Source	Auto Changeover	Heat Only or Cool Only Option	Programmable Fan	Energy Mgt. Recovery	Dual Fuel Option	EMR/ Early Start Program	Temperature Setpoint Limits Adjustable Max/Min	Duel Fuel Control	Keypad Lockout	Setpoint Temp. Limits Adj.	Indoor Remote Sensor*	Outdoor Remote Sensor*	User Interface (T) Touchscreen / (B) Button	Display Size (Square Inches)	Lighted Display***	Audible Feedback	Alkaline Battery Life ** (Years)	Cool Savings™	Daylight Sav. Adj. (A)Auto (B) Button	Furnace Lockout Ignit. Mod. Reset	Memory Back-up (P) Permanent (B) Battery	Display Temp. Recalibration	Warranty (Years)
1/1	2/2	4/2	1F95-1291	7,5+1+1,0	4, 2, 0	•	•	•	H/D	B,H,PA	•	•	•	•	•	•	•	•	•	•	•	•	T	12	•	•	3	•	A	•	P	•	5
1/1	2/2	4/2	1F95-1277	7,5+1+1,0	4, 2, 0	•	•	•	—	B,H,PA	•	•	•	•	•	•	•	•	•	•	•	•	T	12	•	•	3	•	A	•	P	•	5
1/1	—	2/1	1F97-1277	7,5+1+1,0	4, 2, 0	•	•	•	—	B,H,PA	•	•	•	•	•	•	•	•	•	•	•	•	T	12	•	•	3	•	A	•	P	•	5

B = Battery, H = Hardwired, PA = Power Stealing Assist *** Optional continous display light w/hardwire connection **Recommended battery change interval is once per year
* Only one (1) remote sensor may be used - either indoor or outdoor; or Logic Program and indoor remote sensor.

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PROCONTRACTORBRANDING.COM

R-5004-1 (10/20)

CU-1 / AHU-1

Submittal Data Sheet

1.5 Ton, AC, Single Stage, 13 SEER - DX13SN0181

Project: Grove Lofts Res Splits

Submitted by: Eddie Christ of THERMAL MECHANICS INC. STL on 2/20/2020

Submitted to: No Engineer Name Specified

Tags: || AHRI 6524125: Products [DX13SN0181, AWUF180516], SEER 13, EER 11, Cooling 17400, Fit 0, AFUE 0

STANDARD FEATURES

- Energy-efficient compressor
- Single-speed PSC condenser fan motor
- Factory-installed filter drier
- Copper tube/aluminum fin coil
- Service valves with sweat connections and easy-access gauge ports
- AHRI Certified
- ETL Listed

CABINET FEATURES

- Heavy-gauge galvanized-steel cabinet with grille-style sound control top design
- Custom Nickel Gray powder-paint finish
- 500-hour salt-spray tested
- Wire fan discharge grille
- Steel louver coil guard
- Top and side maintenance access
- Single-panel access to controls with space provided for field-installed accessories
- When properly anchored, meets the 2010 Florida Building Code unit integrity requirements for hurricane-type winds (Anchor bracket kits available.)

CU-1 / AHU-1

Submittal Data Sheet

1.5 Ton, AC, Single Stage, 13 SEER - DX13SN0181

Project: Grove Lofts Res Splits

Submitted by: Eddie Christ of THERMAL MECHANICS INC. STL on 2/20/2020

Submitted to: No Engineer Name Specified

Tags: || AHRI 6524125: Products [DX13SN0181, AWUF180516], SEER 13, EER 11, Cooling 17400, Fit 0, AFUE 0

PERFORMANCE	* VALUES SHOWN ARE FOR AHRI RATED HIGH SALES VOLUME TESTED COMBINATION (HSVTC)		
Outdoor Unit Model No.	DX13SN0181	Outdoor Unit Name:	1.5 Ton, AC, Single Stage, 13 SEER
Rated Cooling Conditions:	Indoor (°F DB/WB): 80 / 67 Ambient (°F DB/WB): 95 / 75	Rated Heating Conditions:	Indoor (°F DB/WB): / Ambient (°F DB/WB): /
* EER:	11.00	* Rated Cooling Capacity (Btu/hr):	17,800
* SEER:	13.00		

OUTDOOR UNIT DETAILS			
Power Supply (V/Hz/Ph):	208/230 / 60 / 1	Compressor Type:	Single Stage
Min. Circuit Amps MCA (A):	9.1	Suction Valve Connection Size (inch):	3/4
Max Overcurrent Protection (MOP) (A):	15.0	Liquid Valve Connection Size (inch):	3/8
Rated Load Amps RLA(A):	9	Sound Pressure (High) (dBA):	75
Refrigerant Type:	R-410A	Cooling Operation Range (°F DB):	65 - 115
Holding Refrigerant Charge (ozs):	63	Heating Operation Range (°F DB):	-
Additional Charge (lb/ft):	0.60	Max. Pipe Length (Vertical) (ft):	80
Pre-charge Piping (Length) (ft):	15	Min. Cooling Range w/Baffle (°F DB):	55
Max. Pipe Length (Total) (ft):	250	Min. Heating Range w/Baffle (°F DB):	
Net Weight (lb):	102	Gross Weight (lb):	100
Dimensions (HxWxD) (in):	27-1/2 x 26 x 26		

CU-1 / AHU-1

Submittal Data Sheet

1.5 Ton, Wall-Mount, Unpainted, Air Handler - AWUF180516

Project: Grove Lofts Res Splits

Submitted by: Eddie Christ of THERMAL MECHANICS INC. STL on 2/20/2020

Submitted to: No Engineer Name Specified

Tags: || AHRI 6524125: Products [DX13SN0181, AWUF180516], SEER 13, EER 11, Cooling 17400, Fit 0, AFUE 0

STANDARD FEATURES

- 1. Equipped with a Check Flowrater for cooling-only and heat pump operation
- 2. Direct-drive, multi-speed motors allows air volume variation for heating/cooling:
- 3. Multi-speed ECM: AWUF19, 25, 31, 32, 37
- 4. Multi-speed PSC motor: AWUF18, 24, 30, 36
- 5. Sequence-controlled, rust-resistant nickel chromium heating elements of 3, 5, 8, and 10 kW
- 6. Aluminum tubing coils on all models
- 7. Factory-installed pull-type disconnect
- 8. Thermoplastic drain pan with bottom primary and secondary drain connections
- 9. AHRI Certified
- 10. ETL Listed

CABINET FEATURES

- 1. Cabinet air leakage less than 2.0% at 1.0 inch H2O when tested in accordance with ASHRAE standard 193
- 2. Cabinet air leakage less than 1.4% at 0.5 inch H2O when tested in accordance with ASHRAE standard 193
- 3. Built-in filter rack (filter included)
- 4. Large chassis (2-1/2 and 3 ton units), front return only
- 5. Small chassis (1-1/2 and 2 ton units), front or bottom return
- 6. Wall-hanging bracket provided

