



# Public Utilities Commission

## Application to Commit Energy Efficiency/Peak Demand Reduction Programs (Mercantile Customers Only)

**Case No.: 14-0430-EL-EEC**

Mercantile Customer: VALLEY ASSOCIATION CORP

Electric Utility: Ohio Edison Company

Program Title or Description: LED Lighting, Building 49 Controls

Rule 4901:1-39-05(F), Ohio Administrative Code (O.A.C.), permits a mercantile customer to file, either individually or jointly with an electric utility, an application to commit the customer's existing demand reduction, demand response, and energy efficiency programs for integration with the electric utility's programs. The following application form is to be used by mercantile customers, either individually or jointly with their electric utility, to apply for commitment of such programs in accordance with the Commission's pilot program established in Case No. [10-834-EL-POR](#)

Completed applications requesting the cash rebate reasonable arrangement option in lieu of an exemption from the electric utility's energy efficiency and demand reduction (EEDR) rider will be automatically approved on the sixty-first calendar day after filing, unless the Commission, or an attorney examiner, suspends or denies the application prior to that time. Completed applications requesting the exemption from the EEDR rider for a period of up to 12 months will also qualify for the 60-day automatic approval. However, all applications requesting an exemption from the EEDR rider for longer than 12 months must provide additional information, as described within the Historical Mercantile Annual Report Template, that demonstrates additional energy savings and the continuance of the Customer's energy efficiency program. This information must be provided to the Commission at least 61 days prior to the termination of the initial 12 month exemption period to prevent interruptions in the exemption period.

Complete a separate application for each customer program. Projects undertaken by a customer as a single program at a single location or at various locations within the same service territory should be submitted together as a single program filing, when possible.

Check all boxes that are applicable to your program. For each box checked, be sure to complete all subparts of the question, and provide all requested additional information. Submittal of altered or incomplete applications may result in a suspension of the automatic approval process or denial of the application.

Any confidential or trade secret information may be submitted to Staff on disc or via email at [ee-pdr@puc.state.oh.us](mailto:ee-pdr@puc.state.oh.us).

## Section 1: Mercantile Customer Information

Name: VALLEY ASSOCIATION CORP

Principal address: 4020 KINROSS LAKES PARKWAY, RICHFIELD, 44286

Address of facility for which this energy efficiency program applies: 1210 MASSILLON ROAD, AKRON

Name and telephone number for responses to questions: TONY CLARK (330-618-9969)

Electricity use by the customer (check the box(es) that apply):

- ☒ The customer uses more than seven hundred thousand kilowatt hours per year at the above facility. (Please attach documentation.)
- ☐ The customer is part of a national account involving multiple facilities in one or more states. (Please attach documentation.)

## Section 2: Application Information

A) The customer is filing this application (choose which applies):

- ☐ Individually, without electric utility participation.
- ☒ Jointly with the electric utility.

B) The electric utility is: Ohio Edison Company

C) The customer is offering to commit (check any that apply):

- ☐ Energy savings from the customer's energy efficiency program. (Complete Sections 3, 5, 6, and 7.)
- ☐ Capacity savings from the customer's demand response/demand reduction program. (Complete Sections 4, 5, 6, and 7.)
- ☒ Both the energy savings and the capacity savings from the customer's energy efficiency program. (Complete all sections of the Application.)

### Section 3: Energy Efficiency Programs

A) The customer's energy efficiency program involves (check those that apply):

- ☒ Early replacement of fully functioning equipment with new equipment. (Provide the date on which the customer replaced fully functioning equipment, and the date on which the customer would have replaced such equipment if it had not been replaced early. Please include a brief explanation for how the customer determined this future replacement date (or, if not known, please explain why this is not known)). **If Checked, Please see Exhibit 1 and Exhibit 2**
- ☐ Installation of new equipment to replace failed equipment which has no useful life remaining. The customer installed new equipment on the following date(s): \_\_\_\_\_.
- ☐ Installation of new equipment for new construction or facility expansion. The customer installed new equipment on the following date(s): \_\_\_\_\_.
- ☒ Behavioral or operational improvement.

B) Energy savings achieved/to be achieved by the energy efficiency program:

- 1) If you checked the box indicating that the project involves the early replacement of fully functioning equipment replaced with new equipment, then calculate the annual savings [(kWh used by the original equipment) - (kWh used by new equipment) = (kWh per year saved)]. Please attach your calculations and record the results below:

Annual savings: 263,228 kWh

- 2) If you checked the box indicating that the customer installed new equipment to replace failed equipment which had no useful life remaining, then calculate the annual savings [(kWh used by new standard equipment) - (kWh used by the optional higher efficiency new equipment) = (kWh per year saved)]. Please attach your calculations and record the results below:

Annual savings: N/A kWh

Please describe any less efficient new equipment that was rejected in favor of the more efficient new equipment. **Please see Exhibit 1 if applicable**

- 3) If you checked the box indicating that the project involves equipment for new construction or facility expansion, then calculate the annual savings [(kWh used by standard new equipment) - (kWh used by optional higher efficiency new equipment) = (kWh per year saved)]. Please attach your calculations and record the results below:

Annual savings: N/A kWh

Please describe the less efficient new equipment that was rejected in favor of the more efficient new equipment. **Please see Exhibit 1 if applicable**

- 4) If you checked the box indicating that the project involves behavioral or operational improvements, provide a description of how the annual savings were determined.

Annual savings: 155,311KWH. REFER TO EXHIBIT 1 FOR SAVINGS DETERMINATION. kWh

#### Section 4: Demand Reduction/Demand Response Programs

A) The customer's program involves (check the one that applies):

- ☐ This project does not include peak demand reduction savings.
- ☒ Coincident peak-demand savings from the customer's energy efficiency program.
- ☐ Actual peak-demand reduction. (Attach a description and documentation of the peak-demand reduction.)
- ☐ Potential peak-demand reduction (check the one that applies):
  - ☐ The customer's peak-demand reduction program meets the requirements to be counted as a capacity resource under a tariff of a regional transmission organization (RTO) approved by the Federal Energy Regulatory Commission.
  - ☐ The customer's peak-demand reduction program meets the requirements to be counted as a capacity resource under a program that is equivalent to an RTO program, which has been approved by the Public Utilities Commission of Ohio.

B) On what date did the customer initiate its demand reduction program?

PLEASE REFER TO EXHIBIT #2

C) What is the peak demand reduction achieved or capable of being achieved (show calculations through which this was determined):

85 kW

## **Section 5: Request for Cash Rebate Reasonable Arrangement, Exemption from Rider, or Commitment Payment**

Under this section, check all boxes that apply and fill in all corresponding blanks.

A) The customer is applying for:

☒ A cash rebate reasonable arrangement.

☐ An exemption from the energy efficiency cost recovery mechanism implemented by the electric utility.

☐ Commitment payment

B) The value of the option that the customer is seeking is:

A cash rebate reasonable arrangement.

☒ A cash rebate of \$18,185. (Rebate shall not exceed 50% project cost. Attach documentation showing the methodology used to determine the cash rebate value and calculations showing how this payment amount was determined.)

An exemption from payment of the electric utility's energy efficiency/peak demand reduction rider.

☐ An exemption from payment of the electric utility's energy efficiency/peak demand reduction rider for \_\_\_\_\_ months (not to exceed 24 months). (Attach calculations showing how this time period was determined.)

☐ Ongoing exemption from payment of the electric utility's energy efficiency/peak demand reduction rider for an initial period of 24 months because this program is part of the customer's ongoing efficiency program. (Attach documentation that establishes the ongoing nature of the program.) In order to continue the exemption beyond the initial 12 month period, the customer will need to complete, and file within this application, the Historical Mercantile Annual Report

Template to verify the projects energy savings are persistent.

- ☐ A commitment payment valued at no more than \$\_\_\_\_. (Attach documentation and calculations showing how this payment amount was determined.)

### Section 6: Cost Effectiveness

The program is cost effective because it has a benefit/cost ratio greater than 1 using the (choose which applies):

- ☐ Total Resource Cost (TRC) Test. The calculated TRC value is: \_\_\_\_ (Continue to Subsection 1, then skip Subsection 2)
- ☒ Utility Cost Test (UCT) . The calculated UCT value is: **See Exhibit 3** (Skip to Subsection 2.)

#### Subsection 1: TRC Test Used (please fill in all blanks).

The TRC value of the program is calculated by dividing the value of our avoided supply costs (generation capacity, energy, and any transmission or distribution) by the sum of our program overhead and installation costs and any incremental measure costs paid by either the customer or the electric utility.

The electric utility's avoided supply costs were \_\_\_\_\_.

Our program costs were \_\_\_\_\_.

The incremental measure costs were \_\_\_\_\_.

Subsection 2: UCT Used (please fill in all blanks).

We calculated the UCT value of our program by dividing the value of our avoided supply costs (capacity and energy) by the costs to our electric utility (including administrative costs and incentives paid or rider exemption costs) to obtain our commitment.

Our avoided supply costs were **See Exhibit 3**

The utility's program costs were **See Exhibit 3**

The utility's incentive costs/rebate costs were **See Exhibit 3**

## **Section 7: Additional Information**

Please attach the following supporting documentation to this application:

- Narrative description of the program including, but not limited to, make, model, and year of any installed and replaced equipment.
- A copy of the formal declaration or agreement that commits the program or measure to the electric utility, including:
  - 1) any confidentiality requirements associated with the agreement;
  - 2) a description of any consequences of noncompliance with the terms of the commitment;
  - 3) a description of coordination requirements between the customer and the electric utility with regard to peak demand reduction;
  - 4) permission by the customer to the electric utility and Commission staff and consultants to measure and verify energy savings and/or peak-demand reductions resulting from your program; and,
  - 5) a commitment by the customer to provide an annual report on your energy savings and electric utility peak-demand reductions achieved.
- A description of all methodologies, protocols, and practices used or proposed to be used in measuring and verifying program results. Additionally, identify and explain all deviations from any program measurement and verification guidelines that may be published by the Commission.





## Public Utilities Commission

Application to Commit  
Energy Efficiency/Peak Demand  
Reduction Programs  
(Mercantile Customers Only)

Case No.: 14-0430-EL-EEC

State of OHIO :

FRANK LANTERMAN, Affiant, being duly sworn according to law, deposes and says that:

1. I am the duly authorized representative of:

VALLEY ASSOCIATION CORP

[insert customer or EDU company name and any applicable name(s) doing business as]

2. I have personally examined all the information contained in the foregoing application, including any exhibits and attachments. Based upon my examination and inquiry of those persons immediately responsible for obtaining the information contained in the application, I believe that the information is true, accurate and complete.

Signature of Affiant & Title

Sworn and subscribed before me this 2nd day of June, 2014 Month/Year

Signature of official administering oath

GAIL T. MODZELEWSKI  
Print Name and Title

My commission expires on 9/14/2018



GAIL T. MODZELEWSKI  
Notary Public  
State of Ohio  
Lake County  
My Commission Expires  
September 14, 2018

## Exhibit 1

Customer Legal Entity Name: VALLEY ASSOCIATION CORPORATION

Site Address: LOCKHEED-MARTIN

Principal Address: 1210 MASSILON ROAD

Pro ect No.	Pro ect Name	Narrative description of your program including, but not limited to, make, model, and year of any installed and replaced equipment:	Description of methodologies, protocols and practices used in measuring and verifying pro ect results	What date would you have replaced your equipment if you had not replaced it early Also, please explain briefly how you determined this future replacement date.	Please describe the less efficient new equipment that you re ected in favor of the more efficient new equipment.
1	Plant C-C2E Lighting Modifications	Remove existing high pressure sodium wall sconces, T12 fluorescent up-light fixtures mounted to cubicals, and T12 task lighting fixtures. Install LED troffers, LED wall sconces on each column, and LED task lighting fixtures and 8- occupancy sensors .	Refer to Lighting Rebate Calculator spreadsheet.	Approximately 2016. At that time, the existing metal halide and T12 fluorescent fixtures would become cost prohibitive due to the decreasing light levels, increased maintenance costs, and government regulations.	N/A
2	Building 49-HVAC Controls&VFDs	Controls were installed on existing HVAC units to incorporate night setback, the bypass dampers were closed, VFDs were installed on various supply/return fans, and CO2 ventilation controls were added to match occupancy loading.	Refer to attached project summary sheet and associated HAP engineering calculations.	N/A	N/A

Docket No. 14-0430

Site: 1210 MASSILON ROAD

## Exhibit 2

**Customer Legal Entity Name:** VALLEY ASSOCIATION CORPORATION

**Site Address:** LOCKHEED-MARTIN

**Principal Address:** 1210 MASSILON ROAD

	Unadjusted Usage, kwh (A)	Weather Adjusted Usage, kwh (B)	Weather Adjusted Usage with Energy Efficiency Addbacks, kwh (C)
2012	55,613,002	55,613,002	55,767,889
2011	58,519,432	58,519,432	58,623,682
2010	61,229,642	61,229,642	61,229,642
<b>Average</b>	<b>58,454,025</b>	<b>58,454,025</b>	<b>58,540,404</b>

Project Number	Project Name	In-Service Date	Project Cost	50 % of Project Cost	Wh Saved/ ear (D) counting towards utility compliance	Wh Saved/ ear (E) eligible for incentive	Utility Peak Demand Reduction Contribution, W (F)	Prescriptive Rebate Amount (G)	Eligible Rebate Amount (H)	Commitment Payment
1	Plant C-C2E Lighting Modifications	05/01/2013	291,055	145,528	263,228	263,228	68	11,822	8,867	
2	uilding 49-HVAC Controls&VFDs	05/01/2011	65,495	32,748	155,311	155,311	17	12,425	9,319	
					-	-	-	24,247	18,185	0
					-	-	-			
					-	-	-			
					-	-	-			
					-	-	-			
Total			356,550		418,539	418,539	85			

Docket No. 14-0430

**Site:** 1210 MASSILON ROAD

## Notes

(1) Customer's usage is adjusted to account for the effects of the energy efficiency programs included in this application. When applicable, such adjustments are prorated to the in-service date to account for partial year savings.

(2) The eligible rebate amount is based upon 75% of the rebates offered by the FirstEnergy Commercial and Industrial Energy Efficiency programs or 75% of \$0.08/kWh for custom programs for all energy savings eligible for a cash rebate as defined in the PUCO order in Case NO.10-834-EL-EEC dated 9/15/2010, not to exceed the lesser of 50% of the project cost or \$250,000 per project. The rebate also cannot exceed \$500,000 per customer per year, per utility service territory.

### Exhibit 3 Utility Cost Test

UCT = Utility Avoided Costs / Utility Costs

Project	Total Annual Savings, MWh	Utility Avoided Cost /MWh ( )	Utility Avoided Cost (C)	Utility Cost (D)	Cash Rebate (E)	Administrator Variable Fee (F)	Total Utility Cost (G)	UCT (H)
1	263	\$ 308	\$ 81,148	\$ 2,025	\$8,867	\$0	\$ 10,892	7.5
2	155	\$ 308	\$ 47,879	\$ 2,025	\$9,319	\$0	\$ 11,344	4.22
<b>Total</b>	<b>419</b>	<b>\$ 308</b>	<b>129,027</b>	<b>4,050</b>	<b>\$18,185</b>	<b>\$0</b>	<b>22,235</b>	<b>5.8</b>

#### Notes

- (A) From Exhibit 2, = kWh saved / 1000
- (B) This value represents avoided energy costs (wholesale energy prices) from the Department of Energy, Energy Information Administration's 2009 Annual Energy Outlook (AEO) low oil prices case. The AEO represents a national average energy price, so for a better representation of the energy price that Ohio customers would see, a Cinergy Hub equivalent price was derived by applying a ratio based on three years of historic national average and Cinergy Hub prices. This value is consistent with avoided cost assumptions used in EE&PDR Program Portfolio and Initial Benchmark Report, filed Dec 15, 2009 (See Section 8.1, paragraph a).
- (C) = (A) \* (B)
- (D) Represents the utility's costs incurred for self-directed mercantile applications for applications filed and applications in progress. Includes incremental costs of legal fees, fixed administrative expenses, etc.
- (E) This is the amount of the cash rebate paid to the customer for this project.
- (F) Based on approximate Administrator's variable compensation for purposes of calculating the UCT, actual compensation may be less.
- (G) = (D) + (E) + (F)
- (H) = (C) / (G)

**VALLE ASSOCIATION CORPORATION LOC HEED-MARTIN**  
**Docket No. 14-0430**

**Site:** 1210 MASSILON ROAD



# THE FOWLER COMPANY

MECHANICAL ♦ ELECTRICAL ♦ PLUMBING ♦ ENGINEERING ♦ CONSTRUCTION ♦ SERVICE

## First Energy Rebate Program

Re: Valley Associate Corp.  
1210 Massillon Rd.  
Akron, OH 44312  
Plant C Energy Savings Projects 2012

May 19, 2014

### **Energy Savings Project Summary – Year 2012**

Starting in 2011 the entire East mezzanine of Plant C was renovated. This included the complete replacement of all lighting fixtures and controls. The energy savings associated with this project was calculated using the Lighting Project Cash Rebate Form. The following is a summary of this project.

#### **Existing Conditions**

The 51k ft<sup>2</sup> of conditioned office space was set to accommodate approximately 450 people with Haworth single and double occupant cubicles. The lighting consisted of T8 twin lamp 4' fixtures with an electronic ballast, mounted on top of the overhead storage units of the cubicles which illuminated the white ceiling above. Single occupant cubicles had (2) twin lamp fixtures and the double occupant cubicles had (4) twin lamp fixtures. A single 3' T12 task lamp was also installed under the bookshelf to illuminate the each desktop area. Lastly, (2) halogen sconces were installed on the east and west side of each building column (60 total columns).

#### **Lighting Retrofit Project**

As part of an entire 2012 office renovation, the existing fluorescent and halogen lighting was replaced with LED throughout. New 2'x2' LED lay-in fixtures were installed to replace the indirect fluorescent up lighting. The existing halogen sconces and fluorescent task fixtures were replaced with LED types. The task lighting and wall sconces were 1-for-1 replacements, whereas a lighting calculation was performed for the general illumination fixtures.



