Ohio | Public Utilities Commission

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

Case No.: 14 - 0170 **-EL-EEC**

Mercantile Customer: Cardinal Local School District

Electric Utility: The Cleveland Electric Illuminating Company

Program Title or Description: Lighting Retrofit

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:Cardinal Local School District

Principal address:15982 E. High Street, Middlefield OH 44062

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

Name and telephone number for responses to questions:Meg Bair 440-243-3535

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: The Cleveland Electric Illuminating 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):

_____.

☐ 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: 186,147 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: _____ 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):

0 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 $6,980.51 . (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.: 14-0170-EL-EEC

State of Ohio :

Scott Hunt, Affiant, being duly sworn according to law, deposes and says that:

1. I am the duly authorized representative of:

   Cardinal Local School District
   [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.

Scott Hunt SUPERINTENDENT
Signature of Affiant & Title

Sworn and subscribed before me this 8 day of January, 2014 Month/Year

Cynthia A Sague
Signature of official administering oath

CYNTHIA A SAGUE
Print Name and Title

My commission expires on November 27, 2017

Project Overview
Cardinal Local School District

	Kwh Saved	Kw Saved	Project Cost	Rebate
High School	53707	21.37	$59,836	$2,014
Middle School	82112	29.5	$116,194	$3,079
Jordak Elementary	50328	17.5	$32,714	$1,887
Totals	**186147**	**68**	**$208,744**	**$6,981**

Exhibit 1

Customer Legal Entity Name: Cardinal Local School District

Site Address: Cardinal High School

Principal Address: 14785 Thompson 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	HIGH SCHOOL LIGHTING RETROFIT	THE LINEAR FLUORESCENT LIGHITNG SYSTEMS CONSISTING OF A COMBINATION OF 34 W T12 AND T8 LAMPS AND BALLASTS WERE REPLACED WITH THE NEW LIGHTING SYSTEMS CONSISTING OF 25 WATT LAMPS AND LOW BALLAST FACTOR (.77) ELECTRONIC BALLAST. 400 W METAL HALIDE REPLACED WITH T5 HIGH BAY FIXTURES	A Fluke 335 True RMS Plant Meter was used by a licensed electrician to take voltage and amperage readings of a sampling of fixtures to determine the energy use of the lighting systems, both on the old existing system and the newly installed system. Volts X Amps = Watts. The results are then multiplied by the number of hours which the system is run to get Kwh savings.	WE WOULD HAVE REPLACED THE LAMPS AND BALLASTS IN EACH FIXTURE AS THEY FAILED. THIS IS COMMON PRACTICE FOR THE MAINTENANCE OF LIGHTING IN A SCHOOL FACILITY. THE ONLY FULL RETROFIT WE WOULD HAVE PERFORMED WOULD HAVE BEEN AREAS UNDERGOING OTHER UPGRADES NO SUCH UPGRADES WERE OR ARE PLANNED FOR THIS FACILITY.	N/A

Docket No. 14-0170

Site: 14785 Thompson Ave.

Exhibit 2

Customer Legal Entity Name: Cardinal Local School District
Site Address: Cardinal High School
Principal Address: 14785 Thompson Ave.

	Unadjusted Usage, kwh (A)	Weather Adjusted Usage, kwh (B)	Weather Adjusted Usage with Energy Efficiency Addbacks, kwh (c) *Note 1*
2012	389,120	389,120	442,680
2011	414,080	414,080	463,226
2010	443,609	443,609	443,609
Average	**415,603**	**415,603**	**449,838**

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	HIGH SCHOOL LIGHTING RETROFIT	02/01/2011	$59,836	$29,918	53,707	53,707	-	$2,685	$2,014	
					-	-	-			
					-	-	-			
					-	-	-			
					-	-	-			
					-	-	-			
					-	-	-			
		Total	**$59,836**		**53,707**	**53,707**	**0**	**$2,685**	**$2,014**	**$0**

Docket No. 14-0170
Site: 14785 Thompson 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	54	$ 308	$ 16,557	$ 4,050	$2,014	$537	$ 6,601	**2.5**
Total	**54**	**$ 308**	**16,557**	**4,050**	**$2,014**	**$537**	**6,601**	**2.5**

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)

Cardinal Local School District ~ Cardinal High School
Docket No. 14-0170

Site: 14785 Thompson Ave.

Project Estimated Annual Savings Summary

Lighting

Estimated Annual kWh Savings	53,707
Total Change in Connected Load	21.37

Annual Estimated Cost Savings	$5,370.70
Annual Operating Hours	2,491

Interior Lighting Incentive @ $0.05/kWh (excluding retrofit CFLs, sensors, or LED exit signs)	$2,685.35
Exterior Lighting Incentive @ $0.05/kWh (excluding retrofit CFLs, sensors, or LED exit signs)	$0.00
Total retrofit CFL Incentive @ $1/screw-in CFL lamp; $15/hard-wired CFL lamp (includes all retrofit CFLs, both interior and exterior)	$0.00
Total retrofit LED Exit Incentive @ $10/exit sign	$0.00
Total Lighting Controls Incentive @ $25/occupancy sensor and $25/daylight sensor (includes all Lighting Controls, both interior and exterior)	$0.00

Total Calculated Incentive	$2,685.35

Total Fixture Quantity excluding retrofit CFLs and LED Exit Signs	637
Total Lamp Quantity for retrofit Screw-In CFLs	0
Total Lamp Quantity for retrofit Hard-Wired CFLs	0
Total Fixture Quantity for retrofit LED Exit Signs	0
Total Quantity for Occupancy Sensors	0
Total Quantity for Daylight Sensors	0

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

Demand Savings (For Internal Use Only)	17.91

Lighting Form

Lighting Inventory Form

Applicant Name: CARDINAL LOCAL SCHOOL DISTRICT

Facility Name: HIGH SCHOOL

Date:

Lighting Zone (exterior only): Lighting Zone 3

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

For existing or proposed control, choose OCC for Occupany Sensor, DAY for photosensor, Hi-Lo for bi-level sensors or NONE for none. Controls in spaces where existing controls exist do not qualify.

