Ohio Public Utilities Commission

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

Case No.: 13-0432 **-EL-EEC**

Mercantile Customer: Alliance City Schools

Electric Utility: **Ohio Edison Company**

Program Title or Description: House Bill 264 Renovations

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 (Option 1) 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 (Option 2) will also qualify for the 60-day automatic approval so long as the exemption period does not exceed 24 months. Rider exemptions for periods of more than 24 months will be reviewed by the Commission Staff and are only approved up the issuance of a Commission order.

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 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.

Section 1: Mercantile Customer Information

Name:Alliance City Schools

Principal address:200 Glamorgan Street Alliance, OH 44601

Address of facility for which this energy efficiency program applies:See Exhibit 1

Name and telephone number for responses to questions:Dan Dumond 614-949-5203

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 equipment that needed to be replaced 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):

2/13/2012.

☐ 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: _____ kWh

2) If you checked the box indicating that the customer installed new equipment to replace equipment that needed to be replaced, then calculate the annual savings [(kWh used by less efficient new equipment) – (kWh used by the higher efficiency new equipment) = (kWh per year saved)]. Please attach your calculations and record the results below:

Annual savings: _____ 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 less efficient new equipment) – (kWh used by higher efficiency new equipment) = (kWh per year saved)]. Please attach your calculations and record the results below:

Annual savings: 556,826 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.

Section 4: Demand Reduction/Demand Response Programs

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

☐ 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?

_____

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

_____ kW

Section 5: Request for Cash Rebate Reasonable Arrangement (Option 1) or Exemption from Rider (Option 2)

Under this section, check the box that applies and fill in all blanks relating to that choice.

Note: If Option 2 is selected, the application will not qualify for the 60-day automatic approval. All applications, however, will be considered on a timely basis by the Commission.

A) The customer is applying for:

☒ Option 1: A cash rebate reasonable arrangement.

OR

☐ Option 2: An exemption from the energy efficiency cost recovery mechanism implemented by the electric utility.

OR

☐ Commitment payment

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

Option 1: A cash rebate reasonable arrangement, which is the lesser of (show both amounts):

☒ A cash rebate of $33,172. (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.)

Option 2: 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.)

OR

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

OR

☐ 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 24 month period, the customer will need to provide a future application establishing additional energy savings and the continuance of the organization's energy efficiency program.)

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.

Ohio | Public Utilities Commission

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

Case No.: 13-0432 -EL-EEC

State of Ohio :

Kirk A. Heath, Affiant, being duly sworn according to law, deposes and says that:

1. I am the duly authorized representative of:

   Alliance City Schools
   [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.

Kirk A. Heath Treasurer
Signature of Affiant & Title

Sworn and subscribed before me this 12th day of OCTOBER, 2012 Month/Year

Mary Pat J. Reynolds
Signature of official administering oath

Mary Pat J. Reynolds
Print Name and Title

My commission expires on 10-19-13

NOTARIAL SEAL STATE OF OHIO

MARY PAT J. REYNOLDS
NOTARY PUBLIC - OHIO
MY COMMISSION EXPIRES 10-19-13

Docket Number	Customer Number	Site Name	Address	City	State	Zip	Utility	Total Project Cost	Saved Early kWh	Saved New kWh	Saved Early kW	Saved New kW	Eligible Rebate Amount
13-0432	08037523620000193944	Alliance Early Learning	285 Oxford Street	Alliance	OH	44601	OE	$91,273.00	0	50,116	0	0	$3,007
13-0432	08037523620000195021	Alliance High School	400 Glamorgan Street	Alliance	OH	44601	OE	$827,191.44	0	296,941	0	0	$17,578
13-0432	08037523620001527564	Alliance Middle School	3205 S Union Ave	Alliance	OH	44601	OE	$216,276.48	0	72,176	0	0	$4,331
13-0432	08037523620001533958	Alliance Northside	701 Johnson Ave	Alliance	OH	44601	OE	$105,464.16	0	32,803	0	0	$1,968
13-0432	08037523620000193465	Allliance Parkway	1490 Parkway Blvd	Alliance	OH	44601	OE	$96,583.31	0	50,117	0	0	$3,007
13-0432	08037523620001563983	Alliance Rockhill	2400 S Rockhill Ave	Alliance	OH	44601	OE	$94,387.00	0	54,673	0	0	$3,281
							Totals	$1,431,175.39	0	556,826	0	0	$33,172

Exhibit 1

Customer Legal Entity Name: Alliance City Schools

Site Address: Alliance City Schools Early Learning School
Principal Address: 285 Oxford Street

Project No.	Project 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 project 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 rejected in favor of the more efficient new equipment.
1	Installation of dynamic filters and bypass system on classroom ventilator and airhandlers	This projects includes the installation of dynamic filters and bypass systems along with new CO2 detection strategies to reduce outside air usage and hvac equipment usage, along with new DDC controls for the air handlers to reduce outdoor air usage.	Data was gathered from attachment E, supplementary calculations were done in attacchment F, and the results were entered into the custom rebate calcualtor to determine rebate.	N/A	The alternative was to use standard filters with no changes to the controls using more outdoor air.

Docket No. 13-0432
Site: 285 Oxford Street

Exhibit 2

Customer Legal Entity Name: Alliance City Schools
Site Address: Alliance City Schools Early Learning School
Principal Address: 285 Oxford Street

	Unadjusted Usage, kwh (A)	Weather Adjusted Usage, kwh (B)	Weather Adjusted Usage with Energy Efficiency Addbacks, kwh (c) *Note 1*
2011	390,640	390,640	390,640
Average	**390,640**	**390,640**	**390,640**

Project Number	Project Name	In-Service Date	Project Cost $	50% of Project Cost $	KWh Saved/Year (D) counting towards utility compliance	KWh Saved/Year (E) eligible for incentive	Utility Peak Demand Reduction Contribution, KW (F)	Prescriptive Rebate Amount (G) $	Eligible Rebate Amount (H) $ *Note 2*	Commitment Payment $
1	Installation of dynamic filters and bypass system on classroom ventilator and airhandlers	02/13/2012	$91,273	$45,637	50,116	50,116	-	$4,009	$3,007	
					-	-	-			
					-	-	-			
					-	-	-			
					-	-	-			
					-	-	-			
					-	-	-			
		Total	**$91,273**		**50,116**	**50,116**	**0**	**$4,009**	**$3,007**	**$0**

Docket No. 13-0432
Site: 285 Oxford Street

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 (A)	Utility Avoided Cost $/MWh (B)	Utility Avoided Cost $ (C)	Utility Cost $ (D)	Cash Rebate $ (E)	Administrator Variable Fee $ (F)	Total Utility Cost $ (G)	UCT (H)
1	50	$ 308	$ 15,450	$ 4,050	$3,007	$501	$ 7,558	**2.0**
Total	**50**	**$ 308**	**15,450**	**4,050**	**$3,007**	**$501**	**7,558**	**2.0**

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)

Alliance City Schools ~ Alliance City Schools Early Learning Schoo
Docket No. 13-0432

Site: 285 Oxford Street

Exhibit 1

Customer Legal Entity Name: Alliance City Schools

Site Address: Alliance City Schools High School
Principal Address: 400 Galmorgan Street

Project No.	Project 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 project 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 rejected in favor of the more efficient new equipment.
1	Lighting Occupancy Sensors	This project includes the installation of new occupancy sensors to control lights through the building.	Data was gathered from attachment A and entered into attachment B. Resulting data was entered into the lighting rebate calculator to determine savings and rebate.	N/A	N/A
2	Instllation of dynamic filters and bypass system on classroom ventilator and airhandlers	This projects includes the installation of dynamic filters and bypass systems along with new CO2 detection strategies to reduce outside air usage and hvac equipment usage.	Data was gathered from attachment C, supplementary calculations were made on attachment D and savings data was entered into the custom rebate calcualtor to determine rebate.	N/A	N/A

Docket No. 13-0432
Site: 400 Galmorgan Street

Exhibit 2

Customer Legal Entity Name: Alliance City Schools
Site Address: Alliance City Schools High School
Principal Address: 400 Galmorgan Street

	Unadjusted Usage, kwh (A)	Weather Adjusted Usage, kwh (B)	Weather Adjusted Usage with Energy Efficiency Addbacks, kwh (c) *Note 1*
2011	2,711,400	2,711,400	2,711,400
Average	**2,711,400**	**2,711,400**	**2,711,400**

Project Number	Project Name	In-Service Date	Project Cost $	50% of Project Cost $	KWh Saved/Year (D) counting towards utility compliance	KWh Saved/Year (E) eligible for incentive	Utility Peak Demand Reduction Contribution, KW (F)	Prescriptive Rebate Amount (G) $	Eligible Rebate Amount (H) $ *Note 2*	Commitment Payment $
1	Lighting Occupancy Sensors	02/13/2012	$422,186	$211,093	69,922	69,922	-	$5,275	$3,956	
2	Instllation of dynamic filters and bypass system on classroom ventilator and airhandlers	02/13/2012	$405,005	$202,503	227,019	227,019	-	$18,162	$13,622	
					-	-	-			
					-	-	-			
					-	-	-			
					-	-	-			
					-	-	-			
		Total	$827,191		296,941	296,941	0	$23,437	$17,578	$0

Docket No. 13-0432
Site: 400 Galmorgan Street

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 (A)	Utility Avoided Cost $/MWh (B)	Utility Avoided Cost $ (C)	Utility Cost $ (D)	Cash Rebate $ (E)	Administrator Variable Fee $ (F)	Total Utility Cost $ (G)	UCT (H)
1	70	$ 308	$ 21,556	$ 2,025	$3,956	$699	$ 6,680	**3.2**
2	227	$ 308	$ 69,985	$ 2,025	$13,622	$2,270	$ 17,917	**3.91**
Total	**297**	**$ 308**	**91,541**	**4,050**	**$17,578**	**$2,969**	**24,597**	**3.7**

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)

Alliance City Schools ~ Alliance City Schools High Schoo
Docket No. 13-0432

Site: 400 Galmorgan Street

Exhibit 1

Customer Legal Entity Name: Alliance City Schools

Site Address: Alliance City Schools Middle School
Principal Address: 3205 S Union Ave

Project No.	Project 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 project 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 rejected in favor of the more efficient new equipment.
1	Installation of dynamic filters and bypass system on classroom ventilators and airhandlers	This projects includes the installation of dynamic filters and bypass systems along with new CO2 detection strategies to reduce outside air usage and hvac equipment usage, along with new DDC controls for the air handlers to reduce outdoor air usage.	Data was gathered from attachment G, supplementary calculations were done in attachment H, and the results were entered into the custom rebate calcualtor to determine rebate.	N/A	The alterntaive was to use standard filters with no changes to the controls using more outdoor air.

Docket No. 13-0432
Site: 3205 S Union Ave

Exhibit 2

Customer Legal Entity Name: Alliance City Schools
Site Address: Alliance City Schools Middle School
Principal Address: 3205 S Union Ave

	Unadjusted Usage, kwh (A)	Weather Adjusted Usage, kwh (B)	Weather Adjusted Usage with Energy Efficiency Addbacks, kwh (c) *Note 1*
2011	1,281,280	1,281,280	1,281,280
Average	**1,281,280**	**1,281,280**	**1,281,280**

Project Number	Project Name	In-Service Date	Project Cost $	50% of Project Cost $	KWh Saved/Year (D) counting towards utility compliance	KWh Saved/Year (E) eligible for incentive	Utility Peak Demand Reduction Contribution, KW (F)	Prescriptive Rebate Amount (G) $	Eligible Rebate Amount (H) $ *Note 2*	Commitment Payment $
1	Installation of dynamic filters and bypass system on classroom ventilators and airhandlers	02/13/2012	$216,276	$108,138	72,176	72,176	-	$5,774	$4,331	
					-	-	-			
					-	-	-			
					-	-	-			
					-	-	-			
					-	-	-			
					-	-	-			
		Total	**$216,276**		**72,176**	**72,176**	**0**	**$5,774**	**$4,331**	**$0**

Docket No. 13-0432
Site: 3205 S Union Ave

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 (A)	Utility Avoided Cost $/MWh (B)	Utility Avoided Cost $ (C)	Utility Cost $ (D)	Cash Rebate $ (E)	Administrator Variable Fee $ (F)	Total Utility Cost $ (G)	UCT (H)
1	72	$ 308	$ 22,250	$ 4,050	$4,331	$722	$ 9,102	**2.4**
Total	**72**	**$ 308**	**22,250**	**4,050**	**$4,331**	**$722**	**9,102**	**2.4**

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)

Alliance City Schools ~ Alliance City Schools Middle School
Docket No. 13-0432

Site: 3205 S Union Ave

Exhibit 1

Customer Legal Entity Name: Alliance City Schools

Site Address: Alliance City Schools Northside
Principal Address: 701 Johnson Ave

Project No.	Project 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 project 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 rejected in favor of the more efficient new equipment.
1	Installation of dynamic filters and bypass system on classroom ventilators and airhandlers	This projects includes the installation of dynamic filters and bypass systems along with new CO2 detection strategies to reduce outside air usage and hvac equipment usage, along with new DDC controls for the air handlers to reduce outdoor air usage.	Data was gathered from attachment I, supplementary calculations were done in attachment J, and the results were entered into the custom rebate calcualtor to determine rebate.	N/A	The alterntaive was to use standard filters with no changes to the controls using more outdoor air.

Docket No. 13-0432
Site: 701 Johnson Ave

Exhibit 2

Customer Legal Entity Name: Alliance City Schools
Site Address: Alliance City Schools Northside
Principal Address: 701 Johnson Ave

	Unadjusted Usage, kwh (A)	Weather Adjusted Usage, kwh (B)	Weather Adjusted Usage with Energy Efficiency Addbacks, kwh (c) *Note 1*
2011	660,270	660,270	660,270
Average	**660,270**	**660,270**	**660,270**

Project Number	Project Name	In-Service Date	Project Cost $	50% of Project Cost $	KWh Saved/Year (D) counting towards utility compliance	KWh Saved/Year (E) eligible for incentive	Utility Peak Demand Reduction Contribution, KW (F)	Prescriptive Rebate Amount (G) $	Eligible Rebate Amount (H) $ *Note 2*	Commitment Payment $
1	Installation of dynamic filters and bypass system on classroom ventilators and airhandlers	02/13/2012	$105,464	$52,732	32,803	32,803	-	$2,624	$1,968	
					-	-	-			
					-	-	-			
					-	-	-			
					-	-	-			
					-	-	-			
					-	-	-			
		Total	**$105,464**		**32,803**	**32,803**	**0**	**$2,624**	**$1,968**	**$0**

Docket No. 13-0432
Site: 701 Johnson Ave

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 (A)	Utility Avoided Cost $/MWh (B)	Utility Avoided Cost $ (C)	Utility Cost $ (D)	Cash Rebate $ (E)	Administrator Variable Fee $ (F)	Total Utility Cost $ (G)	UCT (H)
1	33	$ 308	$ 10,113	$ 4,050	$1,968	$328	$ 6,346	**1.6**
Total	**33**	**$ 308**	**10,113**	**4,050**	**$1,968**	**$328**	**6,346**	**1.6**

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)

Alliance City Schools ~ Alliance City Schools Northside
Docket No. 13-0432

Site: 701 Johnson Ave

Exhibit 1

Customer Legal Entity Name: Alliance City Schools

Site Address: Alliance City Schools Parkway
Principal Address: 1490 Parkway Blvd

Project No.	Project 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 project 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 rejected in favor of the more efficient new equipment.
1	Installation of dynamic filters and bypass system on classroom ventilators and airhandlers	This projects includes the installation of dynamic filters and bypass systems along with new CO2 detection strategies to reduce outside air usage and hvac equipment usage, along with new DDC controls for the air handlers to reduce outdoor air usage.	Data was gathered from attachment K, supplementary calculations were done in attachment L, and the results were entered into the custom rebate calcualtor to determine rebate.	N/A	The alterntaive was to use standard filters with no changes to the controls using more outdoor air.

Docket No. 13-0432
Site: 1490 Parkway Blvd

Exhibit 2

Customer Legal Entity Name: Alliance City Schools
Site Address: Alliance City Schools Parkway
Principal Address: 1490 Parkway Blvd

	Unadjusted Usage, kwh (A)	Weather Adjusted Usage, kwh (B)	Weather Adjusted Usage with Energy Efficiency Addbacks, kwh (c) *Note 1*
2011	511,520	511,520	511,520
Average	**511,520**	**511,520**	**511,520**

Project Number	Project Name	In-Service Date	Project Cost $	50% of Project Cost $	KWh Saved/Year (D) counting towards utility compliance	KWh Saved/Year (E) eligible for incentive	Utility Peak Demand Reduction Contribution, KW (F)	Prescriptive Rebate Amount (G) $	Eligible Rebate Amount (H) $ *Note 2*	Commitment Payment $
1	Installation of dynamic filters and bypass system on classroom ventilators and airhandlers	02/13/2012	$96,583	$48,292	50,117	50,117	-	$4,009	$3,007	
					-	-	-			
					-	-	-			
					-	-	-			
					-	-	-			
					-	-	-			
					-	-	-			
		Total	**$96,583**		**50,117**	**50,117**	**0**	**$4,009**	**$3,007**	**$0**

Docket No. 13-0432
Site: 1490 Parkway Blvd

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 (A)	Utility Avoided Cost $/MWh (B)	Utility Avoided Cost $ (C)	Utility Cost $ (D)	Cash Rebate $ (E)	Administrator Variable Fee $ (F)	Total Utility Cost $ (G)	UCT (H)
1	50	$ 308	$ 15,450	$ 4,050	$3,007	$501	$ 7,558	**2.0**
Total	**50**	**$ 308**	**15,450**	**4,050**	**$3,007**	**$501**	**7,558**	**2.0**

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)

Alliance City Schools ~ Alliance City Schools Parkway
Docket No. 13-0432

Site: 1490 Parkway Blvd

Exhibit 1

Customer Legal Entity Name: Alliance City Schools

Site Address: Alliance City Schools Rockhill
Principal Address: 2400 S Rockhill Ave

Project No.	Project 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 project 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 rejected in favor of the more efficient new equipment.
1	Installation of dynamic filters and bypass system on classroom ventilators and airhandlers	This projects includes the installation of dynamic filters and bypass systems along with new CO2 detection strategies to reduce outside air usage and hvac equipment usage, along with new DDC controls for the air handlers to reduce outdoor air usage.	Data was gathered from attachment M, supplementary calculations were done in attachment N, and the results were entered into the custom rebate calcualtor to determine rebate.	N/A	The alterntaive was to use standard filters with no changes to the controls using more outdoor air.

Docket No. 13-0432
Site: 2400 S Rockhill Ave

Exhibit 2

Customer Legal Entity Name: Alliance City Schools
Site Address: Alliance City Schools Rockhill
Principal Address: 2400 S Rockhill Ave

	Unadjusted Usage, kwh (A)	Weather Adjusted Usage, kwh (B)	Weather Adjusted Usage with Energy Efficiency Addbacks, kwh (c) *Note 1*
2011	654,840	654,840	654,840
Average	**654,840**	**654,840**	**654,840**

Project Number	Project Name	In-Service Date	Project Cost $	50% of Project Cost $	KWh Saved/Year (D) counting towards utility compliance	KWh Saved/Year (E) eligible for incentive	Utility Peak Demand Reduction Contribution, KW (F)	Prescriptive Rebate Amount (G) $	Eligible Rebate Amount (H) $ *Note 2*	Commitment Payment $
1	Installation of dynamic filters and bypass system on classroom ventilators and airhandlers	02/13/2012	$94,387	$47,194	54,673	54,673	-	$4,374	$3,281	
					-	-	-			
					-	-	-			
					-	-	-			
					-	-	-			
					-	-	-			
					-	-	-			
		Total	**$94,387**		**54,673**	**54,673**	**0**	**$4,374**	**$3,281**	**$0**

Docket No. 13-0432
Site: 2400 S Rockhill Ave

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 (A)	Utility Avoided Cost $/MWh (B)	Utility Avoided Cost $ (C)	Utility Cost $ (D)	Cash Rebate $ (E)	Administrator Variable Fee $ (F)	Total Utility Cost $ (G)	UCT (H)
1	55	$ 308	$ 16,855	$ 4,050	$3,281	$547	$ 7,877	**2.1**
Total	**55**	**$ 308**	**16,855**	**4,050**	**$3,281**	**$547**	**7,877**	**2.1**

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)

Alliance City Schools ~ Alliance City Schools Rockhil
Docket No. 13-0432

Site: 2400 S Rockhill Ave

For the Early Learning, Middle School, Northside, Parkway, and Rockhill facilities; projected savings from the installation of dynamic filters on a typical 10000 CFM air handler was calculated to be 8149 kWh. Total projected CFM per facility was calculated, and then typical savings were factored into this number to determine total annual savings for the facility as a whole. Additional cooling savings from DDC controls modification were added in afterwards to get total kWh saved.