# THE FOWLER COMPANY

MECHANICAL ♦ ELECTRICAL ♦ PLUMBING ♦ ENGINEERING ♦ CONSTRUCTION ♦ SERVICE

## First Energy Rebate Program

Re: Valley Association Corp.  
1210 Massillon Rd.  
Akron, Ohio 44312

May 12, 2014

### Building-49 HVAC Energy Savings Project Summary – Year 2011

In 2011 the HVAC control systems were upgraded in building-49 to reduce energy usage. The energy savings associated with these projects was calculated using Carrier HAP version 4.80 Hourly Analysis Program building energy simulation software. The total electrical energy savings was calculated at 155,310 kWh. The following is a summary of the HVAC controls upgrade:

#### Packaged Heat Pump RTU-1

RTU-1 is a nominal 20-ton packaged heat pump with electric resistance secondary heating that served approximately 7200 s.f. of office and optical lab space. It had a stand-alone VVT system with by-pass damper. The outdoor air ventilation damper was fixed at about 20% open. The system had night set-back control.

A VFD was installed on the supply fan, and the by-pass damper was fixed closed. CO2 ventilation control was added to match the outdoor ventilation rate to the occupancy loading.

#### Split-System A/C Unit HV-49/4

HV-49/4 is a nominal 30-ton split-system air conditioning unit with electric resistance secondary heating that served approximately 7300 s.f. of office and optical lab space. It had a stand-alone VVT system with by-pass damper. The outdoor air ventilation damper was fixed at about 10% open, and the system ran continuously 24/7.

VFDs were installed on the 15 HP supply fan and 7.5 HP return fan, and the by-pass damper was fixed closed. CO2 ventilation control was added to match the outdoor ventilation rate to the occupancy loading. Night set-back controls were also added.

#### Split-System A/C Unit HV-49/5

HV-49/5 is a nominal 5-ton split-system air conditioning unit with electric resistance secondary heating that served approximately 950 s.f. of office space. It had a stand-alone VVT system with by-pass damper. The outdoor air ventilation damper was fixed at about 10% open, and the system ran continuously 24/7.

A VFD was installed on the 2 HP supply fan, and the by-pass damper was fixed closed. CO2 ventilation control was added to match the outdoor ventilation rate to the occupancy loading. Night set-back controls were also added.

*The Fowler Company*  
Robert J. Mraz, P.E.  
Senior Mechanical Engineer

Ohio Edison • The Illuminating Company • Toledo Edison

## Mercantile Customer Program - Custom Project Rebate Calculator

<b>Project Name and Number:</b>	Building 49 HVAC Controls&VFDs
<b>Site Name:</b>	<b>LOCKHEED MARTIN</b>
<b>Completed by (Name):</b>	<b>THE FOWLER COMPANY</b>
<b>Date completed:</b>	<b>5/1/2011</b>

Energy Conservation Measure	Annual Energy Savings kWh	Eligible Prescriptive Rebate Amount kWh * \$0.08
HVAC unit VFDs, dampers, and controls	155,311	12424.88
<b>Total Project Energy Savings kWh</b>	<b>155,311</b>	
<b>Total Custom Prescriptive Rebate Amount \$</b>	<b>\$</b>	<b>12,424.88</b>

<p><b>Notes about this rebate calculation:</b></p> <p>PLEASE REFER TO THE ATTACHED ENGINEERING HOURLY ANALYSIS PROGRAM (HAP) CALCULATION &amp; SIMULATION AND PROJECT SUMMARY SHEET.</p>
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## Project Estimated Annual Savings Summary

### Lighting

<b>Estimated Annual kWh Savings (kWh Impact)</b>	263,228
Total Change in Connected Load	60.42

<b>Demand Savings (kW Impact)</b>	68.01
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Annual Estimated Cost Savings	\$18,425.96
<b>Annual Operating Hours (Full Load Hours)</b>	3,435

Interior Lighting Incentive @ \$0.05/kWh (excluding retrofit CFLs, sensors, or LED exit signs)	\$11,622.00
Exterior Lighting Incentive @ \$0.05/kWh (excluding retrofit CFLs, sensors, or LED exit signs)	\$0.00
Total retrofit CFL Incentive @ \$1/screw-in CFL lamp; \$15/hard-wired CFL lamp (includes all retrofit CFLs, both interior and exterior)	\$0.00
Total retrofit LED Exit Incentive @ \$10/exit sign	\$0.00
Total Lighting Controls Incentive @ \$25/occupancy sensor and \$25/daylight sensor (includes all Lighting Controls, both interior and exterior)	\$200.00

<b>Total Calculated Incentive Amount</b>	<b>\$11,822.00</b>
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Total Fixture Quantity excluding retrofit CFLs and LED Exit Signs	1272
Total Lamp Quantity for retrofit Screw-In CFLs	0
Total Lamp Quantity for retrofit Hard-Wired CFLs	0
Total Fixture Quantity for retrofit LED Exit Signs	0
Total Quantity for Occupancy Sensors	8
Total Quantity for Daylight Sensors	0

Please briefly describe how you estimated your coincidence factor (CF) and applicant equivalent full-load hours (EFLH) for facility type "Other" indicated on the Lighting Form tab Utilizing the chart on "Instructions"



## Lighting Form

## Lighting Inventory Form

Account Name:	VALLEY ASSOCIATION/COMP
Facility Name:	1 COUNTEYS MOUNTAIN
Date:	5/15/2014
Electric Rate (\$/KWH):	\$0.07
Lighting Zone (select one):	Lighting Zone 3

Instructions: Please use one line for each fixture type in a room or area.

For existing or proposed control, choose OCC for Occupancy Sensor, DAY for photosensor, H-L for hi-level sensors or NONE for none. Controls in spaces where existing controls exist do not qualify.

The total of Column S, the quantities of CFLs and exit signs in Column M, and the quantities of sensors in Column R, will be used to calculate your incentive on the NonStandard Lighting form.

[illegible]

## Lighting Form

[illegible]



# VLT® HVAC Drive

The VLT® HVAC Drive series is available in a wide power range designed for all HVAC applications. An advanced drive built on HVAC dedication.



The VLT® HVAC Drive is a full-featured, HVAC dedicated drive with built-in intelligence.

The VLT® HVAC Drive has a vast number of functions developed to meet the diverse needs of the HVAC business.

It is the perfect match for pumps, fans and compressors in modern buildings that are fitted with increasingly sophisticated solutions.

## Product range:

3 x 200 – 240 V.....	1.1 – 45 kW
3 x 380 – 480 V.....	1.1 – 1000 kW
3 x 525 – 600 V.....	1.1 – 90 kW
3 x 525 – 690 V.....	45 – 1400 kW

*With 110% over load torque*

## Available enclosure ratings:

IP 00 .....	45 – 630 kW
IP 20.....	1.1 – 400 kW
IP 21 (NEMA 1) .....	1.1 – 1400 kW
IP 54 (NEMA 12).....	55 – 1400 kW
IP 55 (NEMA 12).....	1.1 – 90 kW
IP 66 (NEMA 4X indoor) .....	1.1 – 90 kW

*Optional coating providing extra protection for aggressive environments.*

Feature	Benefit
<b>All built-in – low investment</b>	
Modular product concept with a wide range of options	Low initial investment – max. flexibility, later upgrade possible
Dedicated HVAC I/O functionality for temperature sensors etc.	External conversion saved
Decentral I/O control via serial communication	Reduced wiring costs, and external controller I/O saved
Wide range of HVAC protocols for BMS controller connectivity	Less extra gateway solutions needed
4 x auto tuned PID's	No external PID controller needed
Smart Logic Controller	Often makes PLC unnecessary
Real Time Clock	Enables daily and weekly settings
Integrated fan, pump and compressor functionality i.e.	Saves external control and conversion equipment
Fire Override Mode, Dry run Detection, Constant Torque etc.	Protects equipment and saves energy
Back-channel cooling for frame D, E and F frame	Prolonged lifetime of electronics
<b>Save energy – less operation cost</b>	
Automatic Energy Optimizer function, advanced version	Saves 5 – 15% energy
Advanced energy monitoring	Overview on energy consumption
Energy saving functions i.e. flow compensation, sleep mode etc.	Saves energy
<b>Unequalled robustness – maximum uptime</b>	
Robust single enclosure	Maintenance-free
Unique cooling concept with no ambient air flow over electronics	Problem-free operation in harsh environments
Max ambient temp. 50°C without derating (D-frame 45°C)	No external cooling or oversize necessary
<b>User-friendly – save commissioning and operating cost</b>	
Smart start	Quick and precise start-up
Awarded graphical display, 27 languages	Effective commissioning and operation
USB plug and play connection	Easy to use PC software tools
Global HVAC support organisation	Local service – globally
<b>Built-in DC coils and RFI filters – no EMC concerns</b>	
Integrated DC link harmonic filters	Small power cables. Meets EN 61000-3-12
Integrated EMC filters	Meets EN 55011 Class B, A1 or A2

## Application options

A wide range of integrated HVAC options can be fitted in the drive:

### VLT® General Purpose I/O MCB 101

3 digital inputs, 2 digital outputs, 1 analogue current output, 2 analogue voltage inputs.

### VLT® Relay Card MCB 105

Adds 3 relay outputs.

### VLT® Analog I/O MCB 109

3 Pt1000/Ni1000 inputs, 3 analogue voltage outputs and back-up power for Real-Time Clock.

### VLT® 24 V External Supply MCB 107

24 VDC external supply can be connected to supply, control and option cards.

### Sensor input card

Sensor input card for motor protection with 2 or 3 PT100 or PT1000 inputs (VLT® Sensor Input MCB 114).

### Brake chopper (IGBT) option

Connected to an external brake resistor, the built-in brake chopper limits the load on the intermediate circuit in the case the motor acts as a generator.

## Power options

A wide range of external power options are available for VLT® HVAC Drives in critical networks or applications:

- **Advanced harmonic filters:** For critical demands on harmonic distortion
- **dU/dt filters:** For special demands on motor isolation protection
- **Sine wave filters**

## HVAC PC software tools

- **VLT® Motion Control Tool MCT 10:** Ideal for commissioning and servicing the drive
- **VLT® Energy Box:** Comprehensive energy analysis tool. Energy consumption with and without drive can be calculated (drive payback time). Online function for accessing drives energy log.
- **VLT® Motion Control Tool MCT 31:** Harmonics calculation tool

## Specifications

Mains supply (L1, L2, L3)	
Supply voltage	200 – 240 V ±10% 380 – 480 V ±10% 525 – 600 V ±10% 525 – 690 V ±10%
Supply frequency	50/60 Hz
Displacement Power Factor (cos φ) near unity	(> 0.98)
Switching on input supply L1, L2, L3	1–2 times/min.
Output data (U, V, W)	
Output voltage	0–100% of supply voltage
Switching on output	Unlimited
Ramp times	1–3600 sec.
Output frequency	0–590 Hz
Digital inputs	
Programmable digital inputs	6*
Logic	PNP or NPN
Voltage level	0–24 VDC
* 2 can be used as digital outputs	
Pulse inputs	
Programmable pulse inputs	2*
Voltage level	0–24 VDC (PNP positive logic)
Pulse input accuracy	(0.1–110 kHz)
* Utilize some of the digital inputs	
Analogue input	
Analogue inputs	2
Modes	Voltage or current
Voltage level	0 V to +10 V (scaleable)
Current level	0/4 to 20 mA (scaleable)
Analogue output	
Programmable analogue outputs	1
Current range at analogue output	0/4–20 mA
Relay outputs	
Programmable relay outputs	2 (240 VAC, 2 A and 400 VAC, 2 A)
Fieldbus communication	
Standard built-in: FC Protocol N2 Metasys FLN Apogee Modbus RTU BACnet embedded	Optional: LonWorks (MCA 108) BACnet (MCA 109) DeviceNet (MCA 104) Profibus (MCA 101)

## High power options

- IEC Emergency stop with Safety Relay
- Safety Stop with Safety Relay
- RFI filter
- NAMUR terminals
- RCD
- IRM
- Mains shielding
- Regen terminals

Please see the VLT® High Power Drive Selection Guide for the complete range of options.

## Vykon JACE-600™

### Overview

The Vykon JACE-600™ (Java Application Control Engine) is a compact, embedded controller/server platform. It combines integrated control, supervision, data logging, alarming, scheduling and network management functions with Internet connectivity and web serving capabilities in a small, compact platform. The JACE-600 makes it possible to control and manage external devices over the Internet and present real-time information to users in web-based graphical views.



The JACE-600 is a member of the Vykon suite of Java based controller/server products, software applications and tools, which are designed to integrate a variety of devices and protocols into unified, distributed systems. Vykon products are powered by the revolutionary Niagara<sup>AX</sup> Framework®, the industry's first software technology designed to integrate diverse systems and devices into a seamless system. Niagara supports a wide range of protocols including LonWorks™, BACnet™, Modbus, oBIX and Internet standards. The AX Framework also includes integrated network management tools to support the design, configuration, installation and maintenance of interoperable networks.

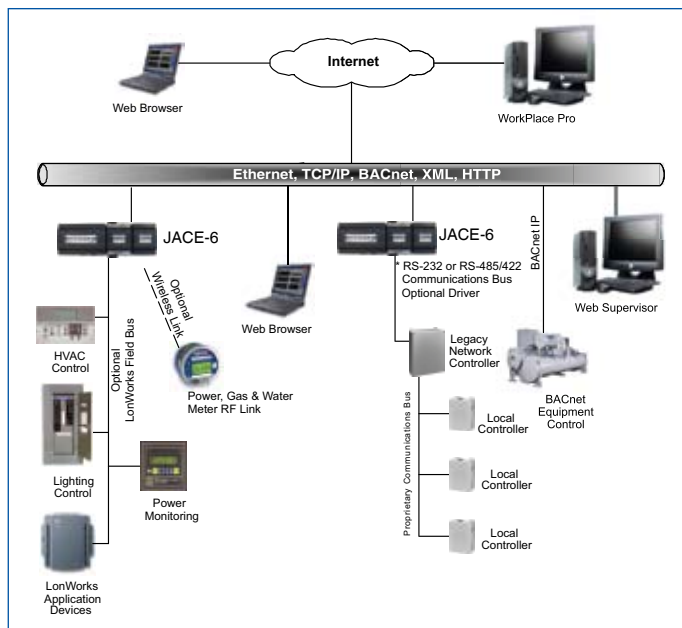
### Applications

The JACE-600 is ideal for smaller facilities, remote sites, and for distributing control and monitoring throughout large facilities. Optional input/output modules can be plugged in for applications where local control is required. The JACE-600 also supports a wide range of field busses for connection to remote I/O and standalone controllers. In small facility applications, the JACE-600 is all you need for a complete system.

The JACE-600 serves data and rich graphical displays to a standard web browser via an Ethernet LAN or remotely over the Internet, or dial-up modem. In larger facilities, multi-building applications and large-scale control system integrations, Vykon AX Supervisor™ software can be used to aggregate information (real-time data, history, alarms, etc.) from large numbers of JACEs into a single unified application. The AX Supervisor can manage global control functions, support data passing over multiple networks, connect to enterprise level software applications, and host multiple, simultaneous client workstations connected over the local network, the Internet, or dial-up modem.

### Features

- Embedded PowerPC Platform@ 524MHz
- Supports open and legacy protocols
- QNX Real-time Operating System
- Web User interface (standard) serves rich graphical browser presentations
- Run stand-alone control, energy management, and integration applications within the JACE-600 series controllers
- Supports two optional communications boards
- Optional 16 and 34 point I/O Modules



Drawing shown with optional IO Modules

## Ordering Information

### J-600

Base Unit including two Ethernet ports, one RS-232 port, one RS-485 port, one USB port, Web User Interface and Niagara Connectivity included. oBIX Client/Server driver included.

## Specifications

### Platform

- PowerPC 440 524 MHz processor
- 128MB DDR RAM & 128 MB Serial Flash
- Optional 256 MB DDR RAM
- Battery Backup
- Real-time clock

### Optional Communications Cards

- NPB-LON** Optional 78 Kbps FTT10 A Lon Adapter
- NPB-232** Optional RS-232 port adapter with 9 pin Dshell connector
- NPB-2X-485** Optional dual port RS-485 adapter; electrically isolated

### Memory Upgrade Option

- NPB-256** Upgrade RAM memory to 256 MB DDR

### Operating System

- QNX Real-time Operating System
- IBM J9 JVM Java Virtual Machine
- Niagara<sup>AX</sup> 3.1 or greater

## Power Supply

**NPB-PWR** Optional: 24 Volt AC/DC power supply module, Din Rail mounted

Optional Wall Power Modules –

(Note: All modules are universal input 90 – 240 volts, 50/60 Hz.; the model numbers below represent the various plug configurations only)

- WPM-US** 120 Vac, 50- 60 Hz. US
- WPM-EUR** 230 Vac, 50-60 Hz. Europe/Asia
- WPM-UK** 230 Vac 50-60 Hz. UK
- WPM-JA** 100 Vac 50-60 Hz. Japan

## NPB-PWR-UN

Optional universal voltage input power supply module, Din Rail mounted. Input voltage is 90 – 263 Volts AC, 50 / 60 Hz, auto adjusting.

## Optional I/O Modules

### IO-34 - 34 Point I/O Module

- Max of 1 per Jace-600; includes integral 24 volt AC/DC input power supply for JACE 2 and IO; no other power required
- 16 Universal Inputs (Type 3 (10k) Thermistors, 0-1000 ohm, 0-10 volts, 0-20 mA with external resistor)
- 10 relay outputs (Form A contacts, 24 VAC @.5 amp rated)
- 8 analog outputs (0-10 volt DC)

### IO-16 - 16 Point I/O Module

- Up to 4 per Jace-600, 2 per Jace-600 if combined with a 34 Point I/O module
- 8 Universal Inputs (Type 3 (10k) Thermistors, 0-1000 ohm, 0-10 volts, 0-20 mA with external resistor)
- 4 relay outputs (Form A contacts, 24 VAC @.5 amp rated)
- 4 analog outputs (0-10 volt DC)

## Chassis

- Construction: Plastic, din rail or screw mount chassis, plastic cover
- Cooling: Internal air convection

## Environment

- Operating temperature range: 0° to 50°C (32°F to 122°F)
- Storage Temperature range: 0° to 70°C (32°F to 158°F)
- Relative humidity range: 5% to 95%, non-condensing

## Agency Listings

- UL 916, C-UL listed to Canadian Standards Association (CSA) C22.2 No.
- 205-M1983 "Signal Equipment", CE, FCC part 15 Class A.