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

PROJECT BASIC INFORMATION										PRE-INSTALLATION (RETROFIT)						BASELINE (NEW CONSTRUCTION)				POST-INSTALLATION							Energy Calculations										
Line Item	New Construction or Retrofit	Building Address	Floor	Area Description	Space Description	Interior or Exterior Fixture	Predominant Space Type	Exterior Lighting Description (Exterior Lighting Only)	Area Cooling	Pre Fixture Qty	Pre Fixture Code	Pre Watts / Fixture (W)	Pre kW / Space (kW)	Existing Control drop down	Existing Sensor Quantity When applicable	Units e.g. Square Feet (ft^2) If multiple fixture types are used, please only enter the total area/distance/qty once per space.		Lighting Power Density (W/unit)	Baseline kW / Space (kW)	Post Fixture Qty	Post Fixture Code	Post Watts/ Fixture (W)	Post kW / Space (kW)	Are Occupancy Sensors Required by Code?	Proposed Control drop down	Proposed Sensor Quantity When applicable	Change in Connected Load (kW)	Applicant Coincidence Factor (CF) Estimate	Coincidence Factor	Interactive Factor (demand)	Interactive Factor (energy)	Pre Controls Factor	Post Controls Factor	Demand Savings (kW)	Applicant Equivalent Full Load Hours (EFLH) Estimate	Prescribed Equivalent Full Load Hours	Annual kWh Saved
e.g.	Retrofit	400 North Street	2	Office	Other	Interior	Office - Small		Cooled Space	3	F44ILL	112	0.34	NONE		[redacted]				3	CFT55/1-BX	56	0.17	No	OCC	3	0.17	84%	84%	34%	12%	0%	30%	0.19	2,808	3,435	646
e.g.	NewConstruction	Example	1	Restaurant	Conference, Meeting or Training Room	Exterior	Retail - Small	Builing facades (liner ft based)	Cooled Space	[redacted]						500	linear ft	3.8	1.88	5	Example Cut Sheet 2	25	0.13	Yes	DAY	5	1.75	88%	89%	34%	12%	0%	0%	2.09	8,760	3,068	6,013
1	RETROFIT			boys locker room	Other	INTERIOR	Education - Secondary School		Cooled Space	3	F41LL	31	0.09	NONE		[redacted]				3	CUT SHEET 1	21	0.06	No	NONE		0.03	1.00	100%	34%	12%	0%	0%	0.04	2880	2,880	97
2	RETROFIT			girls locker room	Other	INTERIOR	Education - Secondary School		Cooled Space	3	F41LL	31	0.09	NONE		[redacted]				3	CUT SHEET 1	21	0.06	No	NONE		0.03	1.00	100%	34%	12%	0%	0%	0.04	2880	2,880	97
3	RETROFIT			trophy case	Other	INTERIOR	Education - Secondary School		Cooled Space	10	F41LL	31	0.31	NONE		[redacted]				10	CUT SHEET 1	21	0.21	No	NONE		0.10	1.00	100%	34%	12%	0%	0%	0.13	8760	8,760	981
4	RETROFIT			art room	Other	INTERIOR	Education - Secondary School		Cooled Space	2	F41LL	31	0.06	NONE		[redacted]				2	CUT SHEET 1	21	0.04	No	NONE		0.02		57%	34%	12%	0%	0%	0.02		2,080	47
5	RETROFIT			library	Other	INTERIOR	Education - Secondary School		Cooled Space	6	F41LL	31	0.19	NONE		[redacted]				6	CUT SHEET 1	21	0.13	No	NONE		0.06	1.00	100%	34%	12%	0%	0%	0.08		2,080	140
6	RETROFIT			hallway	Other	INTERIOR	Education - Secondary School		Cooled Space	3	F42LL	59	0.18	NONE		[redacted]				3	CUT SHEET 1	21	0.06	No	NONE		0.11	1.00	100%	34%	12%	0%	0%	0.15	2880	2,880	368
7	RETROFIT			trophy case	Other	INTERIOR	Education - Secondary School		Cooled Space	2	F42LL	59	0.12	NONE		[redacted]				2	CUT SHEET 1	21	0.04	No	NONE		0.08	1.00	100%	34%	12%	0%	0%	0.10	8760	8,760	746
8	RETROFIT			Main Office	Other	INTERIOR	Education - Secondary School		Cooled Space	8	F42LL	59	0.47	NONE		[redacted]				4	CUT SHEET 4	77	0.31	No	NONE		0.16		57%	34%	12%	0%	0%	0.13		2,080	382
9	RETROFIT			Cas Office	Other	INTERIOR	Education - Secondary School		Cooled Space	2	F42LL	59	0.12	NONE		[redacted]				2	CUT SHEET 2	38	0.08	No	NONE		0.04		57%	34%	12%	0%	0%	0.03		2,080	98
10	RETROFIT			Princ. Office	Other	INTERIOR	Education - Secondary School		Cooled Space	2	F42LL	59	0.12	NONE		[redacted]				2	CUT SHEET 2	38	0.08	No	NONE		0.04		57%	34%	12%	0%	0%	0.03		2,080	98
11	RETROFIT			guid. Hall	Other	INTERIOR	Education - Secondary School		Cooled Space	5	F42LL	59	0.30	NONE		[redacted]				5	CUT SHEET 2	38	0.19	No	NONE		0.11	1.00	100%	34%	12%	0%	0%	0.14	2880	2,880	339
12	RETROFIT			guid. Office	Other	INTERIOR	Education - Secondary School		Cooled Space	1	F42LL	59	0.06	NONE		[redacted]				1	CUT SHEET 2	38	0.04	No	NONE		0.02		57%	34%	12%	0%	0%	0.02		2,080	49
13	RETROFIT			asst. prin.	Other	INTERIOR	Education - Secondary School		Cooled Space	3	F42LL	59	0.18	NONE		[redacted]				3	CUT SHEET 2	38	0.11	No	NONE		0.06		57%	34%	12%	0%	0%	0.05		2,080	147
14	RETROFIT			room 15	Other	INTERIOR	Education - Secondary School		Cooled Space	12	F42LL	59	0.71	NONE		[redacted]				6	CUT SHEET 4	77	0.46	No	NONE		0.25		57%	34%	12%	0%	0%	0.19		2,080	573
15	RETROFIT			room 15	Other	INTERIOR	Education - Secondary School		Cooled Space	3	F42LL	59	0.18	NONE		[redacted]				3	CUT SHEET 2	38	0.11	No	NONE		0.06		57%	34%	12%	0%	0%	0.05		2,080	147
16	RETROFIT			room 16	Other	INTERIOR	Education - Secondary School		Cooled Space	15	F42LL	59	0.89	NONE		[redacted]				15	CUT SHEET 2	38	0.57	No	NONE		0.32		57%	34%	12%	0%	0%	0.24		2,080	734
17	RETROFIT			room 17	Other	INTERIOR	Education - Secondary School		Cooled Space	15	F42LL	59	0.89	NONE		[redacted]				15	CUT SHEET 2	38	0.57	No	NONE		0.32		57%	34%	12%	0%	0%	0.24		2,080	734
18	RETROFIT			office practice	Other	INTERIOR	Education - Secondary School		Cooled Space	12	F42LL	59	0.71	NONE		[redacted]				6	CUT SHEET 4	77	0.46	No	NONE		0.25		57%	34%	12%	0%	0%	0.19		2,080	573
19	RETROFIT			office practice	Other	INTERIOR	Education - Secondary School		Cooled Space	3	F42LL	59	0.18	NONE		[redacted]				3	CUT SHEET 2	38	0.11	No	NONE		0.06		57%	34%	12%	0%	0%	0.05		2,080	147
20	RETROFIT			room 18	Other	INTERIOR	Education - Secondary School		Cooled Space	21	F42LL	59	1.24	NONE		[redacted]				21	CUT SHEET 2	38	0.80	No	NONE		0.44		57%	34%	12%	0%	0%	0.34		2,080	1,027
21	RETROFIT			athl. Office - guess	Other	INTERIOR	Education - Secondary School		Cooled Space	2	F42LL	59	0.12	NONE		[redacted]				2	CUT SHEET 2	38	0.08	No	NONE		0.04		57%	34%	12%	0%	0%	0.03		2,080	98
22	RETROFIT			typing	Other	INTERIOR	Education - Secondary School		Cooled Space	24	F42LL	59	1.42	NONE		[redacted]				12	CUT SHEET 4	77	0.92	No	NONE		0.49		57%	34%	12%	0%	0%	0.38		2,080	1,146
23	RETROFIT			girls office	Other	INTERIOR	Education - Secondary School		Cooled Space	1	F42LL	59	0.06	NONE		[redacted]				1	CUT SHEET 2	38	0.04	No	NONE		0.02		57%	34%	12%	0%	0%	0.02		2,080	49
24	RETROFIT			cons. Stand	Other	INTERIOR	Education - Secondary School		Cooled Space	3	F42LL	59	0.18	NONE		[redacted]				3	CUT SHEET 2	38	0.11	No	NONE		0.06		57%	34%	12%	0%	0%	0.05		2,080	147
25	RETROFIT			boys rr	Other	INTERIOR	Education - Secondary School		Cooled Space	1	F42LL	59	0.06	NONE		[redacted]				1	CUT SHEET 2	38	0.04	No	NONE		0.02	1.00	100%	34%	12%	0%	0%	0.03	2880	2,880	68
26	RETROFIT			t.b.	Other	INTERIOR	Education - Secondary School		Cooled Space	1	F42LL	59	0.06	NONE		[redacted]				1	CUT SHEET 2	38	0.04	No	NONE		0.02		57%	34%	12%	0%	0%	0.02		2,080	49
27	RETROFIT			rm. 21	Other	INTERIOR	Education - Secondary School		Cooled Space	30	F42LL	59	1.77	NONE		[redacted]				30	CUT SHEET 2	38	1.14	No	NONE		0.63		57%	34%	12%	0%	0%	0.48		2,080	1,468
28	RETROFIT			woodshop	Other	INTERIOR	Education - Secondary School		Cooled Space	18	F42LL	59	1.06	NONE		[redacted]				9	CUT SHEET 4	77	0.69	No	NONE		0.37		57%	34%	12%	0%	0%	0.28		2,080	860
29	RETROFIT			woodshop	Other	INTERIOR	Education - Secondary School		Cooled Space	18	F42LL	59	1.06	NONE		[redacted]				18	CUT SHEET 2	38	0.68	No	NONE		0.38		57%	34%	12%	0%	0%	0.29		2,080	881
30	RETROFIT			metal shop	Other	INTERIOR	Education - Secondary School		Cooled Space	64	F42LL	59	3.78	NONE		[redacted]				32	CUT SHEET 4	77	2.46	No	NONE		1.31		57%	34%	12%	0%	0%	1.00		2,080	3,056
31	RETROFIT			boys locker room	Other	INTERIOR	Education - Secondary School		Cooled Space	34	F42LL	59	2.01	NONE		[redacted]				34	CUT SHEET 2	38	1.29	No	NONE		0.71	1.00	100%	34%	12%	0%	0%	0.96	2880	2,880	2,303
32	RETROFIT			locker room office	Other	INTERIOR	Education - Secondary School		Cooled Space	2	F42LL	59	0.12	NONE		[redacted]				1	CUT SHEET 4	77	0.08	No	NONE		0.04		57%	34%	12%	0%	0%	0.03		2,080	96
33	RETROFIT			wrestling	Other	INTERIOR	Education - Secondary School		Cooled Space	2	F42LL	59	0.12	NONE		[redacted]				2	CUT SHEET 2	38	0.08	No	NONE		0.04		57%	34%	12%	0%	0%	0.03		2,080	98
34	RETROFIT			girls locker room	Other	INTERIOR	Education - Secondary School		Cooled Space	34	F42LL	59	2.01	NONE		[redacted]				34	CUT SHEET 2	38	1.29	No	NONE		0.71	1.00	100%	34%	12%	0%	0%	0.96	2880	2,880	2,303
35	RETROFIT			locker room office	Other	INTERIOR	Education - Secondary School		Cooled Space	2	F42LL	59	0.12	NONE		[redacted]				1	CUT SHEET 4	77	0.08	No	NONE		0.04		57%	34%	12%	0%	0%	0.03		2,080	96
36	RETROFIT			hallway	Other	INTERIOR	Education - Secondary School		Cooled Space	8	F42LL	59	0.47	NONE		[redacted]				8	CUT SHEET 2	38	0.30	No	NONE		0.17	1.00	100%	34%	12%	0%	0%	0.23	2880	2,880	542
37	RETROFIT			teachers lounge	Other	INTERIOR	Education - Secondary School		Cooled Space	3	F42LL	59	0.18	NONE		[redacted]				3	CUT SHEET 2	38	0.11	No	NONE		0.06		57%	34%	12%	0%	0%	0.05		2,080	147
38	RETROFIT			nurses office	Other	INTERIOR	Education - Secondary School		Cooled Space	3	F42LL	59	0.18	NONE		[redacted]				3	CUT SHEET 2	38	0.11	No	NONE		0.06		57%	34%	12%	0%	0%	0.05		2,080	147
39	RETROFIT			room 12	Other	INTERIOR	Education - Secondary School		Cooled Space	12	F42LL	59	0.71	NONE		[redacted]				6	CUT SHEET 4	77	0.46	No	NONE		0.25		57%	34%	12%	0%	0%	0.19		2,080	573
40	RETROFIT			room 12	Other	INTERIOR	Education - Secondary School		Cooled Space	3	F42LL	59	0.18	NONE		[redacted]				3	CUT SHEET 2	38	0.11	No	NONE		0.06		57%	34%	12%	0%	0%	0.05		2,080	147
41	RETROFIT			room 11	Other	INTERIOR	Education - Secondary School		Cooled Space	12	F42LL	59	0.71	NONE		[redacted]				6	CUT SHEET 4	77	0.46	No	NONE		0.25		57%	34%	12%	0%	0%	0.19		2,080	573
42	RETROFIT			room 11	Other	INTERIOR	Education - Secondary School		Cooled Space	3	F42LL	59	0.18	NONE		[redacted]				3	CUT SHEET 2	38	0.11	No	NONE		0.06		57%	34%	12%	0%	0%	0.05		2,080	147
43	RETROFIT			room 9	Other	INTERIOR	Education - Secondary School		Cooled Space	12	F42LL	59	0.71	NONE		[redacted]				6	CUT SHEET 4	77	0.46	No	NONE		0.25		57%	34%	12%	0%	0%	0.19		2,080	573
44	RETROFIT			room 8	Other	INTERIOR	Education - Secondary School		Cooled Space	12	F42LL	59	0.71	NONE		[redacted]				6	CUT SHEET 4	77	0.46	No	NONE		0.25		57%	34%	12%	0%	0%	0.19		2,080	573
45	RETROFIT			room 7	Other	INTERIOR	Education - Secondary School		Cooled Space	12	F42LL	59	0.71	NONE		[redacted]				12	CUT SHEET 2	38	0.46	No	NONE		0.25		57%	34%	12%	0%	0%	0.19		2,080	587
46	RETROFIT			room 4	Other	INTERIOR	Education - Secondary School		Cooled Space	30	F42LL	59	1.77	NONE		[redacted]				15	CUT SHEET 4	77	1.16	No	NONE		0.62		57%	34%	12%	0%	0%	0.47		2,080	1,433
47	RETROFIT			room 3	Other	INTERIOR	Education - Secondary School		Cooled Space	12	F42LL	59	0.71	NONE		[redacted]				6	CUT SHEET 4	77	0.46	No	NONE		0.25		57%	34%	12%	0%	0%	0.19		2,080	573
48	RETROFIT			room 1/2	Other	INTERIOR	Education - Secondary School		Cooled Space	24	F42LL	59	1.42	NONE		[redacted]				12	CUT SHEET 4	77	0.92	No	NONE		0.49		57%	34%	12%	0%	0%	0.38		2,080	1,146
49	RETROFIT			library	Other	INTERIOR	Education - Secondary School		Cooled Space	3	F42LL	59	0.18	NONE		[redacted]				3	CUT SHEET 2	38	0.11	No	NONE		0.06	1.00	100%	34%	12%	0%	0%	0.08		2,080	147
50	RETROFIT			LRC	Other	INTERIOR	Education - Secondary School		Cooled Space	8	F42LL	59	0.47	NONE		[redacted]				8	CUT SHEET 2	38	0.30	No	NONE		0.17	1.00	100%	34%	12%	0%	0%	0.23		2,080	391
51	RETROFIT			hallway	Other	INTERIOR	Education - Secondary School			28	F42LL	59	1.65	NONE		[redacted]				28	CUT SHEET 2	38	1.06	No	NONE		0.59	1.00	100%	0%	0%	0%	0%	0.59	2880	2,880	1,693
52	RETROFIT			trophy case	Other	INTERIOR	Education - Secondary School			1	F42LL	59	0.06	NONE		[redacted]				1	CUT SHEET 2	38	0.04	No	NONE		0.02		57%	0%	0%	0%	0%	0.01	8760	8,760	184
53	RETROFIT			hallway	Other	INTERIOR	Education - Secondary School			12	F44LL	112	1.34	NONE		[redacted]				12	CUT SHEET 4	77	0.92	No	NONE		0.42	1.00	100%	0%	0%	0%	0%	0.42	2880	2,880	1,210
54	RETROFIT			book storage	Other	INTERIOR	Education - Secondary School			2	F44LL	112	0.22	NONE		[redacted]				2	CUT SHEET 4	77	0.15	No	NONE		0.07		57%	0%	0%	0%	0%	0.04		2,080	146
55	RETROFIT			art room	Other	INTERIOR	Education - Secondary School			26	F44LL	112	2.91	NONE		[redacted]				26	CUT SHEET 4	77	2.00	No	NONE		0.91		57%	0%	0%	0%	0%	0.52		2,080	1,893
56	RETROFIT			voed office	Other	INTERIOR	Education - Secondary School			2	F44LL	112	0.22	NONE		[redacted]				2	CUT SHEET 4	77	0.15	No	NONE		0.07		57%	0%	0%	0%	0%	0.04		2,080	146
57	RETROFIT			room 6	Other	INTERIOR	Education - Secondary School			9	F44LL	112	1.01	NONE		[redacted]				9	CUT SHEET 4	77	0.69	No	NONE		0.32		57%	0%	0%	0%	0%	0.18		2,080	655
58	RETROFIT			room 5	Other	INTERIOR	Education - Secondary School			12	F44LL	112	1.34	NONE		[redacted]				12	CUT SHEET 4	77	0.92	No	NONE		0.42		57%	0%	0%	0%	0%	0.24		2,080	874
59	RETROFIT			biology	Other	INTERIOR	Education - Secondary School			15	F44LL	112	1.68	NONE		[redacted]				15	CUT SHEET 4	77	1.16	No	NONE		0.53		57%	0%	0%	0%	0%	0.30		2,080	1,092
60	RETROFIT			biology office-guess	Other	INTERIOR	Education - Secondary School			2	F44LL	112	0.22	NONE		[redacted]				2	CUT SHEET 4	77	0.15	No	NONE		0.07		57%	0%	0%	0%	0%	0.04		2,080	146
61	RETROFIT			back library	Other	INTERIOR	Education - Secondary School			15	F44LL	112	1.68	NONE		[redacted]				15	CUT SHEET 4	77	1.16	No	NONE		0.53		57%	0%	0%	0%	0%	0.30		2,080	1,092
62	RETROFIT			back library	Other	INTERIOR	Education - Secondary School			14	F44LL	112	1.57	NONE		[redacted]				14	CUT SHEET 4	77	1.08	No	NONE		0.49		57%	0%	0%	0%	0%	0.28		2,080	1,019
63	RETROFIT			library	Other	INTERIOR	Education - Secondary School			30	F44LL	112	3.36	NONE		[redacted]				30	CUT SHEET 4	77	2.31	No	NONE		1.05	1.00	100%	0%	0%	0%	0%	1.05		2,080	2,184
64	RETROFIT			office practice	Other	INTERIOR	Education - Secondary School			1	F44LL	112	0.11	NONE		[redacted]				1	CUT SHEET 4	77	0.08	No	NONE		0.04		57%	0%	0%	0%	0%	0.02		2,080	73
65	RETROFIT			room 10	Other	INTERIOR	Education - Secondary School			18	F44LL	112	2.02	NONE		[redacted]				18	CUT SHEET 4	77	1.39	No	NONE		0.63		57%	0%	0%	0%	0%	0.36		2,080	1,310
66	RETROFIT			atind. Office	Other	INTERIOR	Education - Secondary School			2	F44LL	112	0.22	NONE		[redacted]				2	CUT SHEET 4	77	0.15	No	NONE		0.07		57%	0%	0%	0%	0%	0.04		2,080	146
67	RETROFIT			choral	Other	INTERIOR	Education - Secondary School			8	F44LL	112	0.90	NONE		[redacted]				8	CUT SHEET 4	77	0.62	No	NONE		0.28		57%	0%	0%	0%	0%	0.16		2,080	582
68	RETROFIT			band	Other	INTERIOR	Education - Secondary School			18	F44LL	112	2.02	NONE		[redacted]				18	CUT SHEET 4	77	1.39	No	NONE		0.63		57%	0%	0%	0%	0%	0.36		2,080	1,310
69	RETROFIT			band storage	Other	INTERIOR	Education - Secondary School			2	F44LL	112	0.22	NONE		[redacted]				2	CUT SHEET 4	77	0.15	No	NONE		0.07		57%	0%	0%	0%	0%	0.04		2,080	146
70	RETROFIT			storage	Other	INTERIOR	Education - Secondary School			2	F44LL	112	0.22	NONE		[redacted]				2	CUT SHEET 4	77	0.15	No	NONE		0.07		57%	0%	0%	0%	0%	0.04		2,080	146
71	RETROFIT			teachers lounge	Other	INTERIOR	Education - Secondary School			4	F44LL	112	0.45	NONE		[redacted]				4	CUT SHEET 4	77	0.31	No	NONE		0.14		57%	0%	0%	0%	0%	0.08		2,080	291
72	RETROFIT			hallway	Other	INTERIOR	Education - Secondary School			4	F44LL	112	0.45	NONE		[redacted]				4	CUT SHEET 4	77	0.31	No	NONE		0.14	1.00	100%	0%	0%	0%	0%	0.14	2880	2,880	403
73	RETROFIT			wrestling	Other	INTERIOR	Education - Secondary School			6	MH4001	458	2.75	NONE		[redacted]				6	CUT SHEET 6	234	1.40	No	NONE		1.34	1.00	100%	0%	0%	0%	0%	1.34	2880	2,880	3,871
74	RETROFIT			Mr	Other	INTERIOR	Education - Secondary School			8	MH4001	458	3.66	NONE		[redacted]				8	CUT SHEET 6	234	1.87	No	NONE		1.79	1.00	100%	0%	0%	0%	0%	1.79	2880	2,880	5,161
75													0.00	NONE									0.00		NONE		0.00										0
76													0.00	NONE									0.00		NONE		0.00										0
77													0.00	NONE									0.00		NONE		0.00										0
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79													0.00	NONE									0.00		NONE		0.00										0
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81													0.00	NONE									0.00		NONE		0.00										0
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84													0.00	NONE									0.00		NONE		0.00	1.00									0
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86													0.00	NONE									0.00		NONE		0.00	1.00									0
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180													0.00	NONE									0.00		NONE		0.00										0
181													0.00	NONE									0.00		NONE		0.00										0
182													0.00	NONE									0.00		NONE		0.00										0
183													0.00	NONE									0.00		NONE		0.00										0
184													0.00	NONE									0.00		NONE		0.00										0
185													0.00	NONE									0.00		NONE		0.00	100%							2,880		0
186													0.00	NONE									0.00		NONE		0.00										0
187													0.00	NONE									0.00		NONE		0.00										0
188													0.00	NONE									0.00		NONE		0.00										0
189													0.00	NONE									0.00		NONE		0.00										0
190													0.00	NONE									0.00		NONE		0.00										0
191													0.00	NONE									0.00		NONE		0.00										0
192													0.00	NONE									0.00		NONE		0.00										0
193													0.00	NONE									0.00		NONE		0.00										0
194													0.00	NONE									0.00		NONE		0.00										0
195													0.00	NONE									0.00		NONE		0.00										0
196													0.00	NONE									0.00		NONE		0.00										0
197													0.00	NONE									0.00		NONE		0.00										0
198													0.00	NONE									0.00		NONE		0.00										0
199													0.00	NONE									0.00		NONE		0.00										0
200													0.00	NONE									0.00		NONE		0.00										0