CU-1 / AHU-1

Submittal Data Sheet

1.5 Ton, Wall-Mount, Unpainted, Air Handler - AWUF180516

Project: Grove Lofts Res Splits

Submitted by: Eddie Christ of THERMAL MECHANICS INC. STL on 2/20/2020

Submitted to: No Engineer Name Specified

Tags: || AHRI 6524125: Products [DX13SN0181, AWUF180516], SEER 13, EER 11, Cooling 17400, Fit 0, AFUE 0

PERFORMANCE

Product Model No.	AWUF180516	Product Model Name:	1.5 Ton, Wall-Mount, Unpainted, Air Handler
Type:	Air Handler	Cooling Capacity (Nominal) (Btu/hr):	18,000
Blower Motor Rating (HP):	1/5		

PRODUCT DETAILS

Power Supply (V/Hz/Ph):	208-230 / 60 / 1	Airflow Rate (High) (CFM):	
Min. Circuit Amps MCA (A):	23/26.6	Suction Valve Connection Size (inch):	5/8
Max Overcurrent Protection (MOP) (A):	25/30	Liquid Valve Connection Size (inch):	3/8
Dimensions (HxWxD) (in):	36 x 20-1/4 x 16-1/4	Condensate Connection (inch):	3/4
Net Weight (lb):	84	Blower Size Diameter (inch):	9
Gross Weight (lb):	83	Blower Size Width (inch):	6

CU-2 / AHU-2

Submittal Data Sheet

2 Ton, AC, Single Stage, 13 SEER - DX13SN0241

Project: Grove Lofts Res Splits

Submitted by: Eddie Christ of THERMAL MECHANICS INC. STL on 2/20/2020

Submitted to: No Engineer Name Specified

Tags: || AHRI 9039367: Products [DX13SN0241, AWUF241016], SEER 13, EER 11, Cooling 23000, Fit 0, AFUE 0

STANDARD FEATURES

- Energy-efficient compressor
- Single-speed PSC condenser fan motor
- Factory-installed filter drier
- Copper tube/aluminum fin coil
- Service valves with sweat connections and easy-access gauge ports
- AHRI Certified
- ETL Listed

CABINET FEATURES

- Heavy-gauge galvanized-steel cabinet with grille-style sound control top design
- Custom Nickel Gray powder-paint finish
- 500-hour salt-spray tested
- Wire fan discharge grille
- Steel louver coil guard
- Top and side maintenance access
- Single-panel access to controls with space provided for field-installed accessories
- When properly anchored, meets the 2010 Florida Building Code unit integrity requirements for hurricane-type winds (Anchor bracket kits available.)

CU-2 / AHU-2

Submittal Data Sheet

2 Ton, AC, Single Stage, 13 SEER - DX13SN0241

Project: Grove Lofts Res Splits

Submitted by: Eddie Christ of THERMAL MECHANICS INC. STL on 2/20/2020

Submitted to: No Engineer Name Specified

Tags: || AHRI 9039367: Products [DX13SN0241, AWUF241016], SEER 13, EER 11, Cooling 23000, Fit 0, AFUE 0

PERFORMANCE	* VALUES SHOWN ARE FOR AHRI RATED HIGH SALES VOLUME TESTED COMBINATION (HSVTC)		
Outdoor Unit Model No.	DX13SN0241	Outdoor Unit Name:	2 Ton, AC, Single Stage, 13 SEER
Rated Cooling Conditions:	Indoor (°F DB/WB): 80 / 67 Ambient (°F DB/WB): 95 / 75	Rated Heating Conditions:	Indoor (°F DB/WB): / Ambient (°F DB/WB): /
* EER:	11.00	* Rated Cooling Capacity (Btu/hr):	23,000
* SEER:	13.00		

OUTDOOR UNIT DETAILS			
Power Supply (V/Hz/Ph):	208/230 / 60 / 1	Compressor Type:	Single Stage
Min. Circuit Amps MCA (A):		Suction Valve Connection Size (inch):	3/4
Max Overcurrent Protection (MOP) (A):	15	Liquid Valve Connection Size (inch):	3/8
Rated Load Amps RLA(A):	7.7	Sound Pressure (High) (dBA):	75
Refrigerant Type:	R-410A	Cooling Operation Range (°F DB):	65 - 115
Holding Refrigerant Charge (ozs):	60	Heating Operation Range (°F DB):	-
Additional Charge (lb/ft):	0.60	Max. Pipe Length (Vertical) (ft):	80
Pre-charge Piping (Length) (ft):	15	Min. Cooling Range w/Baffle (°F DB):	55
Max. Pipe Length (Total) (ft):	250	Min. Heating Range w/Baffle (°F DB):	
Net Weight (lb):	115	Gross Weight (lb):	134
Dimensions (HxWxD) (in):	27-1/2 x 26 x 26		

CU-2 / AHU-2

Submittal Data Sheet

2 Ton, Wall-Mount, Unpainted, Air Handler - AWUF241016

Project: Grove Lofts Res Splits

Submitted by: Eddie Christ of THERMAL MECHANICS INC. STL on 2/20/2020

Submitted to: No Engineer Name Specified

Tags: || AHRI 9039367: Products [DX13SN0241, AWUF241016], SEER 13, EER 11, Cooling 23000, Fit 0, AFUE 0

STANDARD FEATURES

- 1. Equipped with a Check Flowrater for cooling-only and heat pump operation
- 2. Direct-drive, multi-speed motors allows air volume variation for heating/cooling:
- 3. Multi-speed ECM: AWUF19, 25, 31, 32, 37
- 4. Multi-speed PSC motor: AWUF18, 24, 30, 36
- 5. Sequence-controlled, rust-resistant nickel chromium heating elements of 3, 5, 8, and 10 kW
- 6. Aluminum tubing coils on all models
- 7. Factory-installed pull-type disconnect
- 8. Thermoplastic drain pan with bottom primary and secondary drain connections
- 9. AHRI Certified
- 10. ETL Listed

CABINET FEATURES

- 1. Cabinet air leakage less than 2.0% at 1.0 inch H2O when tested in accordance with ASHRAE standard 193
- 2. Cabinet air leakage less than 1.4% at 0.5 inch H2O when tested in accordance with ASHRAE standard 193
- 3. Built-in filter rack (filter included)
- 4. Large chassis (2-1/2 and 3 ton units), front return only
- 5. Small chassis (1-1/2 and 2 ton units), front or bottom return
- 6. Wall-hanging bracket provided