For the High School facility; projected savings from the installation of dynamic filters on a typical 10000 CFM air handler was calculated to be 8149 kWh. Total projected CFM per facility was calculated, then typical savings were factored into this number to determine total annual savings for the facility as a whole. Additional cooling savings from the installation of CO2 detection systems on classroom unit ventilators was added in afterwards to get total kWh saved. The lighting controls savings were determined by using a lighting survey to determine total controlled load, then the data was entered into the utility provided rebate calculator to determine savings and rebate.

All figures used in the supporting calculations were gathered from the attached referenced supporting documentation.

Typical fan energy savings for an 10000 cfm AHU with Dynamic filters and heat wheel bypass

The installation of Dynamic air filters in each AHU will to reduce the amount of supply and return/relief fan horsepower required by the reduced air pressure drop when bypassing the heat wheel

Attachment E

Attachment E

Supply fan	
SF motor	15
BHP	11.8
TSP	4.3
@ new SP	3.5
bhp	9.5
diff	2.3
kw =	1.7158
hrs /yr	3120
kwh/saved	5353
savings	$525

Return Fan	
RF motor	15
BHP	5
TSP	1.75
@ new SP	0 75
bhp	2.6
diff	2.4
kw =	1.7904
hrs /yr	2120 less econimizer
kwh/saved	2796
savings	$274
total savings	$799
cost/cfm	$0.080 based on 10000 cfm

AHU Fan Savings Summary		
School	**AHU cfm**	**Savings**
High School	275800	$22,025
Middle	62000	$5,590
Northside	36000	$2,875
Parkway	55000	$4,392
Rockhill	60100	$4,800
Early Learning	55000	$4,392
Total		$44,075

Early Learning Center

The following data was utilized to calculate energy savings for various ECMs. Data was obtained from ASHRAE Weather data or school district personel.

Weather Data for Alliance, Ohio

Winter Design	6 Deg F	37 Deg F (average)
Summer Design	89 Deg (Db)	
	73 Deg (Wb)	

The outdoor air quantity will be controlled using dynamic reset in accordance with ASHRAE 62 by monitoring Co2 concentrations in the return air system of each air handler. In additional Dynanmic fiilters will be installed which act both a passive filter and polarized media air clearner.

Calculations

Btuh saved per year = CFM X Delta T between Outside air and space set point X Operational days per year X Operational Hours per day

Early Learning Center Air handler's DDC controls modification

Install Dynamic air passive filter/polarized filter media in each Unit ventilator to reduce the amount of outside air introduced using in addition to a Co2 detection strategy based on ASHRAE 62.1 "Ventilation for Acceptable Indoor Air Quality"

Cooling -Current

CFM	% of O. A	Delta T	EFLH		
55000 cfm	40%	25	1000	1,366,200,000 btuh/year	sensible
55000 cfm	40%	26	1000	224,400,000 btuh/year	latent
				1,590,600,000	
				133 tons	
				132,550 tons/yr	
				141,829 kwh/yr	

Cooling - revised to 55 Deg f

55000 cfm	12%	22	1000	1,306,800,000 btuh/year	sensible
55000 cfm	12%	16	1000	224,400,000 btuh/year	latent
				1,531,200,000	
				128 tons	
				127,600 tons/yr	
				136,532 kwh/yr	

Heating - Current

55000 cfm	40%	8	1000	594,000,000 btuh/year	
				743 mcf/yr	

Heating -Revised

55000 cfm	12%	2	1000	148,500,000 btuh/year	
				186 mcf/yr	

	Heating	**Mcf Savings**	**557 mcf/yr**	**$7.19 mcf**	**$4,004 year**
	Cooling	**Kwh Savings**	**5,297 kwh/yr**	**0.13 kwh**	**$689 year**
					$4,692 year
				Savings per cfm	$0.09 cfm

Attachment F

Calculated annual AHU kWh savings per 10000 CFM	8149
Total annual AHU CFM saved at facility	55000
Total annual kWh savings from AHU filters	44819.5
Additional annual savings from from vent filters	5297
Total annual kWh savings at facility	50116.5

Client:Alliance City Schools
Site:High School
Prepared By:Dan Dumond
Attachment A

plug smart™
intelligent energy solutions

Room By Room COMcheck Summary

Area (sq ft)	Allowed Wattage	Proposed Wattage	% Above/Below Code	Watts Saved
0	0	0	#DIV/0!	0

Hours of Operation	Electric Rate	kWh Saved	$ Saved
0	0	0	0

Whole Building COMcheck Summary

Building Type	COMcheck Rating
School	1.2

Area	Allowed Wattage	Proposed Wattage	% Above/Below Code	Watts Saved
0	0	100049	#DIV/0!	-100049

Hours of Operation	Electric Rate	kWh Saved	$ Saved
0	0	0	0

Occupancy Sensor Summary

Watts Controlled	OS>500W	OS<500W	OS Total
100049	99	112	211

Room Type	Area	COMcheck Rating	Allowed Wattage	Proposed Wattage
Audience	0	0.9	0	0
Classroom	0	1.4	0	0
Conference Room	0	1.3	0	0
Dining	0	0.9	0	0
Dorm Room	0	1.1	0	0
Exam/Treatment	0	1.5	0	0
Exercise Area	0	0.9	0	0
Food Prep	0	1.2	0	0
Gym	0	2.3	0	0
Hall	0	0.5	0	0
Laboratory	0	1.4	0	0
Laundry	0	0.6	0	0
Lobby	0	1.3	0	0
Locker	0	0.6	0	0
Lounge	0	1.2	0	0
Mail Sorting	0	1.2	0	0
Mech/Elec	0	1.5	0	0
Nurse	0	1	0	0
Office	0	1.1	0	0
Operating Room	0	2.2	0	0
Parking Garage	0	0.2	0	0
Patient Room	0	0.7	0	0
Pharmacy	0	1.2	0	0
Reading	0	1.2	0	0
Restroom	0	0.9	0	0
Sales Area	0	1.7	0	0
Stacks	0	1.7	0	0
Stairs	0	0.6	0	0
Storage	0	0.8	0	0
Workshop	0	1.9	0	0
Totals	**0**		**0**	**0**

Client:Alliance City Schools	Property of Plug Smart © 2012
Site:High School	Powers Worksheet
Prepared By:Dan Dumond	30 53 106 160 27
Attachment A	Fixture Type

Occupancy Controls	
Watts Controlled	OS>500W
640	1
160	0
160	0
160	0
160	0
160	0
320	0
106	0
480	0
0	0
424	0
742	1
1280	1
53	0
1200	1
1200	1
240	0
1200	1
480	0
1440	1
240	0
1200	1
0	0
1200	1
240	0
720	1
720	1
720	1
424	0
742	1
477	0
640	1
720	1
212	0
477	0
477	0
477	0
477	0
477	0
477	0
636	1
477	0
742	1
742	1
212	0
0	0
212	0
106	0
106	0
212	0
106	0
480	0
106	0
212	0
159	0
880	1
53	0
960	1
160	0
240	0
240	0
480	0
160	0
160	0
0	0
480	0
2560	2
80	0
160	0
2240	1
3520	3
80	0
320	0
160	0
106	0
720	1
320	0
160	0
160	0
160	0
2320	2
2080	2
160	0
400	0
159	0
0	0
480	0
318	0
960	1
880	1
960	1
640	1
80	0
212	0
212	0
212	0
212	0
212	0
212	0
80	0
160	0
640	1
960	1
160	0
960	1
640	2
742	2
0	0
640	1
480	0
720	1
720	1
720	1
720	1
720	1
720	1
720	1
1272	1
636	1
400	0
240	0
160	0
1908	4
1908	4
106	0
106	0
80	0
0	0
212	0
424	0
2438	3
424	0
1696	3
480	0
960	4
1760	2
320	0
160	0
320	0
2480	2
800	1
480	0
0	0
424	0
636	2
640	1
960	2
1520	1
160	0
960	1
960	1
424	0
530	2
0	0
800	1
160	0
960	1
1840	2
160	0
240	0
800	1
160	0
1920	2
800	1
480	0
160	0
640	1
960	1
53	0
106	0
106	0
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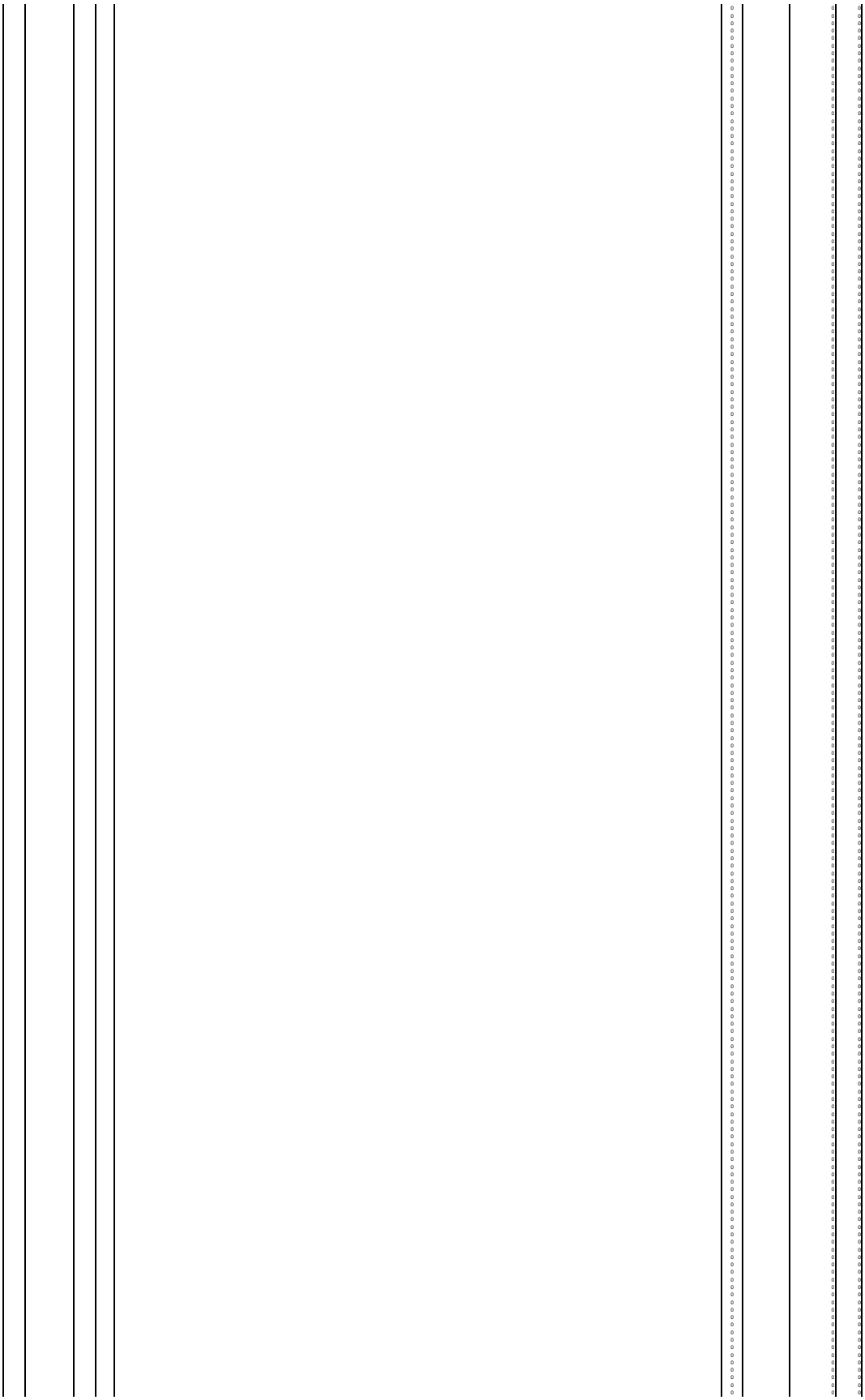
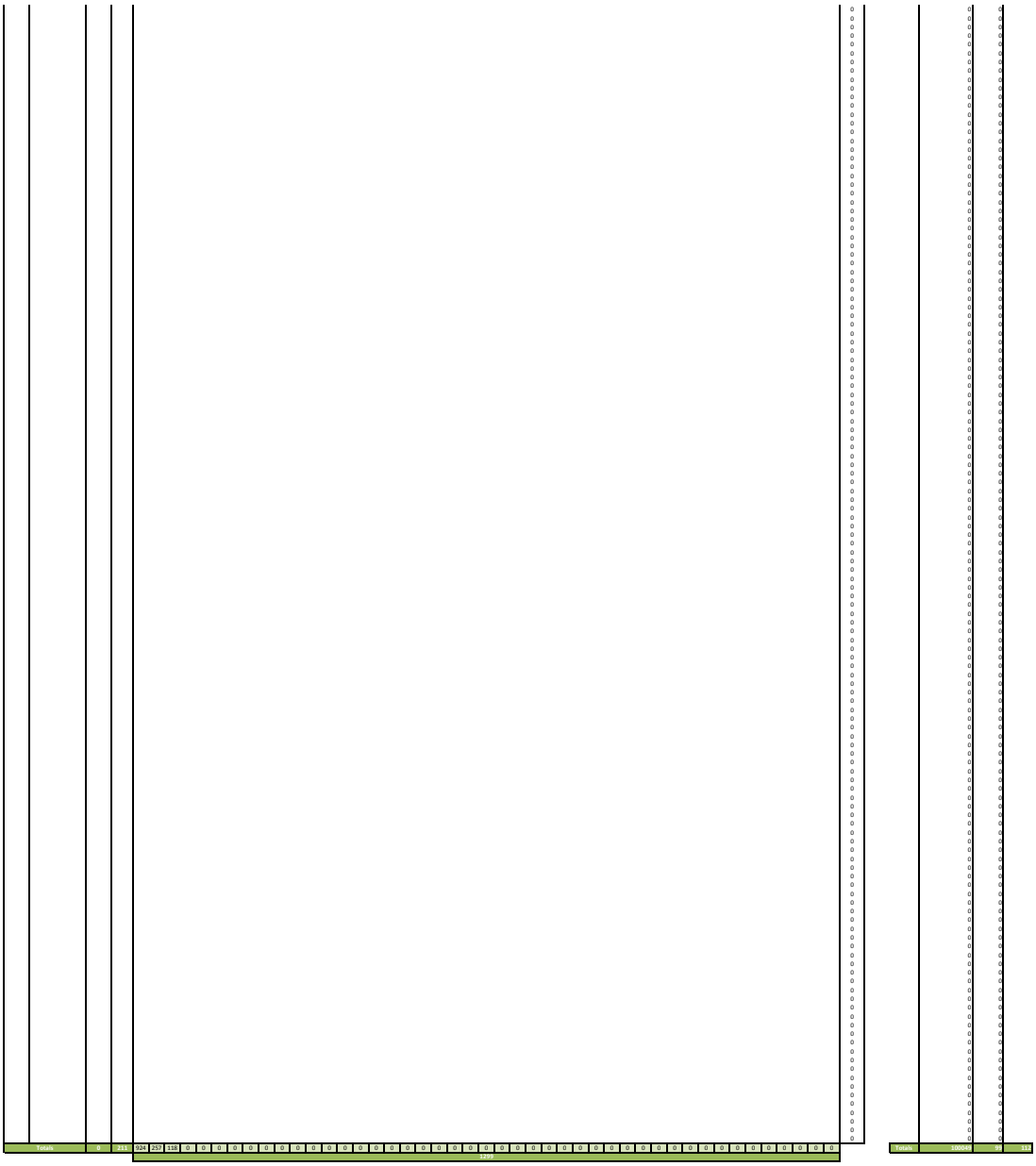
0	0

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	80	53	106	160	27	0	0	0	0	0	0
	3L	2L	4L	6L	1L	0	0	0	0	0	0
Audience	0	0	0	0	0	0	0	0	0	0	0
Classroom	0	0	0	0	0	0	0	0	0	0	0
Conference Room	0	0	0	0	0	0	0	0	0	0	0
Dining	0	0	0	0	0	0	0	0	0	0	0
Dorm Room	0	0	0	0	0	0	0	0	0	0	0
Exam/Treatment	0	0	0	0	0	0	0	0	0	0	0
Exercise Area	0	0	0	0	0	0	0	0	0	0	0
Food Prep	0	0	0	0	0	0	0	0	0	0	0
Gym	0	0	0	0	0	0	0	0	0	0	0
Hall	0	0	0	0	0	0	0	0	0	0	0
Laboratory	0	0	0	0	0	0	0	0	0	0	0
Laundry	0	0	0	0	0	0	0	0	0	0	0
Lobby	0	0	0	0	0	0	0	0	0	0	0
Locker	0	0	0	0	0	0	0	0	0	0	0
Lounge	0	0	0	0	0	0	0	0	0	0	0
Mail Sorting	0	0	0	0	0	0	0	0	0	0	0
Mech/Elec	0	0	0	0	0	0	0	0	0	0	0
Nurse	0	0	0	0	0	0	0	0	0	0	0
Office	0	0	0	0	0	0	0	0	0	0	0
Operating Room	0	0	0	0	0	0	0	0	0	0	0
Parking Garage	0	0	0	0	0	0	0	0	0	0	0
Patient Room	0	0	0	0	0	0	0	0	0	0	0
Pharmacy	0	0	0	0	0	0	0	0	0	0	0
Reading	0	0	0	0	0	0	0	0	0	0	0
Restroom	0	0	0	0	0	0	0	0	0	0	0
Sales Area	0	0	0	0	0	0	0	0	0	0	0
Stacks	0	0	0	0	0	0	0	0	0	0	0
Stairs	0	0	0	0	0	0	0	0	0	0	0
Storage	0	0	0	0	0	0	0	0	0	0	0
Workshop	0	0	0	0	0	0	0	0	0	0	0

Total Fixtures	0

										Fixture Wattage			
0	0	0	0	0	0	0	0	0	0	0	0	0	0
										Fixture Type			
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
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0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
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Attachment C

ligh School Classroom Unit Ventilators w/ air conditioning

nstall Dynamic air passive filter/polarized filter media in each Unit ventilator to reduce the amount of outside air introduced using in addition to a Co2 detection strat
n ASHRAE 62.1 "Ventilation for Acceptable Indoor Air Quality"

urrent strategy - Average 35% outside air 11 hrs day/5 days week

CFM	*% of O. A*	*Delta T*	*Days per Yr*			
leating CFM						
1000 cfm	35% oa	25 F	110 days	42,471,000	btuh/year	
				42	mcf/yr	
ooling CFM						
1000 cfm	35% oa	26 F	70 days	28,080,000	btuh/year	sensible
1000 cfm	35% oa	15 F	70 days	11,560,000	btuh/year	latent
				39,640,000		
				12,000		3,303 tons/yr
						4,063 Kwh/year

evised strategy - 12% outside air 11 hrs day/5 days week

CFM	*% of O. A*	*Delta T*	*Days per Yr*			
leating CFM						
1000 cfm	12% oa	9 F	110 days	10,692,000	btuh/year	
				11	mcf/yr	
ooling CFM						
1000 cfm	12% oa	22 F	70 days	13,305,600	btuh/year	sensible
1000 cfm	12% oa	8 F	70 days	4,188,800	btuh/year	latent
				17,494,400		
				12,000		1,458 tons/yr
						1,793 Kwh/year

Heating	**Mcf Savings**	**32**	**mcf/yr**	**$7.19**	**mcf/ units =** **$228 yea**
Cooling	**Kwh Savings**	**2,270**	**Kwh/yr**	**$0.12**	**kwh/ units =** **$272 yea**
					Total Savings **$501 yea**
					savings/cfm **$0.50 cfm**

assroom Unit Ventilators w/ air conditioning

passive filter/polarized filter media in each Unit ventilator to reduce the amount of outside air introduced using in addition to a Co2 detection strategy based on entilation for Acceptable Indoor Air Quality"

Average 35% outside air 11 hrs day/5 days week

% of O. A	*Delta T*	*Days per Yr*			
35% oa	25 F	110 days	42,471,000	btuh/year	
			42	mcf/yr	
35% oa	26 F	70 days	28,080,000	btuh/year	sensible
35% oa	15 F	70 days	11,560,000	btuh/year	latent
			39,640,000		
			12,000		3,303 tons/yr
					4,063 Kwh/year