Lighting Form

Line Item	New Construction or Retrofit	Building Address	Floor	Area Description	Space Description	Interior or Exterior Fixture	Predominant Space Type	Exterior Lighting Description (Exterior Lighting Only)	Area Cooling	Pre Fixture Qty	Pre Fixture Code	Pre Watts / Fixture (W)	Pre kW / Space (kW)	Existing Control	Existing Sensor Quantity	Units e.g. Square Feet (ft²). If multiple fixture types are used, please only enter the total area/dimension/qty once per space.	Lighting Power Density (W/unit)	Baseline kW / Space (kW)	Post Fixture Qty	Post Fixture Code	Post Watts / Fixture (W)	Post kW / Space (kW)	Are Occupancy Sensors Required by Code?	Proposed Control	Proposed Sensor Quantity	Change in Connected Load (kW)	Applicant Coincidence Factor (CF) Estimate	Coincidence Factor	Interactive Factor (demand)	Interactive Factor (energy)	Pre Controls Factor	Post Controls Factor	Demand Savings (kW)	Applicant Equivalent Full-Load Hours (EFLH) Estimate	Prescribed Equivalent Full-Load Hours	Annual kWh Saved
001													0.00	NONE								0.00		NONE		0.00										0
002													0.00	NONE								0.00		NONE		0.00										0
003													0.00	NONE								0.00		NONE		0.00										0
004													0.00	NONE								0.00		NONE		0.00										0
005													0.00	NONE								0.00		NONE		0.00										0
006													0.00	NONE								0.00		NONE		0.00										0
007													0.00	NONE								0.00		NONE		0.00										0
008													0.00	NONE								0.00		NONE		0.00										0
009													0.00	NONE								0.00		NONE		0.00										0
010													0.00	NONE								0.00		NONE		0.00										0
011													0.00	NONE								0.00		NONE		0.00										0
012													0.00	NONE								0.00		NONE		0.00										0
013													0.00	NONE								0.00		NONE		0.00										0
014													0.00	NONE								0.00		NONE		0.00										0
015													0.00	NONE								0.00		NONE		0.00										0
016													0.00	NONE								0.00		NONE		0.00										0
017													0.00	NONE								0.00		NONE		0.00										0
018													0.00	NONE								0.00		NONE		0.00										0
019													0.00	NONE								0.00		NONE		0.00										0
020													0.00	NONE								0.00		NONE		0.00										0
021													0.00	NONE								0.00		NONE		0.00										0
022													0.00	NONE								0.00		NONE		0.00										0
023													0.00	NONE								0.00		NONE		0.00										0
024													0.00	NONE								0.00		NONE		0.00										0
025													0.00	NONE								0.00		NONE		0.00										0
026													0.00	NONE								0.00		NONE		0.00										0
027													0.00	NONE								0.00		NONE		0.00										0
028													0.00	NONE								0.00		NONE		0.00										0
029													0.00	NONE								0.00		NONE		0.00										0
030													0.00	NONE								0.00		NONE		0.00										0
031													0.00	NONE								0.00		NONE		0.00										0
032													0.00	NONE								0.00		NONE		0.00										0
033													0.00	NONE								0.00		NONE		0.00										0
034													0.00	NONE								0.00		NONE		0.00										0
035													0.00	NONE								0.00		NONE		0.00										0
036													0.00	NONE								0.00		NONE		0.00										0
037													0.00	NONE								0.00		NONE		0.00										0
038													0.00	NONE								0.00		NONE		0.00										0
039													0.00	NONE								0.00		NONE		0.00										0
040													0.00	NONE								0.00		NONE		0.00										0
041													0.00	NONE								0.00		NONE		0.00										0
042													0.00	NONE								0.00		NONE		0.00										0
043													0.00	NONE								0.00		NONE		0.00										0
044													0.00	NONE								0.00		NONE		0.00										0
045													0.00	NONE								0.00		NONE		0.00										0
046													0.00	NONE								0.00		NONE		0.00										0
047													0.00	NONE								0.00		NONE		0.00										0
048													0.00	NONE								0.00		NONE		0.00										0
049													0.00	NONE								0.00		NONE		0.00										0
050													0.00	NONE								0.00		NONE		0.00										0
Totals										795			66.44						697			38.17				28.27							17.85		8,486	93,797