[www.tridium.com](http://www.tridium.com)

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# MEDMASTER AURACYL™ SCNCE



## MAS SERIES – LED

### PRODUCT FEATURES:

- » Wall mount – 8" x 13"
- » Sealed marine-grade extruded aluminum
- » Sealed backlighting creates a pleasing visual accent and NSF2 listing
- » Standard antimicrobial finish for cleanability



### PROJECT INFORMATION

Job Name

Fixture Type

Catalog Number

Approved by

### SPECIFICATIONS

**HOUSING:** Marine grade extruded aluminum. Marine grade die-cast aluminum end caps. TGIC polyester powder coat – 5-stage pre-treatment; Salt spray test: 1,000 hours. Antimicrobial finish standard on exposed painted aluminum surfaces of installed luminaire.

**REFLECTOR:** Die-formed marine grade aluminum. Full reflector/wire cover – 92% reflectivity.

**DECORATIVE OUTER LENS:** Acrylic translucent white lens standard. Nominal thickness .125". Optional decorative Lumicor® resins – see Ordering Information.

**INNER LENS:** UV-stabilized, high impact resistant, extruded 100% DR acrylic frost lens. Nominal thickness .100". Lens secured in place by lens frame.

**HARDWARE:** One stainless steel Phillips head fastener standard. Four stainless steel Phillips head fasteners with IP64 option. Internal brackets and fasteners are non-corrosive.

**ELECTRICAL:** Replaceable high-brightness ANSI 3000K or 4000K white LED array with integral 120V or 277V electronic driver. LED dimming capability controlled through compatible 0-10V dimmer (supplied by others). 10%-100% dimming range.

**INSTALLATION:** Standard four-point mounting required.

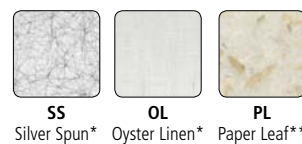
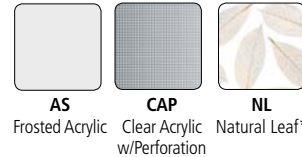
**PHOTOMETRICS:** For photometric information, go to [www.kenall.com](http://www.kenall.com).

**PATENT:** U.S. Patent No. 7,029,139; D610,294.

**WARRANTY:** One (1) year warranty against defects in materials and workmanship. Five (5) year warranty on LED lamps and driver for defects resulting in a fixture lumen depreciation of 30% or greater.

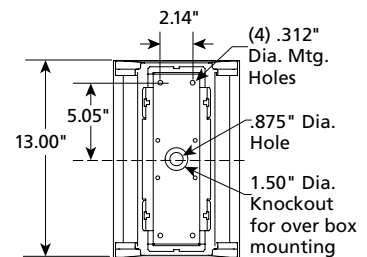
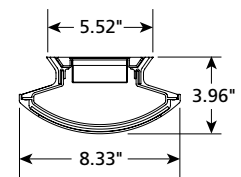
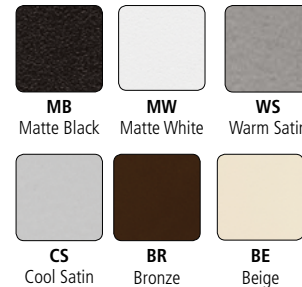
**LISTINGS:** Luminaire is certified to UL Standards by Intertek Testing Laboratory for damp location. NSF2 Splash/Non-Food Zone. ADA Compliant. Optional IP64 certified to IEC 60598. Photometry tested to the IESNA LM-79-08 standard by an ILAC/ISO17025 accredited laboratory.

### DECORATIVE OUTER LENS



\*Lumicor® Lumiclear™ Acrylic Resin  
\*\*Lumicor® Lumiform™ PETG Resin

### FRAME FINISH



### ORDERING INFORMATION

Model	Frame Type	Outer Lens	Finish	Lamp/Driver Type	Options
<b>MAS813</b>	<b>PAN</b>				

#### Frame Type

**PAN** Pane

#### Decorative Outer Lens

**AS** Frosted Acrylic  
**CAP** Clear Acrylic w/Inner Perforation painted to match housing/frame finish  
**NL\*** Acrylic Natural Leaf  
**SS\*** Acrylic Silver Spun  
**OL\*** Acrylic Oyster Linen  
**PL\*\*** PETG Paper Leaf  
**CD** Custom Decorative Lens (Consult factory)

#### Finish

**BE** Beige  
**BR** Bronze  
**CS** Cool Satin Painted Anodized  
**MB** Matte Black (Antimicrobial finish)  
**MW** Matte White (Antimicrobial finish)  
**WS** Warm Satin Painted Anodized  
**CC** Custom Color (Consult factory)

#### Lamp/Driver Type (Voltage)

**6L30K-SCC-120** 6 Watt 3000K LED (SCC, 120V)  
**6L40K-SCC-120** 6 Watt 4000K LED (SCC, 120V)  
**14L30K-SCC-120** 14 Watt 3000K LED (SCC, 120V)  
**14L40K-SCC-120** 14 Watt 4000K LED (SCC, 120V)  
**14L30K-DCC-120** 14 Watt 3000K LED (Dimming, 120V)  
**14L40K-DCC-120** 14 Watt 4000K LED (Dimming, 120V)  
**14L30K-SCC-277** 14 Watt 3000K LED (SCC, 277V)  
**14L40K-SCC-277** 14 Watt 4000K LED (SCC, 277V)

#### Options

**IP64** IP64 certified to IEC 60598  
**FS** Single Fuse & Holder

\* Lumicor® Lumiclear™ Acrylic Resin  
\*\* Lumicor® Lumiform™ PETG Resin

Lumicor® is a registered trademark of Lumicor, Inc., the leader in encapsulated resin technology. All Rights Reserved.



[www.kenall.com](http://www.kenall.com)

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MAS813-LED-111113

## HV-49/4 Input Data

Project Name: LM\_B49\_HVAC control upgrade  
Prepared by: The Fowler Company

05/12/2014  
06:02AM

### 1. General Details:

Air System Name ..... HV-49/4  
Equipment Type ..... Split AHU  
Air System Type ..... VVT  
Number of zones ..... 10

### 2. Ventilation System Components:

#### Ventilation Air Data:

Airflow Control ..... Proportional  
Ventilation Sizing Method ..... Sum of Space OA Airflows  
Minimum Airflow ..... 0 %  
Unocc. Damper Position ..... Closed  
Damper Leak Rate ..... 5 %  
Outdoor Air CO2 Level ..... 400 ppm

#### Economizer Data:

Control ..... Integrated enthalpy control  
Upper Cutoff ..... 73.0 °F  
Lower Cutoff ..... -60.0 °F

#### Central Cooling Data:

Supply Air Temperature ..... 58.0 °F  
Coil Bypass Factor ..... 0.100  
Cooling Source ..... Air-Cooled D  
Schedule ..... FMAM ASOND  
Capacity Control ..... Constant Temperature - Fan On  
Bypass Airflow ..... 80 %  
Changeover Time ..... 5 minutes

#### Central Heating Data:

Supply Temperature ..... 95.0 °F  
Heating Source ..... Electric Resistance  
Schedule ..... FMAM ASOND  
Capacity Control ..... Constant Temperature - Fan On

#### Supply Fan Data:

Fan Type ..... Forward Curved  
Configuration ..... Draw-thru  
Fan Performance ..... 12.00 BHP  
Motor Efficiency ..... 90 %

Airflow	100	90	80	70	60	50
kW	100	91	81	72	61	54

Airflow	40	30	20	10	0
kW	46	40	33	27	21

#### Duct System Data:

##### Supply Duct Data:

Duct Heat Gain ..... 5 %  
Duct Leakage ..... 5 %

##### Return Duct or Plenum Data:

Return Air Via ..... Ducted Return

#### Return Fan Data:

Fan Type ..... Forward Curved  
Fan Performance ..... 7.26 BHP  
Motor Efficiency ..... 90 %

Airflow	100	90	80	70	60	50
kW	100	91	81	72	61	54

Airflow	40	30	20	10	0
kW	46	40	33	27	21

### 3. Zone Components:

#### Space Assignments:



## HV-49/4 Input Data

Project Name: LM\_B49\_HVAC control upgrade  
Prepared by: The Fowler Company

05/12/2014  
06:02AM

<b>one 1: one 1</b>	
1flr_entry	x1
<b>one 2: one 2</b>	
30_comm rm & utility rm	x1
<b>one 3: one 3</b>	
31-32_oracle rooms	x1
<b>one 4: one 4</b>	
41-42-43_optical labs	x1
<b>one 5: one 5</b>	
50_Foyer	x1
<b>one 6: one 6</b>	
51_work room	x1
<b>one 7: one 7</b>	
52_optics	x1
<b>one 8: one 8</b>	
5th central area storage	x1
<b>one 9: one 9</b>	
5th flr toilets	x1
<b>one 10: one 10</b>	
5th_work area	x1

### Thermostats and one Data:

Zone ..... **All**  
 Cooling T-stat: Occ. .... **74.0** °F  
 Cooling T-stat: Unocc. .... **80.0** °F  
 Heating T-stat: Occ. .... **70.0** °F  
 Heating T-stat: Unocc. .... **62.0** °F  
 T-stat Throttling Range ..... **1.50** °F  
 Diversity Factor ..... **100** %  
 Direct Exhaust Airflow ..... **0.0** CFM  
 Direct Exhaust Fan kW ..... **0.0** kW

Thermostat Schedule ..... **100** **On T-stat**  
 Unoccupied Cooling is ..... **Available**

### Supply Terminals Data:

Zone ..... **All**  
 Terminal Type ..... **VVT**  
 Minimum Airflow ..... **40** % of supply air

### 4. Si ing Data (Computer-Generated):

#### System Si ing Data:

**Si ing Data:**  
 Cooling Supply Temperature ..... **58.0** °F  
 Supply Fan Airflow ..... **11718.4** CFM  
 Ventilation Airflow ..... **1121.8** CFM  
 Heating Supply Temperature ..... **95.0** °F

#### Hydronic Si ing Specifications:

Chilled Water Delta-T ..... **10.0** °F  
 Hot Water Delta-T ..... **20.0** °F

#### Safety Factors:

Cooling Sensible ..... **70** %  
 Cooling Latent ..... **0** %  
 Heating ..... **0** %

#### one Si ing Data:

Zone Airflow Sizing Method ..... **Peak one sensible load**  
 Space Airflow Sizing Method ..... **Individual peak space loads**

one	Supply Airflow (CFM)	one Htg Unit (M H)	Reheat Coil (M H)	-
1	555.7	-	-	-
2	1079.9	-	-	-

## HV-49/4 Input Data

Project Name: LM\_B49\_HVAC control upgrade  
Prepared by: The Fowler Company

05/12/2014  
06:02AM

one	Supply Airflow (CFM)	one Htg Unit (M H)	Reheat Coil (M H)	- -
3	1163.7	-	-	-
4	2441.9	-	-	-
5	411.0	-	-	-
6	1428.3	-	-	-
7	1031.9	-	-	-
8	174.2	-	-	-
9	584.9	-	-	
10	2346.6	-	-	

### 5. Equipment Data

#### Central Cooling Unit - Air-Cooled D

Estimated Maximum Load ..... **276.5** MBH  
 Design OAT ..... **95.0** °F  
 Equipment Sizing ..... **User-Defined**  
 Gross Cooling Capacity ..... **60.0** MBH  
 ARI Performance Rating ..... **11.000** EER  
 Conventional Cutoff OAT ..... **55.0** °F  
 Low Temperature Operation ..... **Used**  
 Low Temperature Cutoff OAT ..... **0.0** °F

## HV-49/4 w VFD & CO2 cntls Input Data

Project Name: LM\_B49\_HVAC control upgrade  
Prepared by: The Fowler Company

05/12/2014  
06:02AM

### 1. General Details:

Air System Name ..... HV-49/4 w VFD & CO2 cntls  
Equipment Type ..... Split AHU  
Air System Type ..... VVT  
Number of zones ..... 10

### 2. Ventilation System Components:

#### Ventilation Air Data:

Airflow Control ..... Demand Controlled Ventilation  
Ventilation Sizing Method ..... Sum of Space OA Airflows  
Minimum Airflow ..... 0 %  
Damper Leak Rate ..... 5 %  
Minimum CO2 Differential ..... 100 ppm  
Maximum CO2 Differential ..... 700 ppm  
Outdoor Air CO2 Level ..... 400 ppm

#### Economizer Data:

Control ..... Integrated enthalpy control  
Upper Cutoff ..... 73.0 °F  
Lower Cutoff ..... -60.0 °F

#### Central Cooling Data:

Supply Air Temperature ..... 58.0 °F  
Coil Bypass Factor ..... 0.100  
Cooling Source ..... Air-Cooled D  
Schedule ..... FMAM ASOND  
Capacity Control ..... Constant Temperature - Fan On  
Bypass Airflow ..... 0 %  
Changeover Time ..... 5 minutes

#### Central Heating Data:

Supply Temperature ..... 95.0 °F  
Heating Source ..... Electric Resistance  
Schedule ..... FMAM ASOND  
Capacity Control ..... Constant Temperature - Fan On

#### Supply Fan Data:

Fan Type ..... Forward Curved with Variable Frequency Drive  
Configuration ..... Draw-thru  
Fan Performance ..... 12.00 BHP  
Motor Efficiency ..... 90 %

Airflow	100	90	80	70	60	50
kW	100	77	60	44	35	25

Airflow	40	30	20	10	0
kW	19	13	9	7	6

#### Duct System Data:

##### Supply Duct Data:

Duct Heat Gain ..... 5 %  
Duct Leakage ..... 5 %

##### Return Duct or Plenum Data:

Return Air Via ..... Ducted Return

#### Return Fan Data:

Fan Type ..... Forward Curved with Variable Frequency Drive  
Fan Performance ..... 7.26 BHP  
Motor Efficiency ..... 90 %

Airflow	100	90	80	70	60	50
kW	100	77	60	44	35	25

Airflow	40	30	20	10	0
kW	19	13	9	7	6

### 3. Zone Components:

#### Space Assignments:

## HV-49/4 w VFD & CO2 cntls Input Data

Project Name: LM\_B49\_HVAC control upgrade  
Prepared by: The Fowler Company

05/12/2014  
06:02AM

<b>one 1: one 1</b>	
1flr_entry	x1
<b>one 2: one 2</b>	
30_comm rm & utility rm	x1
<b>one 3: one 3</b>	
31-32_oracle rooms	x1
<b>one 4: one 4</b>	
41-42-43_optical labs	x1
<b>one 5: one 5</b>	
50_Foyer	x1
<b>one 6: one 6</b>	
51_work room	x1
<b>one 7: one 7</b>	
52_optics	x1
<b>one 8: one 8</b>	
5th central area storage	x1
<b>one 9: one 9</b>	
5th flr toilets	x1
<b>one 10: one 10</b>	
5th_work area	x1

### Thermostats and one Data:

Zone ..... **All**  
 Cooling T-stat: Occ. .... **74.0** °F  
 Cooling T-stat: Unocc. .... **80.0** °F  
 Heating T-stat: Occ. .... **70.0** °F  
 Heating T-stat: Unocc. .... **62.0** °F  
 T-stat Throttling Range ..... **1.50** °F  
 Diversity Factor ..... **100** %  
 Direct Exhaust Airflow ..... **0.0** CFM  
 Direct Exhaust Fan kW ..... **0.0** kW

Thermostat Schedule ..... **90.1 Office HVAC**  
 Unoccupied Cooling is ..... **Available**

### Supply Terminals Data:

Zone ..... **All**  
 Terminal Type ..... **VVT**  
 Minimum Airflow ..... **40** % of supply air

### 4. Si ing Data (Computer-Generated):

#### System Si ing Data:

**Si ing Data:**  
 Cooling Supply Temperature ..... **58.0** °F  
 Supply Fan Airflow ..... **11718.4** CFM  
 Ventilation Airflow ..... **1121.8** CFM  
 Heating Supply Temperature ..... **95.0** °F

#### Hydronic Si ing Specifications:

Chilled Water Delta-T ..... **10.0** °F  
 Hot Water Delta-T ..... **20.0** °F

#### Safety Factors:

Cooling Sensible ..... **70** %  
 Cooling Latent ..... **0** %  
 Heating ..... **0** %

#### one Si ing Data:

Zone Airflow Sizing Method ..... **Peak one sensible load**  
 Space Airflow Sizing Method ..... **Individual peak space loads**

one	Supply Airflow (CFM)	one Htg Unit (M H)	Reheat Coil (M H)	-
1	555.7	-	-	-
2	1079.9	-	-	-

## HV-49/4 w VFD & CO2 cntls Input Data

Project Name: LM\_B49\_HVAC control upgrade  
Prepared by: The Fowler Company

05/12/2014  
06:02AM

one	Supply Airflow (CFM)	one Htg Unit (M H)	Reheat Coil (M H)	- -
3	1163.7	-	-	-
4	2441.9	-	-	-
5	411.0	-	-	-
6	1428.3	-	-	-
7	1031.9	-	-	-
8	174.2	-	-	-
9	584.9	-	-	
10	2346.6	-	-	

### 5. Equipment Data

#### Central Cooling Unit - Air-Cooled D

Estimated Maximum Load ..... **276.3** MBH  
 Design OAT ..... **95.0** °F  
 Equipment Sizing ..... **User-Defined**  
 Gross Cooling Capacity ..... **60.0** MBH  
 ARI Performance Rating ..... **11.000** EER  
 Conventional Cutoff OAT ..... **55.0** °F  
 Low Temperature Operation ..... **Used**  
 Low Temperature Cutoff OAT ..... **0.0** °F

## HV-49/5 Input Data

Project Name: LM\_B49\_HVAC control upgrade  
Prepared by: The Fowler Company

05/12/2014  
06:02AM

### 1. General Details:

Air System Name ..... HV-49/5  
Equipment Type ..... Split AHU  
Air System Type ..... VVT  
Number of zones ..... 1

### 2. Ventilation System Components:

#### Ventilation Air Data:

Airflow Control ..... Proportional  
Ventilation Sizing Method ..... Sum of Space OA Airflows  
Minimum Airflow ..... 0 %  
Unocc. Damper Position ..... Closed  
Damper Leak Rate ..... 5 %  
Outdoor Air CO2 Level ..... 400 ppm

#### Economizer Data:

Control ..... Integrated enthalpy control  
Upper Cutoff ..... 73.0 °F  
Lower Cutoff ..... -60.0 °F

#### Central Cooling Data:

Supply Air Temperature ..... 58.0 °F  
Coil Bypass Factor ..... 0.100  
Cooling Source ..... Air-Cooled D  
Schedule ..... FMAM ASOND  
Capacity Control ..... Constant Temperature - Fan On  
Bypass Airflow ..... 80 %  
Changeover Time ..... 5 minutes