12% outside air 11 hrs day/5 days week

% of O. A	*Delta T*	*Days per Yr*			
12% oa	9 F	110 days	10,692,000	btuh/year	
			11	mcf/yr	
12% oa	22 F	70 days	13,305,600	btuh/year	sensible
12% oa	8 F	70 days	4,188,800	btuh/year	latent
			17,494,400		
			12,000		1,458 tons/yr
					1,793 Kwh/year

Heating	**Mcf Savings**	**32**	**mcf/yr**	**$7.19**	**mcf/ units =**	**$228 year**
Cooling	**Kwh Savings**	**2,270**	**Kwh/yr**	**$0.12**	**kwh/ units =**	**$272 year**
					Total Savings	**$501 year**
					savings/cfm	**$0.50 cfm/year**

Typical fan energy savings for an 10000 cfm AHU with Dynamic filters and heat wheel bypass

The installation of Dynamic air filters in each AHU will to reduce the amount of supply and return/relief fan horsepower required by the reduced air pressure drop when bypassing the heat wheel

Supply fan		**Return Fan**		
SF motor	15	RF motor	15	
BHP	11.8	BHP	5	
TSP	4.3	TSP	1.75	
@ new SP	3.5	@ new SP	0 75	
bhp	9.5	bhp	2.6	
diff	2.3	diff	2.4	
kw =	1.7158	kw =	1.7904	
hrs /yr	3120	hrs /yr	2120	less econimizer
kwh/saved	5353	kwh/saved	2796	
savings	$525	savings	$274	
		total savings	$799	
		cost/cfm	$0.080	based on 10000 cfm

AHU Fan Savings Summary		
School	**AHU cfm**	**Savings**
High School	275800	$22,025
Middle	62000	$5,590
Northside	36000	$2,875
Parkway	55000	$4,392
Rockhill	60100	$4,800
Early Learning	55000	$4,392
Total		$44,075

Attachment B

PROJECT NAME: ALLIANCE HIGH SCHOOL

LEFFELECTRIC
energy services

LIGHTING SURVEY DATA SHEET

PAGE 1 **LEFF ENERGY SERVICES**

Building Area	Fixture Type	No.of Lamps Curr.	No.of Lamps Prop.	Qty	Proposed	Control	Install Date/ Comments
MAIN OFFICE	2X4 LAY-IN T8 27C	3	3	8	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
FRASER	2X4 LAY-IN T8 27C	3	3	2	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	WSDT	
AQUILO	2X4 LAY-IN T8 27C	3	3	2	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	WSDT	
GRISEZ	2X4 LAY-IN T8 27C	3	3	2	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	WSDT	
LOBBY 2	2X4 LAY-IN T8	3	3	3	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS		
JACKSON	2X4 LAY-IN T8 27C	3	3	2	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	WSDT	
C VELBAR	2X4 LAY-IN T8 27C	3	3	2	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	WSDT	
CONFERENCE	2X4 LAY-IN T8 27C	3	3	4	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
MENS RESTROOM	2X4 LAY-IN T8	2	2	2	RL 2-LAMP FIXTURE W/28WATT T8 LAMPS	WSDT=2	
COPY ROOM	2X4 LAY-IN T8	3	3	6	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
3RD FLOOR							
STAIRS	4' WRS T8	4	4	5	RL 4-LAMP FIXTURE W/28WATT T8 LAMPS		
MENS & WOMENS RR	2X4 LAY-IN T8	2	2	8	RL 2-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT=2	
MENS & WOMENS RR	4' COVE T8	2	2	14	RL 2-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT=2	
CLASSROOM 310	2X4 LAY-IN T8	3	3	16	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT2	
CLASSROOM 310 HALLWAY	4' WRS T8	4	4	20	RL 4-LAMP FIXTURE W/28WATT T8 LAMPS		
RESTROOM	2X4 LAY-IN T8	2	2	1	RL 2-LAMP FIXTURE W/28WATT T8 LAMPS	WSDT	
CLASSROOM 312	2X4 LAY-IN T8	3	3	15	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT2	
CLASSROOM 313	2X4 LAY-IN T8	3	3	15	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT2	
CR 313 SCIENCE PREP	2X4 LAY-IN T8	3	3	3	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT2	
CLASSROOM 314	2X4 LAY-IN T8	3	3	15	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT2	
CLASSROOM 314 PREP	2X4 LAY-IN T8	3	3	6	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
CLASSROOM 315	2X4 LAY-IN T8	3	3	18	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT2	
CLASSROOM 315 PREP	2X4 LAY-IN T8	3	3	3	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
CLASSROOM 316	2X4 LAY-IN T8	3	3	15	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT2	
TOTAL							

PROJECT NAME: ALLIANCE HIGH SCHOOL

27-Dec-10 LIGHTING SURVEY DATA SHEET

LEFFELECTRIC
energy services

PAGE 2 LEFF ENERGY SERVICES

Building Area	Fixture Type	No.of Lamps Curr.	No.of Lamps Prop.	Qty	Proposed	Control	Install Date/ Comments
CLASSROOM 317	2X4 LAY-IN T8	3	3	15	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT2	
CLASSROOM 317 PREP	2X4 LAY-IN T8	3	3	3	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
STAIRS	4' WRAP T8	4	4	5	RL 4-LAMP FIXTURE W/28WATT T8 LAMPS		
CLASSROOM 320	2X4 LAY-IN T8	3	3	9	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
CLASSROOM 322	2X4 LAY-IN T8	3	3	8	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
CLASSROOM 324	2X4 LAY-IN T8	3	3	8	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
MENS & WOMENS RR	2X4 LAY-IN T8	2	2	8	RL 2-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT*2	
MENS & WOMENS RR	4' COVE	2	2	14	RL 2-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT*2	
STAIRS	4' WRAP T8	4	4	5	RL 4-LAMP FIXTURE W/28WATT T8 LAMPS		
CLASSROOM 326	2X4 LAY-IN T8	2	2	8	RL 2-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
CLASSROOM 327	2X4 LAY-IN T8	3	3	8	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
CLASSROOM 327 HALLWAY	4' WRAP T8	4	4	2	RL 4-LAMP FIXTURE W/28WATT T8 LAMPS		
CLASSROOM 328	2X4 LAY-IN T8	3	3	8	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
MECH	4' VAP T8	2	2	1	***LEAVE AS IS***	WSDT	
WORKROOM	2X4 LAY-IN T8	3	3	8	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
CLASSROOM 330	2X4 LAY-IN T8	3	3	8	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
CLASSROOM 329	2X4 LAY-IN T8	3	3	8	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
CLASSROOM 332	2X4 LAY-IN T8	3	3	8	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
CLASSROOM 331	2X4 LAY-IN T8	3	3	8	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
CLASSROOM 331	2X4 LAY-IN T8	3	3	8	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
CLASSROOM 334	2X4 LAY-IN T8	3	3	1	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
CLASSROOM 333	2X4 LAY-IN T8	3	3	8	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
CLASSROOM 335	2X4 LAY-IN 18C T8	4	4	8	RL 4-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT2	
CLASSROOM 336	2X4 LAY-IN 18C T8	4	4	8	RL 4-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT2	
CLASSROOM 336 OFFICE	2X4 LAY-IN T8	3	3	4	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
TOTAL							

PROJECT NAME: ALLIANCE HIGH SCHOOL

LEFFELECTRIC
energy services

27-Dec-10 LIGHTING SURVEY DATA SHEET

PAGE 3 LEFF ENERGY SERVICES

Building Area	Fixture Type	No.of Lamps Curr.	No.of Lamps Prop.	Qty	Proposed	Control	Install D. Comme
STAIRS	4' WRAP T8	4	4	4	RL 4-LAMP FIXTURE W/28WATT T8 LAMPS		
*** 2ND FLOOR ***							
262 LOCKER ROOM	8' VAPOR T8	4	4	2	RL 4-LAMP FIXTURE W/28WATT T8 LAMPS	WSDT	
262 RESTROOM	4' VAPOR T8	2	2	2	RL 2-LAMP FIXTURE W/28WATT T8 LAMPS	WSDT	
262 RESTROOM HALLWAY	8' VAPOR T8	4	4	2	RL 4-LAMP FIXTURE W/28WATT T8 LAMPS		
WOMENS LOCKER ROOM	4' VAPOR T8	2	2	2	RL 2-LAMP FIXTURE W/28WATT T8 LAMPS	WSDT	
ROOM 262 OFFICE	8' VAPOR T8	4	4	2	RL 4-LAMP FIXTURE W/28WATT T8 LAMPS	WSDT	
ROOM 262 COMPUTER	2X4 LAY-IN T8	2	2	2	RL 2-LAMP FIXTURE W/28WATT T8 LAMPS	WSDT	
ROOM 262 ENTRY	2X4 LAY-IN T8	2	2	2	RL 2-LAMP FIXTURE W/28WATT T8 LAMPS		
OFFICE	2X4 LAY-IN T8	3	3	6	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
TOOL ROOM	4' VAPOR T8	2	2	2	RL 2-LAMP FIXTURE W/28WATT T8 LAMPS	WSDT	
LOCKER	8' VAPOR T8	4	4	2	RL 4-LAMP FIXTURE W/28WATT T8 LAMPS	WSDT	
RESTROOMS 1 & 2	4' VAPOR T8	2	2	3	RL 2-LAMP FIXTURE W/28WATT T8 LAMPS	WSDT=1	
MEZZANINE STORAGE	8' VAPOR T8	4	4	6	***LEAVE AS IS***		
CLASSROOM 257 HALLWAY	4' WRAP T8	4	4	23	RL 4-LAMP FIXTURE W/28WATT T8 LAMPS		
CLASSROOM 257	2X4 LAY-IN T8	3	3	11	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
ELECT ROOM	4' VAPOR T8	2	2	1	RL 2-LAMP FIXTURE W/28WATT T8 LAMPS	WSDT	
CLASSROOM 255	2X4 LAY-IN T8	3	3	12	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
SHOP 258 OFFCE	2X4 LAY-IN T8	3	3	2	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	WSDT	
MENS LKR ROOM 258 & RR	2X4 LAY-IN T8	3	3	3	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	WS=2	
WOMENS LKR RM 258 & RR	2X4 LAY-IN T8	3	3	3	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	WS=2	
ROOM 256 PRINT	2X4 LAY-IN T8	3	3	6	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
ROOM 256 OFF	2X4 LAY-IN T8	3	3	2	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	WSDT	
PHOTO ROOM	2X4 LAY-IN T8	3	3	2	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	WSDT	
ROOM 253 STAGE	2X4 LAY-IN T8	3	3	28	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS		
TOTAL							

PROJECT NAME: ALLIANCE HIGH SCHOOL

27-Dec-10 LIGHTING SURVEY DATA SHEET

LEFFELECTRIC
energy services

PAGE 4 LEFF ENERGY SERVICES

Building Area	Fixture Type	No.of Lamps Curr.	No.of Lamps Prop.	Qty	Proposed	Control	Install Date/ Comments
PRODUCTION	2X4 LAY-IN T8	3	3	7	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS		
CLASSROOM 254	2X4 LAY-IN T8	3	3	6	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
ROOM 254 LKR ROOM & RR	2X4 LAY-IN T8	3	3	32	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	WSDT=2	
ROOM 254 RESTROOM	2X4 LAY-IN T8	3	3	1	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	WSDT	
ROOM 254 STORAGE 1 & 2	2X4 LAY-IN T8	3	3	2	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	WSDT=2	
SIDE ENTRY	4' WRAP T8	4	4	4	RL 4-LAMP FIXTURE W/28WATT T8 LAMPS		
CLASSROOM 251	2X4 LAY-IN T8	3	3	28	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT2	
CLASSROOM 249	2X4 LAY-IN T8	3	3	44	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT=4	
CLASSROOM 249 KILN	2X4 LAY-IN T8	3	3	1	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	WSDT	
CLASSROOM 249 STORAGE	2X4 LAY-IN T8	3	3	4	***LEAVE AS IS***	CSDT	
MENS & WOMENS RR	2X4 LAY-IN T8	3	3	2	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
MENS & WOMENS RR	4' COVE T8	4	4	1	RL 4-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
CLASSROOM 247	2X4 LAY-IN T8	3	3	9	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
CLASSROOM 247 OFFICE	2X4 LAY-IN T8	3	3	4	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
STORAGE	2X4 LAY-IN T8	3	3	2	***LEAVE AS IS***	WSDT	
CLASSROOM 245	2X4 LAY-IN T8	3	3	6	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS		
CLASSROOM 245 HALLWAY	4' WRAP T8	4	4	31	RL 4-LAMP FIXTURE W/28WATT T8 LAMPS		
CLASSROOM 243	2X4 LAY-IN T8	3	3	2	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	WSDT	
CLASSROOM 241	2X4 LAY-IN T8	3	3	2	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	WSDT	
CLASSROOM 237	2X4 LAY-IN ITC T8	3	3	29	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT=2	
CLASSROOM 235	2X4 LAY-IN T8	3	3	26	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT=2	
CLASSROOM 235 OFFICE	2X4 LAY-IN T8	3	3	2	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	WSDT	
CONCESSION	2X4 LAY-IN T8	3	3	5	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
STORAGE	2X4 LAY-IN T8	2	2	3	***LEAVE AS IS***	CSDT	
TOTAL							

PROJECT NAME: ALLIANCE HIGH SCHOOL

LEFFELECTRIC
energy services

27-Dec-10 LIGHTING SURVEY DATA SHEET

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Building Area	Fixture Type	No.of Lamps Curr.	No.of Lamps Prop.	Qty	Proposed	Control	Install Comm
PRODUCTION	2X4 LAY-IN T8	3	3	7	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS		
CLASSROOM 254	2X4 LAY-IN T8	3	3	6	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
ROOM 254 LKR ROOM & RR	2X4 LAY-IN T8	3	3	32	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	WSDT=2	
ROOM 254 RESTROOM	2X4 LAY-IN T8	3	3	1	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	WSDT	
ROOM 254 STORAGE 1 & 2	2X4 LAY-IN T8	3	3	2	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	WSDT=2	
SIDE ENTRY	4' WRAP T8	4	4	4	RL 4-LAMP FIXTURE W/28WATT T8 LAMPS		
CLASSROOM 251	2X4 LAY-IN T8	3	3	28	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT2	
CLASSROOM 249	2X4 LAY-IN T8	3	3	44	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT=3	
CLASSROOM 249 KILN	2X4 LAY-IN T8	3	3	1	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	WSDT	
CLASSROOM 249 STORAGE	2X4 LAY-IN T8	3	3	4	***LEAVE AS IS***	CSDT	
MENS & WOMENS RR	2X4 LAY-IN T8	3	3	2	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
MENS & WOMENS RR	4' COVE T8	4	4	1	RL 4-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
CLASSROOM 247	2X4 LAY-IN T8	3	3	9	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
CLASSROOM 247 OFFICE	2X4 LAY-IN T8	3	3	4	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
STORAGE	2X4 LAY-IN T8	3	3	2	***LEAVE AS IS***	WSDT	
CLASSROOM 245	2X4 LAY-IN T8	3	3	6	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS		
CLASSROOM 245 HALLWAY	4' WRAP T8	4	4	31	RL 4-LAMP FIXTURE W/28WATT T8 LAMPS		
CLASSROOM 243	2X4 LAY-IN T8	3	3	2	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	WSDT	
CLASSROOM 241	2X4 LAY-IN T8	3	3	2	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	WSDT	
CLASSROOM 237	2X4 LAY-IN 17C T8	3	3	29	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT=2	
CLASSROOM 235	2X4 LAY-IN T8	3	3	26	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT=2	
CLASSROOM 235 OFFICE	2X4 LAY-IN T8	3	3	2	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	WSDT	
CONCESSION	2X4 LAY-IN T8	3	3	5	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
STORAGE	2X4 LAY-IN T8	2	2	3	***LEAVE AS IS***	CSDT	
TOTAL							

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Building Area	Fixture Type	No.of Lamps Curr.	No.of Lamps Prop.	Qty
MENS & WOMENS RR	2X4 LAY-IN T8	3	3	6 RL 3-LAMP FIX
MENS & WOMENS RR	4' COVE T8	2	2	6 RL 2-LAMP FIX
CLASSROOM 201	2X4 LAY-IN T8	3	3	12 RL 3-LAMP FIX
CLASSROOM 203	2X4 LAY-IN T8	3	3	11 RL 3-LAMP FIX
CLASSROOM 205	2X4 LAY-IN T8	3	3	12 RL 3-LAMP FIX
CLASSROOM 207	2X4 LAY-IN T8	3	3	8 RL 3-LAMP FIX
CLASSROOM 207 OFFICE	2X4 LAY-IN T8	3	3	1 RL 3-LAMP FIX
GUIDANCE LOBBY	2X4 LAY-IN T8 18C	4	4	8 RL 4-LAMP FIX
COPY	2X4 LAY-IN T8 18C	4	4	2 RL 4-LAMP FIX
MOWEY OFFICE	2X4 LAY-IN T8 18C	4	4	2 RL 4-LAMP FIX
SHEA	2X4 LAY-IN T8 18C	4	4	2 RL 4-LAMP FIX
COUNSELOR 1	2X4 LAY-IN T8 18C4	4	4	2 RL 4-LAMP FIX
COUNSELOR 2	2X4 LAY-IN T8 18C4	4	4	2 RL 4-LAMP FIX
COUNSELOR 3	2X4 LAY-IN T8 18C4	4	4	2 RL 4-LAMP FIX
CLINIC	2X4 LAY-IN T8 18C4	3	3	5 RL 3-LAMP FIX
CLINIC RESTROOM	2X4 LAY-IN T8 18C4	3	3	1 RL 3-LAMP FIX
CLINIC HALLWAY	2X4 LAY-IN T8 18C4	3	3	2 RL 3-LAMP FIX
CLINIC FILE	2X4 LAY-IN T8 18C4	3	3	2 RL 3-LAMP FIX
CLASSROOM 209	2Z4 LAY-IN T8	3	3	8 RL 3-LAMP FIX
CLASSROOM 211	2Z4 LAY-IN T8	3	3	12 RL 3-LAMP FIX
STAIRS	4' WRAP T8	4	4	4 RL 4-LAMP FIX
CLASSROOM 208	2X4 LAY-IN T8	3	3	2 RL 3-LAMP FIX
CLASSROOM 210	2X4 LAY-IN T8	3	3	12 RL 3-LAMP FIX
MENS & WOMENS RR	2X4 LAY-IN T8	3	3	8 RL 3-LAMP FIX
MENS & WOMENS RR	4' COVE	2	2	14 RL 2-LAMP FIX
STAIRS	4' WRAP T8	4	4	2 RL 4-LAMP FIX
TOTAL				

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Building Area	Fixture Type	No.of Lamps Curr.	No.of Lamps Prop.	Qty	Proposed	Control	Install Da / Commen
MENS & WOMENS RR	2X4 LAY-IN T8	3	3	6	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT=2	
MENS & WOMENS RR	4' COVE T8	2	2	6	RL 2-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT=2	
CLASSROOM 201	2X4 LAY-IN T8	3	3	12	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
CLASSROOM 203	2X4 LAY-IN T8	3	3	11	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
CLASSROOM 205	2X4 LAY-IN T8	3	3	12	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
CLASSROOM 207	2X4 LAY-IN T8	3	3	8	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
CLASSROOM 207 OFFICE	2X4 LAY-IN T8	3	3	1	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	WSDT	
GUIDANCE LOBBY	2X4 LAY-IN T8 18C	4	4	8	RL 4-LAMP FIXTURE W/28WATT T8 LAMPS		
COPY	2X4 LAY-IN T8 18C	4	4	2	RL 4-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
MOWEY OFFICE	2X4 LAY-IN T8 18C	4	4	2	RL 4-LAMP FIXTURE W/28WATT T8 LAMPS	WSDT	
SHEA	2X4 LAY-IN T8 18C	4	4	2	RL 4-LAMP FIXTURE W/28WATT T8 LAMPS	WSDT	
COUNSELOR 1	2X4 LAY-IN T8 18C4	4	4	2	RL 4-LAMP FIXTURE W/28WATT T8 LAMPS	WSDT	
COUNSELOR 2	2X4 LAY-IN T8 18C4	4	4	2	RL 4-LAMP FIXTURE W/28WATT T8 LAMPS	WSDT	
COUNSELOR 3	2X4 LAY-IN T8 18C4	4	4	2	RL 4-LAMP FIXTURE W/28WATT T8 LAMPS	WSDT	
CLINIC	2X4 LAY-IN T8 18C4	3	3	5	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS		
CLINIC RESTROOM	2X4 LAY-IN T8 18C4	3	3	1	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	WSDT	
CLINIC HALLWAY	2X4 LAY-IN T8 18C4	3	3	2	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS		
CLINIC FILE	2X4 LAY-IN T8 18C4	3	3	2	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	WSDT	
CLASSROOM 209	2Z4 LAY-IN T8	3	3	8	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
CLASSROOM 211	2Z4 LAY-IN T8	3	3	12	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
STAIRS	4' WRAP T8	4	4	4	RL 4-LAMP FIXTURE W/28WATT T8 LAMPS		
CLASSROOM 208	2X4 LAY-IN T8	3	3	2	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
CLASSROOM 210	2X4 LAY-IN T8	3	3	12	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
MENS & WOMENS RR	2X4 LAY-IN T8	3	3	8	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT=2	
MENS & WOMENS RR	4' COVE	2	2	14	RL 2-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT=2	
STAIRS	4' WRAP T8	4	4	2	RL 4-LAMP FIXTURE W/28WATT T8 LAMPS		
TOTAL							