CU-2 / AHU-2

Submittal Data Sheet

2 Ton, Wall-Mount, Unpainted, Air Handler - AWUF241016

Project: Grove Lofts Res Splits

Submitted by: Eddie Christ of THERMAL MECHANICS INC. STL on 2/20/2020

Submitted to: No Engineer Name Specified

Tags: || AHRI 9039367: Products [DX13SN0241, AWUF241016], SEER 13, EER 11, Cooling 23000, Fit 0, AFUE 0

PERFORMANCE

Product Model No.	AWUF241016	Product Model Name:	2 Ton, Wall-Mount, Unpainted, Air Handler
Type:	Air Handler	Cooling Capacity (Nominal) (Btu/hr):	24,000
Blower Motor Rating (HP):	1/5		

PRODUCT DETAILS

Power Supply (V/Hz/Ph):	208-230 / 60 / 1	Airflow Rate (High) (CFM):	
Min. Circuit Amps MCA (A):	46/52.7	Suction Valve Connection Size (inch):	5/8
Max Overcurrent Protection (MOP) (A):	50/60	Liquid Valve Connection Size (inch):	3/8
Dimensions (HxWxD) (in):	36 x 20-1/4 x 16-1/4	Condensate Connection (inch):	3/4
Net Weight (lb):	84	Blower Size Diameter (inch):	10
Gross Weight (lb):	79	Blower Size Width (inch):	6

CU-3 / AHU-3

Submittal Data Sheet

4 Ton, AC, Single Stage, 13 SEER - DX13SN0481

Project: Grove Lofts Res Splits

Submitted by: Eddie Christ of THERMAL MECHANICS INC. STL on 2/20/2020

Submitted to: No Engineer Name Specified

Tags: || AHRI 8171752: Products [DX13SN0481, ARUF49D14], SEER 13, EER 11, Cooling 45000, Fit 0, AFUE 0

STANDARD FEATURES

- Energy-efficient compressor
- Single-speed PSC condenser fan motor
- Factory-installed filter drier
- Copper tube/aluminum fin coil
- Service valves with sweat connections and easy-access gauge ports
- AHRI Certified
- ETL Listed

CABINET FEATURES

- Heavy-gauge galvanized-steel cabinet with grille-style sound control top design
- Custom Nickel Gray powder-paint finish
- 500-hour salt-spray tested
- Wire fan discharge grille
- Steel louver coil guard
- Top and side maintenance access
- Single-panel access to controls with space provided for field-installed accessories
- When properly anchored, meets the 2010 Florida Building Code unit integrity requirements for hurricane-type winds (Anchor bracket kits available.)
- When properly anchored, meets the 2010 Florida Building Code unit integrity requirements for hurricane-type winds (Anchor bracket kits available.)

CU-3 / AHU-3

Submittal Data Sheet

4 Ton, AC, Single Stage, 13 SEER - DX13SN0481

Project: Grove Lofts Res Splits

Submitted by: Eddie Christ of THERMAL MECHANICS INC. STL on 2/20/2020

Submitted to: No Engineer Name Specified

Tags: || AHRI 8171752: Products [DX13SN0481, ARUF49D14], SEER 13, EER 11, Cooling 45000, Fit 0, AFUE 0

PERFORMANCE	* VALUES SHOWN ARE FOR AHRI RATED HIGH SALES VOLUME TESTED COMBINATION (HSVTC)		
Outdoor Unit Model No.	DX13SN0481	Outdoor Unit Name:	4 Ton, AC, Single Stage, 13 SEER
Rated Cooling Conditions:	Indoor (°F DB/WB): 80 / 67 Ambient (°F DB/WB): 95 / 75	Rated Heating Conditions:	Indoor (°F DB/WB): / Ambient (°F DB/WB): /
* EER:	11.00	* Rated Cooling Capacity (Btu/hr):	46,000
* SEER:	13.00		

OUTDOOR UNIT DETAILS			
Power Supply (V/Hz/Ph):	208/230 / 60 / 1	Compressor Type:	Single Stage
Min. Circuit Amps MCA (A):		Suction Valve Connection Size (inch):	1-1/8
Max Overcurrent Protection (MOP) (A):	45	Liquid Valve Connection Size (inch):	3/8
Rated Load Amps RLA(A):	19.9	Sound Pressure (High) (dBA):	76
Refrigerant Type:	R-410A	Cooling Operation Range (°F DB):	65 - 115
Holding Refrigerant Charge (ozs):	91	Heating Operation Range (°F DB):	-
Additional Charge (lb/ft):	0.60	Max. Pipe Length (Vertical) (ft):	80
Pre-charge Piping (Length) (ft):	15	Min. Cooling Range w/Baffle (°F DB):	55
Max. Pipe Length (Total) (ft):	250	Min. Heating Range w/Baffle (°F DB):	
Net Weight (lb):	175	Gross Weight (lb):	191
Dimensions (HxWxD) (in):	36-1/4 x 29 x 29		

CU-3 / AHU-3

20KW Heat with Single Point Kit

Submittal Data Sheet

4 Ton, Multi-Position, Multi-Speed PSC, Air Handler - ARUF49D14

Project: Grove Lofts Res Splits

Submitted by: Eddie Christ of THERMAL MECHANICS INC. STL on 2/20/2020

Submitted to: No Engineer Name Specified

Tags: || AHRI 8171752: Products [DX13SN0481, ARUF49D14], SEER 13, EER 11, Cooling 45000, Fit 0, AFUE 0

STANDARD FEATURES

- 1. Check flowrator for cooling and heat pump applications
- 2. Direct drive, multi-speed PSC blower motor
- 3. All-aluminum evaporator coil
- 4. Coil mounting track for quick repositioning
- 5. Cabinet air leakage less than 2.0% at 1.0 inch H2O when tested in accordance with ASHRAE standard 193
- 5. Cabinet air leakage less than 1.4% at 0.5 inch H2O when tested in accordance with ASHRAE standard 193
- 6. 3 kW â€“ 25 kW electric heater kits
- 7. Horizontal or vertical configuration capabilities
- 8. AHRI certified
- 9. ETL listed

CABINET FEATURES

- 1. Rigid SmartFrame cabinet
- 2. 21" depth for easier attic access
- 3. DecaBDE-free thermoplastic drain pan with secondary drain connections
- 4. Screw-less sides and back helps to reduce condensation when installed in humid locations
- 5. Foil-faced insulation covers the internal casing to reduce cabinet condensation
- 6. Galvanized, leather grain-embossed finish
- 7. Glue-less cabinet insulation retention
- 8. Tool-less filter access