#### Central Heating Data:

Supply Temperature ..... 95.0 °F  
Heating Source ..... Electric Resistance  
Schedule ..... FMAM ASOND  
Capacity Control ..... Constant Temperature - Fan On

#### Supply Fan Data:

Fan Type ..... Forward Curved  
Configuration ..... Draw-thru  
Fan Performance ..... 1.50 BHP  
Motor Efficiency ..... 90 %

Airflow	100	90	80	70	60	50
kW	100	91	81	72	61	54

Airflow	40	30	20	10	0
kW	46	40	33	27	21

#### Duct System Data:

##### Supply Duct Data:

Duct Heat Gain ..... 5 %  
Duct Leakage ..... 5 %

##### Return Duct or Plenum Data:

Return Air Via ..... Ducted Return

### 3. Zone Components:

#### Space Assignments:

one 1: one 1	
5th Assembly/VSD/Optical	x1

#### Thermostats and Zone Data:

Zone ..... All  
Cooling T-stat: Occ. .... 74.0 °F  
Cooling T-stat: Unocc. .... 80.0 °F  
Heating T-stat: Occ. .... 70.0 °F  
Heating T-stat: Unocc. .... 62.0 °F  
T-stat Throttling Range ..... 1.50 °F  
Diversity Factor ..... 100 %  
Direct Exhaust Airflow ..... 0.0 CFM  
Direct Exhaust Fan kW ..... 0.0 kW

## HV-49/5 Input Data

Project Name: LM\_B49\_HVAC control upgrade  
Prepared by: The Fowler Company

05/12/2014  
06:02AM

Thermostat Schedule ..... **100** On T-stat  
Unoccupied Cooling is ..... **Available**

### Supply Terminals Data:

Zone ..... **All**  
Terminal Type ..... **VVT**  
Minimum Airflow ..... **40** % of supply air

### 4. Sizing Data (Computer-Generated):

#### System Sizing Data:

**Sizing Data:**  
Cooling Supply Temperature ..... **58.0** °F  
Supply Fan Airflow ..... **2064.7** CFM  
Ventilation Airflow ..... **196.1** CFM  
Heating Supply Temperature ..... **95.0** °F

#### Hydronic Sizing Specifications:

Chilled Water Delta-T ..... **10.0** °F  
Hot Water Delta-T ..... **20.0** °F

#### Safety Factors:

Cooling Sensible ..... **100** %  
Cooling Latent ..... **0** %  
Heating ..... **0** %

#### Zone Sizing Data:

Zone Airflow Sizing Method ..... **Peak zone sensible load**  
Space Airflow Sizing Method ..... **Individual peak space loads**

Zone	Supply Airflow (CFM)	Zone Htg Unit (M H)	Reheat Coil (M H)	Reheat Coil (CFM)
1	1961.5	-	-	

### 5. Equipment Data

#### Central Cooling Unit - Air-Cooled DX

Estimated Maximum Load ..... **45.3** MBH  
Design OAT ..... **95.0** °F  
Equipment Sizing ..... **User-Defined**  
Gross Cooling Capacity ..... **60.0** MBH  
ARI Performance Rating ..... **11.000** EER  
Conventional Cutoff OAT ..... **55.0** °F  
Low Temperature Operation ..... **Used**  
Low Temperature Cutoff OAT ..... **0.0** °F

# HV-49/5 w VFD & CO2 cntls Input Data

Project Name: LM\_B49\_HVAC control upgrade  
Prepared by: The Fowler Company

05/12/2014  
06:02AM

## 1. General Details:

Air System Name ..... HV-49/5 w VFD & CO2 cntls  
Equipment Type ..... Split AHU  
Air System Type ..... VVT  
Number of zones ..... 1

## 2. Ventilation System Components:

### Ventilation Air Data:

Airflow Control ..... Demand Controlled Ventilation  
Ventilation Sizing Method ..... Sum of Space OA Airflows  
Minimum Airflow ..... 0 %  
Damper Leak Rate ..... 5 %  
Minimum CO2 Differential ..... 100 ppm  
Maximum CO2 Differential ..... 700 ppm  
Outdoor Air CO2 Level ..... 400 ppm

### Economizer Data:

Control ..... Integrated enthalpy control  
Upper Cutoff ..... 73.0 °F  
Lower Cutoff ..... -60.0 °F

### Central Cooling Data:

Supply Air Temperature ..... 58.0 °F  
Coil Bypass Factor ..... 0.100  
Cooling Source ..... Air-Cooled D  
Schedule ..... FMAM ASOND  
Capacity Control ..... Constant Temperature - Fan On  
Bypass Airflow ..... 0 %  
Changeover Time ..... 5 minutes

### Central Heating Data:

Supply Temperature ..... 95.0 °F  
Heating Source ..... Electric Resistance  
Schedule ..... FMAM ASOND  
Capacity Control ..... Constant Temperature - Fan On

### Supply Fan Data:

Fan Type ..... Forward Curved with Variable Frequency Drive  
Configuration ..... Draw-thru  
Fan Performance ..... 1.50 BHP  
Motor Efficiency ..... 90 %

Airflow	100	90	80	70	60	50
kW	100	77	60	44	35	25

Airflow	40	30	20	10	0
kW	19	13	9	7	6

### Duct System Data:

#### Supply Duct Data:

Duct Heat Gain ..... 5 %  
Duct Leakage ..... 5 %

#### Return Duct or Plenum Data:

Return Air Via ..... Ducted Return

## 3. Zone Components:

### Space Assignments:

one 1: one 1	
5th Assembly/VSD/Optical	x1

### Thermostats and Zone Data:

Zone ..... All  
Cooling T-stat: Occ. .... 74.0 °F  
Cooling T-stat: Unocc. .... 80.0 °F  
Heating T-stat: Occ. .... 70.0 °F  
Heating T-stat: Unocc. .... 62.0 °F  
T-stat Throttling Range ..... 1.50 °F  
Diversity Factor ..... 100 %  
Direct Exhaust Airflow ..... 0.0 CFM



## HV-49/5 w VFD & CO2 cntls Input Data

Project Name: LM\_B49\_HVAC control upgrade  
Prepared by: The Fowler Company

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Direct Exhaust Fan kW ..... 0.0 kW

Thermostat Schedule ..... 90.1 Office HVAC  
Unoccupied Cooling is ..... Available

### Supply Terminals Data:

Zone ..... All  
Terminal Type ..... VVT  
Minimum Airflow ..... 40 % of supply air

### 4. Sizing Data (Computer-Generated):

#### System Sizing Data:

##### System Sizing Data:

Cooling Supply Temperature ..... 58.0 °F  
Supply Fan Airflow ..... 2064.7 CFM  
Ventilation Airflow ..... 196.1 CFM  
Heating Supply Temperature ..... 95.0 °F

##### Hydronic Sizing Specifications:

Chilled Water Delta-T ..... 10.0 °F  
Hot Water Delta-T ..... 20.0 °F

##### Safety Factors:

Cooling Sensible ..... 100 %  
Cooling Latent ..... 0 %  
Heating ..... 0 %

#### Zone Sizing Data:

Zone Airflow Sizing Method ..... Peak zone sensible load  
Space Airflow Sizing Method ..... Individual peak space loads

Zone	Supply Airflow (CFM)	Zone Htg Unit (M H)	Reheat Coil (M H)	Reheat Coil (CFM)
1	1961.5	-	-	-

### 5. Equipment Data

#### Central Cooling Unit - Air-Cooled DX

Estimated Maximum Load ..... 44.5 MBH  
Design OAT ..... 95.0 °F  
Equipment Sizing ..... User-Defined  
Gross Cooling Capacity ..... 60.0 MBH  
ARI Performance Rating ..... 11.000 EER  
Conventional Cutoff OAT ..... 55.0 °F  
Low Temperature Operation ..... Used  
Low Temperature Cutoff OAT ..... 0.0 °F

## RTU-1 Input Data

Project Name: LM\_B49\_HVAC control upgrade  
Prepared by: The Fowler Company

05/12/2014  
06:02AM

### 1. General Details:

Air System Name ..... RTU-1  
Equipment Type ..... Packaged Rooftop Units  
Air System Type ..... VVT  
Number of zones ..... 6

### 2. Ventilation System Components:

#### Ventilation Air Data:

Airflow Control ..... Proportional  
Ventilation Sizing Method ..... Sum of Space OA Airflows  
Minimum Airflow ..... 0 %  
Unocc. Damper Position ..... Closed  
Damper Leak Rate ..... 5 %  
Outdoor Air CO2 Level ..... 400 ppm

#### Economizer Data:

Control ..... Integrated enthalpy control  
Upper Cutoff ..... 73.0 °F  
Lower Cutoff ..... -60.0 °F

#### Central Cooling Data:

Supply Air Temperature ..... 58.0 °F  
Coil Bypass Factor ..... 0.100  
Cooling Source ..... Air-Cooled D  
Schedule ..... FMAM ASOND  
Capacity Control ..... Constant Temperature - Fan On  
Bypass Airflow ..... 80 %  
Changeover Time ..... 5 minutes

#### Central Heating Data:

Supply Temperature ..... 95.0 °F  
Heating Source ..... Air Source Heat Pump  
Schedule ..... FMAM ASOND  
Capacity Control ..... Constant Temperature - Fan On

#### Supply Fan Data:

Fan Type ..... Forward Curved  
Configuration ..... Draw-thru  
Fan Performance ..... 2.00 in wg  
Overall Efficiency ..... 54 %

Airflow	100	90	80	70	60	50
kW	100	91	81	72	61	54

Airflow	40	30	20	10	0
kW	46	40	33	27	21

#### Duct System Data:

##### Supply Duct Data:

Duct Heat Gain ..... 5 %  
Duct Leakage ..... 5 %

##### Return Duct or Plenum Data:

Return Air Via ..... Ducted Return

### 3. Zone Components:

#### Space Assignments:

<b>one 1: one 1</b>	
201_conf break-out room	x1
<b>one 2: one 2</b>	
202_conference room	x1
<b>one 3: one 3</b>	
203_work room	x1
<b>one 4: one 4</b>	
204_supplies	x1
<b>one 5: one 5</b>	
301_supplies	x1
<b>one 6: one 6</b>	

## RTU-1 Input Data

Project Name: LM\_B49\_HVAC control upgrade  
Prepared by: The Fowler Company

05/12/2014  
06:02AM

402_supplies	x1
--------------	----

### Thermostats and one Data:

Zone ..... **All**  
 Cooling T-stat: Occ. .... **74.0** °F  
 Cooling T-stat: Unocc. .... **80.0** °F  
 Heating T-stat: Occ. .... **70.0** °F  
 Heating T-stat: Unocc. .... **62.0** °F  
 T-stat Throttling Range ..... **1.50** °F  
 Diversity Factor ..... **100** %  
 Direct Exhaust Airflow ..... **0.0** CFM  
 Direct Exhaust Fan kW ..... **0.0** kW  
  
 Thermostat Schedule ..... **90.1 Office HVAC**  
 Unoccupied Cooling is ..... **Available**

### Supply Terminals Data:

Zone ..... **All**  
 Terminal Type ..... **VVT**  
 Minimum Airflow ..... **40** % of supply air

## 4. Sizing Data (Computer-Generated):

### System Sizing Data:

#### Sizing Data:

Cooling Supply Temperature ..... **58.0** °F  
 Supply Fan Airflow ..... **6861.9** CFM  
 Ventilation Airflow ..... **1214.5** CFM  
 Heating Supply Temperature ..... **95.0** °F

#### Hydronic Sizing Specifications:

Chilled Water Delta-T ..... **10.0** °F  
 Hot Water Delta-T ..... **20.0** °F

#### Safety Factors:

Cooling Sensible ..... **70** %  
 Cooling Latent ..... **0** %  
 Heating ..... **0** %

### one Sizing Data:

Zone Airflow Sizing Method ..... **Peak one sensible load**  
 Space Airflow Sizing Method ..... **Individual peak space loads**

one	Supply Airflow (CFM)	one Htg Unit (M H)	Reheat Coil (M H)	-
1	484.6	-	-	-
2	1513.7	-	-	-
3	1263.8	-	-	-
4	1442.7	-	-	-
5	911.7	-	-	-
6	911.7	-	-	-

## 5. Equipment Data

### Central Cooling Unit - Air-Cooled D

Estimated Maximum Load ..... **179.1** MBH  
 Design OAT ..... **95.0** °F  
 Equipment Sizing ..... **User-Defined**  
 Gross Cooling Capacity ..... **240.0** MBH  
 ARI Performance Rating ..... **11.000** EER  
 Conventional Cutoff OAT ..... **55.0** °F  
 Low Temperature Operation ..... **Used**  
 Low Temperature Cutoff OAT ..... **0.0** °F

## RTU-1 Input Data

Project Name: LM\_B49\_HVAC control upgrade  
Prepared by: The Fowler Company

05/12/2014  
06:02AM

### Central Heating Unit - ASHP

Estimated Maximum Load .....	68.1	MBH
Design OAT .....	47.0	°F
Equipment Sizing .....	(Auto-Sized) 68.1	MBH
Capacity Oversizing Factor .....	0	%
ARI Performance Rating .....	3.300	COP
Cutoff OAT .....	-15.0	°F

### Auxiliary Heating:

Auxiliary Heating Type .....	Electric Resistance
Auxiliary Heating Upper Cutoff .....	40.0 °F

## RTU-1 w VFD & CO2 cntls Input Data

Project Name: LM\_B49\_HVAC control upgrade  
Prepared by: The Fowler Company

05/12/2014  
06:02AM

### 1. General Details:

Air System Name ..... RTU-1 w VFD & CO2 cntls  
Equipment Type ..... Packaged Rooftop Units  
Air System Type ..... VVT  
Number of zones ..... 6

### 2. Ventilation System Components:

#### Ventilation Air Data:

Airflow Control ..... Demand Controlled Ventilation  
Ventilation Sizing Method ..... Sum of Space OA Airflows  
Minimum Airflow ..... 0 %  
Damper Leak Rate ..... 5 %  
Minimum CO2 Differential ..... 100 ppm  
Maximum CO2 Differential ..... 700 ppm  
Outdoor Air CO2 Level ..... 400 ppm

#### Economizer Data:

Control ..... Integrated enthalpy control  
Upper Cutoff ..... 73.0 °F  
Lower Cutoff ..... -60.0 °F

#### Central Cooling Data:

Supply Air Temperature ..... 58.0 °F  
Coil Bypass Factor ..... 0.100  
Cooling Source ..... Air-Cooled D  
Schedule ..... FMAM ASOND  
Capacity Control ..... Constant Temperature - Fan On  
Bypass Airflow ..... 0 %  
Changeover Time ..... 5 minutes

#### Central Heating Data:

Supply Temperature ..... 95.0 °F  
Heating Source ..... Air Source Heat Pump  
Schedule ..... FMAM ASOND  
Capacity Control ..... Constant Temperature - Fan On

#### Supply Fan Data:

Fan Type ..... Forward Curved with Variable Frequency Drive  
Configuration ..... Draw-thru  
Fan Performance ..... 2.00 in wg  
Overall Efficiency ..... 48 %

Airflow	100	90	80	70	60	50
kW	100	77	60	44	35	25

Airflow	40	30	20	10	0
kW	19	13	9	7	6

### Duct System Data:

#### Supply Duct Data:

Duct Heat Gain ..... 5 %  
Duct Leakage ..... 5 %

#### Return Duct or Plenum Data:

Return Air Via ..... Ducted Return

### 3. one Components:

#### Space Assignments:

<b>one 1: one 1</b>	
201_conf break-out room	x1
<b>one 2: one 2</b>	
202_conference room	x1
<b>one 3: one 3</b>	
203_work room	x1
<b>one 4: one 4</b>	
204_supplies	x1
<b>one 5: one 5</b>	
301_supplies	x1

## RTU-1 w VFD & CO2 cntls Input Data

Project Name: LM\_B49\_HVAC control upgrade  
Prepared by: The Fowler Company

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<b>one 6: one 6</b>	
402_supplies	x1

### Thermostats and one Data:

Zone ..... **All**  
 Cooling T-stat: Occ. .... **74.0** °F  
 Cooling T-stat: Unocc. .... **80.0** °F  
 Heating T-stat: Occ. .... **70.0** °F  
 Heating T-stat: Unocc. .... **62.0** °F  
 T-stat Throttling Range ..... **1.50** °F  
 Diversity Factor ..... **100** %  
 Direct Exhaust Airflow ..... **0.0** CFM  
 Direct Exhaust Fan kW ..... **0.0** kW  
  
 Thermostat Schedule ..... **90.1 Office HVAC**  
 Unoccupied Cooling is ..... **Available**

### Supply Terminals Data:

Zone ..... **All**  
 Terminal Type ..... **VVT**  
 Minimum Airflow ..... **40** % of supply air

## 4. Si ing Data (Computer-Generated):

### System Si ing Data:

**Si ing Data:**  
 Cooling Supply Temperature ..... **58.0** °F  
 Supply Fan Airflow ..... **6861.9** CFM  
 Ventilation Airflow ..... **1214.5** CFM  
 Heating Supply Temperature ..... **95.0** °F

### Hydronic Si ing Specifications:

Chilled Water Delta-T ..... **10.0** °F  
 Hot Water Delta-T ..... **20.0** °F

### Safety Factors:

Cooling Sensible ..... **70** %  
 Cooling Latent ..... **0** %  
 Heating ..... **0** %

### one Si ing Data:

Zone Airflow Sizing Method ..... **Peak one sensible load**  
 Space Airflow Sizing Method ..... **Individual peak space loads**

one	Supply Airflow (CFM)	one Htg Unit (M H)	Reheat Coil (M H)	- -
1	484.6	-	-	-
2	1513.7	-	-	-
3	1263.8	-	-	-
4	1442.7	-	-	-
5	911.7	-	-	
6	911.7	-	-	

## 5. Equipment Data

### Central Cooling Unit - Air-Cooled D

Estimated Maximum Load ..... **176.5** MBH  
 Design OAT ..... **95.0** °F  
 Equipment Sizing ..... **User-Defined**  
 Gross Cooling Capacity ..... **240.0** MBH  
 ARI Performance Rating ..... **11.000** EER  
 Conventional Cutoff OAT ..... **55.0** °F  
 Low Temperature Operation ..... **Used**  
 Low Temperature Cutoff OAT ..... **0.0** °F