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Building Area	Fixture Type	No.of Lamps Curr.	No.of Lamps Prop.	Qty	Proposed		
DATA	4' WRAP T8	2	2	1	RL 2-LAMP FIXTURE W/28WATT T8 LAMPS		
DATA HALLWAY	4' SURFACE T8	4	4	23	RL 4-LAMP FIXTURE W/28WATT T8 LAMPS		
CLASSROOM 212	2X4 LAY-IN T8	3	3	8	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
CLASSROOM 213	2X4 LAY-IN T8	3	3	6	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
CLASSROOM 214	2X4 LAY-IN T8	3	3	9	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
CLASSROOM 215	2X4 LAY-IN T8	3	3	9	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
CLASSROOM 216	2X4 LAY-IN T8	3	3	9	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
CLASSROOM 217	2X4 LAY-IN T8	3	3	9	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
CLASSROOM 218	2X4 LAY-IN T8	3	3	9	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
CLASSROOM 219	2X4 LAY-IN T8	3	3	9	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
CLASSROOM 220	2X4 LAY-IN T8	3	3	9	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
CLASSROOM 221	2X4 LAY-IN T8	3	3	9	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
CLASSROOM 223	2X4 LAY-IN 18C T8	4	4	12	RL 4-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT2	
CLASSROOM 222	1X4 SURFACE T8	2	2	12	RL 2-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
CLASSROOM 222 HALLWAY	4' STRIP T8	4	4	16	RL 4-LAMP FIXTURE W/28WATT T8 LAMPS		
ATTENDANCE OFFICE	2X4 LAY-IN T8	3	3	5	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
TICKET OFFICE	2X4 LAY-IN T8	3	3	3	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
SCHOOL LOBBY	2X4 LAY-IN T8	3	3	5	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS		
SCHOOL LOBBY OFFICE	2X4 LAY-IN T8	3	3	2	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	WSDT	
BOYS LOCKER ROOM	8' VAPOR T8	4	4	18	RL 4-LAMP FIXTURE W/28WATT T8 LAMPS	WWS=2, WCMS=2	
GIRLS LOCKER ROOM	8' VAPOR T8	4	4	18	RL 4-LAMP FIXTURE W/28WATT T8 LAMPS	WWS=2, WCMS=2	
BOYS & GIRLS OFFICE	4' WRAP T8	2	2	2	RL 2-LAMP FIXTURE W/28WATT T8 LAMPS	WSDT=2	
BOYS & GIRLS RESTROOM	8' VAPOR T8	4	4	1	RL 4-LAMP FIXTURE W/28WATT T8 LAMPS	WSDT=2	
GYM STORAGE	2X4 LAY-IN T8	3	3	1	***LEAVE AS IS***	WSDT	
GYM FLOOR (OLD)	MH REC CAN	1		69	***REMOVE***		
GYM FLOOR (NEW)	HIGH BAY		6	54	NEW 6-LAMP T8 HIGH BAY W/REFLECTOR		
TOTAL							

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Building Area	Fixture Type	No.of Lamps Curr.	No.of Lamps Prop.	Qty	Proposed	Control
BLEACHERS (OLD)	MH SQ REC	1		20	***REMOVE***	
BLEACHERS (OLD)	INC	1		24	***REMOVE***	
BLEACHERS (NEW)	HIGH BAY		4	36	NEW 4-LAMP T8 HIGH BAY W/REFLECTOR	
LOUNGE	8' VAPOR T8	4	4	2	RL 4-LAMP FIXTURE W/28WATT T8 LAMPS	WSDT
LAUNDRY	8' VAPOR T8	4	4	4	RL 4-LAMP FIXTURE W/28WATT T8 LAMPS	WSDT
FOOTBALL LOCKER ROOM	8' VAPOR T8	4	4	23	RL 4-LAMP FIXTURE W/28WATT T8 LAMPS	WWS=3, WCMS=3
STORAGE 1 & 2	8' VAPOR T8	4	4	4	***LEAVE AS IS***	WSDT=2
BOYS HALLWAY	1X4 T8	2	2	24	RL 2-LAMP FIXTURE W/28WATT T8 LAMPS	
BACK HALLWAY	2X4 LAY-IN T8	3	3	13	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	
WEIGHT ROOM (OLD)	MH SQ REC	1		6	***REMOVE***	
WEIGHT ROOM (NEW)	HIGH BAY		4	20	NEW 2X4 LAY-IN W/T-8 & ELECT. 4 LAMP	
FOOTBALL LOCKER ROOM	2X4 LAY-IN T8	4	4	16	RL 4-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT=3
SHOWER	4' VAPOR	4	4	2	RL 4-LAMP FIXTURE W/28WATT T8 LAMPS	
MENS & WOMENS LKR RM	2X4 LAY-IN T8	3	3	6	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	WWS=4, WCMS=4
MENS & WOMENS LKR RM	4' COVE	2	2	12	RL 2-LAMP FIXTURE W/28WATT T8 LAMPS	WWS=4, WCMS=4
RESTROOM/HALLWAY	4' STRIP T8	2	2	2	RL 2-LAMP FIXTURE W/28WATT T8 LAMPS	
CLASSROOM 266	2X4 LAY-IN T8	3	3	22	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT=2
OFFICE 1	2X4 LAY-IN T8	3	3	4	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	WSDT
OFFICE 2	2X4 LAY-IN T8	3	3	2	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	WSDT
BAND LOCKER	2X4 LAY-IN T8	3	3	4	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	WSDT
CLASSROOM 268	2X4 LAY-IN T8	3	3	31	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT=2
OFFICE 1,2,3	2X4 LAY-IN T8	3	3	10	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	WSDT=3
BAND HALLWAY	1X4 SURFACE T8	4	4	19	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	
BOYS & GIRLS DRESSING	2X4 LAY-IN T8	3	3	6	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	WSDT=2
TOTAL						

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Building Area	Fixture Type	No.of Lamps Curr.	No.of Lamps Prop.	Qty	Proposed	Control	Insta Con
*** 1ST FLOOR ***							
SIDE ENTRY	1X4 SURFACE T8	4	4	2	RL 4-LAMP FIXTURE W/28WATT T8 LAMPS		
CAFETERIA HALLWAY	2X4 LAY-IN T8	2	2	11	RL 2-LAMP FIXTURE W/28WATT T8 LAMPS		
MENS & WOMENS RR	2X4 LAY-IN T8	2	2	6	RL 2-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT=2	
MENS & WOMENS RR	4' COVE T8	2	2	12	RL 2-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT=2	
CUSTODIANS OFFICE	2X4 LAY-IN T8	3	3	8	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
KITCHEN	2X4 LAY-IN T8	3	3	34	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS		
KITCHEN HALLWAY	2X4 LAY-IN T8	3	3	11	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS		
REC.	8' VAPOR	4	4	75	RL 4-LAMP FIXTURE W/28WATT T8 LAMPS		
CAFETERIA	2X4 LAY-IN T8	3	3	60	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS		
SERVING 1 & 2	2X4 LAY-IN T8	3	3	20	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS		
DISH WASH	2X4 LAY-IN T8	3	3	4	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS		
FACULTY ROOM	2X4 LAY-IN T8	3	3	12	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT=2	
MENS & WOMENS RR	2X4 LAY-IN T8	2	2	6	RL 2-LAMP FIXTURE W/28WATT T8 LAMPS		
ELECT ROOM	8' VAPOR T8	4	4	5	***LEAVE AS IS***		
DATA	8' VAPOR T8	4	4	7	RL 4-LAMP FIXTURE W/28WATT T8 LAMPS		
CLASSROOM 126	2X4 LAY-IN T8	3	3	19	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
CLASSROOM 126 OFFICE	2X4 LAY-IN T8	3	3	2	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
CLASSROOM 126 HALLWAY	1X4 LAY-IN T8	4	4	28	RL 4-LAMP FIXTURE W/28WATT T8 LAMPS		
BOILER	8' VAPOR T8	4	4	18	RL 4-LAMP FIXTURE W/28WATT T8 LAMPS		
CLASSROOM 124	2X4 LAY-IN T8	3	3	12	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
CLASSROOM 122	2X4 LAY-IN T8	3	3	12	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
HALLWAY EXIT	2X4 LAY-IN T8	3	3	4	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS		
MENS & WOMENS RR	2X4 LAY-IN T8	2	2	8	RL 2-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT=2	
MENS & WOMENS RR	4' COVE T8	2	2	10	RL 2-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT=2	
TOTAL							

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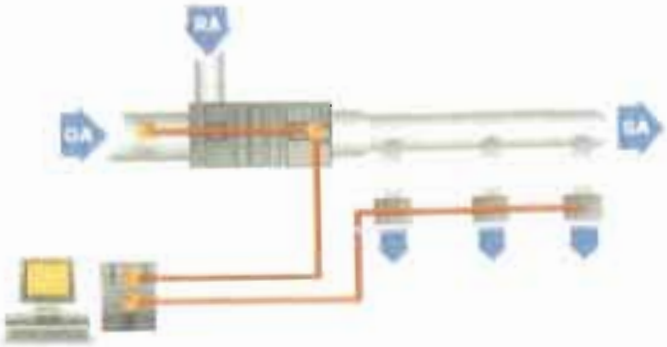
Building Area	Fixture Type	No.of Lamps Curr.	No.of Lamps Prop.	Qty	Proposed	Control	Install Date / Comments
CLASSROOM 119	2X4 LAY-IN T8	3	3	10	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
CLASSROOM 119 OFFICE	2X4 LAY-IN T8	3	3	2	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	WSDT	
CLASSROOM 120	2X4 LAY-IN T8	3	3	12	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT2	
CLASSROOM 120 OFFICE	2X4 LAY-IN T8	3	3	2	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS		
CLASSROOM 117	2X4 LAY-IN T8	3	3	23	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT=2	
ROOM 115 SHOP OFFICE	2X4 LAY-IN T8	3	3	2	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	WSDT=2	
RESTROOMS 1,2,3	2X4 LAY-IN T8	2	2	3	RL 2-LAMP FIXTURE W/28WATT T8 LAMPS	WSDT=3	
CLASSROOM 113 HALLWAY	1X4 SURFACE T8	4	4	34	RL 4-LAMP FIXTURE W/28WATT T8 LAMPS		
CLASSROOM 111 HALLWAY	1X4 SURFACE T8	4	4	7	RL 4-LAMP FIXTURE W/28WATT T8 LAMPS		
CLASSROOM 111	2X4 LAY-IN T8	3	3	10	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
CLASSROOM 111 OFFICE	2X4 LAY-IN T8	3	3	2	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	WSDT	
CLASSROOM 107	2X4 LAY-IN T8	3	3	24	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT=2	
CLASSROOM 107 EXT	2X4 LAY-IN T8	3	3	2	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS		
CLASSROOM 105	2X4 LAY-IN T8	3	3	10	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
CLASSROOM 105	4' COVE T8	4	4	2	RL 4-LAMP FIXTURE W/28WATT T8 LAMPS		
CLASSROOM 105	2X4 LAY-IN T8	3	3	6	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
CLASSROOM 105 STORAGE	2X4 LAY-IN T8	3	3	2	***LEAVE AS IS***	WSDT	
CLASSROOM 103	2X4 LAY-IN T8	3	3	8	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
CLASSROOM 101	2X4 LAY-IN T8	3	3	12	RL 3-LAMP FIXTURE W/28WATT T8 LAMPS	CSDT	
RESTROOM	2X4 LAY-IN T8	2	2	1	RL 2-LAMP FIXTURE W/28WATT T8 LAMPS	WSDT	
STORAGE 1	2X4 LAY-IN T8	2	2	2	***LEAVE AS IS***	WSDT	
STORAGE 2	4' WRAP T12	4	4	1	***LEAVE AS IS***	WSDT	
STAIRS	8' WALLMOUNT T8	4	4	1	RL 4-LAMP FIXTURE W/28WATT T8 LAMPS		

CO_2 Demand Controlled Ventilation

Managing your environment & your energy budget through CO_2 control.

Carbon dioxide control is an effective means of enhancing building comfort and efficiency. CO2, is of course, released by building occupants. The more occupants, the more CO_2 is released and thus the need for more outside air.



But how much outside air? By monitoring CO_2 through your building automation system, your building can be assured of just the right amount of outside air, without excessive energy use to heat or cool that outside air. Your automation system can reduce the total outdoor airflow during periods of reduced occupancy. This can lead to decreased HVAC system operating costs since more return air, and less outside air, is used.

When is CO_2 Demand Controlled Ventilation appropriate?

There are many opportunities for tailoring carbon dioxide demand controlled ventilation based upon your building's needs and the degree of control required. Variables to consider include:

- Number and location of CO_2 sensors.
- Building use schedules.
- Use of occupancy sensors to initiate the control program.
- Use of modulating outdoor air and re turn air dampers.
- Use of airflow measuring stations.

More about CO2 demand controlled ventilation

In addition to energy savings, there are other benefits to implementing a CO_2 based control program. These include:

- *Improved IAQ* by ensuring limits on CO_2 concentration levels.
- *Improved Humidity Control* by preventing influxes of humid outdoor air.

For expert advice on proper CO_2 based control in your building, contact your Gardiner Trane representative at 440-248-3400.

CO2 Demand Based Ventilation

Study Results: Federal Energy Management Program

Internal Rate of Return	> 50%
Simple Payback	0.4 to 2.2 years
Design Ventilation Reduction	10% to 40%
Energy Cost Reduction	25% to 70%

TRA

energy
efficient
fluorescent
ighting
ystems

ltraStar™

IltraStar™ Fluroescent

Lighting Systems, Inc now offers the **UltraStar™** series of T5 and T8 Fluorescent fixtures viding an excellent energy saving alternative to GE's broad line of HID and Compact orescent line of indoor products.

'isp / Clear Lighting Efficiency

raStar™ fixtures incorporate the latest in fluorescent fixture, lamp and ballast technology viding highly efficient, high quality, white light. The UltraStar™ fixture optimizes lighting tem performance through high fixture efficiency and lower lumen loss over time versus ures utilizing metal halide HID light sources. Lumen depreciation of T5 or T8 lamps at mean is less than 10% as compared to 15% lumen loss with standard universal burning metal de. This provides an excellent opportunity for retrofit of aged metal halide systems where ire wattage can be reduced while providing improved quality of light.

h a higher color rendering index and color consistency, this lighting is ideal where brilliant rs and clear color differentiation is needed. Applications range from display areas, aisle ting, signage, indoor general area, manufacturing and distribution, to commercial and retail ironments.

UltraStar™ Series – Features

SOLUTIONS DRIVEN OPTIONS:

Occupancy sensor
- Energy saving control for applications where part time lighting is applied

Emergency Battery Back-Up
- T8 & T5 offering with 90 minute version

Steel door and lens
- Hinged and non-hinged versions for enclosed fixture requirements
- F Series offers wide range with flat clear, flat diffuse and drop down diffuse lens options

Wireguard
- Lamp and luminaire protection for gymnasium applications.
- F series provided with wireguard inset in steel lens door for ease in installation and robust protection.
- All others provided with exterior mounted wireguard options.

INDUSTRY LEADING PERFORMANCE:

- High efficiency photometrics
  - Fewer fixtures required
  - Light where desired
- High "Quality of Light"
  - Consistent, uniform output
  - Low lumen depreciation
  - Reliable, efficient components

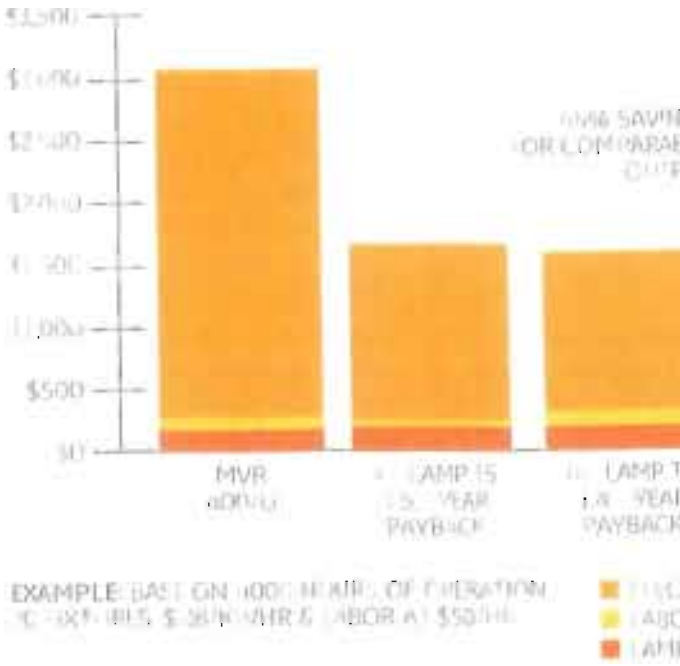
The UltraStar™ Advantage

- **High Color Rendering Index:** 80-85 CRI
- **Energy Savings:** Lower system watts required for same lumen output as standard metal halide
- **Silent Operation:** Electronic ballasts provide noise free system
- **Consistent Light Output:** Excellent lumen depreciation results in less light loss and longer re-lamping intervals
- **Instant-On:** Fluorescent technology means instant light with no delays in re-strike

Lower Energy Consumption:

Compared to standard metal halide (HID) systems, input watts can be reduced by nearly 60% depending on ballast and lamp combinations used. Additional savings can be realized through the use of optional occupancy sensors or simple light controls where fixtures can be dimmed or shut off when areas are unoccupied.

The choice for high light output. With a ballast factor of 1.15, UltraMax H delivers the most lumens for maximum light or when you want more savings using fewer lamps. This is the first high-efficiency high-light output line for 2, 3 and 4 T8 lamps.



UltraMax™ Ballast

THE T8 WATT-MISER FAMILY

- F32T8/WM - Only 30 watts
- F32T8/XL/WM - 30 watts & Long 25,000 hr. Life
- Same life and light output as standard T8 lamps*
- 94% Lumen Maintenance
- 82 CRI - industry best SP rating

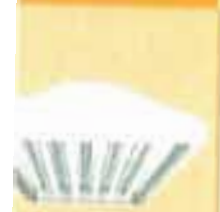
THE ULTRA BALLAST FAMILY

- Ful Product Range - 2, 3 & 4 Lamp 120 & 277 v, Standard & Low BF
- Available for F32T8
- High performance: < 10% THD
- 5 year warranty
- 4% more efficient than standard electronic ballasts.