CU-3 / AHU-3

20KW Heat with Single Point Kit

Submittal Data Sheet

4 Ton, Multi-Position, Multi-Speed PSC, Air Handler - ARUF49D14

Project: Grove Lofts Res Splits

Submitted by: Eddie Christ of THERMAL MECHANICS INC. STL on 2/20/2020

Submitted to: No Engineer Name Specified

Tags: || AHRI 8171752: Products [DX13SN0481, ARUF49D14], SEER 13, EER 11, Cooling 45000, Fit 0, AFUE 0

PERFORMANCE

Product Model No.	ARUF49D14	Product Model Name:	4 Ton, Multi-Position, Multi-Speed PSC, Air Handler
Type:	Air Handler	Cooling Capacity (Nominal) (Btu/hr):	48,000
Blower Motor Rating (HP):	1/2		

PRODUCT DETAILS

Power Supply (V/Hz/Ph):	208/230 / 60 / 1	Airflow Rate (High) (CFM):	
Min. Circuit Amps MCA (A):	4.4/4.4	Suction Valve Connection Size (inch):	7/8
Max Overcurrent Protection (MOP) (A):	15	Liquid Valve Connection Size (inch):	3/8
Dimensions (HxWxD) (in):	53-1/2 x 24-1/2 x 21	Condensate Connection (inch):	3/4
Net Weight (lb):	145	Blower Size Diameter (inch):	10-5/8
Gross Weight (lb):	147	Blower Size Width (inch):	10-5/8

CU-4 / AHU-4

Submittal Data Sheet

5 Ton, AC, Single Stage, 13 SEER - DX13SN0611

Project: Grove Lofts Res Splits

Submitted by: Eddie Christ of THERMAL MECHANICS INC. STL on 2/20/2020

Submitted to: No Engineer Name Specified

Tags: || AHRI 7988993: Products [DX13SN0611, ARUF61D14], SEER 13, EER 11, Cooling 55500, Fit 0, AFUE 0

STANDARD FEATURES

- Energy-efficient compressor
- Single-speed PSC condenser fan motor
- Factory-installed filter drier
- Copper tube/aluminum fin coil
- Service valves with sweat connections and easy-access gauge ports
- AHRI Certified
- ETL Listed

CABINET FEATURES

- Heavy-gauge galvanized-steel cabinet with grille-style sound control top design
- Custom Nickel Gray powder-paint finish
- 500-hour salt-spray tested
- Wire fan discharge grille
- Steel louver coil guard
- Top and side maintenance access
- Single-panel access to controls with space provided for field-installed accessories
- When properly anchored, meets the 2010 Florida Building Code unit integrity requirements for hurricane-type winds (Anchor bracket kits available.)

CU-4 / AHU-4

Submittal Data Sheet

5 Ton, AC, Single Stage, 13 SEER - DX13SN0611

Project: Grove Lofts Res Splits

Submitted by: Eddie Christ of THERMAL MECHANICS INC. STL on 2/20/2020

Submitted to: No Engineer Name Specified

Tags: || AHRI 7988993: Products [DX13SN0611, ARUF61D14], SEER 13, EER 11, Cooling 55500, Fit 0, AFUE 0

PERFORMANCE	* VALUES SHOWN ARE FOR AHRI RATED HIGH SALES VOLUME TESTED COMBINATION (HSVTC)		
Outdoor Unit Model No.	DX13SN0611	Outdoor Unit Name:	5 Ton, AC, Single Stage, 13 SEER
Rated Cooling Conditions:	Indoor (°F DB/WB): 80 / 67 Ambient (°F DB/WB): 95 / 75	Rated Heating Conditions:	Indoor (°F DB/WB): / Ambient (°F DB/WB): /
* EER:	11.00	* Rated Cooling Capacity (Btu/hr):	56,500
* SEER:	13.00		

OUTDOOR UNIT DETAILS			
Power Supply (V/Hz/Ph):	208/230 / 60 / 1	Compressor Type:	Single Stage
Min. Circuit Amps MCA (A):		Suction Valve Connection Size (inch):	7/8
Max Overcurrent Protection (MOP) (A):	60	Liquid Valve Connection Size (inch):	3/8
Rated Load Amps RLA(A):	26.4	Sound Pressure (High) (dBA):	77
Refrigerant Type:	R-410A	Cooling Operation Range (°F DB):	65 - 115
Holding Refrigerant Charge (ozs):	111	Heating Operation Range (°F DB):	-
Additional Charge (lb/ft):	0.60	Max. Pipe Length (Vertical) (ft):	80
Pre-charge Piping (Length) (ft):	15	Min. Cooling Range w/Baffle (°F DB):	55
Max. Pipe Length (Total) (ft):	250	Min. Heating Range w/Baffle (°F DB):	
Net Weight (lb):	211	Gross Weight (lb):	232
Dimensions (HxWxD) (in):	38-1/4 x 35-1/2 x 35-1/2		

CU-4 / AHU-4

20KW Heat with Single Point Kit

Submittal Data Sheet

5 Ton, Multi-Position, Multi-Speed PSC, Air Handler - ARUF61D14

Project: Grove Lofts Res Splits

Submitted by: Eddie Christ of THERMAL MECHANICS INC. STL on 2/20/2020

Submitted to: No Engineer Name Specified

Tags: || AHRI 7988993: Products [DX13SN0611, ARUF61D14], SEER 13, EER 11, Cooling 55500, Fit 0, AFUE 0

STANDARD FEATURES

- 1. Check flowrator for cooling and heat pump applications
- 2. Direct drive, multi-speed PSC blower motor
- 3. All-aluminum evaporator coil
- 4. Coil mounting track for quick repositioning
- 5. Cabinet air leakage less than 2.0% at 1.0 inch H2O when tested in accordance with ASHRAE standard 193
- 5. Cabinet air leakage less than 1.4% at 0.5 inch H2O when tested in accordance with ASHRAE standard 193
- 6. 3 kW â€“ 25 kW electric heater kits
- 7. Horizontal or vertical configuration capabilities
- 8. AHRI certified
- 9. ETL listed

CABINET FEATURES

- 1. Rigid SmartFrame cabinet
- 2. 21" depth for easier attic access
- 3. DecaBDE-free thermoplastic drain pan with secondary drain connections
- 4. Screw-less sides and back helps to reduce condensation when installed in humid locations
- 5. Foil-faced insulation covers the internal casing to reduce cabinet condensation
- 6. Galvanized, leather grain-embossed finish
- 7. Glue-less cabinet insulation retention
- 8. Tool-less filter access