## RTU-1 w VFD & CO2 cntls Input Data

Project Name: LM\_B49\_HVAC control upgrade  
Prepared by: The Fowler Company

05/12/2014  
06:02AM

### Central Heating Unit - ASHP

Estimated Maximum Load .....	95.6	MBH
Design OAT .....	47.0	°F
Equipment Sizing .....	(Auto-Sized) 95.6	MBH
Capacity Oversizing Factor .....	0	%
ARI Performance Rating .....	3.300	COP
Cutoff OAT .....	-15.0	°F

### Auxiliary Heating:

Auxiliary Heating Type .....	Electric Resistance
Auxiliary Heating Upper Cutoff .....	40.0 °F

# Annual Energy and Emissions Summary

LM\_B49\_HVAC control upgrade  
The Fowler Company

05/12/2014  
06:04AM

**Table 1. Annual Costs**

Component	_ ASE_ Idg-49 HVAC Systems ( )	Alt1_ 49 HVAC w/ VFD s, CO2 vent, controls ( )
<b>HVAC Components</b>		
Electric	15,176	4,305
Natural Gas	0	0
Fuel Oil	0	0
Propane	0	0
Remote HW	0	0
Remote Steam	0	0
Remote CW	0	0
<b>HVAC Sub-Total</b>	<b>15,176</b>	<b>4,305</b>
<b>Non-HVAC Components</b>		
Electric	5,446	5,446
Natural Gas	0	0
Fuel Oil	0	0
Propane	0	0
Remote HW	0	0
Remote Steam	0	0
<b>Non-HVAC Sub-Total</b>	<b>5,446</b>	<b>5,446</b>
<b>Grand Total</b>	<b>20,622</b>	<b>9,750</b>

**Table 2. Annual Energy Consumption**

Component	_ ASE_ Idg-49 HVAC Systems	Alt1_ 49 HVAC w/ VFD s, CO2 vent, controls
<b>HVAC Components</b>		
Electric (kWh)	216,806	61,496
Natural Gas (na)	0	0
Fuel Oil (na)	0	0
Propane (na)	0	0
Remote HW (na)	0	0
Remote Steam (na)	0	0
Remote CW (na)	0	0
<b>Non-HVAC Components</b>		
Electric (kWh)	77,796	77,796
Natural Gas (na)	0	0
Fuel Oil (na)	0	0
Propane (na)	0	0
Remote HW (na)	0	0
Remote Steam (na)	0	0
<b>Totals</b>		
Electric (kWh)	294,602	139,291
Natural Gas (na)	0	0
Fuel Oil (na)	0	0
Propane (na)	0	0
Remote HW (na)	0	0
Remote Steam (na)	0	0
Remote CW (na)	0	0



## Annual Energy and Emissions Summary

LM\_B49\_HVAC control upgrade  
The Fowler Company

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**Table 3. Annual Emissions**

Component	_ ASE_ Idg-49 HVAC Systems	Alt1_ 49 HVAC w/ VFD s, CO2 vent, controls
CO2 Equivalent (lb)	0	0

**Table 4. Annual Cost per Unit Floor Area**

Component	_ ASE_ Idg-49 HVAC Systems ( /ft²)	Alt1_ 49 HVAC w/ VFD s, CO2 vent, controls ( /ft²)
<b>HVAC Components</b>		
Electric	0.988	0.280
Natural Gas	0.000	0.000
Fuel Oil	0.000	0.000
Propane	0.000	0.000
Remote HW	0.000	0.000
Remote Steam	0.000	0.000
Remote CW	0.000	0.000
<b>HVAC Sub-Total</b>	<b>0.988</b>	<b>0.280</b>
<b>Non-HVAC Components</b>		
Electric	0.355	0.355
Natural Gas	0.000	0.000
Fuel Oil	0.000	0.000
Propane	0.000	0.000
Remote HW	0.000	0.000
Remote Steam	0.000	0.000
<b>Non-HVAC Sub-Total</b>	<b>0.355</b>	<b>0.355</b>
<b>Grand Total</b>	<b>1.343</b>	<b>0.635</b>
Gross Floor Area (ft²)	15359.0	15359.0
Conditioned Floor Area (ft²)	15359.0	15359.0

Note: Values in this table are calculated using the Gross Floor Area.

## Annual Energy and Emissions Summary

LM\_B49\_HVAC control upgrade  
The Fowler Company

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**Table 5. Component Cost as a Percentage of Total Cost**

Component	_ ASE_ Idg-49 HVAC Systems ( )	Alt1_ 49 HVAC w/ VFD s, CO2 vent, controls ( )
<b>HVAC Components</b>		
Electric	73.6	44.1
Natural Gas	0.0	0.0
Fuel Oil	0.0	0.0
Propane	0.0	0.0
Remote HW	0.0	0.0
Remote Steam	0.0	0.0
Remote CW	0.0	0.0
<b>HVAC Sub-Total</b>	<b>73.6</b>	<b>44.1</b>
<b>Non-HVAC Components</b>		
Electric	26.4	55.9
Natural Gas	0.0	0.0
Fuel Oil	0.0	0.0
Propane	0.0	0.0
Remote HW	0.0	0.0
Remote Steam	0.0	0.0
<b>Non-HVAC Sub-Total</b>	<b>26.4</b>	<b>55.9</b>
<b>Grand Total</b>	<b>100.0</b>	<b>100.0</b>

# Monthly Energy Use by Component - \_ ASE\_ Idg-49 HVAC Systems

LM\_B49\_HVAC control upgrade  
The Fowler Company

05/12/2014  
06:04AM

## 1. Monthly Energy Use by System Component

Component	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Air System Fans (kWh)	11389	10268	11381	10985	11423	11109	11501	11508	11027	11384	11013	11339
<i>Cooling</i>												
Electric (kWh)	454	435	606	654	1029	2282	3149	2532	1348	650	555	465
Natural Gas (na)	0	0	0	0	0	0	0	0	0	0	0	0
Fuel Oil (na)	0	0	0	0	0	0	0	0	0	0	0	0
Propane (na)	0	0	0	0	0	0	0	0	0	0	0	0
Remote HW (na)	0	0	0	0	0	0	0	0	0	0	0	0
Remote Steam (na)	0	0	0	0	0	0	0	0	0	0	0	0
Remote CW (na)	0	0	0	0	0	0	0	0	0	0	0	0
<i>Heating</i>												
Electric (kWh)	13860	11411	8584	5103	2638	500	241	565	1533	4864	7599	11423
Natural Gas (na)	0	0	0	0	0	0	0	0	0	0	0	0
Fuel Oil (na)	0	0	0	0	0	0	0	0	0	0	0	0
Propane (na)	0	0	0	0	0	0	0	0	0	0	0	0
Remote HW (na)	0	0	0	0	0	0	0	0	0	0	0	0
Remote Steam (na)	0	0	0	0	0	0	0	0	0	0	0	0
Pumps (kWh)	0	0	0	0	0	0	0	0	0	0	0	0
Heat Rej. Fans (kWh)	0	0	0	0	0	0	0	0	0	0	0	0
Lighting (kWh)	4206	3686	4070	3875	4206	3897	4049	4206	3739	4206	4033	3913
Electric Eqpt. (kWh)	2595	2277	2517	2395	2595	2411	2501	2595	2318	2595	2489	2424
Misc. Electric (kWh)	0	0	0	0	0	0	0	0	0	0	0	0
<i>Misc. Fuel</i>												
Natural Gas (na)	0	0	0	0	0	0	0	0	0	0	0	0
Propane (na)	0	0	0	0	0	0	0	0	0	0	0	0
Remote HW (na)	0	0	0	0	0	0	0	0	0	0	0	0
Remote Steam (na)	0	0	0	0	0	0	0	0	0	0	0	0

# Monthly Energy Use by Component - Alt1\_ 49 HVAC w/ VFD s, CO2 vent, controls

LM\_B49\_HVAC control upgrade  
The Fowler Company

05/12/2014  
06:04AM

## 1. Monthly Energy Use by System Component

Component	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Air System Fans (kWh)	1692	1468	1514	1429	1889	2425	2695	2524	1828	1447	1385	1581
<i>Cooling</i>												
Electric (kWh)	6	6	113	246	683	1756	2279	1910	979	204	48	8
Natural Gas (na)	0	0	0	0	0	0	0	0	0	0	0	0
Fuel Oil (na)	0	0	0	0	0	0	0	0	0	0	0	0
Propane (na)	0	0	0	0	0	0	0	0	0	0	0	0
Remote HW (na)	0	0	0	0	0	0	0	0	0	0	0	0
Remote Steam (na)	0	0	0	0	0	0	0	0	0	0	0	0
Remote CW (na)	0	0	0	0	0	0	0	0	0	0	0	0
<i>Heating</i>												
Electric (kWh)	7895	6058	3952	1541	511	20	2	20	176	1561	3293	6351
Natural Gas (na)	0	0	0	0	0	0	0	0	0	0	0	0
Fuel Oil (na)	0	0	0	0	0	0	0	0	0	0	0	0
Propane (na)	0	0	0	0	0	0	0	0	0	0	0	0
Remote HW (na)	0	0	0	0	0	0	0	0	0	0	0	0
Remote Steam (na)	0	0	0	0	0	0	0	0	0	0	0	0
Pumps (kWh)	0	0	0	0	0	0	0	0	0	0	0	0
Heat Rej. Fans (kWh)	0	0	0	0	0	0	0	0	0	0	0	0
Lighting (kWh)	4206	3686	4070	3875	4206	3897	4049	4206	3739	4206	4033	3913
Electric Eqpt. (kWh)	2595	2277	2517	2395	2595	2411	2501	2595	2318	2595	2489	2424
Misc. Electric (kWh)	0	0	0	0	0	0	0	0	0	0	0	0
<i>Misc. Fuel</i>												
Natural Gas (na)	0	0	0	0	0	0	0	0	0	0	0	0
Propane (na)	0	0	0	0	0	0	0	0	0	0	0	0
Remote HW (na)	0	0	0	0	0	0	0	0	0	0	0	0
Remote Steam (na)	0	0	0	0	0	0	0	0	0	0	0	0

# Space Input Data

LM\_B49\_HVAC control upgrade  
The Fowler Company

05/12/2014  
06:03AM

## 1flr entry

### 1. General Details:

Floor Area ..... **200.0** ft<sup>2</sup>  
Avg. Ceiling Height ..... **9.0** ft  
Building Weight ..... **120.0** lb/ft<sup>2</sup>

### 1.1. OA Ventilation Requirements:

Space Usage ..... **User-Defined**  
OA Requirement 1 ..... **10** % of supply air  
OA Requirement 2 ..... **0.00** CFM/ft<sup>2</sup>  
Space Usage Defaults ..... **ASHRAE Standard 62-2001**

### 2. Internals:

#### 2.1. Overhead Lighting:

Fixture Type ..... **Recessed (Unvented)**  
Wattage ..... **100.0** Watts  
Ballast Multiplier ..... **1.00**  
Schedule ..... **90.1 Office Lights/Elec**

#### 2.2. Task Lighting:

Wattage ..... **0.00** W/ft<sup>2</sup>  
Schedule ..... **None**

#### 2.3. Electrical Equipment:

Wattage ..... **0.0** Watts  
Schedule ..... **None**

### 3. Walls, Windows, Doors:

Exp.	Wall Gross Area (ft <sup>2</sup> )	Window 1 Qty.	Window 2 Qty.	Door 1 Qty.
NNE	160.0	0	0	0

### 3.1. Construction Types for Exposure NNE

Wall Type ..... **Corrugated Siding + drywall**

### 4. Roofs, Skylights:

**(No Roof or Skylight data).**

### 5. Infiltration:

Design Cooling ..... **2.00** ACH  
Design Heating ..... **6.00** ACH  
Energy Analysis ..... **3.00** ACH  
**Infiltration occurs at all hours.**

### 6. Floors:

Type ..... **Slab Floor On Grade**  
Floor Area ..... **200.0** ft<sup>2</sup>  
Total Floor U-Value ..... **0.100** BTU/(hr-ft<sup>2</sup>-°F)  
Exposed Perimeter ..... **16.0** ft  
Edge Insulation R-Value ..... **0.00** (hr-ft<sup>2</sup>-°F)/BTU

### 7. Partitions:

**(No partition data).**

### 2.4. People:

Occupancy ..... **0.0** Person  
Activity Level ..... **Office Work**  
Sensible ..... **245.0** BTU/hr/person  
Latent ..... **205.0** BTU/hr/person  
Schedule ..... **None**

### 2.5. Miscellaneous Loads:

Sensible ..... **0** BTU/hr  
Schedule ..... **None**  
Latent ..... **0** BTU/hr  
Schedule ..... **None**

## Space Input Data

LM\_B49\_HVAC control upgrade  
The Fowler Company

05/12/2014  
06:03AM

### 201 conf break-out room

#### 1. General Details:

Floor Area ..... **370.0** ft<sup>2</sup>  
Avg. Ceiling Height ..... **9.0** ft  
Building Weight ..... **120.0** lb/ft<sup>2</sup>

#### 1.1. OA Ventilation Requirements:

Space Usage ..... **User-Defined**  
OA Requirement 1 ..... **20** % of supply air  
OA Requirement 2 ..... **0.00** CFM/ft<sup>2</sup>  
Space Usage Defaults ..... **ASHRAE Standard 62-2001**

#### 2. Internals:

##### 2.1. Overhead Lighting:

Fixture Type ..... **Recessed (Unvented)**  
Wattage ..... **600.0** Watts  
Ballast Multiplier ..... **1.00**  
Schedule ..... **Conference Area Elec**

##### 2.2. Task Lighting:

Wattage ..... **0.00** W/ft<sup>2</sup>  
Schedule ..... **None**

##### 2.3. Electrical Equipment:

Wattage ..... **100.0** Watts  
Schedule ..... **Conference Area Elec**

#### 3. Walls, Windows, Doors:

Exp.	Wall Gross Area (ft <sup>2</sup> )	Window 1 Qty.	Window 2 Qty.	Door 1 Qty.
NNE	300.0	0	0	0

##### 3.1. Construction Types for Exposure NNE

Wall Type ..... **Corrugated Siding + drywall**

#### 4. Roofs, Skylights:

**(No Roof or Skylight data).**

#### 5. Infiltration:

Design Cooling ..... **0.00** CFM  
Design Heating ..... **0.00** CFM  
Energy Analysis ..... **0.00** CFM

*Infiltration occurs only when the fan is off.*

#### 6. Floors:

Type ..... **Floor Above Unconditioned Space**  
Floor Area ..... **370.0** ft<sup>2</sup>  
Total Floor U-Value ..... **0.157** BTU/(hr-ft<sup>2</sup>-°F)  
Unconditioned Space Max Temp. .... **95.0** °F  
Ambient at Space Max Temp. .... **90.0** °F  
Unconditioned Space Min Temp. .... **70.0** °F  
Ambient at Space Min Temp. .... **0.0** °F

#### 7. Partitions:

##### 7.1. 1st Partition Details:

Partition Type ..... **Wall Partition**  
Area ..... **480.0** ft<sup>2</sup>  
U-Value ..... **0.085** BTU/(hr-ft<sup>2</sup>-°F)  
Uncondit. Space Max Temp. .... **95.0** °F  
Ambient at Space Max Temp. .... **90.0** °F  
Uncondit. Space Min Temp. .... **70.0** °F  
Ambient at Space Min Temp. .... **55.0** °F

##### 2.4. People:

Occupancy ..... **2.0** People  
Activity Level ..... **Office Work**  
Sensible ..... **245.0** BTU/hr/person  
Latent ..... **205.0** BTU/hr/person  
Schedule ..... **Conference Area Occupants**

##### 2.5. Miscellaneous Loads:

Sensible ..... **0** BTU/hr  
Schedule ..... **None**  
Latent ..... **0** BTU/hr  
Schedule ..... **None**

##### 7.2. 2nd Partition Details:

**(No partition data).**

# Space Input Data

LM\_B49\_HVAC control upgrade  
The Fowler Company

05/12/2014  
06:03AM

## 202 conference room

### 1. General Details:

Floor Area ..... **700.0** ft<sup>2</sup>  
Avg. Ceiling Height ..... **9.0** ft  
Building Weight ..... **120.0** lb/ft<sup>2</sup>

### 1.1. OA Ventilation Requirements:

Space Usage ..... **User-Defined**  
OA Requirement 1 ..... **20** % of supply air  
OA Requirement 2 ..... **0.00** CFM/ft<sup>2</sup>  
Space Usage Defaults ..... **ASHRAE Standard 62-2001**

### 2. Internals:

#### 2.1. Overhead Lighting:

Fixture Type ..... **Recessed (Unvented)**  
Wattage ..... **1200.0** Watts  
Ballast Multiplier ..... **1.00**  
Schedule ..... **90.1 Office Lights/Elec**

#### 2.2. Task Lighting:

Wattage ..... **0.00** W/ft<sup>2</sup>  
Schedule ..... **None**

#### 2.3. Electrical Equipment:

Wattage ..... **500.0** Watts  
Schedule ..... **90.1 Office Lights/Elec**

### 3. Walls, Windows, Doors:

Exp.	Wall Gross Area (ft <sup>2</sup> )	Window 1 Qty.	Window 2 Qty.	Door 1 Qty.
NNE	372.0	0	0	0

#### 3.1. Construction Types for Exposure NNE

Wall Type ..... **Corrugated Siding + drywall**

### 4. Roofs, Skylights:

**(No Roof or Skylight data).**

### 5. Infiltration:

Design Cooling ..... **0.00** CFM  
Design Heating ..... **0.00** CFM  
Energy Analysis ..... **0.00** CFM

**Infiltration occurs only when the fan is off.**

### 6. Floors:

Type ..... **Floor Above Unconditioned Space**  
Floor Area ..... **700.0** ft<sup>2</sup>  
Total Floor U-Value ..... **0.157** BTU/(hr-ft<sup>2</sup>-°F)  
Unconditioned Space Max Temp. .... **95.0** °F  
Ambient at Space Max Temp. .... **90.0** °F  
Unconditioned Space Min Temp. .... **70.0** °F  
Ambient at Space Min Temp. .... **0.0** °F

### 7. Partitions:

#### 7.1. 1st Partition Details:

Partition Type ..... **Wall Partition**  
Area ..... **96.0** ft<sup>2</sup>  
U-Value ..... **0.085** BTU/(hr-ft<sup>2</sup>-°F)  
Uncondit. Space Max Temp. .... **95.0** °F  
Ambient at Space Max Temp. .... **90.0** °F  
Uncondit. Space Min Temp. .... **70.0** °F  
Ambient at Space Min Temp. .... **55.0** °F

#### 2.4. People:

Occupancy ..... **36.0** People  
Activity Level ..... **Seated at Rest**  
Sensible ..... **230.0** BTU/hr/person  
Latent ..... **120.0** BTU/hr/person  
Schedule ..... **Conference Area Occupants**

#### 2.5. Miscellaneous Loads:

Sensible ..... **0** BTU/hr  
Schedule ..... **None**  
Latent ..... **0** BTU/hr  
Schedule ..... **None**

#### 7.2. 2nd Partition Details:

**(No partition data).**

# Space Input Data

LM\_B49\_HVAC control upgrade  
The Fowler Company

05/12/2014  
06:03AM

## 203 work room

### 1. General Details:

Floor Area ..... 514.0 ft<sup>2</sup>  
Avg. Ceiling Height ..... 9.0 ft  
Building Weight ..... 120.0 lb/ft<sup>2</sup>

### 1.1. OA Ventilation Requirements:

Space Usage ..... User-Defined  
OA Requirement 1 ..... 20 % of supply air  
OA Requirement 2 ..... 0.00 CFM/ft<sup>2</sup>  
Space Usage Defaults ..... ASHRAE Standard 62-2001

### 2. Internals:

#### 2.1. Overhead Lighting:

Fixture Type ..... Recessed (Unvented)  
Wattage ..... 1100.0 Watts  
Ballast Multiplier ..... 1.00  
Schedule ..... 90.1 Office Lights/Elec

#### 2.2. Task Lighting:

Wattage ..... 0.00 W/ft<sup>2</sup>  
Schedule ..... None

#### 2.3. Electrical Equipment:

Wattage ..... 1350.0 Watts  
Schedule ..... 90.1 Office Lights/Elec

### 3. Walls, Windows, Doors:

Exp.	Wall Gross Area (ft <sup>2</sup> )	Window 1 Qty.	Window 2 Qty.	Door 1 Qty.
NNE	264.0	0	0	0
ESE	288.0	0	0	0

#### 3.1. Construction Types for Exposure NNE

Wall Type ..... Corrugated Siding + drywall

#### 3.2. Construction Types for Exposure ESE

Wall Type ..... Corrugated Siding + drywall

### 4. Roofs, Skylights:

(No Roof or Skylight data).