Starcoat

*On instant start electronic ballast and approved rapid star ballasts

roduct Selection

	PRODUCT	LAMP TYPE	LAMP QTY.	HOUSING	LENS OPTIONS	WIREGUARD	UPLIGHT OPTION
	"F" Series BEST	T5 & T8	4 - 8	T5: .040" AL T8: 22 Guage CRS Box Type 4 ft.	Flat clear acrylic, flat diffuse acrylic, drop-down diffuse acrylic	Provided Inset In steel lens frame	Uplight lamps or slotted (5% standard with other %options available)
	"M" Series BETTER	T5 only	4	.040" AL Box Type 4 ft.	Flat clear acrylic, flat prismatic acrylic	Provided mounted to housing exterior	No Uplight available
	"C" Series BETTER	T5 only	4	.040" AL Box Type 4 ft.	Flat clear acrylic, flat prismatic acrylic	Provided mounted to housing exterior	No Uplight available
	"E" Series GOOD	T5 & T8	4 - 8	Unibody .036" AL with steel end caps 4 ft.	Not available	Provided mounted to Unibody exterior	Slotted (5% standard with other % options available)
	"S" Series GOOD	T5 & T8	2, 4, 6 (T8 only)	Unibody .036" AL with steel end caps 8 ft.	Not available	Provided mounted to Unibody exterior	Slotted (5% standard with other % options available)
	"A" Series GOOD	T8	6	Unibody .036" AL with steel end caps 8 ft.	Not available	Provided mounted to Unibody exterior	Slotted (5% standard with other % options available)

Al series utilize high specularity anodized Miro 4™ aluminum reflectors

hting Alternatives

TEM FORMANCE	T8 HIGH LUMEN (6 LAMPS)	T5HO (6 LAMP)	T5HO (4 LAMP)	400 WATT MH MVR400/U
np	F32T8/HL	F54W/T5	F54W/T5	MVR400/U
Of Lamps	6	6	4	1
ed Life	20,000	20,000	20,000	20,000
	82	85	85	65

				CRS Box Type 4 ft.	flat diffuse acrylic, drop-down diffuse acrylic	In steel lens frame	slotted (5% standard with other %options available)
	"M" Series BETTER	T5 only	4	.040" AL Box Type 4 ft.	Flat clear acrylic, flat prismatic acrylic	Provided mounted to housing exterior	No Uplight available
	"C" Series BETTER	T5 only	4	.040" AL Box Type 4 ft.	Flat clear acrylic, flat prismatic acrylic	Provided mounted to housing exterior	No Uplight available
	"E" Series GOOD	T5 & T8	4 - 8	Unibody .036" AL with steel end caps 4 ft.	Not available	Provided mounted to Unibody exterior	Slotted (5% standard with other % options available)
	"S" Series GOOD	T5 & T8	2, 4, 6 (T8 only)	Unibody .036" AL with steel end caps 8 ft.	Not available	Provided mounted to Unibody exterior	Slotted (5% standard with other % options available)
	"A" Series GOOD	T8	6	Unibody .036" AL with steel end caps 8 ft.	Not available	Provided mounted to Unibody exterior	Slotted (5% standard with other % options available)

lote: All series utilize high specularity anodized Miro 4® aluminum reflectors

ighting Alternatives

SYSTEM PERFORMANCE	T8 HIGH LUMEN (8 LAMPS)	T5HO (6 LAMP)	T5HO (4 LAMP)	400 WATT MH MVR400/U
Lamp	F32T8/HL	F54W/T5	F54W/T5	MVR400/U
No. Of Lamps	6	6	4	1
Rated Life	20,000	20,000	20,000	20,000
CRI	82	85	85	65
Nominal Lamp Initial Lumens (per fixture)	18,600	30,000	20,000	36,000
Nominal Lamp Mean Lumens (per fixture)	17,490	28,200	18,800	23,400
Lumen Maintenance	94%	94%	94%	65%
Ballast Factor	1.15	1	1	1
System Watts	226	351	234	456
*System Initial Lumens	21,390	30,000	20,000	36,000
System Mean Lumens	20,114	28,300	18,800	23,400
System LPW (Mean)	89	81	80	51

ncludes ballast factor and temp

	**BEST**			T8: 22 Guage CRS Box Type 4 ft.	acrylic, flat diffuse acrylic, drop-down diffuse acrylic	Inset In steel lens frame	lamps or slotted (5% standard with other %options available)
	**"M" Series BETTER**	T5 only	4	.040" AL Box Type 4 ft.	Flat clear acrylic, flat prismatic acrylic	Provided mounted to housing exterior	No Uplight available
	**"C" Series BETTER**	T5 only	4	040" AL Box Type 4 ft.	Flat clear acrylic, flat prismatic acrylic	Provided mounted to housing exterior	No Uplight available
	**"E" Series GOOD**	T5 & T8	4 - 8	Unibody 036" AL with steel end caps 4 ft.	Not available	Provided mounted to Unibody exterior	Slotted (5% standard with other % options available)
	"S" Series GOOD	T5 & T8	2, 4, 6 (T8 only)	Unibody .036" AL with steel end caps 8 ft.	Not available	Provided mounted to Unibody exterior	Slotted (5% standard with other % options available)
	**"A" Series GOOD**	T8	6	Unibody .036" AL with steel end caps 8 ft.	Not available	Provided mounted to Unibody exterior	Slotted (5% standard with other % options available)

All series utilize high specularity anodized Miro 4™ aluminum reflectors

hting Alternatives

TEM FORMANCE	T8 HIGH LUMEN (6 LAMPS)	T5HO (6 LAMP)	T5HO (4 LAMP)	400 WATT MH MVR400/U
np	F32T8/HL	F54W/T5	F54W/T5	MVR400/U
Of Lamps	6	6	4	1
ed Life	20,000	20,000	20,000	20,000
	82	85	85	65
ninal Lamp Initial Lumens (per fixture)	18,600	30,000	20,000	36,000
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stem Initial Lumens	21,390	30,000	20,000	36,000
tem Mean Lumens	20,114	28,300	18,800	23,400
tem LPW (Mean)	89	81	80	51

Order Logic

SERIES

F5	E5	A8
F8	E8	
M5	S5	
C5	S8	

LENGTH

4' = 4 FEET
8' = 8 FEET

NUMBER OF LAMPS DOWN

2 = 2 DOWN	6 = 6 DOWN
4 = 4 DOWN	8 = 8 DOWN

LAMP WATTAGE/TYPE

3 = 32W	5 = 54W

LAMP COLOR/TEMP

0 = NO LAMP	A = 4100K	E = 5000K	B=6500K

UPLIGHT/DISTRIBUTION SELECTION

0 = NO UPLIGHT/STANDARD DISTRIBUTION
2 = 2 LAMP UPLIGHT/STANDARD DISTRIBUTION
P = 5% UPLIGHT SLOTS

BALLAST TYPE SELECTION

1ST DIGIT = BALLAST TYPE
E = ELECTRONIC BALLAST - INSTANT START
R = ELECTRONIC BALLAST - PROGRAM START

2ND DIGIT = BALLAST FACTOR
(T5) 1 = STANDARD - OFFERING HIGH BALLAST FACTOR 1.00
(T8) 1 = STANDARD - OFFERING GE ULTRAMAX HIGH BALLAST FACTOR 1.15
(T8) 2 = ULTRAMAX NORMAL BALLAST FACTOR .87

3RD DIGIT = TYPE/COMBINATION
G = (2) 2-LAMP BALLASTS TO OPERATE (4) LAMPS
H = (1) 2-LAMP BALLASTS TO OPERATE (2) LAMPS
J = (2) 3-LAMP BALLASTS TO OPERATE (6) LAMPS
M = (2) 4-LAMP BALLASTS TO OPERATE (8) LAMPS
CONTACT FACTORY FOR DIFFERENT LAMP BALLAST COMBINATIONS

VOLTAGE

0 = UNIVERSAL VOLTAGE (120-277V) DISCRETE VOLTAGES
1 = 120 VOLT
2 = 208 VOLT
3 = 240 VOLT
4 = 277 VOLT
(T8) 5 = 480 VOLT
(T5) H = 347 X 480 VOLT

MOUNTING OPTIONS

AA = NO MOUNTING HARDWARE
AB = ACCESS BOX FOR 3/4" SINGLE PENDANT MOUNT
AD = V-HANGER W/3' CHAIN
AK = V-HANGER ONLY (NO CHAIN)

CORD LENGTH

00 = NO CORD	03 = 3 FOOT	06 = 6 FOOT	08 = 8

CORD CONDUCTOR

0 = NONE	3 = AWG 18-3	6 = STOW 16-3

PLUG TYPE

A = NO PLUG

DISCRETE VOLTAGE MUST BE SPECIFIED WHEN ORDERING FOLLOWING:
B = NEMA STRAIGHT PLUG 15 AMP
C = NEMA TWISTLOCK PLUG 15 AMP
E = NEMA TWISTLOCK PLUG 20 AMP

OPTIONS

C = OCCUPANCY SENSOR (FOR OPEN AREA)
E = (T8) EMERGENCY BATTERY BACK-UP (AVAILABLE ONLY A 120 TO 277 DISCRETE VOLTAGE ONLY)
H = STEEL DOOR FRAME, W/CLEAR LENS
J = (T5) EMERGENCY BATTERY
K = STEEL DOOR FRAME WITH PIANO HINGE WITH CLEAR L
L = OCCUPANCY SENSOR (FOR AISLE USE)
P = STEEL DOOR FRAME W/ PATTERN 12 LENS
V = STEEL DOOR FRAME W/ PRISMATIC "V" BOTTOM LENS
W = WIRE GUARD

SPECIAL NOTES

1. OCCUPANCY SENSOR REQUIRES DISCRETE VOLTAGE. LIN VOLTAGE OPERATION STANDARD.

SERIES	LENGTH	LAMPS	WATTAGE	LAMP COLOR	UPLIGHT	BALLAST	VOLTAGE	MOUNTING	CORD LENGTH	CORD CONDUCTOR	PLUG TYPE	OPTIONS
XX	X	X	X	X	X	XXX	X	XX	XX	X	X	X

SERIES

F5	E5	A8
F8	E8	
M5	S5	
C5	S8	

LENGTH

4' = 4 FEET
8' = 8 FEET

NUMBER OF LAMPS DOWN

2 = 2 DOWN 6 = 6 DOWN
4 = 4 DOWN 8 = 8 DOWN

LAMP WATTAGE/TYPE

3 = 32W 5 = 54W

LAMP COLOR/TEMP

0 = NO LAMP A = 4100K E = 5000K B=6500K

UPLIGHT/DISTRIBUTION SELECTION

0 = NO UPLIGHT/STANDARD DISTRIBUTION
2 = 2 LAMP UPLIGHT/STANDARD DISTRIBUTION
P = 5% UPLIGHT SLOTS

BALLAST TYPE SELECTION

1ST DIGIT = BALLAST TYPE
E = ELECTRONIC BALLAST - INSTANT START
R = ELECTRONIC BALLAST - PROGRAM START

2ND DIGIT = BALLAST FACTOR
(T5) 1 = STANDARD - OFFERING HIGH BALLAST FACTOR 1.00
(T8) 1 = STANDARD - OFFERING GE ULTRAMAX HIGH BALLAST FACTOR 1.15
(T8) 2 = ULTRAMAX NORMAL BALLAST FACTOR .87

3RD DIGIT = TYPE/COMBINATION
G = (2) 2-LAMP BALLASTS TO OPERATE (4) LAMPS
H = (1) 2-LAMP BALLASTS TO OPERATE (2) LAMPS
J = (2) 3-LAMP BALLASTS TO OPERATE (6) LAMPS
M = (2) 4-LAMP BALLASTS TO OPERATE (8) LAMPS
CONTACT FACTORY FOR DIFFERENT LAMP BALLAST COMBINATIONS

VOLTAGE

0 = UNIVERSAL VOLTAGE (120-277V) DISCRETE VOLTAGES
1 = 120 VOLT
2 = 208 VOLT
3 = 240 VOLT
4 = 277 VOLT
(T8) 5 = 480 VOLT
(T5) H = 347 X 480 VOLT

MOUNTING OPTIONS

AA = NO MOUNTING HARDWARE
AB = ACCESS BOX FOR 3/4" SINGLE PENDANT MOUNT
AD = V-HANGER W/3' CHAIN
AK = V-HANGER ONLY (NO CHAIN)

CORD LENGTH

00 = NO CORD 03 = 3 FOOT 06 = 6 FOOT 08 = 8 FOO

CORD CONDUCTOR

0 = NONE 3 = AWG 18-3 6 = STOW 16-3

PLUG TYPE

A = NO PLUG

DISCRETE VOLTAGE MUST BE SPECIFIED WHEN ORDERING FOLLOWING:
B = NEMA STRAIGHT PLUG 15 AMP
C = NEMA TWISTLOCK PLUG 15 AMP
E = NEMA TWISTLOCK PLUG 20 AMP

OPTIONS

C = OCCUPANCY SENSOR (FOR OPEN AREA)
E = (T8) EMERGENCY BATTERY BACK-UP (AVAILABLE ONLY AS 120 TO 277 DISCRETE VOLTAGE ONLY)
H = STEEL DOOR FRAME, W/CLEAR LENS
J = (T5) EMERGENCY BATTERY
K = STEEL DOOR FRAME WITH PIANO HINGE WITH CLEAR LEN
L = OCCUPANCY SENSOR (FOR AISLE USE)
P = STEEL DOOR FRAME W/ PATTERN 12 LENS
V = STEEL DOOR FRAME W/ PRISMATIC "V" BOTTOM LENS
W = WIRE GUARD

SPECIAL NOTES

1. OCCUPANCY SENSOR REQUIRES DISCRETE VOLTAGE. LINE VOLTAGE OPERATION STANDARD.
2. CORD AND NEMA PLUG REQUIRE DISCRETE VOLTAGE.
3. OPTION E & J BATTERY BACKUP. 1 LAMP AT 1150 LUMENS FOR 90 MINUTES. DISCRETE VOLTAGE 120 TO 277 ONLY.
4. BALLAST SUPPLIER CAN VARY FOR 480 VOLT FIXTURES.

Note: All option selections shown are not available on all fixture types. Refer to specific catalog order logic for each series to determine correct product selection and order logic.

hotometric & Application

ERIES: T5 - 4 Lamp

TOMETRY: (4) Lamp Curve # 35-452969

ency = 97.6%

= 1.9

QUICK REFERENCE GUIDE

4x54 T5 HO, 234W

ture cing	15	20	25
	Maintained Footcandles		
High	55	29	18
High	58	31	19
High	62	34	21
High	65	36	23
High	68	38	25
High	70	41	27
High	75	43	29
High	78	45	31

F5-SERIES: T5 - 6 Lamp

PHOTOMETRY: (6) Lamp Curve # 35-4529737

Efficiency = 98.2%

S/MH = 1.7

QUICK REFERENCE GUIDE

6x54 T5 HO, 351W

Fixture Spacing	15	20	25
	Maintained Footcandles		
50' High	82	46	25
45' High	88	50	28
40' High	94	54	32
35' High	100	57	35
30' High	108	60	38
25' High	115	63	43
20' High	120	68	47

E5-SERIES: T5 - 6 Lamp

PHOTOMETRY: (6) Lamp Curve # 35-452959

Efficiency = 97.10%

SC (ALONG): 1.2 SC (ALONG): 1

QUICK REFERENCE GUIDE

4x54 T5 HO, 234W

Fixture Spacing	15	20	25
	Maintained Footcandles		
50' High	81	45	23
45' High	87	48	27
40' High	93	52	31
35' High	99	55	34
30' High	106	59	36
25' High	112	62	42
20' High	118	67	46

ERIES: T8 - 6 Lamp

TOMETRY: (6) Lamp Curve # 35-452973 Efficiency = 85.9%

S/MH = 1.2

QUICK REFERENCE GUIDE

ture cing	6x32 T8 Normal, 174W			6x32 T8 Light, 224W		
	15	20	25	15	20	25
	Maintained Footcandles			Maintained Footcandles		
High	46	26	16	57	31	21
High	48	28	17	60	33	22
High	51	30	18	64	35	24
High	56	32	19	68	37	25
High	58	33	20	70	39	26
High	60	34	22	72	41	27
High	62	36	24	77	44	29
High	64	37	26	81	46	31

F8-SERIES: T8 - 8 Lamp

PHOTOMETRY: (6) Lamp Curve # 35-452957 Efficiency =

SC (ALONG): 1.2 SC (ALONG):

QUICK REFERENCE GUIDE

Fixture Spacing	6x32 T8 Normal, 174W			6x32 T8 High Light, 2	
	15	20	25	15	20
	Maintained Footcandles			Maintained Footcan	
50' High	47	27	17	59	33
45' High	49	30	18	62	35
40' High	52	32	19	66	37
35' High	57	34	21	70	40
30' High	59	34	23	71	41
25' High	61	35	24	73	42
20' High	63	37	25	79	45
15' High	65	38	27	82	47

ERIES: T5 - 2 or 4 Lamp

TOMETRY: (2) Lamp Curve # 35-452960 Efficiency = 85.9%

(4) Lamp Curve # 35-452985 S/MH = 1.2

QUICK REFERENCE GUIDE

ture cing	(2) Lamp Fixture, 117W 8 Ft. Wide Stack Aisle			(4) Lamp Fixture Task, 234W 8 Ft. Wide Stack Aisle		
	15	20	25	15	20	25
	Maintained Footcandles			Maintained Footcandles		
High	12	9	7	25	20	16
High	14	11	9	28	23	18
High	15	13	11	34	26	21
High	20	15	12	40	31	24

A8-SERIES: 8 Foot - T8 - 6 Lamp

PHOTOMETRY: (6) Lamp Curve # 35-45297355 Efficiency =

S/MH =

QUICK REFERENCE GUIDE (EXAMPLES)

Fixture Spacing	9 FT. WIDE STACK AISLE			6 FT. WIDE STACK A	
	20	25	30	20	25
	Maintained Footcandles			Maintained Footca	
50' High	18	15	12	16	13
45' High	21	17	14	19	15
40' High	23	19	16	21	17
35' High	27	21	18	25	19
30' High	32	25	20	30	23

ency = 97.6%
t = 1.9

QUICK REFERENCE GUIDE
4x54 T5 HO, 234W

ture cing	15	20	25
	Maintained Footcandles		
High	55	29	18
High	58	31	19
High	62	34	21
High	65	36	23
High	68	38	25
High	70	41	27
High	75	43	29
High	78	45	31

Efficiency = 98.2%
S/MH = 1.7

QUICK REFERENCE GUIDE
6x54 T5 HO, 351W

Fixture Spacing	15	20	25
	Maintained Footcandles		
50' High	82	46	25
45' High	88	50	28
40' High	94	54	32
35' High	100	57	35
30' High	108	60	38
25' High	115	63	43
20' High	120	68	47

Efficiency = 97.10%
SC (ALONG): 1.2 SC (ALONG):

QUICK REFERENCE GUIDE
4x54 T5 HO, 234W

Fixture Spacing	15	20	25
	Maintained Footcandles		
50' High	81	45	23
45' High	87	48	27
40' High	93	52	31
35' High	99	55	34
30' High	106	59	36
25' High	112	62	42
20' High	118	67	46

SERIES: T8 - 6 Lamp
TOMETRY: (6) Lamp Curve # 35-452973 Efficiency = 85.9%
S/MH = 1.2

QUICK REFERENCE GUIDE

ture cing	6x32 T8 Normal, 174W 15	20	25	6x32 T8 Light, 224W 15	20	25
	Maintained Footcandles			Maintained Footcandles		
High	46	26	16	57	31	21
High	48	28	17	60	33	22
High	51	30	18	64	35	24
High	56	32	19	68	37	25
High	58	33	20	70	39	26
High	60	34	22	72	41	27
High	62	36	24	77	44	29
High	64	37	26	81	46	31

E8-SERIES: T8 - 6 Lamp
PHOTOMETRY: (6) Lamp Curve # 35-452957 Efficiency =
SC (ALONG): 1.2 SC (ALONG):

QUICK REFERENCE GUIDE

Fixture Spacing	6x32 T8 Normal, 174W 15	20	25	6x32 T8 High Light, 2 15	20
	Maintained Footcandles			Maintained Footcan	
50' High	47	27	17	59	33
45' High	49	30	18	62	35
40' High	52	32	19	66	37
35' High	57	34	21	70	40
30' High	59	34	23	71	41
25' High	61	35	24	73	42
20' High	63	37	25	79	45
15' High	65	38	27	82	47

SERIES: T5 - 2 or 4 Lamp
OTOMETRY: (2) Lamp Curve # 35-452960 Efficiency = 85.9%
(4) Lamp Curve # 35-452985 S/MH = 1.2

QUICK REFERENCE GUIDE

ture cing	(2) Lamp Fixture, 117W 8 Ft. Wide Stack Aisle 15	20	25	(4) Lamp Fixture Task, 234W 8 Ft. Wide Stack Aisle 15	20	25
	Maintained Footcandles			Maintained Footcandles		
High	12	9	7	25	20	16
High	14	11	9	28	23	18
High	15	13	11	34	26	21
High	20	15	12	40	31	24
High	23	18	15	49	38	30
High	28	23	18	60	46	36

A8-SERIES: 8 Foot - T8 - 8 Lamp
PHOTOMETRY: (6) Lamp Curve # 35-45297355 Efficiency
S/MH =

QUICK REFERENCE GUIDE (EXAMPLES)