Lighting Energy Savings Calculations **Cardinal Local Schools** **High School**

			EXISTING LIGHTING		PROPOSED LIGHTING		Existing	Proposed	Total	Hours		
Item	Floor	Area	Qty_E	Description_E	Qty_R	Description_R	Watts_e Each	Watts_p Each	Savings Watts	of Use	KWH Savings	KW Savings
25	1	boys locker room	3	1L4' T8/ELEC	3	1L-4'-Advance Optanium - 25 Watt Lamp	31	21	30	2880	86	0.03
30	1	girls locker room	3	1L4' T8/ELEC	3	1L-4'-Advance Optanium - 25 Watt Lamp	31	21	30	2880	86	0.03
34	1	trophy case	10	1L4' T8/ELEC	10	1L-4'-Advance Optanium - 25 Watt Lamp	31	21	100	8760	876	0.10
48	1	art room	2	1L4' T8/ELEC	2	1L-4'-Advance Optanium - 25 Watt Lamp	31	21	20	2080	42	0.02
61	1	library	6	1L4' T8/ELEC	6	1L-4'-Advance Optanium - 25 Watt Lamp	31	21	60	2080	125	0.06
72	1	hallway	3	2L4' T8/ELEC	3	2L-4'-Advance Optanium - 25 Watt Lamp	59	21	114	2880	328	0.11
72	1	trophy case	2	2L4' T8/ELEC	2	2L-4'-Advance Optanium - 25 Watt Lamp	59	21	76	8760	666	0.08
1	1	Main Office	8	2L4' T8/ELEC	4	4L-4'-Advance Optanium - 25 Watt Lamp & Tandem	59	77	164	2080	341	0.16
2	1	Cas Office	2	2L4' T8/ELEC	2	2L-4'-Advance Optanium - 25 Watt Lamp	59	38	42	2080	87	0.04
3	1	Princ. Office	2	2L4' T8/ELEC	2	2L-4'-Advance Optanium - 25 Watt Lamp	59	38	42	2080	87	0.04
4	1	guid. Hall	5	2L4' T8/ELEC	5	2L-4'-Advance Optanium - 25 Watt Lamp	59	38	105	2880	302	0.11
5	1	guid. Office	1	2L4' T8/ELEC	1	2L-4'-Advance Optanium - 25 Watt Lamp	59	38	21	2080	44	0.02
6	1	asst. prin.	3	2L4' T8/ELEC	3	2L-4'-Advance Optanium - 25 Watt Lamp	59	38	63	2080	131	0.06
7	1	room 15	12	2L4' T8/ELEC	6	4L-4'-Advance Optanium - 25 Watt Lamp & Tandem	59	77	246	2080	512	0.25
8	1	room 15	3	2L4' T8/ELEC	3	2L-4'-Advance Optanium - 25 Watt Lamp	59	38	63	2080	131	0.06
9	1	room 16	15	2L4' T8/ELEC	15	2L-4'-Advance Optanium - 25 Watt Lamp	59	38	315	2080	655	0.32
10	1	room 17	15	2L4' T8/ELEC	15	2L-4'-Advance Optanium - 25 Watt Lamp	59	38	315	2080	655	0.32
11	1	office practice	12	2L4' T8/ELEC	6	4L-4'-Advance Optanium - 25 Watt Lamp & Tandem	59	77	246	2080	512	0.25
12	1	office practice	3	2L4' T8/ELEC	3	2L-4'-Advance Optanium - 25 Watt Lamp	59	38	63	2080	131	0.06
13	1	room 18	21	2L4' T8/ELEC	21	2L-4'-Advance Optanium - 25 Watt Lamp	59	38	441	2080	917	0.44
14	1	athl. Office - guess	2	2L4' T8/ELEC	2	2L-4'-Advance Optanium - 25 Watt Lamp	59	38	42	2080	87	0.04
15	1	typing	24	2L4' T8/ELEC	12	4L-4'-Advance Optanium - 25 Watt Lamp & Tandem	59	77	492	2080	1,023	0.49
16	1	girls office	1	2L4' T8/ELEC	1	2L-4'-Advance Optanium - 25 Watt Lamp	59	38	21	2080	44	0.02
17	1	cons. Stand	3	2L4' T8/ELEC	3	2L-4'-Advance Optanium - 25 Watt Lamp	59	38	63	2080	131	0.06
18	1	boys rr	1	2L4' T8/ELEC	1	2L-4'-Advance Optanium - 25 Watt Lamp	59	38	21	2880	60	0.02
19	1	t.b.	1	2L4' T8/ELEC	1	2L-4'-Advance Optanium - 25 Watt Lamp	59	38	21	2080	44	0.02
20	1	rm. 21	30	2L4' T8/ELEC	30	2L-4'-Advance Optanium - 25 Watt Lamp	59	38	630	2080	1,310	0.63
21	1	woodshop	18	2L4' T8/ELEC	9	4L-4'-Advance Optanium - 25 Watt Lamp & Tandem	59	77	369	2080	768	0.37
22	1	woodshop	18	2L4' T8/ELEC	18	2L-4'-Advance Optanium - 25 Watt Lamp	59	38	378	2080	786	0.38
23	1	metal shop	64	2L4' T8/ELEC	32	4L-4'-Advance Optanium - 25 Watt Lamp & Tandem	59	77	1312	2080	2,729	1.31
24	1	boys locker room	34	2L4' T8/ELEC	34	2L-4'-Advance Optanium - 25 Watt Lamp	59	38	714	2880	2,056	0.71
26	1	locker room office	2	2L4' T8/ELEC	1	4L-4'-Advance Optanium - 25 Watt Lamp & Tandem	59	77	41	2080	85	0.04
27	1	wrestling	2	2L4' T8/ELEC	2	2L-4'-Advance Optanium - 25 Watt Lamp	59	38	42	2080	87	0.04
29	1	girls locker room	34	2L4' T8/ELEC	34	2L-4'-Advance Optanium - 25 Watt Lamp	59	38	714	2880	2,056	0.71
31	1	locker room office	2	2L4' T8/ELEC	1	4L-4'-Advance Optanium - 25 Watt Lamp & Tandem	59	77	41	2080	85	0.04
36	1	hallway	8	2L4' T8/ELEC	8	2L-4'-Advance Optanium - 25 Watt Lamp	59	38	168	2880	484	0.17
39	1	teachers lounge	3	2L4' T8/ELEC	3	2L-4'-Advance Optanium - 25 Watt Lamp	59	38	63	2080	131	0.06
40	1	nurses office	3	2L4' T8/ELEC	3	2L-4'-Advance Optanium - 25 Watt Lamp	59	38	63	2080	131	0.06
41	1	room 12	12	2L4' T8/ELEC	6	4L-4'-Advance Optanium - 25 Watt Lamp & Tandem	59	77	246	2080	512	0.25
42	1	room 12	3	2L4' T8/ELEC	3	2L-4'-Advance Optanium - 25 Watt Lamp	59	38	63	2080	131	0.06

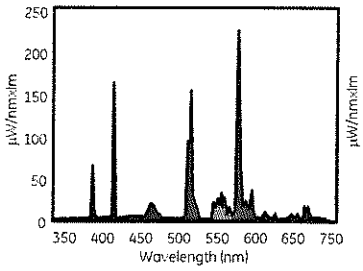
Lighting Energy Savings Calculations **Cardinal Local Schools** **High School**