### 5. Infiltration:

Design Cooling ..... 0.00 CFM  
Design Heating ..... 0.00 CFM  
Energy Analysis ..... 0.00 CFM

Infiltration occurs only when the fan is off.

### 6. Floors:

Type ..... Floor Above Unconditioned Space  
Floor Area ..... 514.0 ft<sup>2</sup>  
Total Floor U-Value ..... 0.157 BTU/(hr-ft<sup>2</sup>-°F)  
Unconditioned Space Max Temp. .... 95.0 °F  
Ambient at Space Max Temp. .... 90.0 °F  
Unconditioned Space Min Temp. .... 70.0 °F  
Ambient at Space Min Temp. .... 0.0 °F

### 7. Partitions:

#### 7.1. 1st Partition Details:

Partition Type ..... Wall Partition  
Area ..... 96.0 ft<sup>2</sup>  
U-Value ..... 0.085 BTU/(hr-ft<sup>2</sup>-°F)  
Uncondit. Space Max Temp. .... 95.0 °F  
Ambient at Space Max Temp. .... 90.0 °F  
Uncondit. Space Min Temp. .... 70.0 °F  
Ambient at Space Min Temp. .... 55.0 °F

#### 7.2. 2nd Partition Details:

(No partition data).



# Space Input Data

LM\_B49\_HVAC control upgrade  
The Fowler Company

05/12/2014  
06:03AM

## 204 supplies

### 1. General Details:

Floor Area ..... **1860.0** ft<sup>2</sup>  
Avg. Ceiling Height ..... **9.0** ft  
Building Weight ..... **120.0** lb/ft<sup>2</sup>

### 1.1. OA Ventilation Requirements:

Space Usage ..... **User-Defined**  
OA Requirement 1 ..... **20** % of supply air  
OA Requirement 2 ..... **0.00** CFM/ft<sup>2</sup>  
Space Usage Defaults ..... **ASHRAE Standard 62-2001**

### 2. Internals:

#### 2.1. Overhead Lighting:

Fixture Type ..... **Recessed (Unvented)**  
Wattage ..... **2000.0** Watts  
Ballast Multiplier ..... **1.00**  
Schedule ..... **Supplies Lights**

#### 2.2. Task Lighting:

Wattage ..... **0.00** W/ft<sup>2</sup>  
Schedule ..... **None**

#### 2.3. Electrical Equipment:

Wattage ..... **0.0** Watts  
Schedule ..... **None**

### 3. Walls, Windows, Doors:

Exp.	Wall Gross Area (ft <sup>2</sup> )	Window 1 Qty.	Window 2 Qty.	Door 1 Qty.
ESE	300.0	0	0	0

#### 3.1. Construction Types for Exposure ESE

Wall Type ..... **Corrugated Siding + drywall**

### 4. Roofs, Skylights:

**(No Roof or Skylight data).**

### 5. Infiltration:

Design Cooling ..... **0.00** CFM  
Design Heating ..... **0.00** CFM  
Energy Analysis ..... **0.00** CFM

*Infiltration occurs only when the fan is off.*

### 6. Floors:

Type ..... **Floor Above Unconditioned Space**  
Floor Area ..... **1860.0** ft<sup>2</sup>  
Total Floor U-Value ..... **0.157** BTU/(hr-ft<sup>2</sup>-°F)  
Unconditioned Space Max Temp. .... **95.0** °F  
Ambient at Space Max Temp. .... **90.0** °F  
Unconditioned Space Min Temp. .... **70.0** °F  
Ambient at Space Min Temp. .... **0.0** °F

### 7. Partitions:

#### 7.1. 1st Partition Details:

Partition Type ..... **Wall Partition**  
Area ..... **1284.0** ft<sup>2</sup>  
U-Value ..... **0.085** BTU/(hr-ft<sup>2</sup>-°F)  
Uncondit. Space Max Temp ..... **95.0** °F  
Ambient at Space Max Temp ..... **90.0** °F  
Uncondit. Space Min Temp ..... **70.0** °F  
Ambient at Space Min Temp ..... **55.0** °F

#### 2.4. People:

Occupancy ..... **0.0** Person  
Activity Level ..... **Office Work**  
Sensible ..... **245.0** BTU/hr/person  
Latent ..... **205.0** BTU/hr/person  
Schedule ..... **None**

#### 2.5. Miscellaneous Loads:

Sensible ..... **0** BTU/hr  
Schedule ..... **None**  
Latent ..... **0** BTU/hr  
Schedule ..... **None**

#### 7.2. 2nd Partition Details:

Partition Type ..... **Wall Partition**  
Area ..... **396.0** ft<sup>2</sup>  
U-Value ..... **0.040** BTU/(hr-ft<sup>2</sup>-°F)  
Uncondit. Space Max Temp ..... **95.0** °F  
Ambient at Space Max Temp ..... **90.0** °F  
Uncondit. Space Min Temp ..... **70.0** °F  
Ambient at Space Min Temp ..... **55.0** °F

## Space Input Data

LM\_B49\_HVAC control upgrade  
The Fowler Company

05/12/2014  
06:03AM

### 30 comm rm & utility rm

#### 1. General Details:

Floor Area ..... **1000.0** ft<sup>2</sup>  
Avg. Ceiling Height ..... **9.0** ft  
Building Weight ..... **120.0** lb/ft<sup>2</sup>

#### 1.1. OA Ventilation Requirements:

Space Usage ..... **User-Defined**  
OA Requirement 1 ..... **10** % of supply air  
OA Requirement 2 ..... **0.00** CFM/ft<sup>2</sup>  
Space Usage Defaults ..... **ASHRAE Standard 62-2001**

#### 2. Internals:

##### 2.1. Overhead Lighting:

Fixture Type ..... **Recessed (Unvented)**  
Wattage ..... **600.0** Watts  
Ballast Multiplier ..... **1.00**  
Schedule ..... **Supplies Lights**

##### 2.2. Task Lighting:

Wattage ..... **0.00** W/ft<sup>2</sup>  
Schedule ..... **None**

##### 2.3. Electrical Equipment:

Wattage ..... **2000.0** Watts  
Schedule ..... **90.1 Office Lights/Elec**

#### 3. Walls, Windows, Doors:

Exp.	Wall Gross Area (ft <sup>2</sup> )	Window 1 Qty.	Window 2 Qty.	Door 1 Qty.
WNW	300.0	0	0	0

##### 3.1. Construction Types for Exposure WNW

Wall Type ..... **Corrugated Siding + drywall**

#### 4. Roofs, Skylights:

**(No Roof or Skylight data).**

#### 5. Infiltration:

Design Cooling ..... **0.00** CFM  
Design Heating ..... **0.00** CFM  
Energy Analysis ..... **0.00** CFM  
Infiltration occurs only when the fan is off.

#### 6. Floors:

Type ..... **Floor Above Conditioned Space**  
**(No additional input required for this floor type).**

#### 7. Partitions:

##### 7.1. 1st Partition Details:

Partition Type ..... **Wall Partition**  
Area ..... **600.0** ft<sup>2</sup>  
U-Value ..... **0.085** BTU/(hr-ft<sup>2</sup>-°F)  
Uncondit. Space Max Temp ..... **95.0** °F  
Ambient at Space Max Temp ..... **90.0** °F  
Uncondit. Space Min Temp ..... **70.0** °F  
Ambient at Space Min Temp ..... **55.0** °F

##### 7.2. 2nd Partition Details:

**(No partition data).**

# Space Input Data

LM\_B49\_HVAC control upgrade  
The Fowler Company

05/12/2014  
06:03AM

## 301 supplies

### 1. General Details:

Floor Area ..... **1860.0** ft<sup>2</sup>  
Avg. Ceiling Height ..... **9.0** ft  
Building Weight ..... **120.0** lb/ft<sup>2</sup>

### 1.1. OA Ventilation Requirements:

Space Usage ..... **User-Defined**  
OA Requirement 1 ..... **20** % of supply air  
OA Requirement 2 ..... **0.00** CFM/ft<sup>2</sup>  
Space Usage Defaults ..... **ASHRAE Standard 62-2001**

### 2. Internals:

#### 2.1. Overhead Lighting:

Fixture Type ..... **Recessed (Unvented)**  
Wattage ..... **2000.0** Watts  
Ballast Multiplier ..... **1.00**  
Schedule ..... **Supplies Lights**

#### 2.2. Task Lighting:

Wattage ..... **0.00** W/ft<sup>2</sup>  
Schedule ..... **None**

#### 2.3. Electrical Equipment:

Wattage ..... **0.0** Watts  
Schedule ..... **None**

### 3. Walls, Windows, Doors:

Exp.	Wall Gross Area (ft <sup>2</sup> )	Window 1 Qty.	Window 2 Qty.	Door 1 Qty.
ESE	300.0	0	0	0

#### 3.1. Construction Types for Exposure ESE

Wall Type ..... **Corrugated Siding + drywall**

### 4. Roofs, Skylights:

**(No Roof or Skylight data).**

### 5. Infiltration:

Design Cooling ..... **0.00** CFM  
Design Heating ..... **0.00** CFM  
Energy Analysis ..... **0.00** CFM  
Infiltration occurs only when the fan is off.

### 6. Floors:

Type ..... **Floor Above Conditioned Space**  
**(No additional input required for this floor type).**

### 7. Partitions:

#### 7.1. 1st Partition Details:

Partition Type ..... **Wall Partition**  
Area ..... **1284.0** ft<sup>2</sup>  
U-Value ..... **0.085** BTU/(hr-ft<sup>2</sup>-°F)  
Uncondit. Space Max Temp ..... **100.0** °F  
Ambient at Space Max Temp ..... **90.0** °F  
Uncondit. Space Min Temp ..... **70.0** °F  
Ambient at Space Min Temp ..... **55.0** °F

#### 7.2. 2nd Partition Details:

Partition Type ..... **Wall Partition**  
Area ..... **396.0** ft<sup>2</sup>  
U-Value ..... **0.040** BTU/(hr-ft<sup>2</sup>-°F)  
Uncondit. Space Max Temp ..... **100.0** °F  
Ambient at Space Max Temp ..... **90.0** °F  
Uncondit. Space Min Temp ..... **70.0** °F  
Ambient at Space Min Temp ..... **55.0** °F

# Space Input Data

LM\_B49\_HVAC control upgrade  
The Fowler Company

05/12/2014  
06:03AM

## 31-32 oracle rooms

### 1. General Details:

Floor Area ..... 1200.0 ft<sup>2</sup>  
Avg. Ceiling Height ..... 9.0 ft  
Building Weight ..... 120.0 lb/ft<sup>2</sup>

#### 1.1. OA Ventilation Requirements:

Space Usage ..... User-Defined  
OA Requirement 1 ..... 10 % of supply air  
OA Requirement 2 ..... 0.00 CFM/ft<sup>2</sup>  
Space Usage Defaults ..... ASHRAE Standard 62-2001

### 2. Internals:

#### 2.1. Overhead Lighting:

Fixture Type ..... Recessed (Unvented)  
Wattage ..... 1800.0 Watts  
Ballast Multiplier ..... 1.00  
Schedule ..... 90.1 Office Lights/Elec

#### 2.2. Task Lighting:

Wattage ..... 0.00 W/ft<sup>2</sup>  
Schedule ..... None

#### 2.3. Electrical Equipment:

Wattage ..... 0.50 W/ft<sup>2</sup>  
Schedule ..... 90.1 Office Lights/Elec

### 3. Walls, Windows, Doors:

Exp.	Wall Gross Area (ft <sup>2</sup> )	Window 1 Qty.	Window 2 Qty.	Door 1 Qty.
NNE	576.0	0	0	0
ESE	288.0	0	0	0

#### 3.1. Construction Types for Exposure NNE

Wall Type ..... Corrugated Siding + drywall

#### 3.2. Construction Types for Exposure ESE

Wall Type ..... Corrugated Siding + drywall

### 4. Roofs, Skylights:

(No Roof or Skylight data).

### 5. Infiltration:

Design Cooling ..... 0.00 CFM  
Design Heating ..... 0.00 CFM  
Energy Analysis ..... 0.00 CFM

Infiltration occurs only when the fan is off.

### 6. Floors:

Type ..... Floor Above Conditioned Space

(No additional input required for this floor type).

### 7. Partitions:

#### 7.1. 1st Partition Details:

Partition Type ..... Wall Partition  
Area ..... 720.0 ft<sup>2</sup>  
U-Value ..... 0.085 BTU/(hr-ft<sup>2</sup>-°F)  
Uncondit. Space Max Temp ..... 95.0 °F  
Ambient at Space Max Temp ..... 90.0 °F  
Uncondit. Space Min Temp ..... 70.0 °F  
Ambient at Space Min Temp ..... 55.0 °F

#### 7.2. 2nd Partition Details:

(No partition data).

#### 2.4. People:

Occupancy ..... 200.00 ft<sup>2</sup>/person  
Activity Level ..... Office Work  
Sensible ..... 245.0 BTU/hr/person  
Latent ..... 205.0 BTU/hr/person  
Schedule ..... 90.1 Office Occupants

#### 2.5. Miscellaneous Loads:

Sensible ..... 0 BTU/hr  
Schedule ..... None  
Latent ..... 0 BTU/hr  
Schedule ..... None

# Space Input Data

LM\_B49\_HVAC control upgrade  
The Fowler Company

05/12/2014  
06:03AM

## 402 supplies

### 1. General Details:

Floor Area ..... **1860.0** ft<sup>2</sup>  
Avg. Ceiling Height ..... **9.0** ft  
Building Weight ..... **120.0** lb/ft<sup>2</sup>

#### 1.1. OA Ventilation Requirements:

Space Usage ..... **User-Defined**  
OA Requirement 1 ..... **10** % of supply air  
OA Requirement 2 ..... **0.00** CFM/ft<sup>2</sup>  
Space Usage Defaults ..... **ASHRAE Standard 62-2001**

### 2. Internals:

#### 2.1. Overhead Lighting:

Fixture Type ..... **Recessed (Unvented)**  
Wattage ..... **2000.0** Watts  
Ballast Multiplier ..... **1.00**  
Schedule ..... **Supplies Lights**

#### 2.2. Task Lighting:

Wattage ..... **0.00** W/ft<sup>2</sup>  
Schedule ..... **None**

#### 2.3. Electrical Equipment:

Wattage ..... **0.0** Watts  
Schedule ..... **None**

### 3. Walls, Windows, Doors:

Exp.	Wall Gross Area (ft <sup>2</sup> )	Window 1 Qty.	Window 2 Qty.	Door 1 Qty.
ESE	300.0	0	0	0

#### 3.1. Construction Types for Exposure ESE

Wall Type ..... **Corrugated Siding + drywall**

### 4. Roofs, Skylights:

**(No Roof or Skylight data).**

### 5. Infiltration:

Design Cooling ..... **0.00** CFM  
Design Heating ..... **0.00** CFM  
Energy Analysis ..... **0.00** CFM  
Infiltration occurs only when the fan is off.