Fixture Spacing	9 FT. WIDE STACK AISLE 20	25	30	6 FT. WIDE STACK A 20	25
	Maintained Footcandles			Maintained Footca	
50' High	18	15	12	16	13
45' High	21	17	14	19	15
40' High	23	19	16	21	17
35' High	27	21	18	25	19
30' High	32	25	20	30	23
25' High	36	28	22	34	26

plication Notes:
ctual results may vary depending on application conditions
alculations base on T5 HO Lamps at 4500 mean lumens

- T8 Lamps at 2820 mean lumens and ballast factor 1.15
- All versions do not include up-light options

- Horizontal foot candles at 2.5' work pla
- Based on reflectance of ceiling .5, walls floor .1

Accessories

Lens Types Available

Patterned V Acrylic (F Series Only)

Patterned Flat Acrylic (F, M, C only)

Clear Flat Acrylic (F, M, C only)

Wireguards (W Option)

Wireguard & Chain Mount (F Series)

Wireguard Ext. Mount (M, C Series)

Wireguard Ext. Mount (E, A, S S

Mounting Options

V Hanger & Chain Mount

Large Electric Box


Electric Box

Lens Types Available

Patterned V Acrylic (F Series Only)

Patterned Flat Acrylic (F, M, C only)

Clear Flat Acrylic (F, M, C only

Wireguards (W Option)

Wireguard & Chain Mount (F Series)

Wireguard Ext. Mount (M, C Series)

Wireguard Ext Mount (E, A, S Se

Mounting Options

V Hanger & Chain Mount

Large Electric Box

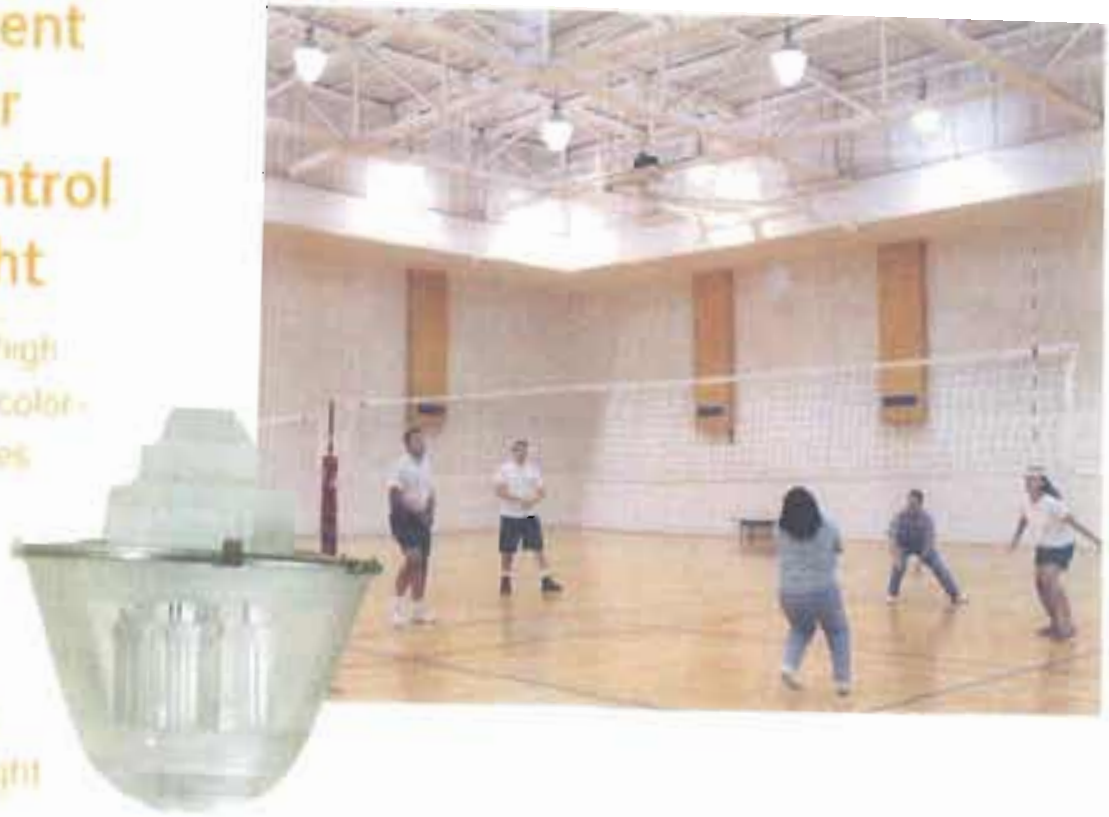

Electric Box

Occupancy Sensor (F Series)

Occupancy Sensor (E Series)


Uplight (F Series "2" Uplight

ompact Fluorescent xtures (CFL) Offer uick Lighting Control d Quality of Light



ere multiple light levels and high lity of lighting is critical, the color- lering and instant-on features ompact fluorescent lamps l are often most desirable high bay or low bay lications. CFL lighting ems are ideal where flexible ing control and consistent light lut is required.

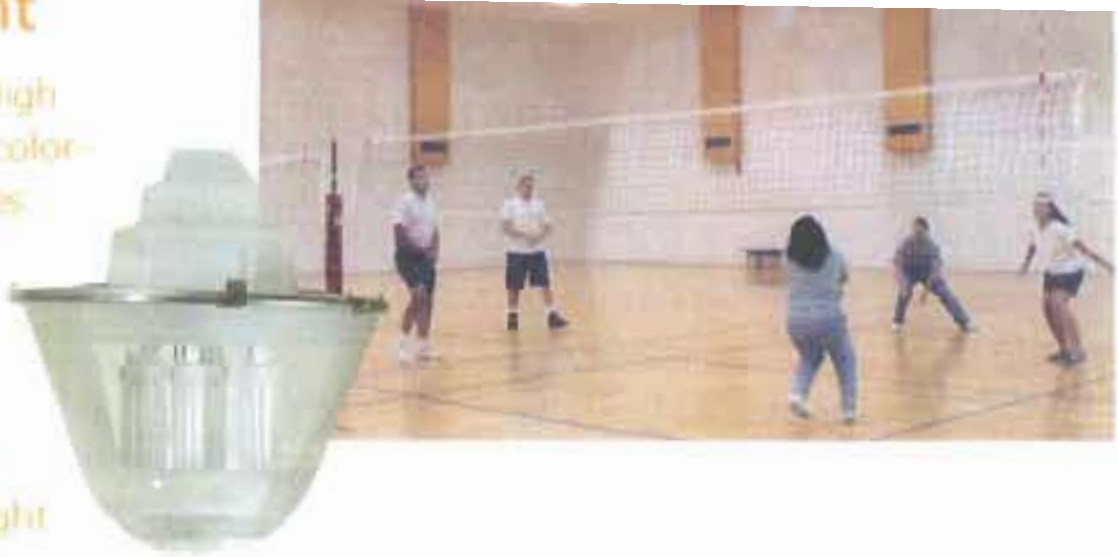
benefits of a high color rendering e (CRI) are evident in commercial l applications that show multi-color ducts at their best light.

Mitron CFL light sources allow multiple light levels and greater rol. For use in multipurpose nasium and auditorium cations CFL lighting from ghting Systems provide a le quality of light.

FEATURES	FUNCTION	BENEFIT
ant on & restrike capabilities	No delay in lighting and no need for emergency quartz restrike	On and off for energy savings and fast response in emergencies
chable light levels	Multiple ballasts allow for switch lamp pairs	Stepped light levels provide flexibility of applications
r rendering	White light with a color rendering (CRI) index of 82	Constant, uniform color over life of lamp allows for brighter clearer more vibrant color recognition
ended lumen maintenance	Less lumen depreciation	

...d Quality of Light

...ete multiple light levels and high ...lity of lighting is critical, the color ...tering and instant-on features ...ompact fluorescent lamps ...) are often most desirable ...high bay or low bay ...lications. CFL lighting ...ems are ideal where flexible ...ting control and consistent light ...ut is required.



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...olor rendering	White light with a color rendering (CRI) index of 82	Constant, uniform color over life of lamp allows for brighter clearer more vibrant color recognition
...mproved lumen maintenance	Less lumen depreciation at mean life than metal halide	More consistent light output over lamp life reduces maintenance costs
...ow Noise	Sound Rated A	Elimination of annoying or disrupting noise generated by fixture

CFL Performance

Lamp Type / Combination	Number Of Lamps	Wattage	Total Watts	Initial Lamp Lumens	Mean Lamp Lumens	Total Fixture Mean Lumens	Maintained Lumens / Watt	Versabeam Availability	Omnibeam Availability	Unimount Availability
4 x 32 watt	4	32	128	2200	1850	7400	58	X	X	X
3 x 42 watt	3	42	126	3200	2720	8160	65	X	X	X
MVR 175	1	175	175	13600	8600	8600	41			
3 x 57 watt	3	57	171	4300	3440	10320	60	C/F	C/F	C/F
4 x 42 watt	4	42	168	3200	2720	10880	65	X	X	X
6 x 32 watt	6	32	192	2200	1850	11100	58	X	X	X
3 x 70 watt	3	70	210	5200	4160	12480	59	X	X	X
MVR175/VBU/PA	1	175	175	17000	12500	12500	71			
MVR 250	1	250	250	20800	13500	13500	54			
4 x 57 watt	4	57	228	4300	3440	13760	60	C/F	C/F	C/F
8 x 32 watt	8	32	256	2200	1850	14800	58	X	X	X
6 x 42 watt	6	42	252	3200	2720	16320	65	X	X	X
4 x 70 watt	4	70	280	5200	4160	16640	59	X	X	X
MVR250/VBU/PA	1	250	250	23000	17000	17000	68			
6 x 57 watt	6	57	342	4300	3440	20640	60	C/F	C/F	C/F
8 x 42 watt	8	42	336	3200	2720	21760	65	X	X	X
MVR400/U	1	400	400	36000	23500	23500	59			
6 x 70 watt	6	70	420	5200	4160	24960	59	X	X	X
MVR400/VBU/HO/PA	1	400	400	41000	31000	31000	78			

CFL Offerings HID Offerings

X = Available Wattage & Lamp C
C/F = Consult Factory

VERSABEAM™

VERSABEAM APPLICATIONS

For low bay or high bay applications with mounting heights from 15' to 30+'. The Versabeam's high efficiency drop-down refractor provides excellent illumination on both horizontal and vertical surface reducing unwanted glare. Enclosed and gasketed optics keep dirt out for better-maintained light outp

The Versabeam offers a unique combination of aesthetic appeal and high performance. For use in commercial, retail, general purpose and industrial applications.

An excellent choice for gymnasium applications where the robust optical construction eliminates the for a wireguard.

OMNIBEAM™
Open or Enclosed

OMNIBEAM APPLICATIONS

For medium to high bay applications from 20' to 30'. The Omnibeam acrylic optical provides an aesth appealing look in both open and enclosed versions.

For commercial or retail applications where an acrylic prismatic reflector with some uplight effect is

UNIMOUNT®
Open

UNIMOUNT®
Enclosed

UNIMOUNT APPLICATIONS

For low bay applications with mounting heights from 15' to 25'. The Unim provides a spun aluminum upper reflector with a diffuse refractor lens or versions. The enclosed and gasketed unit provides improved system life a lower light losses due to dirt depreciation.

For commercial, general purpose and industrial applications where traditi low bay fixtures are used.

Lamp Type / Combination	Number Of Lamps	Wattage	Total Watts	Lamp Lumens	Lamp Lumens	Watt				
4 x 32 watt	4	32	128	2200	1850	7400	58	X	X	X	X
3 x 42 watt	3	42	126	3200	2720	8160	65	X	X	X	X
MVR 175	1	175	175	13600	8600	8600	41				
3 x 57 watt	3	57	171	4300	3440	10320	60	C/F	C/F	C/F	C/F
4 x 42 watt	4	42	168	3200	2720	10880	65	X	X	X	X
6 x 32 watt	6	32	192	2200	1850	11100	58	X	X	X	
3 x 70 watt	3	70	210	5200	4160	12480	59	X	X	X	X
MVR175/VBU/PA	1	175	175	17000	12500	12500	71				
MVR 250	1	250	250	20800	13500	13500	54				
4 x 57 watt	4	57	228	4300	3440	13760	60	C/F	C/F	C/F	C/F
8 x 32 watt	8	32	256	2200	1850	14800	58	X	X	X	
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UNIMOUNT®
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For commercial, general purpose and industrial applications where traditiona low bay fixtures are used.

Jr. VERSABEAM APPLICATIONS

For 8 to 16 ft. (2 to 4 meter) mounting heights.

For applications requiring high efficiency and optimized vertical and horizontal light levels

Industrial, commercial and retail low bay applications, including multipurpose commercial, aisle lightir

loor CFL

/ersabeam™
pact Fluorescent Luminaire

Bay, Enclosed –
ace Mounting Optical Series

Jr. Versabeam Luminaire Specification Features

- 1598 Listed, Suitable For Damp Locations
- 1598 Listed suitable for wet locations depending on mounting configuration ordered
- Listed to Canadian standards and codes
- Lamp included: 4-pin with CFL
- IP54 Standard construction
- Sleek, clean housing with teardrop refractor has a low profile
- Available in custom colors for architectural design
- Decorative stripe adds custom color designs to the high quality die cast housing
- Photometrics provide optimum light levels on vertical and horizontal surfaces
- Advanced refractor technology minimizes glare, maximizes light efficiency
- Mounting options provide flexibility and ease of installation

door CFL

Versabeam™
pact Fluorescent Luminaire

Bay or Low Bay, Enclosed –
ace Mounting Optical Series

Versabeam Luminaire Specification Features

- UL 1598 Listed - Suitable for Damp Locations
- cUL Listed to Canadian standards and codes
- 40° C. ambient rating standard
- UV stabilized injection molded refractor for low brightness
- Enclosed and gasketed optical
- Refractor with combination of reflecting and refracting prisms for high efficiency and good brightness control and low glare
- ALGLAS finish on aluminum surfaces
- High efficiency
- Latched and hinged lens - easy maintenance

Mounting Optical Series

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or CFL

rsabeam™

ct Fluorescent Luminaire

y or Low Bay, Enclosed –

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- ALGLAS finish on aluminum surfaces
- High efficiency
- Latched and hinged lens - easy maintenance

- Enclosed optical provides maximum lamp protection
- Optical construction ideal for gymnasium applications – no wireguard required!

Indoor CFL

OBC OMNIBEAM™
Compact Fluorescent Luminaire

High Bay Prismatic Acrylic
Open/Enclosed - Surface Mount
Optical Series

Omnibeam Luminaire Specification Features

- UL 1598 Listed - Suitable for Damp Locations
- cUL Listed to Canadian standards and codes
- 26" Open / ventilated or enclosed opticals with Choice of clear or prismatic lens
- 40° C. ambient rating standard
- UV stabilized injection molded prismatic acrylic reflector
- Acrylic reflector with "see through" optical appearance
- White polyester paint finish
- High CU & excellent photometry with uplight component

Indoor CFL

UMC UNIMOUNT™
Compact Fluorescent Luminaire

Low Bay, Enclosed/Open -
Surface Mount Optical Series

Unimount Luminaire Specification Features

- UL 1598 Listed - Suitable for Damp Locations
- cUL Listed to Canadian standards and codes
- 40° C. ambient rating standard

- White polyester paint f
- High CU & excellent ph
  component

Indoor CFL

UMC UNIMOUNT®
Compact Fluorescent Luminaire

Low Bay, Enclosed/Open –
Surface Mount Optical Series

Unimount Luminaire Specification Features

- UL 1598 Listed - Suitable for Damp Locations
- cUL Listed to Canadian standards and codes
- 40° C. ambient rating standard
- Open optical or enclosed with UV stabilized injection molded prismatic acrylic refractor for

- 40° C. ambient rating standard
- UV stabilized injection molded prismatic acrylic reflector
- Acrylic reflector with "see through" optical appearance
- White polyester paint finish
- High CU & excellent photometry with uplight component

Indoor CFL

UHC UNIMOUNT™
Compact Fluorescent Luminaire

Low Bay, Enclosed/Open –
Surface Mount Optical Series

Unimount Luminaire Specification Features

- UL 1598 Listed - Suitable for Damp Locations
- cUL Listed to Canadian standards and codes
- 40° C. ambient rating standard
- Open optical or enclosed with UV stabilized injection molded prismatic acrylic refractor for low brightness
- Gasketed optical when enclosed
- Alzak finish on aluminum reflector surfaces
- Latched and hinged refractor for relamping access

State terms project provides Highland Middle School with comfortable tech lab...just in time.

Challenge

With the school year fast approaching, Highland Local Schools found itself with a comfort cooling challenge. The district had created a tech lab at Highland Middle School in a room with no air conditioning. The 25 personal computers, along with the students, created a consistent heat load that requires cooling year round to keep the tech lab at a comfortable temperature. The district also had to address the issue of maintaining comfortable room temperatures in the neighboring classrooms and administrative offices. The decision to install this unit was made approximately five (5) weeks before school began. This did not allow for much time to have the unit ordered, shipped, and installed on target.

Solution

The rooftop was delivered and installed one week before school began. In addition, Gardiner Trane worked with Highland Local Schools to engineer a solution that accomplished the school district's goals, while

Gardiner Trane

Building Specifications

Building Type

- Educational - Grades 6-8
- School Rating:
  Excellent (22 of 22 Test Benchmarks obtained)

Constructed

- 1957
- Renovated 2004

Facility Size

- 657 Students Enrolled
- 47 Staff Members
- 113,986 sq. ft., one (1) story

"With Gardiner Trane's professional assistance in engineering & installation, these rooms were completed & ready for student occupancy on the first day of school. I really appreciate their dedication and expertise!" Jim Reusch, Director of Operations

staying within an aggressive budget. As it turns out, Gardiner Trane engineered Highland's existing ductwork with some modifications and supplements to the ductwork to enable the rooftop unit to serve the tech lab, as well as two (2) additional classrooms, and three (3) administrative offices. This particular rooftop unit, with variable volume dampers, allows for all of these areas to remain comfortable throughout the varying temperatures during the school year.

Results

The limited time frame did not allow for Highland to research and obtain additional bids on this project. Highland quickly learned that Gardiner Trane handles projects on the State Terms Schedule and therefore adheres to pre-negotiated equipment pricing in accordance with state terms. This reassured Highland that further bids would not be necessary and that they would receive the best possible equipment, installation, and service available in the industry. Highland continues to enjoy comfortable temperatures in the designated areas served by the rooftop unit.

For more on Gardiner Trane Solutions, visit ***www.gardinertrane.com*** *or contact us at* ***440.248.3400***

Systems Overview

- Packaged A/C Rooftop Unit
- Variable Air Volume System
- Direct Digital Controls
- State Terms Schedule Procurement

About Highland Local Schools

The Highland Local School District is committed to the highest academic and behavioral expectations. Their mission is to guarantee that each learner reaches maximum potential, by providing, in partnership with the community, a quality, progressive, educational program in a safe and dynamic life-long learning environment.

BUILDING SERVICES

Helping you operate, maintain, and enhance your systems for the life of your building.

No matter what business you're in, proper maintenance of your building systems and the ability to plan for the future can positively impact an organization's productivity and bottom line.

To keep your equipment running smoothly and efficiently, Gardiner Trane offers a range of services unmatched by any other Northeast Ohio service provider. With more than 20 degreed engineers and 45 technicians dedicated to the area, it's no wonder that we service more than twice the number of large applied systems as our nearest competitor.

Whether your equipment is manufactured by Trane or another supplier, we offer complete support capabilities and experience to keep your systems on-line and operating at peak efficiency.

COMMERCIAL COMFORT

INDUSTRIAL FACILITIES & PROCESS COOLING

HEALTHCARE

EDUCATION

GOVERNMENT

Gardiner Trane Services

Mechanical System Services

Maintenance & Repair Services

- All manufacturers, All types of equipment

Predictive & Diagnostic Services

- Full range of testing

System Enhancement Services

- Optimize performance, efficiency, & comfort

Gardiner Trane is Northeast Ohio's exclusive Trane Commercial Systems factory authorized start-up, warranty, and extended service representative.

LEVITON®

Dual Relay Decora® Wall Switch Multi-Technology Occupancy Sensors

OSSMD-MD/-GD

OSSMD-FT

BASIC OPERATION

The PIR is used to detect motion and turn lights ON, while either technology is used to keep lights ON while occupied. This allows the Ultrasonic (U/S) to be set to higher sensitivity levels minimizing false OFF conditions. The PIR portion gives immunity to false ON through a specialized lens that divides the field-of-view into sensor zones. When a person passes into or out of a sensor zone, the sensor detects motion and switches the primary lighting load ON while the secondary relay operaties in manual-ON/auto-OFF (MD/GD models). With the FT models, both relays operate in auto-ON/auto-OFF. The lights will remain ON as long as there is an occupant moving through the sensor zones. The U/S sensors give maximum sensitivity and range in difficult spaces with irregular shaped rooms and partitions that can block the PIR field-of-view. The OSSMD also features the ability to turn off PIR or U/S to become a single tech device.