			EXISTING LIGHTING		PROPOSED LIGHTING		Existing	Proposed	Total	Hours		
Item	Floor	Area	Qty_E	Description_E	Qty_R	Description_R	Watts_e Each	Watts_p Each	Savings Watts	of Use	KWH Savings	KW Savings
43	1	room 11	12	2L4' T8/ELEC	6	4L-4'-Advance Optanium - 25 Watt Lamp & Tandem	59	77	246	2080	512	0.25
44	1	room 11	3	2L4' T8/ELEC	3	2L-4'-Advance Optanium - 25 Watt Lamp	59	38	63	2080	131	0.06
45	1	room 9	12	2L4' T8/ELEC	6	4L-4'-Advance Optanium - 25 Watt Lamp & Tandem	59	77	246	2080	512	0.25
46	1	room 8	12	2L4' T8/ELEC	6	4L-4'-Advance Optanium - 25 Watt Lamp & Tandem	59	77	246	2080	512	0.25
47	1	room 7	12	2L4' T8/ELEC	12	2L-4'-Advance Optanium - 25 Watt Lamp	59	38	252	2080	524	0.25
55	1	room 4	30	2L4' T8/ELEC	15	4L-4'-Advance Optanium - 25 Watt Lamp & Tandem	59	77	615	2080	1,279	0.62
56	1	room 3	12	2L4' T8/ELEC	6	4L-4'-Advance Optanium - 25 Watt Lamp & Tandem	59	77	246	2080	512	0.25
57	1	room 1/2	24	2L4' T8/ELEC	12	4L-4'-Advance Optanium - 25 Watt Lamp & Tandem	59	77	492	2080	1,023	0.49
61	1	library	3	2L4' T8/ELEC	3	2L-4'-Advance Optanium - 25 Watt Lamp	59	38	63	2080	131	0.06
72	1	LRC	8	2L4' T8/ELEC	8	2L-4'-Advance Optanium - 25 Watt Lamp	59	38	168	2080	349	0.17
70	1	hallway	28	2L4' T8/ELEC	28	2L-4'-Advance Optanium - 25 Watt Lamp	59	38	588	2880	1,693	0.59
72	1	trophy case	1	2L4' T8/ELEC	1	2L-4'-Advance Optanium - 25 Watt Lamp	59	38	21	8760	184	0.02
37	1	hallway	12	4L4' T8/ELEC	12	4L-4'-Advance Optanium - 25 Watt Lamp	112	77	420	2880	1,210	0.42
38	1	book storage	2	4L4' T8/ELEC	2	4L-4'-Advance Optanium - 25 Watt Lamp	112	77	70	2080	146	0.07
49	1	art room	26	4L4' T8/ELEC	26	4L-4'-Advance Optanium - 25 Watt Lamp	112	77	910	2080	1,893	0.91
50	1	voed office	2	4L4' T8/ELEC	2	4L-4'-Advance Optanium - 25 Watt Lamp	112	77	70	2080	146	0.07
51	1	room 6	9	4L4' T8/ELEC	9	4L-4'-Advance Optanium - 25 Watt Lamp	112	77	315	2080	655	0.32
52	1	room 5	12	4L4' T8/ELEC	12	4L-4'-Advance Optanium - 25 Watt Lamp	112	77	420	2080	874	0.42
53	1	biology	15	4L4' T8/ELEC	15	4L-4'-Advance Optanium - 25 Watt Lamp	112	77	525	2080	1,092	0.53
54	1	biology office-guess	2	4L4' T8/ELEC	2	4L-4'-Advance Optanium - 25 Watt Lamp	112	77	70	2080	146	0.07
59	1	back library	15	4L4' T8/ELEC	15	4L-4'-Advance Optanium - 25 Watt Lamp	112	77	525	2080	1,092	0.53
60	1	back library	14	4L4' T8/ELEC	14	4L-4'-Advance Optanium - 25 Watt Lamp	112	77	490	2080	1,019	0.49
61	1	library	30	4L4' T8/ELEC	30	4L-4'-Advance Optanium - 25 Watt Lamp	112	77	1050	2080	2,184	1.05
62	1	office practice	1	4L4' T8/ELEC	1	4L-4'-Advance Optanium - 25 Watt Lamp	112	77	35	2080	73	0.04
63	1	room 10	18	4L4' T8/ELEC	18	4L-4'-Advance Optanium - 25 Watt Lamp	112	77	630	2080	1,310	0.63
64	1	atind. Office	2	4L4' T8/ELEC	2	4L-4'-Advance Optanium - 25 Watt Lamp	112	77	70	2080	146	0.07
66	1	choral	8	4L4' T8/ELEC	8	4L-4'-Advance Optanium - 25 Watt Lamp	112	77	280	2080	582	0.28
68	1	band	18	4L4' T8/ELEC	18	4L-4'-Advance Optanium - 25 Watt Lamp	112	77	630	2080	1,310	0.63
69	1	band storage	2	4L4' T8/ELEC	2	4L-4'-Advance Optanium - 25 Watt Lamp	112	77	70	2080	146	0.07
70	1	storage	2	4L4' T8/ELEC	2	4L-4'-Advance Optanium - 25 Watt Lamp	112	77	70	2080	146	0.07
71	1	teachers lounge	4	4L4' T8/ELEC	4	4L-4'-Advance Optanium - 25 Watt Lamp	112	77	140	2080	291	0.14
71	1	hallway	4	4L4' T8/ELEC	4	4L-4'-Advance Optanium - 25 Watt Lamp	112	77	140	2880	403	0.14
0		wrestling	6	Mh-400	6	4L T5HO Highbay Fixture CL & WG	458	234	1344	2880	3,871	1.34
		Mpr	8	mh-400	8	4L T5HO Highbay Fixture CL & WG	458	234	1792	2880	5,161	1.79
						COOLING LOAD					2,993	0.00
											53,707	

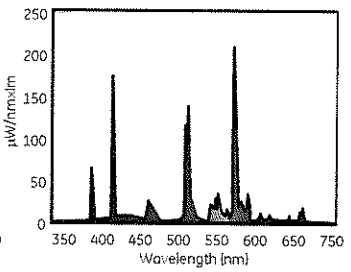
F32T8/25W/SPX/ECO Specs

Product Description	F32T8/25W/SPX30/ECO	F32T8/25W/SPX35/ECO	F32T8/25W/SPX41/ECO	F32T8/25W/SPX50/ECO
Product Code	72128	72129	72130	72131
Case Quantity	36	36	36	36
Physical Characteristics				
Bulb Designation	T8	T8	T8	T8
Bulb Material	Soda Lime	Soda Lime	Soda Lime	Soda Lime
Max Bulb Diameter (D)	1.10" (27.9mm)	1.10" (27.9mm)	1.10" (27.9mm)	1.10" (27.9mm)
Nominal Bulb Diameter (D)	1" (25.4mm)	1" (25.4mm)	1" (25.4mm)	1" (25.4mm)
Base Type	Medium Bipin (G13)	Medium Bipin (G13)	Medium Bipin (G13)	Medium Bipin (G13)
Max Face to End of Opposing Pin (B)	47.50" (1206.5mm)	47.50" (1206.5mm)	47.50" (1206.5mm)	47.50" (1206.5mm)
Min Face to End of Opposing Pin (B)	47.40" (1204.0mm)	47.40" (1204.0mm)	47.40" (1204.0mm)	47.40" (1204.0mm)
Max Overall Length (C)	47.78" (1213.6)	47.78" (1213.6)	47.78" (1213.6)	47.78" (1213.6)
Nominal Overall Length (C)	48"	48"	48"	48"
TCLP Compliant	yes	yes	yes	yes
Low Mercury	yes	yes	yes	yes
Electrical Characteristics				
Nominal Lamp Watts (W)	25	25	25	25
Nominal Lamp Voltage (V)	105	105	105	105
Nominal Lamp Current (A)	0.238	0.238	0.238	0.238
Minimum Starting Temp (°F)	60	60	60	60
Photometric Characteristics				
Reference - Initial Lumens	2400	2400	2400	2350
- Mean Lumens (40% rated life)	2256	2256	2256	2209
Nominal Efficacy (Lumens/Watt)	96	96	96	94
Avg Rated Life (hrs) 3 hr cycle - IS ballast	36000	36000	36000	36000
Avg Rated Life (hrs) 12 hr cycle - IS ballast	40000	40000	40000	40000
Avg Rated Life (hrs) 3 hr cycle - RS ballast	40000	40000	40000	40000
Avg Rated Life (hrs) 12 hr cycle - RS ballast	46000	46000	46000	46000
Color Rendering Index (Ra) CRI	85	85	85	80
Correlated Color Temperature (Kelvin)	3000	3500	4100	5000

Spectral Power Distribution (3000K)



Spectral Power Distribution (3500K)



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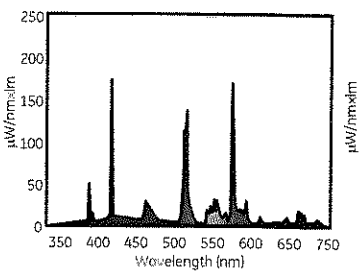

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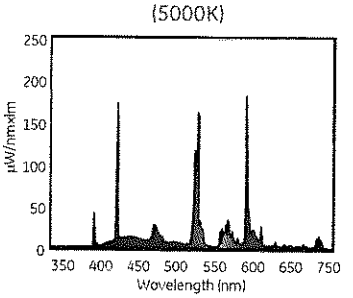
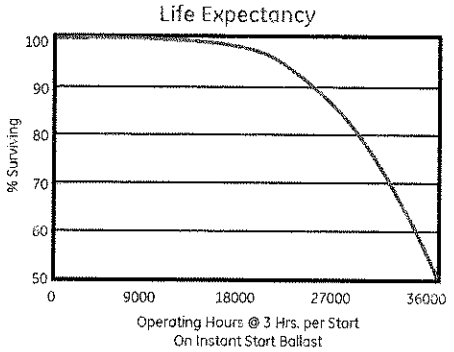
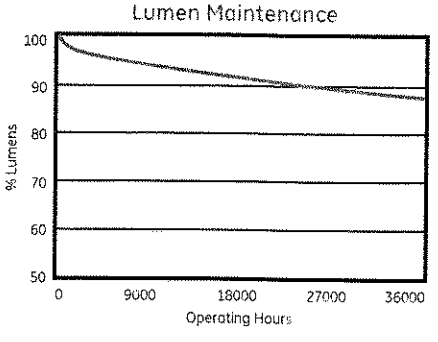


Life Expectancy



Lumen Maintenance



For additional product and application information, please consult GE's Website: www.gelighting.com

72520 9/2007 Printed in USA

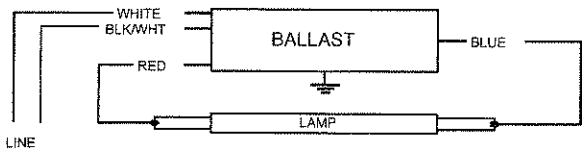
PHILIPS
ADVANCE

IOPA1P32LWSC@120V	
Brand Name	OPTANIUM 2.0
Ballast Type	Electronic
Starting Method	Instant Start
Lamp Connection	Parallel
Input Voltage	120-277
Input Frequency	50/60 HZ
Status	Active

Electrical Specifications

Lamp Type	Num. of Lamps	Rated Lamp Watts	Min. Start Temp (°F/C)	Input Current (Amps)	Input Power (ANSI Watts)	Ballast Factor	MAX THD %	Power Factor	MAX Lamp Current Crest Factor	B.E.F.
F17T8	1	17	-20/-29	0.13	15	0.80	10	0.99	1.5	5.33
F25T8	1	25	-20/-29	0.17	21	0.78	10	0.99	1.5	3.71
F32T8	1	32	-20/-29	0.77	25	0.77	10	0.99	1.5	3.08
* F32T8/ES (25W)	1	25	60/16	21.00	21	0.77	10	0.99	1.5	3.67
F32T8/ES (28W)	1	28	60/16	0.19	22	0.77	10	0.99	1.5	3.50
F32T8/ES (30W)	1	30	60/16	0.20	24	0.77	10	0.99	1.5	3.21

Wiring Diagram

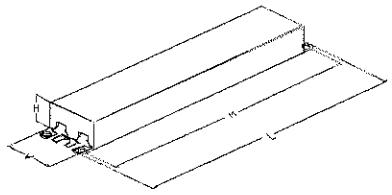


Diag. 63

The wiring diagram that appears above is for the lamp type denoted by the asterisk (*)

Standard Lead Length (inches)

Enclosure



Enclosure Dimensions

OverAll (L)	Width (W)	Height (H)	Mounting (M)
9.50 "	1.7 "	1.18 "	8.90 "
9 1/2	1 7/10	1 9/50	8 9/10
24.1 cm	4.3 cm	3 cm	22.6 cm

Revised 07/09/2008

Data is based upon tests performed by Philips Lighting Electronics N.A. in a controlled environment and is representative of relative performance. Actual performance can vary depending on operating conditions. Specifications are subject to change without notice. All specifications are nominal unless otherwise noted.