CU-4 / AHU-4

20KW Heat with Single Point Kit

Submittal Data Sheet

5 Ton, Multi-Position, Multi-Speed PSC, Air Handler - ARUF61D14

Project: Grove Lofts Res Splits

Submitted by: Eddie Christ of THERMAL MECHANICS INC. STL on 2/20/2020

Submitted to: No Engineer Name Specified

Tags: || AHRI 7988993: Products [DX13SN0611, ARUF61D14], SEER 13, EER 11, Cooling 55500, Fit 0, AFUE 0

PERFORMANCE

Product Model No.	ARUF61D14	Product Model Name:	5 Ton, Multi-Position, Multi-Speed PSC, Air Handler
Type:	Air Handler	Cooling Capacity (Nominal) (Btu/hr):	60,000
Blower Motor Rating (HP):	3/4		

PRODUCT DETAILS

Power Supply (V/Hz/Ph):	208/230 / 60 / 1	Airflow Rate (High) (CFM):	
Min. Circuit Amps MCA (A):	5.8/5.8	Suction Valve Connection Size (inch):	7/8
Max Overcurrent Protection (MOP) (A):	15	Liquid Valve Connection Size (inch):	3/8
Dimensions (HxWxD) (in):	58 x 24-1/2 x 21	Condensate Connection (inch):	3/4
Net Weight (lb):	155	Blower Size Diameter (inch):	11-15/16
Gross Weight (lb):	160	Blower Size Width (inch):	10-5/8

Canada

ENERGUIDE

Energy consumption / Consommation énergétique

660 kWh
per year / par année

Uses least energy / Consomme le moins d'énergie

Uses most energy / Consomme le plus d'énergie

Similar models compared

Type 7

20.5 – 22.4

volume in ft³ / volume en pi³

Modèles similaires comparés

Model number

WRS321SD0***

Numéro du modèle

Removal of this label before first retail purchase is an offense (S.C. 1992, c.36).
Enlever cette étiquette avant le premier achat au détail constitue une violation de la loi (S.C. 1992, c.36).

W11090541 Rev. B

U.S. Government

Federal law prohibits removal of this label before consumer purchase.

ENERGYGUIDE

Clothes Washer
Capacity Class: Standard

Whirlpool Corporation
Model WFW5620H* , WFW6620H*
Capacity (tub volume): 4.5 cubic feet

Compare ONLY to other labels with yellow numbers.
Labels with yellow numbers are based on the same test procedures.

Estimated Yearly Energy Cost
(when used with an electric water heater)

$16

$10 — Cost range of Similar Products — $71

139 kWh
Estimated Yearly Electricity Use

$10
Estimated Yearly Energy Cost
(when used with a natural gas water heater)

- **Your cost will depend on your utility rates and use.**
- Cost range based only on standard capacity models.
- Estimated energy cost based on six wash loads a week and a national average electricity cost of 12 cents per kWh and natural gas cost of $1.09 per therm.

ftc.gov/energy

ENERGY STAR
W11356840

Canada

ENERGUIDE

Energy consumption / Consommation énergétique

139 kWh
per year / par année

This model / Ce modèle

60 kWh
Uses least energy / Consomme le moins d'énergie

159 kWh
Uses most energy / Consomme le plus d'énergie

Similar models compared	**Front Load Standard/ À Changement Frontal odinaires**	Modèles similaires comparés
Model numbers	**WFW5620H* , WFW6620H***	Numéro du modèle

Removal of this label before first retail purchase is an offence (S.C. 1992, c.36).
Enlever cette étiquette avant le premier achat au détail constitue une violation de la loi (S.C. 1992, c.36).

W11356840

ENERGY STAR
HIGH EFFIC ENCY
HAUTE EFFICACITE

The Energy Star® mark on this EnerGuide label signifies that this is an energy – efficient appliance. Its energy performance meets or exceeds the Government of Canada's high efficiency levels. Use the EnerGuide rating to determine how this appliance compares to other similar models.

La marque Energy Star® sur cette étiquette EnerGuide signifie que l'appareil est éconergétique et que son rendement énergétique satisfait ou dépasse les niveaux de haute efficacité du gouvernement du Canada. Utilisez la cote EnerGuide afin de comparer le rendement de l'appareil avec celui d'autres modéles similaires.

7.4 cu. ft. Front Load Electric Dryer

WED5620H

White
WED5620HW

Capacity

Total	7.4 cu. ft.

General Features & Properties

Intuitive Controls
Sanitize Cycle
Advanced Moisture Sensing
EcoBoost™ Option
Quad Baffles
Closet-Depth Fit
Laundry Pedestals
An American Company for Over 100 Years

Electrical Details

Hz	60
Amps	30
Volts	240

Certifications

ADA Compliant	Yes
ENERGY STAR® Certified	Yes

Technical Details

Drum Material	Powder Coat
Fuel Type	Electric
Door Style	Side Swing
Reversible Door	Yes
Number of Dryer Cycles	36
Selection of Drying Cycles	Bulky Items Colors Delicates Heavy Duty Normal Quick Dry Regular Sanitize Timed Dry Towels Whites Wrinkle Control
Dryer Option Selections	Control Lock Cycle Signal Damp Dry Signal Eco Boost™

Dimensions

Product Dimensions (H x W x D)	38-1/8" x 27" x 30-5/8"
Depth with Door Open 90°	54-5/16"
Maximum Vent Length	64'
Venting Direction	Left, Right, Bottom, Rear
Ventless	No

Reference Material

Install Guide

Use & Care Guide

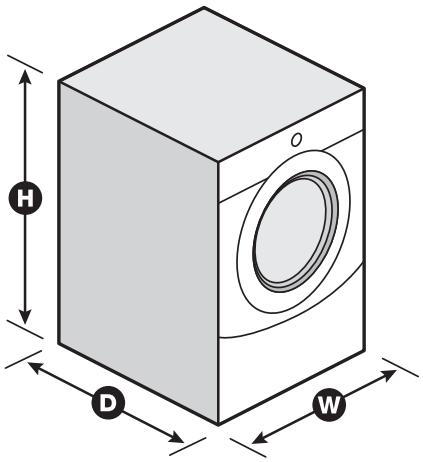
Warranty

Key Features & Benefits

Wrinkle Shield™ Option
Help keep wrinkles from setting into clean, dry fabrics with the Wrinkle Shield™ option. It keeps clothes tumbling for up to 150 minutes after the cycle ends or until you open the door.

7.4 cu. ft. Capacity
Get plenty of room to dry the large loads you washed in the matching front load washer. This 7.4 cu. ft. dryer easily handles bulky items like comforters and sleeping bags.

ENERGY STAR® Certified
ENERGY STAR® certified models exceed government standards to help conserve natural resources and save money on your utility bills.



NOTE: Dimensions are for planning purposes only. For complete details, see Installation Instructions packed with product. Specifications subject to change without notice.

U.S. Government

Federal law prohibits removal of this label before consumer purchase.