APPLICATIONS

- Private and Executive offices
- Conference rooms
- Classrooms
- Storage areas
- Multimedia rooms
- Lounges
- Bi-level or A/B switching
- Multi-location switching (similar to 3-way)
- Daylight harvesting
- Restrooms
- Training areas
- Day care centers
- Retrofits

The OSSMD provides automatic lighting control for two separate loads from a single unit. It is compatible with incandescent, fluorescent, low-voltage lighting, and fan loads. The unit features dual manual-override switches that can be used to toggle the ON/OFF status of each lighting load while an area is occupied. The OSSMD can be installed in place of two single-pole wall switches and fits in a standard single-gang wall box. To comply with CEC Title 24, the second relay is a manual-ON only.

The OSSMD-FT is a Leviton exclusive model which also provides automatic switching of two spearate loads from a single unit. The unit features a single manual override switch for the first relay. The second, “fan relay”, is an auto-ON with relay 1 and has an extended time delay of 10 minutes after relay 1. This provides both energy efficiency and optimum ventilation control from a single device.

HOW THE OSSMD AUTOMATICALLY ADAPTS

CONDITION	EXAMPLE	ADAPTIVE REACTION
False-On: Sensor incorrectly turns the lights ON.	The sensor detects movement in the corridor or hallway and the room light turns ON.	After an initial movement is sensed, if another movement is not sensed within the timer setting the delayed off-time setting is automatically reduced.
False-Off: Sensor incorrectly turns the lights OFF.	The sensor does not detect movement because an occupant is virtually motionless and the lights turn OFF.	If motion is detected shortly after the lights go off, the current delayed off-time setting is increased.

Leviton Mfg. Co., Inc. Lighting & Energy Solutions
201 N. Service Rd. Melville, NY 11747-3138 Tech Line: 1-800-824-3005 Fax: 1-800-832-9538 www.leviton.com/les

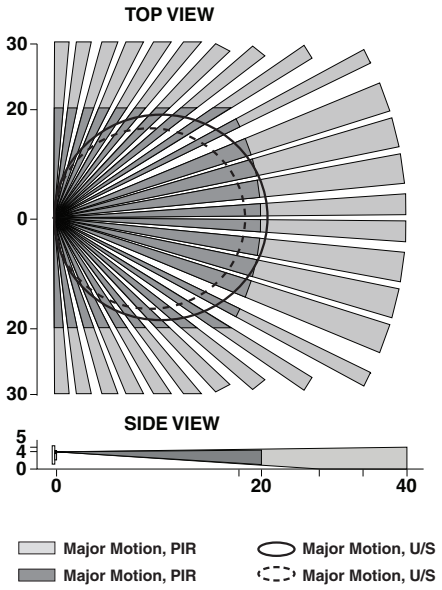
PRODUCT DATA

FEATURES

- Provides automatic lighting control for two separate banks of fluorescent, incandescent, or low-voltage lighting from a single unit.
- The second relay is a manual-ON only with a maximum 30 minute time-out for maximum energy savings to comply with CEC Title 24
- The OSSMD-FT is intended to control a light circuit and a fan. The button on the sensor provides ON control for both circuits and OFF for lighting circuits only. The sensor will automatically turn ON both when occupancy is detected. When no movement is detected, the primary relay will turn OFF after the delay OFF time expires. The fan will remain ON to clear the airspace for an additional 10 minutes after the time-out or button press.
- Fits in a standard single-gang wall box and replaces two single-pole wall-switches for fast and easy installation; neutral and ground connection required for OSSMD-MD and OSSMD-FT. OSSMD-GD does not require a neutral for installation.
- Low-profile design eliminates obtrusive "scanning-device" look. Elegant Decora wallplates complement any interior for sleek aesthetics; uses Decora wallplates and coordinates with Leviton's popular line of Decora wiring devices.
- 180° field-of-view provides approximately 2400 square feet of coverage, suitable for a variety of commercial areas.
- Convenient pushbuttons provide manual-ON/OFF light switching of each load at any time.
- Segmented Fresnel lens provides optimum sensitivity and performance. Designed with an extensive "minor motion" area where even slight body movements will be detected.
- Vandal resistant PIR lens.
- Patented blinders - adjustable horizontal field-of-view (PIR) may be adjusted between 180° and 60° of arc by using integral blinders located on either side of the lens. No masking tape required.
- Manual-ON/auto-OFF mode for installations where manual-ON switching is required but auto-OFF switching is still desired for CEC Title 24 energy savings.
- To comply with CEC Title 24, LED indicator light flashes when sensor detects motion to verify detection is active. Green flashes for ultrasonic, red flashes for PIR.
- Time delay adjustment for delayed-OFF time settings of 30 seconds (for walking test), 10 minutes, 20 minutes, and 30 minutes. Allows customized adjustments to maximize energy savings.
- Light sensor measures the ambient light in the room when it first detects motion and leaves the lights OFF (hold-off) if there is enough light in the room or turns the lights connected to the first relay ON if there is not enough light in the room.
- Self-Adaptive technology eliminates callbacks for adjustments. Time delay and sensitivity settings are continually adjusted to occupant patterns of use in auto adapt mode.
- Exclusive Walk-Through feature provides increased energy savings by not leaving the lights ON for an extended period after only momentary occupancy.
- Non-Adaptive Mode disables self-adjusting delayed-OFF time and walk-through feature in applications where these feature are not desired. Optional manual adjustment for delayed-OFF time settings allows customized adjustments to maximize energy savings.
- Vacancy confirmation; when the time out expires and the relay turns OFF, a 30-second vacancy confirmation exists to turn the relays back ON.
- False detection circuitry.
- U/S technology provides excellent minor motion sensitivity.
- Ability to disable PIR or U/S for added flexibility.
- Presentation Mode feature for slide or film presentations allows pushbuttons to turn lights OFF and keep them OFF while the room is occupied.
- Exclusive Leviton High Inrush Stability (H.I.S.) Circuitry. Specifically designed to handle today's high inrush electronic ballast loads and offer unmatched durability and service.
- One unit can be used for 120V through 277V lighting. Compatible with both electronic and magnetic ballasts.
- True zero-cross relay switches at the zero crossing point of the AC power curve to ensure maximum contactor life and compatibility with electronic ballasts.

FIELD-OF-VIEW

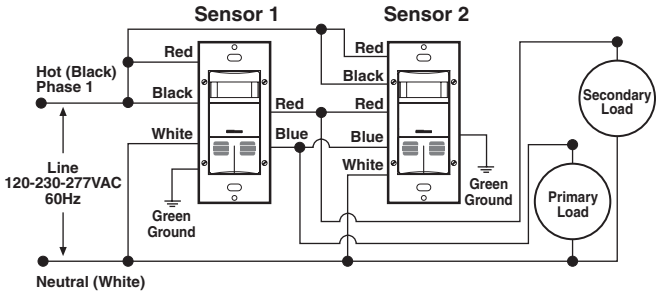
The OSSMD provides a 180° field-of-view with a maximum coverage area of approximately 2400 square feet. The maximum major motion sensing distance in front of the sensor is 40 feet, and side to side is 30 feet. The "minor-motion" zone detects relatively small body movements and allows the lights to stay ON even though a person may not be moving or walking around the room. This zone is approximately 40 feet by 20 feet.



OSSMD Field-of-View (in feet)

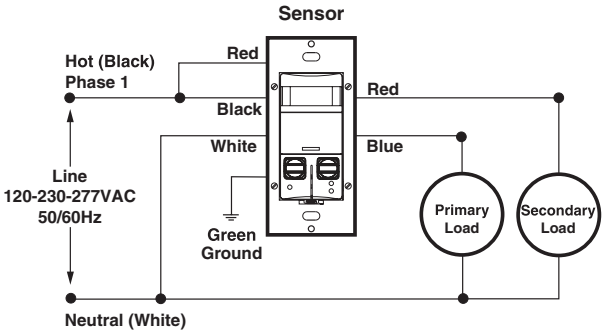
INSTALLATION

The OSSMD mounts in a standard single-gang wall box and replaces two single-pole wall switches that control two separate lighting loads. The unit must be properly grounded in order to operate. The unit's integral blinders may be used to restrict the field-of-view to prevent unwanted detection of hallway traffic. The OSSMD should be positioned at least 6 feet away from HVAC registers. Note that whenever the unit is powered up, it will take approximately 1 minute to begin normal operation.

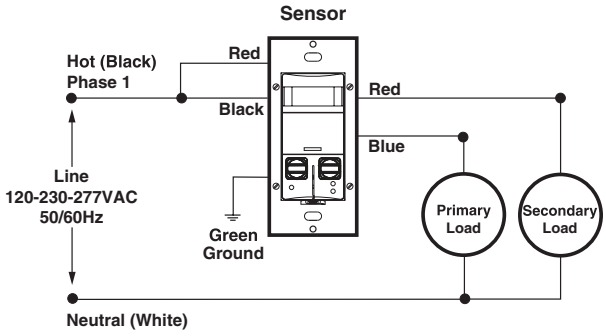


MULTI-LOCATION

WIRING DIAGRAMS



OSSMD-MD/OSSMD-FT



Note: Ground wire must be connected.

OSSMD-GD

Leviton Mfg. Co., Inc. Lighting & Energy Solutions
201 N. Service Rd. Melville, NY 11747-3138 Tech Line: 1-800-824-3005 Fax: 1-800-832-9538 www.leviton.com/les

LEVITON®

OSSMD

SPECIFICATIONS

ELECTRICAL				
Line Voltage	120-230-277 VAC			
Power Consumption		-FT	-MD	-GD
	120V	220mW	210mW	140mW
	277V	430mW	410mW	360mW
Operational Frequency	50/60Hz			
U/S Operating Frequency	40kHz			
Wire Designation	Primary Relay- No. 16 AWG leads: Line-Black Load-Blue Ground-Green White-Neutral (where provided)	Secondary Relay- No. 16 AWG isolated contact leads: (2) Red		
Load Rating	Primary Relay: Fluorescent: 1200VA @ 120V 2700VA @ 277V Incandescent: 800W @ 120V	Secondary Relay: Fluorescent: 800VA @ 120V 1200VA @ 277V Incandescent: 800W @ 120V Motor: 1/4 HP		

ENVIRONMENTAL	
Operating Temperature Range	32°F to 104°F (0° C to 40° C)
Storage Temperature Range	-50°F to 185°F (-10° C to 85° C)
Relative Humidity	20% to 90% non-condensing

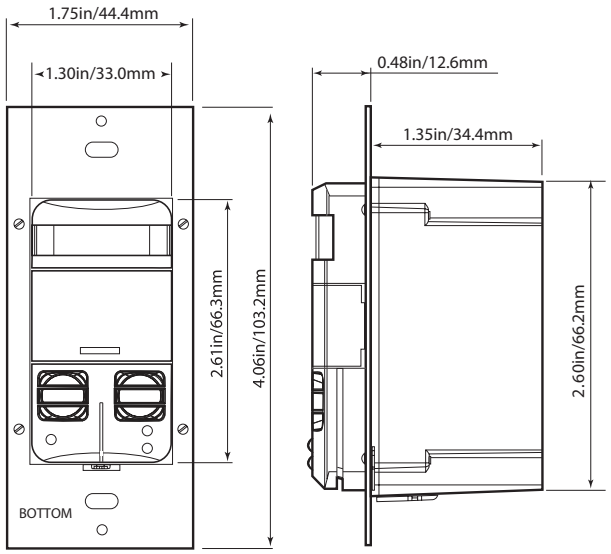
OTHER	
Listings	ETL/cETL Listed, CSA, CEC Title 24 Compliant, FCC Compliant, NOM
Warranty	Limited Five-Year Warranty

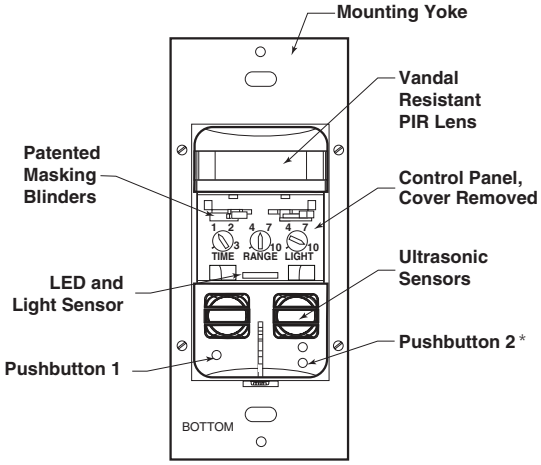
ORDERING INFORMATION

CAT. NO.*	DESCRIPTION
OSSMD- MD	Dual Relay Multi-Tech Wall Switch Occupancy Sensor
OSSMD- GD	No Neutral, Dual Relay Multi-Tech Wall Switch Occupancy Sensor
OSSMD- FT	Dual Relay Multi-Tech Wall Switch Occupancy Sensor with 10-minute Delayed-OFF for Second Relay

* To indicate color, add suffix to the end of the catalog number.
White (-W), Ivory (-I), Light Almond (-T), Gray (-G), Ebony (-E), and Red (-R)
* NAFTA compliant and Made in USA models available.

DIMENSIONAL DIAGRAMS





* Not present in OSSMD-FT

LEVITON SPECIFICATION SUBMITTAL	
JOB NAME:	CATALOG NUMBERS:
JOB NUMBER:	

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Leviton Manufacturing of Canada, Ltd.
165 Hymus Boulevard, Pointe Claire, Quebec H9R 1E9 • Telephone: 1-800-469-7890 • FAX: 1-800-563-1853

Leviton S. de R.L. de C.V.
Lago Tana 43, Mexico DF, Mexico CP 11290 • Tel. (+52) 55-5082-1040 • FAX: (+52) 5386-1797 • www.leviton.com.mx

Visit our Website at: www.leviton.com/les

G-8013C/K11-tb
REV NOV 2011

LEVITON

Line Voltage Sensors

ODW12-MDW

ODC20-MDW

DESCRIPTION

Leviton's ODC and ODW series sensors provide a full line of self contained PIR, Ultrasonic (U/S) and Multi-technology (M/T) occupancy sensors. The sensor's main function is to turn the lights ON or maintain the lights ON while movement is detected within the sensor's field-of-view, and turn the lights OFF when the space is vacant.

The PIR models use a Dual Element PIR heat detector that resides behind a multi-zone optical lens. This Fresnel lens establishes dozens of zones of detections. In order to trigger the sensor the heat source must move from one zone to another.

The U/S models utilize sensors which emit continuous reflective frequency waves. Any movement within the sensor's field-of-view will cause a shift in the original emitted frequency. The sensor identifies the change as movement and controls the light accordingly.

The M/T sensors combine both PIR and U/S technology for unrivaled performance and reliability. The sensors will use PIR technology to initially turn the light ON, and use the U/S technology to keep the lights ON.

The sensors conveniently mount to a standard 2.125" deep x 4" octagon, 2.125" deep x 4" square electrical box with mud ring, or to 4" surface mount wire raceway boxes. It provides wire leads for simple connection to a line-voltage circuit and is ideal for both existing buildings with limited access to wiring and new construction with line-voltage circuiting only.

Use with OPBCA Cosmetic Adaptor for surface mount wire raceway boxes or to over any wallboard cuts for professional finish to all projects.

APPLICATIONS

The ODC and ODW series sensors are the ideal solution for providing immediate energy savings. They are designed for fast installation and require little to no field configuration. They can be used in any of the following applications:

- Remodels in hard ceiling spaces
- Energy conservation retrofits
- Any installation with limited access for low-voltage wiring

FEATURES

Power Base Adaptor

- Streamlined installation offers customers an immediate energy-management solution
- Mounts easily in electrical box and provides leads for simple line voltage connection
- Zero-crossing circuitry for enhanced reliability and long-life operation

OSCxx and OSWxx Occupancy Sensors

- Available in multi-techology, ultrasonic and passive infrared models.
- Self-Adjusting: Internal microprocessor continually analyzes, evaluates and adjusts the infrared sensitivity and time delay. Performance is kept at a maximum and user complaints are eliminated.
- Non-Volatile Memory: Learned and adjusted settings saved in protected memory are not lost during power outages.
- Maximum Reliability, Low Cost: digital circuitry uses a minimum of components.
- Walk-Through: Provides increased energy savings by decreasing the time delay to 2.5min when someone momentarily walks through the monitored space.
- Ambient Light Recognition: A Light Sensor prevents lights from turning on when the room is adequately lit by natural light.
- Wide Coverage: Units from 450 to 2000 sq. ft. available.
- Timer Setting Feature: Automatic - 30sec - 30min. Test mode - 6sec with auto exit programming.

Leviton Mfg. Co., Inc. Lighting & Energy Solutions
20497 SW Teton Avenue, Tualatin, OR 97062 1-800-736-6682 Tech Line: 1-800-959-6004 Fax: 503-404-5594 www.leviton.com/les

LEVITON

Line Voltage Sensors

SPECIFICATIONS

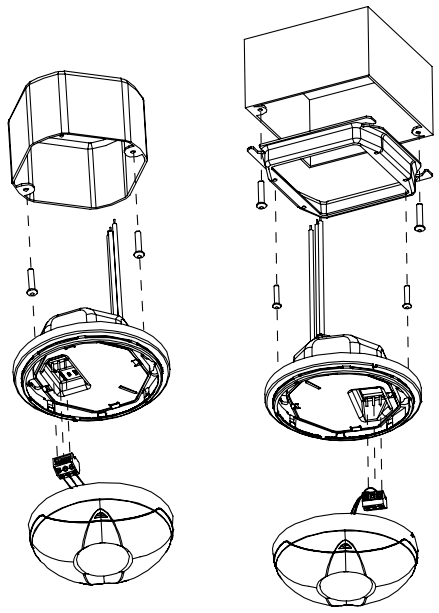
ELECTRICAL	
Input Voltage	120-277 VAC @ 50/60Hz
Output Voltage	24 VDC, 40mA nominal, full-wave rectified and filtered, unregulated.(Each Leviton sensor contains an internal voltage regulator.)
Load Rating	15A Incandescent, Electronic or Magnetic Fluorescent Ballast; 3/4 HP at 120V
Wire Designation	Line-Black, Load-Blue, White-Neutral
ENVIRONMENTAL	
Operating Temperature Range	0°C to 40°C (32°F to 104°F)
Storage Temperature Range	-10°C to 85°C (14°F to 185°F)
Relative Humidity	0% to 90% non-condensing
OTHER	
Mounting Height	OSWHB: 30 feet All others: 8-10 feet
Listings	UL, cUL, NOM, CEC Title 24
Warranty	Limited Five-Year Warranty

ORDERING INFORMATION

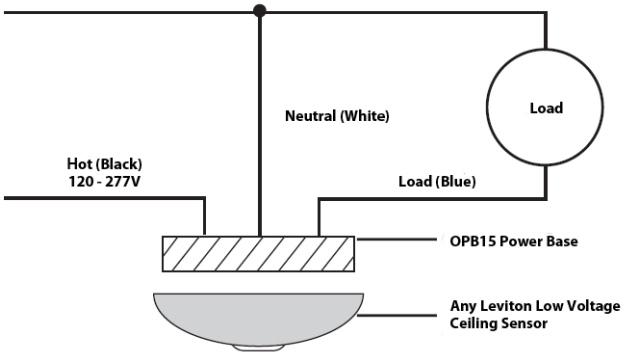
CAT. NO.	DESCRIPTION	COLOR
ODC04-IDW	PIR Ceiling Sensor, 450 Sq Ft	Off-White
ODC05-UDW	U/S Ceiling Sensor, 500 Sq Ft	Off-White
ODC05-MDW	M/T Ceiling Sensor, 500 Sq Ft	Off-White
ODC10-UDW	U/S Ceiling Sensor, 1000 Sq Ft	Off-White
ODC10-MDW	M/T Ceiling Sensor, 1000 Sq Ft	Off-White
ODC15-IDW	PIR Ceiling Sensor, 1500 Sq Ft	Off-White
ODC20-UDW	U/S Ceiling Sensor, 2000 Sq Ft	Off-White
ODC20-MDW	M/T Ceiling Sensor, 2000 Sq Ft	Off-White
ODW12-MDW	M/T Wall Sensor, 1200 Sq Ft	Off-White
ODWLR-IDW	PIR Wall Sensor, Long Range	Off-White
ODWWV-IDW	PIR Wall Sensor, Wideview	Off-White
ODWHB-IDW	PIR Wall Sensor, High Bay	Off-White
OPBCA-00W	Power Base Cosmetic Adaptor	Off-White

INSTALLATION AND WIRING

Connect and mount the ODC/ODW to the electrical box. Test sensor for correct operation



WIRING DIAGRAM



Leviton Manufacturing Co., Inc. Lighting & Energy Solutions
20497 SW Teton Avenue, Tualatin, OR 97062
Telephone: 1-800-736-6682 • FAX: 503-404-5594 • Tech Line (6:00AM-4:00PM P.S.T. Monday-Friday): 1-800-959-6004

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Visit our Website at: www.leviton.com/les

Attachment D

Calculated annual AHU kWh savings per 10000 CFM	8149
Total annual AHU CFM saved at facility	275800
Total annual kWh savings from AHU filters	224749.4
Additional annual savings from from vent filters	2270
Total annual kWh savings at facility	227019.4

Typical fan energy savings for an 10000 cfm AHU with Dynamic filters and heat wheel bypass

The installation of Dynamic air filters in each AHU will to reduce the amount of supply and return/relief fan horsepower required by the reduced air pressure drop when bypassing the heat wheel

Attachment G

Supply fan	
SF motor	15
BHP	11.8
TSP	4.3
@ new SP	3.5
bhp	9.5
diff	2.3
kw =	1.7158
hrs /yr	3120
kwh/saved	5353
savings	$525

Return Fan	
RF motor	15
BHP	5
TSP	1.75
@ new SP	0 75
bhp	2.6
diff	2.4
kw =	1.7904
hrs /yr	2120 less econimizer
kwh/saved	2796
savings	$274
total savings	$799
cost/cfm	$0.080 based on 10000 cfm

AHU Fan Savings Summary		
School	**AHU cfm**	**Savings**
High School	275800	$22,025
Middle	62000	$5,590
Northside	36000	$2,875
Parkway	55000	$4,392
Rockhill	60100	$4,800
Early Learning	55000	$4,392
Total		$44,075

Middle School

The following data was utilized to calculate energy savings for various ECMs. Data was obtained from ASHRAE Weather data or school district personel.