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Customer Support/Technical Service: 800-372-3331 · OEM Support: 866-915-5886

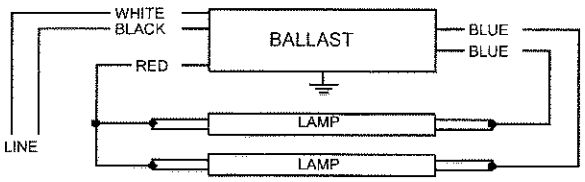
PHILIPS
ADVANCE

IOP2P32LWSC@120V	
Brand Name	OPTANIUM 2.0
Ballast Type	Electronic
Starting Method	Instant Start
Lamp Connection	Parallel
Input Voltage	120-277
Input Frequency	50/60 HZ
Status	Active

Electrical Specifications

Lamp Type	Num. of Lamps	Rated Lamp Watts	Min. Start Temp (°F/C)	Input Current (Amps)	Input Power (ANSI Watts)	Ballast Factor	MAX THD %	Power Factor	MAX Lamp Current Crest Factor	B.E.F.
F32T8/ES (25W)	1	25	60/16	0.20	24	0.90	10	0.99	1.6	3.75
* F32T8/ES (25W)	2	25	60/16	0.32	38	0.77	10	0.99	1.6	2.03

Wiring Diagram



Diag. 64

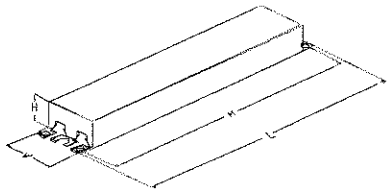
The wiring diagram that appears above is for the lamp type denoted by the asterisk (*)

Standard Lead Length (inches)

	in.	cm.
Black	25	63.5
White	25	63.5
Blue	31	78.7
Red	37	94
Yellow		0
Gray		0
Violet		0

	in.	cm.
Yellow/Blue		0
Blue/White		0
Brown		0
Orange		0
Orange/Black		0
Black/White		0
Red/White		0

Enclosure



Enclosure Dimensions

OverAll (L)	Width (W)	Height (H)	Mounting (M)
9.50 "	1.7 "	1.18 "	8.90 "
9 1/2	1 7/10	1 9/50	8 9/10
24.1 cm	4.3 cm	3 cm	22.6 cm

Revised 08/23/2006

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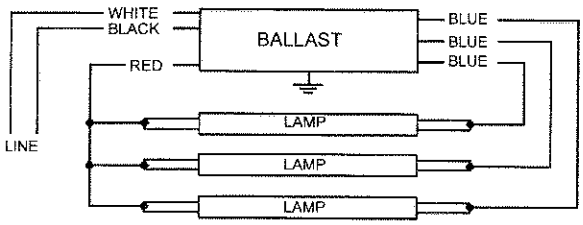
PHILIPS
ADVANCE

IOPA3P32LWSC@120V	
Brand Name	OPTANIUM 2.0
Ballast Type	Electronic
Starting Method	Instant Start
Lamp Connection	Parallel
Input Voltage	120-277
Input Frequency	50/60 HZ
Status	Active

Electrical Specifications

Lamp Type	Num. of Lamps	Rated Lamp Watts	Min. Start Temp (°F/C)	Input Current (Amps)	Input Power (ANSI Watts)	Ballast Factor	MAX THD %	Power Factor	MAX Lamp Current Crest Factor	B.E.F.
F32T8/ES (25W)	2	25	60/16	0.36	43	0.86	10	0.99	1.6	2.00
* F32T8/ES (25W)	3	25	60/16	0.49	58	0.77	10	0.99	1.6	1.33

Wiring Diagram

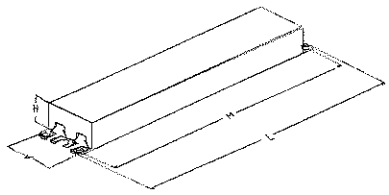


Diag. 65

The wiring diagram that appears above is for the lamp type denoted by the asterisk (*)

Standard Lead Length (inches)

Enclosure



Enclosure Dimensions

OverAll (L)	Width (W)	Height (H)	Mounting (M)
9.50 "	1.7 "	1.18 "	8.90 "
9 1/2	1 7/10	1 9/50	8 9/10
24.1 cm	4.3 cm	3 cm	22.6 cm

Revised 04/02/2009

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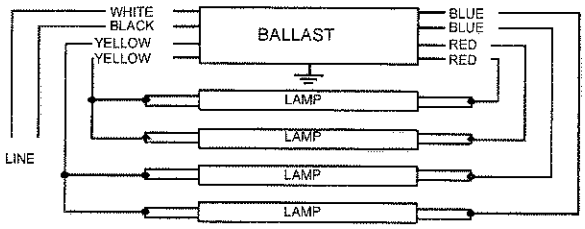
PHILIPS
ADVANCE

IOPA4P32LWSC@120V	
Brand Name	OPTANIUM 2.0
Ballast Type	Electronic
Starting Method	Instant Start
Lamp Connection	Parallel
Input Voltage	120-277
Input Frequency	50/60 HZ
Status	Active

Electrical Specifications

Lamp Type	Num. of Lamps	Rated Lamp Watts	Min. Start Temp (°F/C)	Input Current (Amps)	Input Power (ANSI Watts)	Ballast Factor	MAX THD %	Power Factor	MAX Lamp Current Crest Factor	B.E.F.
F32T8/ES (25W)	3	25	60/16	0.52	62	0.85	10	0.99	1.6	1.37
* F32T8/ES (25W)	4	25	60/16	0.52	77	0.77	10	0.99	1.6	1.00

Wiring Diagram



Diag. 66

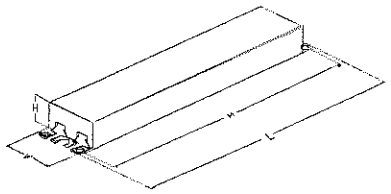
The wiring diagram that appears above is for the lamp type denoted by the asterisk (*)

Standard Lead Length (inches)

	in.	cm.
Black	25	63.5
White	25	63.5
Blue	31	78.7
Red	31	78.7
Yellow	39	99.1
Gray		0
Violet		0

	in.	cm.
Yellow/Blue		0
Blue/White		0
Brown		0
Orange		0
Orange/Black		0
Black/White		0
Red/White		0

Enclosure



Enclosure Dimensions

OverAll (L)	Width (W)	Height (H)	Mounting (M)
9.50 "	1.7 "	1.18 "	8.90 "
9 1/2	1 7/10	1 9/50	8 9/10
24.1 cm	4.3 cm	3 cm	22.6 cm

Revised 03/25/2009

Data is based upon tests performed by Philips Lighting Electronics N.A. in a controlled environment and is representative of relative performance. Actual performance can vary depending on operating conditions. Specifications are subject to change without notice. All specifications are nominal unless otherwise noted.

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For 54-80W Lamps

HIGH POWER FACTOR SOUND RATED A

No. of Lamps	Input Volts	Lamp Starting Method	Ballast Family	Catalog Number	Input Power ANSI (Watts)	Ballast Factor	Max. THD %	Line Current (Amps)	Min. Starting Temp. (°F/°C)	Dim.	Wiring Dia.
F54T5/HO (54W)											
1	120-277	PS	Centium	ICN-2S54+	62	1.02	10	0.52-0.23	-20/-29	D	73
				ICN-2S54-90C+							
				ICN-2S54-90C-SC						B	TBD
			Optanium	IOP-2PSP54-SC	60	1.00	10	0.50 - 0.22			
	347-480		Centium	HCN-2S54-90C-WL	62	1.02	10	0.18-0.13		L	73
2	120-277	PS	Centium	ICN-2S54+	120-117	1.00	10	1.00-0.43	-20/-29	D	74
				ICN-2S54-90C+							
				ICN-2S54-90C-SC						B	TBD
			Optanium	IOP-2PSP54-SC	117-114	1.00	10	0.98 - 0.41			
	347-480		Centium	HCN-2S54-90C-WL	120-119	1.00	10	0.35-0.25		L	74
3	120-277	PS	Centium	ICN-4S54-90C-2LS	182-179	1.00	10	1.52-0.66	-20/-29	E	75A
				ICN-4S54-90C-2LS-G						G	TBD
			Optanium	IOP-4PSP54-2LS-G	176-174	1.00	10	1.47-0.83			
	347-480		Centium	HCN-4S54-90C-2LS-G	188-186	1.04	10	0.54-0.39			75
4	120-277	PS	Centium	ICN-4S54-90C-2LS	240-234	1.00	10	2.00-0.86	-20/-29	E	75
				ICN-4S54-90C-2LS-G						G	TBD
			Optanium	IOP-4PSP54-2LS-G	235-229	1.00	10	1.96-0.83			
	347-480		Centium	HCN-4S54-90C-2LS-G	239-237	1.00	10	0.69-0.50			75
F80T5/HO (80W)											
1	120-277	PS	Centium	ICN-1S80	91-89	1.00	10	0.76-0.33	0/-18	D	73

+ Also available with leads (ICN-2S24-WL, ICN-2S54-WL, or ICN-2S54-90C-WL)

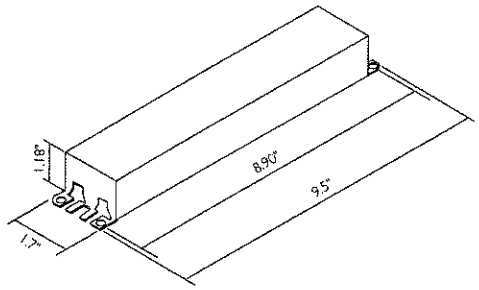


Fig. B

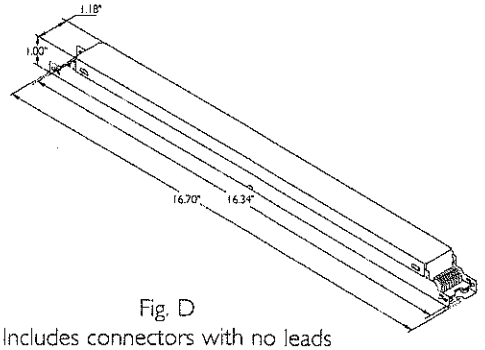


Fig. D
Includes connectors with no leads

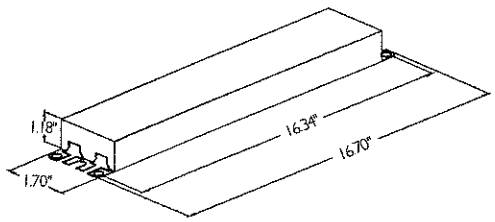


Fig. G

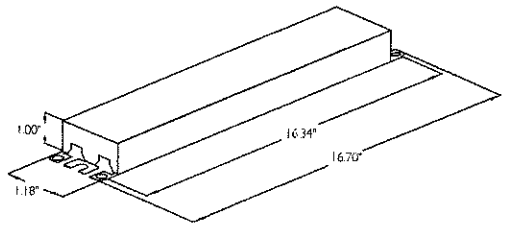
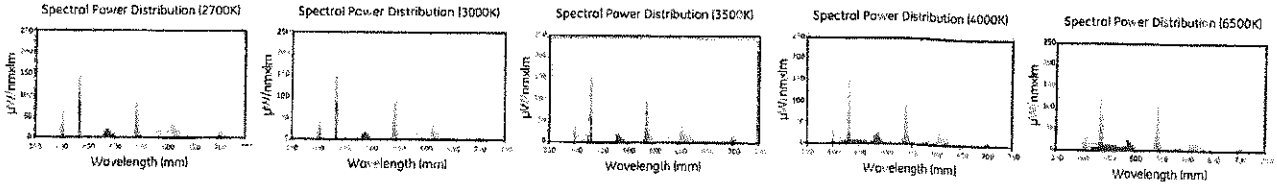