ENERGYGUIDE

Clothes Washer
Capacity Class: Standard

Whirlpool Corporation
Model WFW5620H* , WFW6620H*
Capacity (tub volume): 4.5 cubic feet

Compare ONLY to other labels with yellow numbers.
Labels with yellow numbers are based on the same test procedures.

Estimated Yearly Energy Cost
(when used with an electric water heater)

$16

$10 — Cost range of Similar Products — $71

139 kWh
Estimated Yearly Electricity Use

$10
Estimated Yearly Energy Cost
(when used with a natural gas water heater)

- Your cost will depend on your utility rates and use.
- Cost range based only on standard capacity models.
- Estimated energy cost based on six wash loads a week and a national average electricity cost of 12 cents per kWh and natural gas cost of $1.09 per therm.

ftc.gov/energy

ENERGY STAR

W11323357

Canada

ENERGUIDE

Energy consumption / Consommation énergétique

139 kWh
per year / par année

This model / Ce modèle

38 kWh — 170 kWh

Uses least energy / Consomme le moins d'énergie		Uses most energy / Consomme le plus d'énergie
Similar models compared	Front Load Standard/ À Changement Frontal odinaires	Modèles similaires comparés
Model numbers	WFW5620H* , WFW6620H*	Numéro du modèle

Removal of this label before first retail purchase is an offence (S.C. 1992, c.36).
Enlever cette étiquette avant le premier achat au détail constitue une violation de la loi (S.C. 1992, c.36).

W11323357

ENERGY STAR HIGH EFFICIENCY HAUTE EFFICACITÉ

The Energy Star® mark on this EnerGuide label signifies that this is an energy–efficient appliance. Its energy performance meets or exceeds the Government of Canada's high efficiency levels. Use the EnerGuide rating to determine how this appliance compares to other similar models.

La marque Energy Star® sur cette étiquette EnerGuide signifie que l'appareil est écoénergétique et que son rendement énergétique satisfait ou dépasse les niveaux de haute efficacité du gouvernement du Canada. Utilisez la cote EnerGuide afin de comparer le rendement de l'appareil avec celui d'autres modèles similaires.

G. Test Reports: Submit certified independent testing agency reports indicating window units meet or exceed specified performance requirements.

1.7 SYSTEM DESCRIPTION

A. Operation: DOUBLE HUNG with TILT-IN SASH for cleaning

B. AAMA Rating: Class CW-PG50-H when tested according to AAMA/WDMA/CSA 101/I.S.2/A440-08 at the gateway size of 56” x 91”

C. Construction: 3 1/4 inch frame depth. Wall thickness: 0.062”/0.078” frame/sill; 0.062” sash. Factory finished extruded aluminum frame and sash members with integral structural polyurethane thermal break.

D. Glazing: 7/8 inch insulating glass; black reusable flexible PVC channel gasket;

1.8 HARDWARE:

A. Balances:

1. Balances shall provide a positive lifting force through the full range of sash travel. Sash travel shall be limited on oversize units.

2. When properly adjusted, balances shall hold the sash stationary at any open position.

3. Balances shall be factory calibrated of type Spiral (or Ultra-Lift balance or Block and Tackle)

B. Meeting Rail Lock(s): White or Black painted zinc alloy sweep lock fastened at meeting rail with two self-tapping screws.

C. Head Lock: Automatic aluminum spring-loaded head lock shall secure top sash in closed position.

D. Tilt latches: Custodial-operated locking tamper-proof tilt latches

E. Lift Handles: Integral continuous lift handles on bottom sash.

F. Limit Stops: Jamb-mounted limit stops.

1.9 WEATHERSTRIPPING:

A. Sash: High-density woven pile shall be used in combination with continuous polyethylene rigid seal to minimize air infiltration.

B. Securely stake and join at corners. Provide drainage to exterior as necessary.

1.10 PERFORMANCE REQUIREMENTS

A. Air, Water and Structural Performance Requirements:

When tested in accordance with cited test procedures, windows shall meet or exceed the following performance criteria, as well as those indicated in AAMA/WDMA/CSA 101/I.S.2/A440-08 for performance grade of unit specified unless otherwise noted herein.

1. Air Test Performance Requirements:
   a. Performance: Air infiltration maximum 0.30 cfm per square foot at 1.6 psf pressure differential when tested in accordance with ASTM E283 for sliding sealed products.

1.13 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.14 WARRANTY

A. *Refer to Crystal Window & Door Systems, Ltd. standard warranty*.

B. Optional Extended Warranty (contact your Crystal sales representative).

PART 2- PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: **Crystal Window & Door Systems, Ltd**., which is located at: 31-10 Whitestone Expressway, Flushing, NY 11354; Tel: 718. 961.7300; Tel: 800. 472.9988; Fax: 718.460.4594; Web: www.crystalwindows.com

B. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00.

2.2 Aluminum:

A. Extruded aluminum prime billet 6063-T5 or 6063-T6 alloy for primary components; 6063-T5, 6063-T6, or 6061-T6 for structural components; all meeting the requirements of ASTM B221.

B. Aluminum sheet alloy 5005 H 32 (for anodic finish), meeting the requirements of ÅSTM B209 or alloy 3003 H 14 (for painted or unfinished sheet).

2.3 Thermal Barrier:

A. Structural Thermal Barrier:

1. Structural thermal barrier shall consist of poured-in-place polyurethane polymer that shall transfer shear during bending and provide composite action between frame components.

B. Non Structural Thermal Barriers:

1. Non structural thermal barriers are used only in conjunction with structural thermal barriers. The purpose of non structural thermal barriers is to enhance thermal performance of the primary structural thermal barriers by inhibiting heat transfer through thermal radiation and convection. Non structural thermal barriers shall not be used as primary load carrying members.
2. Rigid non structural thermal barriers shall be constructed of extruded polyvinylchloride (PVC).

2.4 GLASS

A. Glazing Materials:

1. Vertical Glazing: For glass surfaces sloped 15 degrees or less from vertical. Design glass to resist design wind pressure based on glass type factors for short-duration load.
2. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass lites in thicknesses as needed to comply with requirements indicated.
3. Strength: Where float glass is indicated, provide annealed float glass. Where fully tempered glass is indicated, provide Kind FT heat-treated float glass.

1.7 SYSTEM DESCRIPTION

A. Operation: FIXED

B. AAMA Rating: CW-PG60-FW when tested according to AAMA/WDMA/CSA 101/I.S.2/A440-08 at the gateway size of 60” x 60”

C. Construction: 3 1/4 inch frame depth. Wall thickness: 0.062”/0.062” frame/sill. Factory finished extruded aluminum frame and sash members with integral structural polyurethane thermal break.