### 6. Floors:

Type ..... **Floor Above Conditioned Space**  
**(No additional input required for this floor type).**

### 7. Partitions:

#### 7.1. 1st Partition Details:

Partition Type ..... **Wall Partition**  
Area ..... **1284.0** ft<sup>2</sup>  
U-Value ..... **0.085** BTU/(hr-ft<sup>2</sup>-°F)  
Uncondit. Space Max Temp ..... **100.0** °F  
Ambient at Space Max Temp ..... **90.0** °F  
Uncondit. Space Min Temp ..... **70.0** °F  
Ambient at Space Min Temp ..... **55.0** °F

#### 7.2. 2nd Partition Details:

Partition Type ..... **Wall Partition**  
Area ..... **396.0** ft<sup>2</sup>  
U-Value ..... **0.040** BTU/(hr-ft<sup>2</sup>-°F)  
Uncondit. Space Max Temp ..... **100.0** °F  
Ambient at Space Max Temp ..... **90.0** °F  
Uncondit. Space Min Temp ..... **70.0** °F  
Ambient at Space Min Temp ..... **55.0** °F

## Space Input Data

LM\_B49\_HVAC control upgrade  
The Fowler Company

05/12/2014  
06:03AM

### 41-42-43 optical labs

#### 1. General Details:

Floor Area ..... **1425.0** ft<sup>2</sup>  
Avg. Ceiling Height ..... **9.0** ft  
Building Weight ..... **120.0** lb/ft<sup>2</sup>

#### 1.1. OA Ventilation Requirements:

Space Usage ..... **User-Defined**  
OA Requirement 1 ..... **10** % of supply air  
OA Requirement 2 ..... **0.00** CFM/ft<sup>2</sup>  
Space Usage Defaults ..... **ASHRAE Standard 62-2001**

#### 2. Internals:

##### 2.1. Overhead Lighting:

Fixture Type ..... **Recessed (Unvented)**  
Wattage ..... **1.50** W/ft<sup>2</sup>  
Ballast Multiplier ..... **1.00**  
Schedule ..... **90.1 Office Lights/Elec**

##### 2.2. Task Lighting:

Wattage ..... **0.00** W/ft<sup>2</sup>  
Schedule ..... **None**

##### 2.3. Electrical Equipment:

Wattage ..... **1.00** W/ft<sup>2</sup>  
Schedule ..... **90.1 Office Lights/Elec**

#### 3. Walls, Windows, Doors:

Exp.	Wall Gross Area (ft <sup>2</sup> )	Window 1 Qty.	Window 2 Qty.	Door 1 Qty.
NNE	780.0	288	0	0
ESE	288.0	0	0	0

##### 3.1. Construction Types for Exposure NNE

Wall Type ..... **Corrugated Siding + drywall**  
1st Window Type ..... **1x1 2-pane glass**

##### 3.2. Construction Types for Exposure ESE

Wall Type ..... **Corrugated Siding + drywall**

#### 4. Roofs, Skylights:

**(No Roof or Skylight data).**

#### 5. Infiltration:

Design Cooling ..... **2.00** ACH  
Design Heating ..... **5.00** ACH  
Energy Analysis ..... **1.00** ACH  
*Infiltration occurs only when the fan is off.*

#### 6. Floors:

Type ..... **Floor Above Conditioned Space**  
**(No additional input required for this floor type).**

#### 7. Partitions:

##### 7.1. 1st Partition Details:

Partition Type ..... **Wall Partition**  
Area ..... **300.0** ft<sup>2</sup>  
U-Value ..... **0.085** BTU/(hr-ft<sup>2</sup>-°F)  
Uncondit. Space Max Temp ..... **100.0** °F  
Ambient at Space Max Temp ..... **90.0** °F  
Uncondit. Space Min Temp ..... **70.0** °F  
Ambient at Space Min Temp ..... **55.0** °F

##### 7.2. 2nd Partition Details:

Partition Type ..... **Ceiling Partition**  
Area ..... **780.0** ft<sup>2</sup>  
U-Value ..... **0.040** BTU/(hr-ft<sup>2</sup>-°F)  
Uncondit. Space Max Temp ..... **100.0** °F  
Ambient at Space Max Temp ..... **95.0** °F  
Uncondit. Space Min Temp ..... **75.0** °F  
Ambient at Space Min Temp ..... **55.0** °F

## Space Input Data

LM\_B49\_HVAC control upgrade  
The Fowler Company

05/12/2014  
06:03AM

### 50 Foyer

#### 1. General Details:

Floor Area ..... **260.0** ft<sup>2</sup>  
Avg. Ceiling Height ..... **9.0** ft  
Building Weight ..... **120.0** lb/ft<sup>2</sup>

#### 1.1. OA Ventilation Requirements:

Space Usage ..... **User-Defined**  
OA Requirement 1 ..... **10** % of supply air  
OA Requirement 2 ..... **0.00** CFM/ft<sup>2</sup>  
Space Usage Defaults ..... **ASHRAE Standard 62-2001**

#### 2. Internals:

##### 2.1. Overhead Lighting:

Fixture Type ..... **Recessed (Unvented)**  
Wattage ..... **500.0** Watts  
Ballast Multiplier ..... **1.00**  
Schedule ..... **90.1 Office Lights/Elec**

##### 2.4. People:

Occupancy ..... **0.0** Person  
Activity Level ..... **Office Work**  
Sensible ..... **245.0** BTU/hr/person  
Latent ..... **205.0** BTU/hr/person  
Schedule ..... **None**

##### 2.2. Task Lighting:

Wattage ..... **0.00** W/ft<sup>2</sup>  
Schedule ..... **None**

##### 2.5. Miscellaneous Loads:

Sensible ..... **0** BTU/hr  
Schedule ..... **None**  
Latent ..... **0** BTU/hr  
Schedule ..... **None**

##### 2.3. Electrical Equipment:

Wattage ..... **0.0** Watts  
Schedule ..... **None**

#### 3. Walls, Windows, Doors:

Exp.	Wall Gross Area (ft <sup>2</sup> )	Window 1 Qty.	Window 2 Qty.	Door 1 Qty.
NNE	300.0	0	0	0

##### 3.1. Construction Types for Exposure NNE

Wall Type ..... **Corrugated Siding + drywall**

#### 4. Roofs, Skylights:

Exp.	Roof Gross Area (ft <sup>2</sup> )	Roof Slope (deg.)	Skylight Qty.
H	260.0	0	0

##### 4.1. Construction Types for Exposure H

Roof Type ..... **Roof Assembly**

#### 5. Infiltration:

Design Cooling ..... **0.00** CFM  
Design Heating ..... **0.00** CFM  
Energy Analysis ..... **0.00** CFM

Infiltration occurs only when the fan is off.

#### 6. Floors:

Type ..... **Floor Above Conditioned Space**  
**(No additional input required for this floor type).**

#### 7. Partitions:

##### 7.1. 1st Partition Details:

Partition Type ..... **Wall Partition**  
Area ..... **180.0** ft<sup>2</sup>  
U-Value ..... **0.085** BTU/(hr-ft<sup>2</sup>-°F)  
Uncondit. Space Max Temp ..... **100.0** °F  
Ambient at Space Max Temp ..... **90.0** °F  
Uncondit. Space Min Temp ..... **70.0** °F  
Ambient at Space Min Temp ..... **55.0** °F

##### 7.2. 2nd Partition Details:

**(No partition data).**

# Space Input Data

LM\_B49\_HVAC control upgrade  
The Fowler Company

05/12/2014  
06:03AM

## 51 work room

### 1. General Details:

Floor Area ..... 535.0 ft<sup>2</sup>  
Avg. Ceiling Height ..... 9.0 ft  
Building Weight ..... 120.0 lb/ft<sup>2</sup>

### 1.1. OA Ventilation Requirements:

Space Usage ..... User-Defined  
OA Requirement 1 ..... 10 % of supply air  
OA Requirement 2 ..... 0.00 CFM/ft<sup>2</sup>  
Space Usage Defaults ..... ASHRAE Standard 62-2001

### 2. Internals:

#### 2.1. Overhead Lighting:

Fixture Type ..... Recessed (Unvented)  
Wattage ..... 1200.0 Watts  
Ballast Multiplier ..... 1.00  
Schedule ..... 90.1 Office Lights/Elec

#### 2.2. Task Lighting:

Wattage ..... 0.00 W/ft<sup>2</sup>  
Schedule ..... None

#### 2.3. Electrical Equipment:

Wattage ..... 1350.0 Watts  
Schedule ..... 90.1 Office Lights/Elec

### 3. Walls, Windows, Doors:

Exp.	Wall Gross Area (ft <sup>2</sup> )	Window 1 Qty.	Window 2 Qty.	Door 1 Qty.
NNE	312.0	0	0	0

#### 3.1. Construction Types for Exposure NNE

Wall Type ..... Corrugated Siding + drywall

### 4. Roofs, Skylights:

Exp.	Roof Gross Area (ft <sup>2</sup> )	Roof Slope (deg.)	Skylight Qty.
H	535.0	0	0

#### 4.1. Construction Types for Exposure H

Roof Type ..... Roof Assembly

### 5. Infiltration:

Design Cooling ..... 0.00 CFM  
Design Heating ..... 0.00 CFM  
Energy Analysis ..... 0.00 CFM

Infiltration occurs only when the fan is off.

### 6. Floors:

Type ..... Floor Above Conditioned Space  
(No additional input required for this floor type).

### 7. Partitions:

#### 7.1. 1st Partition Details:

Partition Type ..... Wall Partition  
Area ..... 120.0 ft<sup>2</sup>  
U-Value ..... 0.085 BTU/(hr-ft<sup>2</sup>-°F)  
Uncondit. Space Max Temp ..... 95.0 °F  
Ambient at Space Max Temp ..... 90.0 °F  
Uncondit. Space Min Temp ..... 70.0 °F  
Ambient at Space Min Temp ..... 55.0 °F

#### 7.2. 2nd Partition Details:

(No partition data).



## Space Input Data

LM\_B49\_HVAC control upgrade  
The Fowler Company

05/12/2014  
06:03AM

### 52 optics

#### 1. General Details:

Floor Area ..... **675.0** ft<sup>2</sup>  
Avg. Ceiling Height ..... **9.0** ft  
Building Weight ..... **120.0** lb/ft<sup>2</sup>

#### 1.1. OA Ventilation Requirements:

Space Usage ..... **User-Defined**  
OA Requirement 1 ..... **10** % of supply air  
OA Requirement 2 ..... **0.00** CFM/ft<sup>2</sup>  
Space Usage Defaults ..... **ASHRAE Standard 62-2001**

#### 2. Internals:

##### 2.1. Overhead Lighting:

Fixture Type ..... **Recessed (Unvented)**  
Wattage ..... **1000.0** Watts  
Ballast Multiplier ..... **1.00**  
Schedule ..... **90.1 Office Lights/Elec**

##### 2.2. Task Lighting:

Wattage ..... **0.00** W/ft<sup>2</sup>  
Schedule ..... **None**

##### 2.3. Electrical Equipment:

Wattage ..... **1.00** W/ft<sup>2</sup>  
Schedule ..... **90.1 Office Lights/Elec**

#### 3. Walls, Windows, Doors:

Exp.	Wall Gross Area (ft <sup>2</sup> )	Window 1 Qty.	Window 2 Qty.	Door 1 Qty.
NNE	360.0	96	0	0
ESE	300.0	0	0	0

##### 3.1. Construction Types for Exposure NNE

Wall Type ..... **Corrugated Siding + drywall**  
1st Window Type ..... **1x1 2-pane glass**

##### 3.2. Construction Types for Exposure ESE

Wall Type ..... **Corrugated Siding + drywall**

#### 4. Roofs, Skylights:

**(No Roof or Skylight data).**

#### 5. Infiltration:

Design Cooling ..... **2.00** ACH  
Design Heating ..... **5.00** ACH  
Energy Analysis ..... **1.00** ACH  
Infiltration occurs only when the fan is off.

#### 6. Floors:

Type ..... **Floor Above Conditioned Space**  
**(No additional input required for this floor type).**

#### 7. Partitions:

**(No partition data).**

#### 2.4. People:

Occupancy ..... **200.00** ft<sup>2</sup>/person  
Activity Level ..... **Office Work**  
Sensible ..... **245.0** BTU/hr/person  
Latent ..... **205.0** BTU/hr/person  
Schedule ..... **90.1 Office Occupants**

#### 2.5. Miscellaneous Loads:

Sensible ..... **0** BTU/hr  
Schedule ..... **None**  
Latent ..... **0** BTU/hr  
Schedule ..... **None**

# Space Input Data

LM\_B49\_HVAC control upgrade  
The Fowler Company

05/12/2014  
06:03AM

## 5th Assembly/VSD/Optical

### 1. General Details:

Floor Area ..... **950.0** ft<sup>2</sup>  
Avg. Ceiling Height ..... **9.0** ft  
Building Weight ..... **120.0** lb/ft<sup>2</sup>

### 1.1. OA Ventilation Requirements:

Space Usage ..... **User-Defined**  
OA Requirement 1 ..... **10** % of supply air  
OA Requirement 2 ..... **0.00** CFM/ft<sup>2</sup>  
Space Usage Defaults ..... **ASHRAE Standard 62-2001**

### 2. Internals:

#### 2.1. Overhead Lighting:

Fixture Type ..... **Recessed (Unvented)**  
Wattage ..... **2000.0** Watts  
Ballast Multiplier ..... **1.00**  
Schedule ..... **90.1 Office Lights/Elec**

#### 2.2. Task Lighting:

Wattage ..... **0.00** W/ft<sup>2</sup>  
Schedule ..... **None**

#### 2.3. Electrical Equipment:

Wattage ..... **1.00** W/ft<sup>2</sup>  
Schedule ..... **90.1 Office Lights/Elec**

### 3. Walls, Windows, Doors:

**(No Wall, Window, Door data).**

### 4. Roofs, Skylights:

Exp.	Roof Gross Area (ft <sup>2</sup> )	Roof Slope (deg.)	Skylight Qty.
H	950.0	0	0

#### 4.1. Construction Types for Exposure H

Roof Type ..... **Roof Assembly**

### 5. Infiltration:

Design Cooling ..... **0.00** CFM  
Design Heating ..... **0.00** CFM  
Energy Analysis ..... **0.00** CFM

Infiltration occurs only when the fan is off.

### 6. Floors:

Type ..... **Floor Above Conditioned Space**  
**(No additional input required for this floor type).**

### 7. Partitions:

**(No partition data).**

### 2.4. People:

Occupancy ..... **200.00** ft<sup>2</sup>/person  
Activity Level ..... **Office Work**  
Sensible ..... **245.0** BTU/hr/person  
Latent ..... **205.0** BTU/hr/person  
Schedule ..... **90.1 Office Occupants**

### 2.5. Miscellaneous Loads:

Sensible ..... **0** BTU/hr  
Schedule ..... **None**  
Latent ..... **0** BTU/hr  
Schedule ..... **None**

## Space Input Data

LM\_B49\_HVAC control upgrade  
The Fowler Company

05/12/2014  
06:03AM

### 5th central area storage

#### 1. General Details:

Floor Area ..... **180.0** ft<sup>2</sup>  
Avg. Ceiling Height ..... **9.0** ft  
Building Weight ..... **120.0** lb/ft<sup>2</sup>

#### 1.1. OA Ventilation Requirements:

Space Usage ..... **User-Defined**  
OA Requirement 1 ..... **10** % of supply air  
OA Requirement 2 ..... **0.00** CFM/ft<sup>2</sup>  
Space Usage Defaults ..... **ASHRAE Standard 62-2001**

#### 2. Internals:

##### 2.1. Overhead Lighting:

Fixture Type ..... **Recessed (Unvented)**  
Wattage ..... **200.0** Watts  
Ballast Multiplier ..... **1.00**  
Schedule ..... **Supplies Lights**

##### 2.2. Task Lighting:

Wattage ..... **0.00** W/ft<sup>2</sup>  
Schedule ..... **None**

##### 2.3. Electrical Equipment:

Wattage ..... **0.0** Watts  
Schedule ..... **None**

#### 3. Walls, Windows, Doors:

**(No Wall, Window, Door data).**

#### 4. Roofs, Skylights:

Exp.	Roof Gross Area (ft <sup>2</sup> )	Roof Slope (deg.)	Skylight Qty.
H	180.0	0	0

#### 4.1. Construction Types for Exposure H

Roof Type ..... **Roof Assembly**

#### 5. Infiltration:

Design Cooling ..... **0.00** CFM  
Design Heating ..... **0.00** CFM  
Energy Analysis ..... **0.00** CFM

Infiltration occurs only when the fan is off.

#### 6. Floors:

Type ..... **Floor Above Conditioned Space**  
**(No additional input required for this floor type).**

#### 7. Partitions:

**(No partition data).**

#### 2.4. People:

Occupancy ..... **0.0** Person  
Activity Level ..... **Office Work**  
Sensible ..... **245.0** BTU/hr/person  
Latent ..... **205.0** BTU/hr/person  
Schedule ..... **None**

#### 2.5. Miscellaneous Loads:

Sensible ..... **0** BTU/hr  
Schedule ..... **None**  
Latent ..... **0** BTU/hr  
Schedule ..... **None**

## Space Input Data

LM\_B49\_HVAC control upgrade  
The Fowler Company

05/12/2014  
06:03AM

### 5th flr toilets

#### 1. General Details:

Floor Area ..... **500.0** ft<sup>2</sup>  
Avg. Ceiling Height ..... **9.0** ft  
Building Weight ..... **120.0** lb/ft<sup>2</sup>

#### 1.1. OA Ventilation Requirements:

Space Usage ..... **User-Defined**  
OA Requirement 1 ..... **10** % of supply air  
OA Requirement 2 ..... **0.00** CFM/ft<sup>2</sup>  
Space Usage Defaults ..... **ASHRAE Standard 62-2001**

#### 2. Internals:

##### 2.1. Overhead Lighting:

Fixture Type ..... **Recessed (Unvented)**  
Wattage ..... **1.00** W/ft<sup>2</sup>  
Ballast Multiplier ..... **1.00**  
Schedule ..... **90.1 Office Lights/Elec**

##### 2.2. Task Lighting:

Wattage ..... **0.00** W/ft<sup>2</sup>  
Schedule ..... **None**

##### 2.3. Electrical Equipment:

Wattage ..... **0.0** Watts  
Schedule ..... **None**

#### 3. Walls, Windows, Doors:

Exp.	Wall Gross Area (ft <sup>2</sup> )	Window 1 Qty.	Window 2 Qty.	Door 1 Qty.
NNE	252.0	0	0	0
ESE	300.0	0	0	0

##### 3.1. Construction Types for Exposure NNE

Wall Type ..... **Corrugated Siding + drywall**

##### 3.2. Construction Types for Exposure ESE

Wall Type ..... **Corrugated Siding + drywall**

#### 4. Roofs, Skylights:

Exp.	Roof Gross Area (ft <sup>2</sup> )	Roof Slope (deg.)	Skylight Qty.
H	500.0	0	0

##### 4.1. Construction Types for Exposure H

Roof Type ..... **Roof Assembly**

#### 5. Infiltration:

Design Cooling ..... **0.00** CFM  
Design Heating ..... **0.00** CFM  
Energy Analysis ..... **0.00** CFM

Infiltration occurs only when the fan is off.