Fig. L

Refer to page 1-37 and 1-38 for wiring diagrams
Refer to pages 9-24 to 9-28 for lead lengths and shipping data

Starcoat™ T5 High Efficiency (HE) and High Output (HO) Lamp Specifications

Watt	Length mm	Product Description	CCT K	CRI Ra	Rated Average Life 3-hr cycle	Rated Average Life 12-hr cycle	Initial Lumens at 35°C	Initial Lumens at 25°C	EE Class	Product Code	Product Code Ind. Pack
Starcoat™ T5 High Efficiency (ø 16 mm - 5/8″)											
14	549	F14W/T5/827	2700	85	30000	36000	1350	1230	A	90230	39965
		F14W/T5/830	3000	85	30000	36000	1350	1230	A	90239	39964
		F14W/T5/835	3500	85	30000	36000	1350	1230	A	90246	39961
		F14W/T5/840	4000	85	30000	36000	1350	1230	A	90247	39973
		F14W/T5/865	6500	85	30000	36000	1250	1140	A	90244	90222
21	849	F21W/T5/827	2700	85	30000	36000	2100	1910	A	90245	39976
		F21W/T5/830	3000	85	30000	36000	2100	1910	A	90248	39976
		F21W/T5/835	3500	85	30000	36000	2100	1910	A	90249	39977
		F21W/T5/840	4000	85	30000	36000	2100	1910	A	90250	39978
		F21W/T5/865	6500	85	30000	36000	1950	1770	A	90251	39979
28	1149	F28W/T5/827	2700	85	30000	36000	2900	2640	A	90252	39980
		F28W/T5/830	3000	85	30000	36000	2900	2640	A	90253	39982
		F28W/T5/835	3500	85	30000	36000	2900	2640	A	90254	39983
		F28W/T5/840	4000	85	30000	36000	2900	2640	A	90255	39984
		F28W/T5/865	6500	85	30000	36000	2700	2450	A	90256	39985
35	1449	F35W/T5/827	2700	85	30000	36000	3650	3320	A	90257	39986
		F35W/T5/830	3000	85	30000	36000	3650	3320	A	90258	39989
		F35W/T5/835	3500	85	30000	36000	3650	3320	A	90259	39990
		F35W/T5/840	4000	85	30000	36000	3650	3320	A	90260	39991
		F35W/T5/865	6500	85	30000	36000	3400	3090	A	90261	39992
Starcoat™ T5 High Output (ø 16 mm - 5/8″)											
24	549	F24W/T5/827	2700	85	30000	36000	2000	1750	A	90262	39994
		F24W/T5/830	3000	85	30000	36000	2000	1750	A	90263	39998
		F24W/T5/835	3500	85	30000	36000	2000	1750	A	90264	90196
		F24W/T5/840	4000	85	30000	36000	2000	1750	A	90265	90197
		F24W/T5/865	6500	85	30000	36000	1900	1600	A	90266	90198
39	849	F39W/T5/827	2700	85	30000	36000	3500	3200	A	90267	90200
		F39W/T5/830	3000	85	30000	36000	3500	3200	A	90268	90201
		F39W/T5/835	3500	85	30000	36000	3500	3200	A	90269	90202
		F39W/T5/840	4000	85	30000	36000	3500	3200	A	90270	90203
		F39W/T5/865	6500	85	30000	36000	3330	2950	A	90271	90204
49	1449	F49W/T5/827	2700	85	30000	36000	4900	4450	A	90277	90220
		F49W/T5/830	3000	85	30000	36000	4900	4450	A	90278	90219
		F49W/T5/835	3500	85	30000	36000	4900	4450	A	90279	90221
		F49W/T5/840	4000	85	30000	36000	4900	4450	A	90280	90223
		F49W/T5/865	6500	85	30000	36000	4650	4100	A	90281	90224
54	1149	F54W/T5/827	2700	85	30000	36000	5000	4460	A	90272	90205
		F54W/T5/830	3000	85	30000	36000	5000	4460	A	90273	90232
		F54W/T5/835	3500	85	30000	36000	5000	4460	A	90274	90206
		F54W/T5/840	4000	85	30000	36000	5000	4460	A	90275	90209
		F54W/T5/865	6500	85	30000	36000	4750	4100	A	90276	90211
80	1449	F80W/T5/827	2700	85	30000	36000	7000	6450	A	90282	90225
		F80W/T5/830	3000	85	30000	36000	7000	6450	A	90283	90226
		F80W/T5/840	4000	85	30000	36000	7000	6450	A	90285	90227
		F80W/T5/865	6500	85	30000	36000	6650	5950	A	90286	90228



www.GElighting.com

Exhibit 1

Customer Legal Entity Name: Cardinal Local School District

Site Address: A.J. Jordak Elementary
Principal Address: 16000 East High 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	A.J. JORDAK LIGHTING RETROFIT	THE LINEAR FLUORESCENT LIGHITNG SYSTEMS CONSISTING OF A COMBINATION OF 32W T8 LAMPS AND BALLASTS (.88 Ballst Factor) WERE REPLACED WITH THE NEW LIGHTING SYSTEMS CONSISTING OF 25 WATT LAMPS AND LOW BALLAST FACTOR (.77) ELECTRONIC BALLAST. 400 watt metal halide were replaced with 4lamp t5 high bay fixtures	A Fluke 335 True RMS Plant Meter was used by a licensed electrician to take voltage and amperage readings of a sampling of fixtures to determine the energy use of the lighting systems, both on the old existing system and the newly installed system. Volts X Amps = Watts. The results are then multiplied by the number of hours which the system is run to get Kwh savings.	WE WOULD HAVE REPLACE THE LAMPS AND ALALLASTS INEACH FIXTER AS THEY FAILED THIS IS A COMMON PRRACTICE FOR THE MAINTENANCE OF LIGHTING IN A SCHOOL FACILITY. THE ONLY FULL RETROFIT WE WOULD HAVE PERFORMED WOUD HAVE BEEN AREAS UNDERGOING OTHER UPGRADES. NO SUCH UPGRADES WERE OR ARE PLANNED FOR THIS FACILITY.	N/A

Docket No. 14-0170
Site: 16000 East High Street

Exhibit 2

Customer Legal Entity Name: Cardinal Local School District
Site Address: A.J. Jordak Elementary
Principal Address: 16000 East High Street

	Unadjusted Usage, kwh (A)	Weather Adjusted Usage, kwh (B)	Weather Adjusted Usage with Energy Efficiency Addbacks, kwh (c) *Note 1*
2012	213,920	213,920	264,110
2011	239,600	239,600	285,654
2010	236,480	236,480	236,480
Average	**230,000**	**230,000**	**262,081**

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	A.J. JORDAK LIGHTING RETROFIT	02/01/2011	$32,714	$16,357	50,328	50,328	20	$2,516	$1,887	
					-	-	-			
					-	-	-			
					-	-	-			
					-	-	-			
					-	-	-			
					-	-	-			
		Total	**$32,714**		**50,328**	**50,328**	**20**	**$2,516**	**$1,887**	**$0**

Docket No. 14-0170
Site: 16000 East High 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	$ 15,515	$ 4,050	$1,887	$503	$ 6,440	**2.4**
Total	**50**	**$ 308**	**15,515**	**4,050**	**$1,887**	**$503**	**6,440**	**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)

Cardinal Local School District ~ A.J. Jordak Elementary
Docket No. 14-0170

Site: 16000 East High Street

Project Estimated Annual Savings Summary

Lighting

Estimated Annual kWh Savings	50,328
Total Change in Connected Load	20.31

Annual Estimated Cost Savings	$5,032.80
Annual Operating Hours	2,302

Interior Lighting Incentive @ $0.05/kWh (excluding retrofit CFLs, sensors, or LED exit signs)	$2,516.40
Exterior Lighting Incentive @ $0.05/kWh (excluding retrofit CFLs, sensors, or LED exit signs)	$0.00
Total retrofit CFL Incentive @ $1/screw-in CFL lamp; $15/hard-wired CFL lamp (includes all retrofit CFLs, both interior and exterior)	$0.00
Total retrofit LED Exit Incentive @ $10/exit sign	$0.00
Total Lighting Controls Incentive @ $25/occupancy sensor and $25/daylight sensor (includes all Lighting Controls, both interior and exterior)	$0.00

Total Calculated Incentive	$2,516.40

Total Fixture Quantity excluding retrofit CFLs and LED Exit Signs	502
Total Lamp Quantity for retrofit Screw-In CFLs	0
Total Lamp Quantity for retrofit Hard-Wired CFLs	0
Total Fixture Quantity for retrofit LED Exit Signs	0
Total Quantity for Occupancy Sensors	0
Total Quantity for Daylight Sensors	0

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

Demand Savings (For Internal Use Only)	17.59

Lighting Form

Lighting Inventory Form

Applicant Name: CARDINAL LOCAL SCHOOL DISTRICT

Facility Name: JORDAK ELEMENTARY SCHOOL

Date:

Lighting Zone (exterior only): Lighting Zone 3

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

For existing or proposed control, choose OCC for Occupany Sensor, DAY for photosensor, Hi-Lo for bi-level sensors or NONE for none. Controls in spaces where existing controls exist do not qualify.