D. Glazing: 7/8 inch insulating glass; back bedded with dual-sided adhesive butyl tape on the frame glazing leg, and secured in the interior with snap-in glazing beads and bulb gaskets.

1.8 HARDWARE: (None)

1.9 PERFORMANCE REQUIREMENTS

A. Air, Water and Structural Performance Requirements:

When tested in accordance with cited test procedures, windows shall meet or exceed the following performance criteria, as well as those indicated in AAMA 101 and 101/I.S.2/A440-08 for performance grade of unit specified unless otherwise noted herein.

1. Air Test Performance Requirements:
   a. Performance: Air infiltration maximum 0.30 cfm per square foot at 1.6 psf pressure differential when tested in accordance with ASTM E283 for sliding sealed products.
2. Water Test Performance Requirements:
   a. No uncontrolled water leakage at 9 psf static pressure differential when tested in accordance with ASTM E331 and ASTM E547.
3. Structural Test Performance Requirements:
   a. Uniform Load Deflection Test
      1) No deflection of any unsupported span L of test unit (framing rails, muntins, mullions, etc.) in excess of L/175 at both a positive and negative load of design test pressure when tested in accordance with ASTM E330.
      2) Structural reinforcing that is not standard on units being furnished is not allowed.
   b. Uniform Load Structural Test:
      1) Unit to be tested at 1.5 x design test pressure, both positive and negative, acting normal to plane of wall in accordance with ASTM E330.
      2) No glass breakage; permanent damage to fasteners, hardware parts, or anchors; damage to make windows inoperable; or permanent deformation of any main frame or ventilator member in excess of 0.2% of its clear span.

B. Forced Entry Resistance Test: ASTM F 588, Type and Grade as indicated for each Product.

C. Thermal Performance Requirements

1. Perform thermal computer simulation in accordance with the configuration specified in NFRC 100.
2. Computed Thermal Transmittance (U-Value) shall not exceed 0.37 BTU/hr/sq.ft./°F for the whole window assembly.
3. Computed Solar Heat Gain Coefficient (SHGC) shall not exceed 0.42 for the whole window assembly.

1.10 QUALITY ASSURANCE

A. Manufacturer Qualifications: All windows specified in this section shall be supplied by a

B. Non Structural Thermal Barriers:
1. Non structural thermal barriers are used only in conjunction with structural thermal barriers. The purpose of non structural thermal barriers is to enhance thermal performance of the primary structural thermal barriers by inhibiting heat transfer through thermal radiation and convection. Non structural thermal barriers shall not be used as primary load carrying members.
2. Rigid non structural thermal barriers shall be constructed of extruded polyvinylchloride (PVC).

2.4 GLASS

A. Glazing Materials:
1. Vertical Glazing: For glass surfaces sloped 15 degrees or less from vertical. Design glass to resist design wind pressure based on glass type factors for short-duration load.
2. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass lites in thicknesses as needed to comply with requirements indicated.
3. Strength: Where float glass is indicated, provide annealed float glass. Where fully tempered glass is indicated, provide Kind FT heat-treated float glass.
4. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated.
   a. U-Factors: Total-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as BTU/sq.ft x h x deg F (W/sq. m x K).
   b. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.
   c. Visible Reflectance: Center-of-glazing values, according to NFRC 300.
5. Float Glass: ÅSTM C 1036, Type 1, Quality-Q3, Class 1 (clear) unless otherwise indicated.
6. Coated Glass: ASTM C 1376, Type 1, Quality-Q3, Class 1 (clear) unless otherwise indicated, of kind and condition indicated.
7. Laminated Glass: ÅSTM C 1172, Type 1, Quality-Q3, Class 1 (clear) unless otherwise indicated, of kind and condition indicated.

B. Insulating Glass Units:
1. Factory-assemble units consisting of sealed lites of glass separated by a PPG Intercept Spacer system consisting of a one-piece, metallic, U-channel design that creates an effective thermal barrier to help reduce conducted heat loss through the window.
2. Insulating glass units shall be sealed with an integral dessicant matrix and a butyl sealant extruded around the entire perimeter of the spacer to achieve a seal. The sealant applied is to be Dual Seal Equivalent (DSE). Interspace to be filled with air or argon gas as required by thermal computer simulation.

3. Insulating Glass Types: Low-E coated, insulating glass units.
   a. Overall Unit Thickness: 7/8” (22mm)
   b. Thickness of Each Glass Lite: 3/32”, 1/8”, 3/16” or 1/4”
   c. Outdoor Lite: Class 1 (Clear) float glass, or fully tempered float glass.
   d. Interspace Content: Air or Argon Gas.
   e. Indoor Lite: Class 1 (Clear) float glass, or fully tempered float glass.
   f. Low-E Coating: Sputtered on second or third surface.
   g. Glass Winter Night time U-Value: 0.26 maximum.
   h. Solar Heat Gain Coefficient: 0.46 maximum.
   i. Provide safety glazing labeling, if necessary.

2.5 WINDOW ACCESSORIES

Provide the following accessories as specified in the contract drawings. Finish to match window

Installed Interior Lighting Summary

Section Incentive	Section Cost	Section kWh Savings
$14,232.32	$107,490.60	266,933 kWh

ASHRAE Baseline: ASHRAE 90.1 2007

Total Material Cost: $59,717.00

Total Labor Cost: $47,773.60

Space Type #1

Space Type: Retail

Baseline LPD (Watts/Sq Ft): 1.50

Annual Op Hours: 4032

Space Area (Sq. Ft): 2,392

Efficient LPD (Watts/Sq Ft): 0.07

Potential Incentive: $1,365.20

	Fixture Type	Qty	Watts/Unit	Total Watts
1	RAB TSLED4-26N/D10	5	35	175
2				0
3				0
4				0
5				0
6				0
7				0
8				0
9				0
10				0
11				0
12				0
13				0
14				0
15				0
16				0
17				0
18				0
19				0
20				0
21				0
22				0
23				0
24				0
25				0
26				0
27				0
28				0
29				0
30				0
31				0
32				0
33				0
34				0
35				0
36				0
37				0
38				0
39				0
40				0

Space Type #2

Space Type: Parking Garage

Baseline LPD (Watts/Sq Ft): 0.30

Annual Op Hours: 8064

Space Area (Sq. Ft): 11,500

Efficient LPD (Watts/Sq Ft): 0.06

Potential Incentive: $1,124.00

	Fixture Type	Qty	Watts/Unit	Total Watts
1	Republic RAB PRT80PCS Garage Fixture	4	80	320
2	Republic RAB PRT80PCS/E2 Garage Fixture	4	80	320
3				0
4				0
5				0
6				0
7				0
8				0
9				0
10				0
11				0
12				0
13				0
14				0
15				0
16				0
17				0
18				0
19				0
20				0
21				0
22				0
23				0
24				0
25				0
26				0
27				0
28				0
29				0
30				0
31				0
32				0
33				0
34				0
35				0
36				0
37				0
38				0
39				0
40				0