#### 6. Floors:

Type ..... **Floor Above Conditioned Space**  
**(No additional input required for this floor type).**

#### 7. Partitions:

**(No partition data).**

#### 2.4. People:

Occupancy ..... **0.0** Person  
Activity Level ..... **Office Work**  
Sensible ..... **245.0** BTU/hr/person  
Latent ..... **205.0** BTU/hr/person  
Schedule ..... **None**

#### 2.5. Miscellaneous Loads:

Sensible ..... **0** BTU/hr  
Schedule ..... **None**  
Latent ..... **0** BTU/hr  
Schedule ..... **None**

## Space Input Data

LM\_B49\_HVAC control upgrade  
The Fowler Company

05/12/2014  
06:03AM

### 5th work area

#### 1. General Details:

Floor Area ..... 1270.0 ft<sup>2</sup>  
Avg. Ceiling Height ..... 9.0 ft  
Building Weight ..... 120.0 lb/ft<sup>2</sup>

#### 1.1. OA Ventilation Requirements:

Space Usage ..... User-Defined  
OA Requirement 1 ..... 10 % of supply air  
OA Requirement 2 ..... 0.00 CFM/ft<sup>2</sup>  
Space Usage Defaults ..... ASHRAE Standard 62-2001

#### 2. Internals:

##### 2.1. Overhead Lighting:

Fixture Type ..... Recessed (Unvented)  
Wattage ..... 1.50 W/ft<sup>2</sup>  
Ballast Multiplier ..... 1.00  
Schedule ..... 90.1 Office Lights/Elec

##### 2.2. Task Lighting:

Wattage ..... 0.00 W/ft<sup>2</sup>  
Schedule ..... None

##### 2.3. Electrical Equipment:

Wattage ..... 1.00 W/ft<sup>2</sup>  
Schedule ..... 90.1 Office Lights/Elec

#### 3. Walls, Windows, Doors:

Exp.	Wall Gross Area (ft <sup>2</sup> )	Window 1 Qty.	Window 2 Qty.	Door 1 Qty.
WNW	300.0	0	0	0
ESE	300.0	0	0	0

##### 3.1. Construction Types for Exposure WNW

Wall Type ..... Corrugated Siding + drywall

##### 3.2. Construction Types for Exposure ESE

Wall Type ..... Corrugated Siding + drywall

#### 4. Roofs, Skylights:

Exp.	Roof Gross Area (ft <sup>2</sup> )	Roof Slope (deg.)	Skylight Qty.
H	1270.0	0	0

##### 4.1. Construction Types for Exposure H

Roof Type ..... Roof Assembly

#### 5. Infiltration:

Design Cooling ..... 0.00 CFM  
Design Heating ..... 0.00 CFM  
Energy Analysis ..... 0.00 CFM

Infiltration occurs only when the fan is off.

#### 6. Floors:

Type ..... Floor Above Conditioned Space  
(No additional input required for this floor type).

#### 7. Partitions:

##### 7.1. 1st Partition Details:

Partition Type ..... Wall Partition  
Area ..... 1200.0 ft<sup>2</sup>  
U-Value ..... 0.085 BTU/(hr-ft<sup>2</sup>-°F)  
Uncondit. Space Max Temp ..... 95.0 °F  
Ambient at Space Max Temp ..... 90.0 °F  
Uncondit. Space Min Temp ..... 70.0 °F  
Ambient at Space Min Temp ..... 55.0 °F

##### 2.4. People:

Occupancy ..... 200.00 ft<sup>2</sup>/person  
Activity Level ..... Office Work  
Sensible ..... 245.0 BTU/hr/person  
Latent ..... 205.0 BTU/hr/person  
Schedule ..... Conference Area Occupants

##### 2.5. Miscellaneous Loads:

Sensible ..... 0 BTU/hr  
Schedule ..... None  
Latent ..... 0 BTU/hr  
Schedule ..... None

**Mercantile Customer Project Commitment Agreement**  
**Cash Rebate Option**

**THIS MERCANTILE CUSTOMER PROJECT COMMITMENT AGREEMENT** ("Agreement") is made and entered into by and between Ohio Edison Company, its successors and assigns (hereinafter called the "Company") and VALLEY ASSOCIATION CORP, Taxpayer ID No. 34-1617798 its permitted successors and assigns (hereinafter called the "Customer") (collectively the "Parties" or individually the "Party") and is effective on the date last executed by the Parties as indicated below.

**WITNESSETH**

**WHEREAS**, the Company is an electric distribution utility and electric light company, as both of these terms are defined in R.C. § 4928.01(A); and

**WHEREAS**, Customer is a mercantile customer, as that term is defined in R.C. § 4928.01(A)(19), doing business within the Company's certified service territory; and

**WHEREAS**, R.C. § 4928.66 (the "Statute") requires the Company to meet certain energy efficiency and peak demand reduction ("EE&PDR") benchmarks; and

**WHEREAS**, when complying with certain EE&PDR benchmarks the Company may include the effects of mercantile customer-sited EE&PDR projects; and

**WHEREAS**, Customer has certain customer-sited demand reduction, demand response, or energy efficiency project(s) as set forth in attached Exhibit 1 (the "Customer Energy Project(s)") that it desires to commit to the Company for integration into the Company's Energy Efficiency & Peak Demand Reduction Program Portfolio Plan ("Company Plan") that the Company will implement in order to comply with the Statute; and

**WHEREAS**, the Customer, pursuant to the Public Utilities Commission of Ohio's ("Commission") September 15, 2010 Order in Case No. 10-834-EL-EEC, desires to pursue a cash rebate of some of the costs pertaining to its Customer Energy Project(s) ("Cash Rebate") and is committing the Customer Energy Project(s) as a result of such incentive.

**WHEREAS**, Customer's decision to commit its Customer Energy Project(s) to the Company for inclusion in the Company Plan has been reasonably encouraged by the possibility of a Cash Rebate.

**WHEREAS**, in consideration of, and upon receipt of, said cash rebate, Customer will commit the Customer Energy Project(s) to the Company and will comply with all other terms and conditions set forth herein.

**NOW THEREFORE**, in consideration of the mutual promises set forth herein, and for other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the parties, intending to be legally bound, do hereby agree as follows:

1. **Customer Energy Projects.** Customer hereby commits to the Company and Company accepts for integration into the Company Plan the Customer Energy Project(s) set forth on attached Exhibit 1. Said commitment shall be for the life of the Customer Energy Project(s). Company will incorporate said project(s) into the Company Plan to the extent that such projects qualify. In so committing, and as evidenced by the affidavit attached hereto as Exhibit A, Customer acknowledges that the information provided to the Company about the Customer Energy Project(s) is true and accurate to the best of its knowledge.

- a. By committing the Customer Energy Project(s) to the Company, Customer acknowledges and agrees that the Company shall control the use of the kWh and kW reductions resulting from said projects for purposes of complying with the Statute. By committing the Customer Energy Project(s), Customer has the ability to either:
- i. Take ownership of the Energy Efficiency resource credits resulting from their Customer Energy Project(s) and may be able to bid - or sell - the Energy Efficiency resource credits into the market operated by the grid operator, PJM Interconnection, Inc. (PJM), provided several prerequisites are met; or
  - ii. Allow the Company to take ownership of the Energy Efficiency resource credits associated with their Customer Energy Project(s). The Company shall, at its sole discretion, aggregate said capacity into the PJM market through an auction. Any proceeds from any such bids accepted by PJM will be used to offset the costs charged to the Customer and other of the Company's customers for compliance with state mandated energy efficiency and/or peak demand requirements.

**Please indicate your preference as to the treatment of your Energy Efficiency resource credits:**

☐ Customer would like to retain ownership of its Energy Efficiency resource credits.

☒ Customer assigns ownership of its Energy Efficiency resource credits to Company for purposes of bidding these credits into PJM.

- b. The Company acknowledges that some of Customer's Energy Projects contemplated in this paragraph may have been performed under certain other federal and/or state programs in which certain parameters are required to be maintained in order to retain preferential financing or other government benefits (individually and collectively, as appropriate, "Benefits"). In the event that the use of any such project by the Company in any way affects such Benefits, and upon written request from the Customer, Company will release said Customer's Energy Project(s) to the extent necessary for Customer to meet the prerequisites for such Benefits. Customer acknowledges that such release (i) may affect Customer's cash rebate discussed in Article 3 below; and (ii) will not affect any of Customer's other requirements or obligations.
- c. Any future Customer Energy Project(s) committed by Customer shall be subject to a separate application and, upon approval by the Commission, said projects shall become part of this Agreement.
- d. Customer will provide Company or Company's agent(s) with reasonable assistance in the preparation of the Commission's standard joint application for approval of this Agreement ("Joint Application") that will be filed with the Commission, with such Joint Application being consistent with then current Commission requirements.
- e. Upon written request and reasonable advance notice, Customer will grant employees or authorized agents of either the Company or the Commission reasonable, pre-arranged access to the Customer Energy Project(s) for purposes of measuring and verifying energy savings and/or peak demand reductions resulting from the Customer Energy Project(s). It is expressly agreed that consultants of either the Company or the Commission are their respective authorized agents.
2. **Joint Application to the Commission.** The Parties will submit the Joint Application using the Commission's standard "Application to Commit Energy Efficiency/Peak Demand Reduction Programs" ("Joint Application") in which they will seek the Commission's approval of (i) this

Agreement: (ii) the commitment of the Customer Energy Project(s) for inclusion in the Company Plan; and (iii) the Customer's Cash Rebate.

The Joint Application shall include all information as set forth in the Commission's standard form which, includes without limitation:

- i. A narrative description of the Customer Energy Project(s), including but not limited to, make, model and year of any installed and/or replaced equipment;
- ii. A copy of this Agreement; and
- iii. A description of all methodologies, protocols, and practices used or proposed to be used in measuring and verifying program results.

3. **Customer Cash Rebate.** Upon Commission approval of the Joint Application, Customer shall provide Company with a W-9 tax form, which shall at a minimum include Customer's tax identification number. Within the greater of 90 days of the Commission's approval of the Joint Application or the completion of the Customer Energy Project, the Company will issue to the Customer the Cash Rebate in the amount set forth in the Commission's Finding and Order approving the Joint Application.

- a. Customer acknowledges: i) that the Company will cap the Cash Rebate at the lesser of 50% of Customer Energy Project(s) costs or \$250,000; ii) the maximum rebate that the Customer may receive per year is \$500,000 per Taxpayer Identification Number per utility service territory; and iii) if the Customer Energy Project qualifies for a rebate program approved by the Commission and offered by the Company, Customer may still elect to file such project under the Company's mercantile customer self direct program, however the Cash Rebate that will be paid shall be discounted by 25%; and
- b. Customer acknowledges that breaches of this Agreement, include, but are not limited to:
  - i. Customer's failure to comply with the terms and conditions set forth in the Agreement, or its equivalent, within a reasonable period of time after receipt of written notice of such non-compliance;
  - ii. Customer knowingly falsifying any documents provided to the Company or the Commission in connection with this Agreement or the Joint Application.
- c. In the event of a breach of this Agreement by the Customer, Customer agrees and acknowledges that it will repay to the Company, within 90 days of receipt of written notice of said breach, the full amount of the Cash Rebate paid under this Agreement. This remedy is in addition to any and all other remedies available to the Company by law or equity.

4. **Termination of Agreement.** This Agreement shall automatically terminate:

- a. If the Commission fails to approve the Joint Agreement;
- b. Upon order of the Commission; or
- c. At the end of the life of the last Customer Energy Project subject to this Agreement.

Customer shall also have an option to terminate this Agreement should the Commission not approve the Customer's Cash Rebate, provided that Customer provides the Company with written



notice of such termination within ten days of either the Commission issuing a final appealable order or the Ohio Supreme Court issuing its opinion should the matter be appealed.

5. **Confidentiality.** Each Party shall hold in confidence and not release or disclose to any person any document or information furnished by the other Party in connection with this Agreement that is designated as confidential and proprietary ("Confidential Information"), unless: (i) compelled to disclose such document or information by judicial, regulatory or administrative process or other provisions of law; (ii) such document or information is generally available to the public; or (iii) such document or information was available to the receiving Party on a non-confidential basis at the time of disclosure.
  - a. Notwithstanding the above, a Party may disclose to its employees, directors, attorneys, consultants and agents all documents and information furnished by the other Party in connection with this Agreement, provided that such employees, directors, attorneys, consultants and agents have been advised of the confidential nature of this information and through such disclosure are deemed to be bound by the terms set forth herein.
  - b. A Party receiving such Confidential Information shall protect it with the same standard of care as its own confidential or proprietary information.
  - c. A Party receiving notice or otherwise concluding that Confidential Information furnished by the other Party in connection with this Agreement is being sought under any provision of law, to the extent it is permitted to do so under any applicable law, shall endeavor to: (i) promptly notify the other Party; and (ii) use reasonable efforts in cooperation with the other Party to seek confidential treatment of such Confidential Information, including without limitation, the filing of such information under a valid protective order.
  - d. By executing this Agreement, Customer hereby acknowledges and agrees that Company may disclose to the Commission or its Staff any and all Customer information, including Confidential Information, related to a Customer Energy Project, provided that Company uses reasonable efforts to seek confidential treatment of the same.
6. **Taxes.** Customer shall be responsible for all tax consequences (if any) arising from the payment of the Cash Rebate.
7. **Notices.** Unless otherwise stated herein, all notices, demands or requests required or permitted under this Agreement must be in writing and must be delivered or sent by overnight express mail, courier service, electronic mail or facsimile transmission addressed as follows:

**If to the Company:**

FirstEnergy Service Company  
76 South Main Street  
Akron, OH 44308  
Attn: Victoria Nofziger  
Telephone: 330-384-4684  
Fax: 330-761-4281  
Email: [vmnofziger@firstenergycorp.com](mailto:vmnofziger@firstenergycorp.com)

**If to the Customer:**

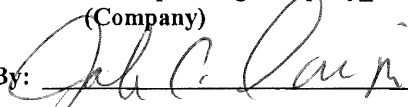
VALLEY ASSOCIATION CORP  
4020 KINROSS LAKES PARKWAY  
RICHFIELD, OH 44286  
Attn: JAMIE CHUPA  
Telephone: 330-659-4060x1505  
Fax: 330-659-3237  
Email: [JCHUPA@IRGRA.COM](mailto:JCHUPA@IRGRA.COM)

or to such other person at such other address as a Party may designate by like notice to the other Party. Notice received after the close of the business day will be deemed received on the next business day; provided that notice by facsimile transmission will be deemed to have been received by the recipient if the recipient confirms receipt telephonically or in writing.

8. **Authority to Act.** The Parties represent and warrant that they are represented by counsel in connection with this Agreement, have been fully advised in connection with the execution thereof, have taken all legal and corporate steps necessary to enter into this Agreement, and that the undersigned has the authority to enter into this Agreement, to bind the Parties to all provisions herein and to take the actions required to be performed in fulfillment of the undertakings contained herein.
9. **Non-Waiver.** The delay or failure of either party to assert or enforce in any instance strict performance of any of the terms of this Agreement or to exercise any rights hereunder conferred, shall not be construed as a waiver or relinquishment to any extent of its rights to assert or rely upon such terms or rights at any later time or on any future occasion.
10. **Entire Agreement.** This Agreement, along with related exhibits, and the Company's Rider DSE, or its equivalent, as amended from time to time by the Commission, contains the Parties' entire understanding with respect to the matters addressed herein and there are no verbal or collateral representations, undertakings, or agreements not expressly set forth herein. No change in, addition to, or waiver of the terms of this Agreement shall be binding upon any of the Parties unless the same is set forth in writing and signed by an authorized representative of each of the Parties. In the event of any conflict between Rider DSE or its equivalent and this document, the latter shall prevail.
11. **Assignment.** Customer may not assign any of its rights or obligations under this Agreement without obtaining the prior written consent of the Company, which consent will not be unreasonably withheld. No assignment of this Agreement will relieve the assigning Party of any of its obligations under this Agreement until such obligations have been assumed by the assignee and all necessary consents have been obtained.
12. **Severability.** If any portion of this Agreement is held invalid, the Parties agree that such invalidity shall not affect the validity of the remaining portions of this Agreement, and the Parties further agree to substitute for the invalid portion a valid provision that most closely approximates the economic effect and intent of the invalid provision.
13. **Governing Law.** This Agreement shall be governed by the laws and regulations of the State of Ohio, without regard to its conflict of law provisions.
14. **Execution and Counterparts.** This Agreement may be executed in multiple counterparts, which taken together shall constitute an original without the necessity of all parties signing the same page or the same documents, and may be executed by signatures to electronically or telephonically transmitted counterparts in lieu of original printed or photocopied documents. Signatures transmitted by facsimile shall be considered original signatures.

IN WITNESS WHEREOF, the Parties hereto have caused this Agreement to be executed by their duly authorized officers or representatives as of the day and year set forth below.

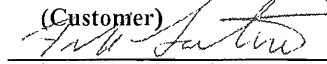
Please Select Operating Company\_  
(Company)

By: 

Title: V.P. Of Energy Efficiency

Date: 6-6-14

VALLEY ASSOCIATION CORP\_  
(Customer)

By:   
Frank Lerman

Title: Managing Agent

Date: 6/2/14

Affidavit of VALLEY ASSOCIATION CORP – Exhibit \_A\_

STATE OF OHIO                                 )  
  )         SS:  
COUNTY OF SUMMIT    )

I, FRANK LANTERMAN, being first duly sworn in accordance with law, deposes and states as follows:

1. I am the REPRESENTATIVE of VALLEY ASSOCIATION CORP (“Customer”) As part of my duties, I oversee energy related matters for the Customer.
2. The Customer has agreed to commit certain energy efficiency projects to Ohio Edison Company (“Company”), which are the subject of the agreement to which this affidavit is attached (“Project(s”).
3. In exchange for making such a commitment, the Company has agreed to provide Customer with Cash (“Incentive”). This Incentive was a critical factor in the Customer’s decision to go forward with the Project(s) and to commit the Project(s) to the Company.
4. All information related to said Project(s) that has been submitted to the Company is true and accurate to the best of my knowledge.

FURTHER AFFIANT SAYETH NAUGHT.



Sworn to before me and subscribed in my presence this 22<sup>nd</sup> day of June, 2014

  
Notary



GAIL T. MODZELEWSKI  
Notary Public  
State of Ohio  
Lake County  
My Commission Expires  
September 14, 2018

**This foregoing document was electronically filed with the Public Utilities**

**Commission of Ohio Docketing Information System on**

**7/14/2014 2:22:09 PM**

**in**

**Case No(s). 14-0430-EL-EEC**

Summary: Application to Commit Energy Efficiency/Peak Demand Reduction Programs of Ohio Edison Company and Valley Association Corporation electronically filed by Ms. Jennifer M. Sybyl on behalf of Ohio Edison Company and Valley Association Corporation