Weather Data for Alliance, Ohio

Winter Design	6 Deg F	37 Deg F (average)
Summer Design	89 Deg (Db)	
	73 Deg (Wb)	

The outdoor air quantity will be controlled using dynamic reset in accordance with ASHRAE 62 "ventialtion for Indoor Air Quality by monitoring Co2 concentrations in the return air system of each air handler. In additional Dynanmic fillters will be installed which act as both a passive filter and polarized media air clearner.

Calculations

Btuh saved per year = CFM X Delta T between Outside air and space set point X Operational days per year X Operational Hours per day

Air handler schedule - Middle school

AHU	cfm	oa min	heat whl cfm	exh cfm	total occupancy occ/classroom	ASHRAE cfm/ pupil	Dynamic filters cfm/ pupil	min oa required	Current min OA based on	New OA Design cfm	cfm savings	OA %	Annual Savings
AHU-1	8000	8000	5200	4900	locker room			1925	1925	1925	3275	24%	$5,124
AHU-2	12000	4800	4800	4892	150	10	6	1500	1952	1952	2848	16%	$1,183
AHU-3	12000	4800	4800	4800	264	10	6	1584	158	1584	3216	13%	$1,183
AHU-4	11000	4800	4800	4800	120	10	6	720	1000	1000	3800	9%	$1,084
AHU-5	11000	4800	4800	4800	171	10	6	1026	1400	1400	3400	13%	$1,084
AHU-6	12000	4800	4800	4800	244	10	6	1464	5484	1800	3000	15%	$1,183
AHU-7	12000	4800	4800	4800	244	10	6	1464	5484	1800	3000	15%	$1,183
	70000	28800								11401		16%	$12,024
		41%	Current OA percent										

Middle School Main Air handler's DDC controls modification

Install Dynamic air passive filter/polarized filter media in each Unit ventilator to reduce the amount of outside air introduced using in addition to a Co2 detection strategy based on on ASHRAE 62.1 "Ventilation for Acceptable Indoor Air Quality"

Cooling -Current

CFM	% of O.A	Delta T	EELH		
70000 cfm	41%	23	1000	1,738,800,000 btuh/year	sensible
70000 cfm	41%	24	1000	285,600,000 btuh/year	latent
				2,024,400,000	
				169 tons	
				168,700 tons/yr	
				180,509 kwh/yr	

Cooling - revised to 55 Deg f

70000 cfm	16%	24	1000	1,663,200,000 btuh/year	sensible
70000 cfm	16%	4	1000	285,600,000 btuh/year	latent
				1,948,800,000	
				162 tons	
				162,400 tons/yr	
				173,768 kwh/yr	

Heating - Current

70000 cfm	41%	12	1000	756,000,000 btuh/year
				945 mcf/yr

Heating -Revised

70000 cfm	16%	2	1000	189,000,000 btuh/year
				236 mcf/yr

	Heating	Mcf Savings	709 mcf/yr	$8.50 mcf	$6,024 year
	Cooling	Kwh Savings	6,741 kwh/yr	0.13 kwh	$876 year
					$6,901 year
				Savings per cfm	$0.10

ddle School Locker room Ahu-1 Air handler's DDC controls modification

dify the existing HVAC unit control strategy to reduce the amount of outside air via Co2 detection strategy per ASHRAE 62.1 "Ventilation for Acceptable Indoor Air Quality"
e sequence of oiperation will be modified to reduce the amount of outside air will the sapce in unoccupied

rrent strategy - Average 100% outside air 11 hrs day/5 days week

CFM	*% of O. A*	*Delta T*	*Days per Yr*			
ating CFM						
8000 cfm	100% oa	32 F	110 days	418,176,000	btuh/year	
				418	mcf/yr	
oling CFM						
8000 cfm	100% oa	16 F	70 days	138,240,000	btuh/year	sensible
8000 cfm	100% oa	5 F	70 days	27,200,000	btuh/year	latent
				165,440,000		
				12,000		13,787 tons/yr
						16,958 Kwh/year

vised strategy - 24% outside air 11 hrs day/5 days week

CFM	*% of O. A*	*Delta T*	*Days per Yr*			
ating CFM						
1925 cfm	24% oa	9 F	110 days	43,451,100	btuh/year	
				43	mcf/yr	
oling CFM						
1925 cfm	24% oa	22 F	70 days	16,299,360	btuh/year	sensible
1925 cfm	24% oa	8 F	70 days	3,665,200	btuh/year	latent
				19,964,560		
				12,000		1,664 tons/yr
						2,046 Kwh/year

	Heating	**Mcf Savings**	**375**	**mcf/yr**	**$8.50 mcf/ units =** **$3,185 year**
	Cooling	**Kwh Savings**	**14,911**	**Kwh/yr**	**0.13 kwh/ units =** **$1,938 year**
					Total Savings **$5,124 year**
					savings per cfm $0.64

Attachment H

Calculated annual AHU kWh savings per 10000 CFM	8149
Total annual AHU CFM saved at facility	62000
Total annual kWh savings from AHU filters	50523.8
Additional annual savings from from vent filters	21652
Total annual kWh savings at facility	72175.8

Typical fan energy savings for an 10000 cfm AHU with Dynamic filters and heat wheel bypass

The installation of Dynamic air filters in each AHU will to reduce the amount of supply and return/relief fan horsepower required by the reduced air pressure drop when bypassing the heat wheel

Attachment I

Supply fan	
SF motor	15
BHP	11.8
TSP	4.3
@ new SP	3.5
bhp	9.5
diff	2.3
kw =	1.7158
hrs /yr	3120
kwh/saved	5353
savings	$525

Return Fan	
RF motor	15
BHP	5
TSP	1.75
@ new SP	0 75
bhp	2.6
diff	2.4
kw =	1.7904
hrs /yr	2120 less econimizer
kwh/saved	2796
savings	$274
total savings	$799
cost/cfm	$0.080 based on 10000 cfm

AHU Fan Savings Summary		
School	**AHU cfm**	**Savings**
High School	275800	$22,025
Middle	62000	$5,590
Northside	36000	$2,875
Parkway	55000	$4,392
Rockhill	60100	$4,800
Early Learning	55000	$4,392
Total		$44,075

Northside Elementary

The following data was utilized to calculate energy savings for various ECMs. Data was obtained from ASHRAE Weather data or school district personel.

Weather Data for Alliance, Ohio

Winter Design	6 Deg F	37 Deg F (average)
Summer Design	89 Deg (Db)	
	73 Deg (Wb)	

The outdoor air quantity will be controlled using dynamic reset in accordance with ASHRAE 62 by monitoring Co2 concentrations in the return air system of each air handler. In additional Dynanmic fiilters will be installed which act as both a passive filter and polarized media air clearner.

Calculations

btuh saved per year = CFM X Delta T between Outside air and space set point X Operational days per year X Operational Hours per day

Air handler schedule - Northside Elementary school

AHU	*cfm*	*oa min*	*heat whl- cfm*	*exh cfm*	*total occupancy occ/classroom*	*ASHRAE cfm/ pupil*	*Dynamic filters cfm/ pupil*	*min oa required*	*min OA based on exh*	*New OA Design cfm*	*cfm savings*	*OA %*	*Annual Savings*
AHU-1	12000	4800	4800	**1400**	210	10	6	**1260**	**1400**	**1400**	3400	12%	$1,183
AHU-2	12000	4800	4800	**1300**	210	10	6	**1260**	**1260**	1260	3540	11%	$1,183
AHU-3	12000	4800	4800	**1250**	270	10	6	**1620**	**1620**	1620	3180	14%	$1,183
	36000	14400							4280		12%		$3,549
		40%	Current OA percent										

Northside School Main Air handler's DDC controls modification

Install Dynamic air passive filter/polarized filter media in each Unit ventilator to reduce the amount of outside air introduced using in addition to a Co2 detection strategy based on on ASHRAE 62.1 "Ventilation for Acceptable Indoor Air Quality"

Cooling -Current					
CFM	***% of O. A***	***Delta T***	***EFLH***		
36000 cfm	40%	25	1000	894,240,000 btuh/year	sensible
36000 cfm	40%	6	1000	146,880,000 btuh/year	latent
				1,041,120,000	
				87 tons	
				86,760 tons/yr	
				92,833 kwh/yr	
Cooling - revised to 55 Deg f					
36000 cfm	12%	22	1000	855,360,000 btuh/year	sensible
36000 cfm	12%	4	1000	146,880,000 btuh/year	latent
				1,002,240,000	
				84 tons	
				83,520 tons/yr	
				89,366 kwh/yr	
Heating - Current					
36000 cfm	40%	12	1000	388,800,000 btuh/year	
				486 mcf/yr	
Heating -Revised					
36000 cfm	12%	2	1000	97,200,000 btuh/year	
				122 mcf/yr	

	Heating	**Mcf Savings**	**365 mcf/yr**	**$8.50 mcf**	**$3,098 year**
	Cooling	**Kwh Savings**	**3,467 kwh/yr**	**0.13 kwh**	**$451 year**
					$3,549 year
				Savings per cfm	$0.10 cfm

Attachment J

Calculated annual AHU kWh savings per 10000 CFM	8149
Total annual AHU CFM saved at facility	36000
Total annual kWh savings from AHU filters	29336.4
Additional annual savings from from vent filters	3467
Total annual kWh savings at facility	32803.4

Typical fan energy savings for an 10000 cfm AHU with Dynamic filters and heat wheel bypass

The installation of Dynamic air filters in each AHU will to reduce the amount of supply and return/relief fan horsepower required by the reduced air pressure drop when bypassing the heat wheel

Attachment K

Attachment K

Supply fan		**Return Fan**	
SF motor	15	RF motor	15
BHP	11.8	BHP	5
TSP	4.3	TSP	1.75
@ new SP	3.5	@ new SP	0 75
bhp	9.5	bhp	2.6
diff	2.3	diff	2.4
kw =	1.7158	kw =	1.7904
hrs /yr	3120	hrs /yr	2120 less econimizer
kwh/saved	5353	kwh/saved	2796
savings	$525	savings	$274
		total savings	$799
		cost/cfm	$0.080 based on 10000 cfm

AHU Fan Savings Summary		
School	**AHU cfm**	**Savings**
High School	275800	$22,025
Middle	62000	$5,590
Northside	36000	$2,875
Parkway	55000	$4,392
Rockhill	60100	$4,800
Early Learning	55000	$4,392
Total		$44,075

Parkway

The following data was utilized to calculate energy savings for various ECMs. Data was obtained from ASHRAE Weather data or school district personel.

Weather Data for Alliance, Ohio

Winter Design	6 Deg F	37 Deg F (average)
Summer Design	89 Deg (Db)	
	73 Deg (Wb)	

The outdoor air quantity will be controlled using dynamic reset in accordance with ASHRAE 62 by monitoring Co2 concentrations in the return air system of each air handler. In additional Dynanmic filters will be installed which act as both a passive filter and polarized media air clearner.

Calculations

btuh saved per year = CFM X Delta T between Outside air and space set point X Operational days per year X Operational Hours per day

Parkway Air handler's DDC controls modification

Install Dynamic air passive filter/polarized filter media in each Unit ventilator to reduce the amount of outside air introduced using in addition to a Co2 detection strategy based on on ASHRAE 62.1 "Ventilation for Acceptable Indoor Air Quality"

Cooling -Current

CFM	% of O. A	Delta T	EFLH		
55000 cfm	40%	25	1000	1,366,200,000 btuh/year	sensible
55000 cfm	40%	26	1000	224,400,000 btuh/year	latent
				1,590,600,000	
				133 tons	
				132,550 tons/yr	
				141,829 kwh/yr	

Cooling - revised to 55 Deg f

55000 cfm	12%	22	1000	1,306,800,000 btuh/year	sensible
55000 cfm	12%	16	1000	224,400,000 btuh/year	latent
				1,531,200,000	
				128 tons	
				127,600 tons/yr	
				136,532 kwh/yr	

Heating - Current					
55000 cfm	40%	8	1000	594,000,000 btuh/year	
				743 mcf/yr	
Heating -Revised					
55000 cfm	12%	2	1000	148,500,000 btuh/year	
				186 mcf/yr	

	Heating	**Mcf Savings**	**557 mcf/yr**	**$7.19 mcf**		**$4,004 year**
	Cooling	**Kwh Savings**	**5,297 kwh/yr**	**0.13 kwh**		**$689 year**
						$4,692 year
					Savings per cfm	$0.09 cfm

Attachment K

Calculated annual AHU kWh savings per 10000 CFM	8149
Total annual AHU CFM saved at facility	55000
Total annual kWh savings from AHU filters	44819.5
Additional annual savings from from vent filters	5297
Total annual kWh savings at facility	50116.5

Typical fan energy savings for an 10000 cfm AHU with Dynamic filters and heat wheel bypass

The installation of Dynamic air filters in each AHU will to reduce the amount of supply and return/relief fan horsepower required by the reduced air pressure drop when bypassing the heat wheel

Attachment M

Attachment M

Supply fan	
SF motor	15
BHP	11.8
TSP	4.3
@ new SP	3.5
bhp	9.5
diff	2.3
kw =	1.7158
hrs /yr	3120
kwh/saved	5353
savings	$525

Return Fan	
RF motor	15
BHP	5
TSP	1.75
@ new SP	0 75
bhp	2.6
diff	2.4
kw =	1.7904
hrs /yr	2120 less econimizer
kwh/saved	2796
savings	$274
total savings	$799
cost/cfm	$0.080 based on 10000 cfm

AHU Fan Savings Summary		
School	**AHU cfm**	**Savings**
High School	275800	$22,025
Middle	62000	$5,590
Northside	36000	$2,875
Parkway	55000	$4,392
Rockhill	60100	$4,800
Early Learning	55000	$4,392
Total		$44,075

Rockhill Elementary

The following data was utilized to calculate energy savings for various ECMs. Data was obtained from ASHRAE Weather data or school district personel.

Weather Data for Alliance, Ohio

Winter Design	6 Deg F	37 Deg F (average)
Summer Design	89 Deg (Db)	
	73 Deg (Wb)	

The outdoor air quantity will be controlled using dynamic reset in accordance with ASHRAE 62 by monitoring Co2 concentrations in the return air system of each air handler. In additional Dynanmic filters will be installed which act as both a passive filter and polarized media air cleaner.

Calculations

btuh saved per year = CFM X Delta T between Outside air and space set point X Operational days per year X Operational Hours per day

Air handler schedule - Rockhill Elementary school

AHU	*cfm*	*oa min*	*heat whl- cfm*	*exh cfm*	*total occupancy occ/classroom*	*ASHRAE cfm/ pupil*	*Dynamic filters cfm/ pupil*	*min oa required*	*Current min OA based on*	*New OA Design cfm*	*cfm savings*	*OA %*	*Annual Savings*
AHU-1	11600	5670	5670	**2870**					2870	2870	2800	25%	$0
AHU-2	9000	4500	4500	**4500**		10	8	950	4500	950	3550	11%	$1,494
AHU-3	10000	3085	3085	**1405**	185	10	8	990	1405	1405	1680	14%	$1,660
AHU-4	11500	4155	4155	**2855**	228	10	8	1350	2855	2855	1300	25%	$1,909
AHU-5	7500	1875	1875	**1325**	225	10	8	1350	1350	1350	525	18%	$0
AHU-6	10500	3360	3360	**1060**	175	10	8	1050	1060	1060	2300	10%	$0
	60100	22845								10490	12155	17%	$5,063
		38%	Current OA percent										

Calculations

btuh saved per year = CFM X Delta T between Outside air and space set point X Operational days per year X Operational Hours per day

Rockhill Elementary School Main Air handler's DDC controls modification

Install Dynamic air passive filter/polarized filter media in each Unit ventilator to reduce the amount of outside air introduced using in addition to a Co2 detection strategy based on on ASHRAE 62.1 "Ventilation for Acceptable Indoor Air Quality"

Cooling -Current

CFM	*% of O. A.*	*Delta T*	*EFLH*		
60100 cfm	47%	25	1000	1,492,884,000 btuh/year	sensible
60100 cfm	47%	6	1000	245,208,000 btuh/year	latent
				1,738,092,000	
				145 tons	
				144,841 tons/yr	
				154,980 kwh/yr	

Cooling - revised

60100 cfm	17%	22	1000	1,427,976,000 btuh/year	sensible
60100 cfm	17%	8	1000	245,208,000 btuh/year	latent
				1,673,184,000	
				139 tons	
				139,432 tons/yr	
				149,192 kwh/yr	

Heating - Current

60100 cfm	47%	23	1000	730,215,000 btuh/year	
				913 mcf/yr	

Heating -Revised

60100 cfm	17%	18	1000	324,540,000 btuh/year	
				406 mcf/yr	

	Heating	**Mcf Savings**	**507** mcf/yr	**$8.50** mcf **$4,310** year
	Cooling	**Kwh Savings**	**5,788** kwh/yr	**0.13** kwh **$752** year
				$5,063 year
			Savings per cfm	$0.17

Attachment N

Calculated annual AHU kWh savings per 10000 CFM	8149
Total annual AHU CFM saved at facility	60100
Total annual kWh savings from AHU filters	48975.49
Additional annual savings from from vent filters	5788
Total annual kWh savings at facility	54763.49

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, its successors and assigns (hereinafter called the "Company") and Alliance City Schools, Taxpayer ID No.34-6000040its 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 believes that it 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 A (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").

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, 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/or kW reductions

resulting from said projects for purposes of complying with the Statute. It is expressly agreed that Customer may use any and all energy related and other attributes created from the Customer Energy Project(s) to the extent permitted by state or federal laws or regulations, provided, and to the extent, that such uses by Customer do not conflict with said compliance by the Company.

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 and Annual Report.** 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 Case 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:	**If to the Customer:**
FirstEnergy Service Company 76 South Main Street Akron, OH 44308 Attn: Victoria Nofziger Telephone: 330-384-4684 Fax: 330-761-4281 Email: vnnofziger@firstenergycorp.com	Kirk Heath, Treasurer Alliance City Schools 200 Glamorgan Street Alliance, OH 44601 heathki@alliancecityschools.org 330-821-2100

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.

Alliance City Schools	Ohio Edison
(Customer)	(Company)
By: _____	By: _____
Title: Treasurer	Title: VP, Energy Efficiency
Date: 10/12/12	Date: 10-17-12

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