	Total Watts	175

	Total Watts	640

Space Type #3

Space Type	Baseline LPD (Watts/Sq Ft)	Annual Op Hours
Retail	1.50	4032
Space Area (Sq. Ft)	**Efficient LPD (Watts/Sq Ft)**	**Potential Incentive**
1,200	0.21	$618.00

	Fixture Type	Qty	Watts/Unit	Total Watts
1	5 inch Recessed Module 80 CRI 3500K	8	10	80
2	RAB TSLED4-26N/D10	5	35	175
3				0
4				0
5				0
6				0
7				0
8				0
9				0
10				0
11				0
12				0
13				0
14				0
15				0
16				0
17				0
18				0
19				0
20				0
21				0
22				0
23				0
24				0
25				0
26				0
27				0
28				0
29				0
30				0
31				0
32				0
33				0
34				0
35				0
36				0
37				0
38				0
39				0
40				0
			Total Watts	255

Space Type #4

Space Type	Baseline LPD (Watts/Sq Ft)	Annual Op Hours
Multi-Family	0.70	8064
Space Area (Sq. Ft)	**Efficient LPD (Watts/Sq Ft)**	**Potential Incentive**
53,600	0.18	$11,125.12

	Fixture Type	Qty	Watts/Unit	Total Watts
1	5 inch Recessed Module 80 CRI 3500K	301	10	3,010
2	Ceiling Fan	120	33	3,960
3	Bath Bar Light	65	3	195
4	Bluetooth Bath Light/Fan	64	40	2,534
5	Ribbon Light	3	3	8
6				0
7				0
8				0
9				0
10				0
11				0
12				0
13				0
14				0
15				0
16				0
17				0
18				0
19				0
20				0
21				0
22				0
23				0
24				0
25				0
26				0
27				0
28				0
29				0
30				0
31				0
32				0
33				0
34				0
35				0
36				0
37				0
38				0
39				0
40				0
			Total Watts	9,707

breez Signature

MODEL SIG110LED

(110 CFM)

Description

Low noise ceiling mount ventilating fan rated for continuous running. ENERGY STAR® Most Efficient 2014. HVI, UL and cUL certified to comply with ASHRAE 62.2 local and whole building continuous and intermittent operation. Meets CA Title 24 requirements.

Motor/Blower

- Power rating of 120 volts/60 Hz.
- DC brushless motor engineered to run continuously.
- Motor equipped with thermal cutoff fuse.
- Removable with permanently lubricated plug-in motor

Housing

- Galvanized steel body.
- Detachable 4" diameter metal duct adapter
- Built-in backdraft damper.
- Easy installation with expandable extension bracket

Grille

- Attractive design using ABS material.
- Attaches directly to housing with torsion springs.

Light

- 12-Watt LED light engine included.

Warranty

- 3-year limited warranty.

Feature

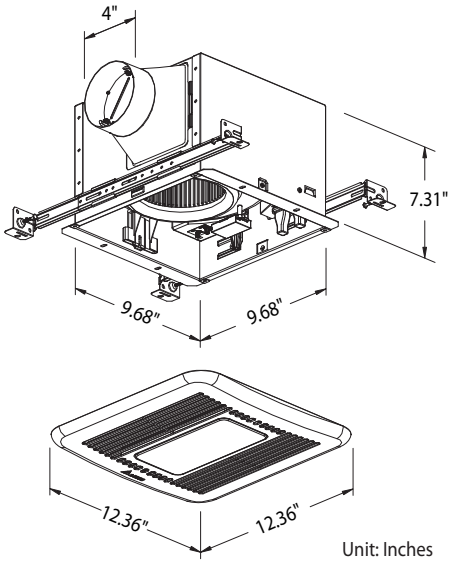
- For ceiling mount only, airflow of 110 CFM (±10%) and 0.5 sones at 0.1" static pressure.
- Power consumption approximately 13.1 Watts with an efficiency rating approximately 8.6 CFM/Watt at 0.1" static pressure.
- Duct diameter no less than 4"
- UL and cUL listed for tub/shower enclosure when used with GFCI-protected branch circuit wiring.

SIG110LED	4" Duct (Standard)	
Static Pressure (inches w.g.)	0.1	0.25
Air Flow (CFM)	110	94
Sones	0.5	0.8
Power Consumption (Watts)	13.1	15.3
Energy Efficiency (CFM/Watt)	8.6	6.3
Current (Amps)	0.38 Max	
Power Rating (V/Hz)	120 / 60	

DC Motor Technology

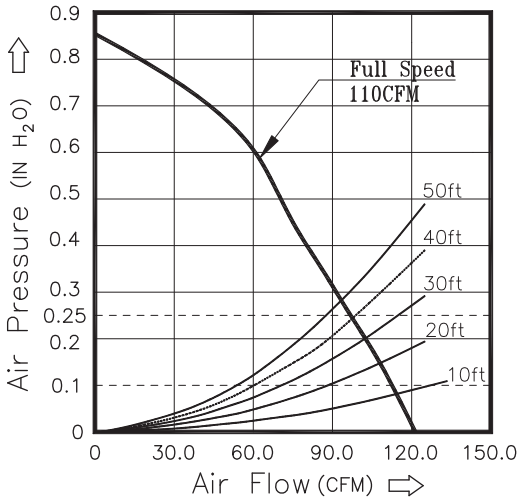
- Built-in soft start function to increase bearings' life.
- Automatically powers OFF when the impeller is locked abnormally.

SIG110LED Dimensions



Unit: Inches

Fan Curve SIG110LED



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2100 HVI CERTIFIED

c UL us

Model	Quantity	Comments	Project:
			Location:
			Architect:
			Engineer:
			Contractor:
			Submitted by:
			Date:

Printed on: December 8, 2020

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SYMPHONY BACKLIT MIRROR

DETAILS

- WiFi enabled speaker, smart touch front controls
- 14 Watts, 1584 Lumen, 70-80 Colour Lumen Index, 6000K colour temperature
- Slim design powder coated metal housing with a silicone gasket around the lights and the housing
- 72 Lights 5050 LED Strip
- Smart touch control
- Rated hrs: 50,000
- Hangs Horizontally

YOUR ONLINE SELECTIONS:

Color:	
Width:	32
Height:	24

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SPECIFICATIONS

- **Glass Type:** 3mm polished edge clear mirror glass

Look for our products under the following brands:

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Exclusive to **Home Depot**

Exclusive to **Lowe's**

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