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

PROJECT BASIC INFORMATION										PRE-INSTALLATION (RETROFIT)					
Line Item	New Construction or Retrofit	Building Address	Floor	Area Description	Space Description	Interior or Exterior Fixture	Predominant Space Type	Exterior Lighting Description (Exterior Lighting Only)	Area Cooling	Pre Fixture Qty	Pre Fixture Code	Pre Watts / Fixture (W)	Pre kW / Space (kW)	Existing Control drop down	Existing Sensor Quantity When applicable
e.g.	*Retrofit*	*400 North Street*	*2*	*Office*	*Other*	*Interior*	*Office - Small*		*Cooled Space*	*3*	*F44ILL*	*112*	*0.34*	*NONE*	
e.g.	*NewConstruction*	*Example*	*1*	*Restaurant*	*Conference, Meeting or Training Room*	*Exterior*	*Retail - Small*	*Builing facades (liner ft based)*	*Cooled Space*						
1	RETROFIT			Gym	Other	INTERIOR	Education - Primary School		Cooled Space	8	MH400/1	458	3.66	NONE	
2	RETROFIT			Main Office	Other	INTERIOR	Education - Primary School		Cooled Space	8	F42LL	59	0.47	NONE	
3	RETROFIT			110-Library	Other	INTERIOR	Education - Primary School		Cooled Space	1	F42LL	59	0.06	NONE	
4	RETROFIT			Teacher Lounge	Other	INTERIOR	Education - Primary School		Cooled Space	1	F42LL	59	0.06	NONE	
5	RETROFIT			elevator	Other	INTERIOR	Education - Primary School		Cooled Space	1	F42LL	59	0.06	NONE	
6	RETROFIT			Rest room	Other	INTERIOR	Education - Primary School		Cooled Space	2	F42LL	59	0.12	NONE	
7	RETROFIT			Rest room	Other	INTERIOR	Education - Primary School		Cooled Space	2	F42LL	59	0.12	NONE	
8	RETROFIT			211/212	Other	INTERIOR	Education - Primary School		Cooled Space	2	F42LL	59	0.12	NONE	
9	RETROFIT			213	Other	INTERIOR	Education - Primary School		Cooled Space	2	F42LL	59	0.12	NONE	
10	RETROFIT			Storage-guess	Other	INTERIOR	Education - Primary School		Cooled Space	2	F42LL	59	0.12	NONE	
11	RETROFIT			Restroom	Other	INTERIOR	Education - Primary School		Cooled Space	2	F42LL	59	0.12	NONE	
12	RETROFIT			Restroom	Other	INTERIOR	Education - Primary School		Cooled Space	2	F42LL	59	0.12	NONE	
13	RETROFIT			Storage	Other	INTERIOR	Education - Primary School		Cooled Space	2	F42LL	59	0.12	NONE	
14	RETROFIT			Guidence Office	Other	INTERIOR	Education - Primary School		Cooled Space	2	F42LL	59	0.12	NONE	
15	RETROFIT			Girls Locker	Other	INTERIOR	Education - Primary School		Cooled Space	3	F42LL	59	0.18	NONE	
16	RETROFIT			boys locker	Other	INTERIOR	Education - Primary School		Cooled Space	3	F42LL	59	0.18	NONE	
17	RETROFIT			Breakroom	Other	INTERIOR	Education - Primary School		Cooled Space	4	F42LL	59	0.24	NONE	
18	RETROFIT			Rm 19 / 10	Other	INTERIOR	Education - Primary School		Cooled Space	4	F42LL	59	0.24	NONE	
19	RETROFIT			Kitchen	Other	INTERIOR	Education - Primary School		Cooled Space	5	F42LL	59	0.30	NONE	
20	RETROFIT			RM15	Other	INTERIOR	Education - Primary School		Cooled Space	5	F42LL	59	0.30	NONE	
21	RETROFIT			Hallway - 1	Other	INTERIOR	Education - Primary School		Cooled Space	6	F42LL	59	0.35	NONE	
22	RETROFIT			Hallway	Other	INTERIOR	Education - Primary School		Cooled Space	7	F42LL	59	0.41	NONE	
23	RETROFIT			Stage	Other	INTERIOR	Education - Primary School		Cooled Space	7	F42LL	59	0.41	NONE	
24	RETROFIT			Hallway - 3	Other	INTERIOR	Education - Primary School		Cooled Space	7	F42LL	59	0.41	NONE	
25	RETROFIT			Hallway - 2	Other	INTERIOR	Education - Primary School		Cooled Space	8	F42LL	59	0.47	NONE	
26	RETROFIT			Hallway	Other	INTERIOR	Education - Primary School		Cooled Space	19	F42LL	59	1.12	NONE	
27	RETROFIT			Hallway	Other	INTERIOR	Education - Primary School		Cooled Space	22	F42LL	59	1.30	NONE	
28	RETROFIT			Work Room	Other	INTERIOR	Education - Primary School		Cooled Space	2	F42LL	59	0.12	NONE	
29	RETROFIT			Rm 9	Other	INTERIOR	Education - Primary School		Cooled Space	2	F42LL	59	0.12	NONE	
30	RETROFIT			Girls bathroom	Other	INTERIOR	Education - Primary School		Cooled Space	4	F42LL	59	0.24	NONE	
31	RETROFIT			Boys Bathroom	Other	INTERIOR	Education - Primary School		Cooled Space	4	F42LL	59	0.24	NONE	
32	RETROFIT			Nurse	Other	INTERIOR	Education - Primary School		Cooled Space	6	F42LL	59	0.35	NONE	
33	RETROFIT			Jordak Office	Other	INTERIOR	Education - Primary School		Cooled Space	6	F42LL	59	0.35	NONE	
34	RETROFIT			213	Other	INTERIOR	Education - Primary School		Cooled Space	6	F42LL	59	0.35	NONE	
35	RETROFIT			art	Other	INTERIOR	Education - Primary School		Cooled Space	8	F42LL	59	0.47	NONE	
36	RETROFIT			Rm 8	Other	INTERIOR	Education - Primary School		Cooled Space	8	F42LL	59	0.47	NONE	
37	RETROFIT			Rm 9	Other	INTERIOR	Education - Primary School		Cooled Space	8	F42LL	59	0.47	NONE	
38	RETROFIT			Rm 11	Other	INTERIOR	Education - Primary School		Cooled Space	10	F42LL	59	0.59	NONE	
39	RETROFIT			Library	Other	INTERIOR	Education - Primary School		Cooled Space	12	F42LL	59	0.71	NONE	
40	RETROFIT			Rm 12	Other	INTERIOR	Education - Primary School		Cooled Space	12	F42LL	59	0.71	NONE	
41	RETROFIT			Rm 19 / 10	Other	INTERIOR	Education - Primary School		Cooled Space	14	F42LL	59	0.83	NONE	
42	RETROFIT			100	Other	INTERIOR	Education - Primary School		Cooled Space	16	F42LL	59	0.94	NONE	
43	RETROFIT			Band / Chorus	Other	INTERIOR	Education - Primary School		Cooled Space	16	F42LL	59	0.94	NONE	
44	RETROFIT			Wood Shop	Other	INTERIOR	Education - Primary School		Cooled Space	16	F42LL	59	0.94	NONE	
45	RETROFIT			Rm 3	Other	INTERIOR	Education - Primary School		Cooled Space	16	F42LL	59	0.94	NONE	
46	RETROFIT			Rm 4	Other	INTERIOR	Education - Primary School		Cooled Space	16	F42LL	59	0.94	NONE	
47	RETROFIT			Rm 5	Other	INTERIOR	Education - Primary School		Cooled Space	16	F42LL	59	0.94	NONE	
48	RETROFIT			Rm 6	Other	INTERIOR	Education - Primary School		Cooled Space	16	F42LL	59	0.94	NONE	
49	RETROFIT			Kitchen	Other	INTERIOR	Education - Primary School		Cooled Space	22	F42LL	59	1.30	NONE	
50	RETROFIT			104	Other	INTERIOR	Education - Primary School		Cooled Space	24	F42LL	59	1.42	NONE	
51	RETROFIT			211/212	Other	INTERIOR	Education - Primary School			2	F43LL	89	0.18	NONE	
52	RETROFIT			Jordak Gym	Other	INTERIOR	Education - Primary School			12	MH400/1	458	5.50	NONE	
53	RETROFIT			Prin. Office	Other	INTERIOR	Education - Primary School			2	F44LL	112	0.22	NONE	
54	RETROFIT			Admin Office	Other	INTERIOR	Education - Primary School			2	F44LL	112	0.22	NONE	
55	RETROFIT			216	Other	INTERIOR	Education - Primary School			2	F44LL	112	0.22	NONE	
56	RETROFIT			Psych	Other	INTERIOR	Education - Primary School			2	F44LL	112	0.22	NONE	
57	RETROFIT			Lounge	Other	INTERIOR	Education - Primary School			2	F44LL	112	0.22	NONE	
58	RETROFIT			RM15	Other	INTERIOR	Education - Primary School			2	F44LL	112	0.22	NONE	
59	RETROFIT			Teacher's Café	Other	INTERIOR	Education - Primary School			3	F44LL	112	0.34	NONE	
60	RETROFIT			Hallway	Other	INTERIOR	Education - Primary School			4	F44LL	112	0.45	NONE	
61	RETROFIT			217	Other	INTERIOR	Education - Primary School			4	F44LL	112	0.45	NONE	
62	RETROFIT			101	Other	INTERIOR	Education - Primary School			6	F44LL	112	0.67	NONE	
63	RETROFIT			102	Other	INTERIOR	Education - Primary School			6	F44LL	112	0.67	NONE	
64	RETROFIT			103	Other	INTERIOR	Education - Primary School			6	F44LL	112	0.67	NONE	
65	RETROFIT			105	Other	INTERIOR	Education - Primary School			6	F44LL	112	0.67	NONE	
66	RETROFIT			106	Other	INTERIOR	Education - Primary School			6	F44LL	112	0.67	NONE	
67	RETROFIT			107	Other	INTERIOR	Education - Primary School			6	F44LL	112	0.67	NONE	
68	RETROFIT			109	Other	INTERIOR	Education - Primary School			6	F44LL	112	0.67	NONE	
69	RETROFIT			201	Other	INTERIOR	Education - Primary School			6	F44LL	112	0.67	NONE	
70	RETROFIT			202	Other	INTERIOR	Education - Primary School			6	F44LL	112	0.67	NONE	
71	RETROFIT			203	Other	INTERIOR	Education - Primary School			6	F44LL	112	0.67	NONE	
72	RETROFIT			207	Other	INTERIOR	Education - Primary School			6	F44LL	112	0.67	NONE	
73	RETROFIT			205	Other	INTERIOR	Education - Primary School			6	F44LL	112	0.67	NONE	
74	RETROFIT			206	Other	INTERIOR	Education - Primary School			6	F44LL	112	0.67	NONE	
75	RETROFIT			207	Other	INTERIOR	Education - Primary School			6	F44LL	112	0.67	NONE	
76	RETROFIT			208	Other	INTERIOR	Education - Primary School			8	F44LL	112	0.90	NONE	
77	RETROFIT			209	Other	INTERIOR	Education - Primary School			8	F44LL	112	0.90	NONE	
78	RETROFIT			210	Other	INTERIOR	Education - Primary School			8	F44LL	112	0.90	NONE	
79	RETROFIT			214	Other	INTERIOR	Education - Primary School			8	F44LL	112	0.90	NONE	
80	RETROFIT			215	Other	INTERIOR	Education - Primary School			8	F44LL	112	0.90	NONE	
81	RETROFIT			108	Other	INTERIOR	Education - Primary School			12	F44LL	112	1.34	NONE	
82	RETROFIT			211/212	Other	INTERIOR	Education - Primary School			18	F44LL	112	2.02	NONE	
83	RETROFIT			110-Library	Other	INTERIOR	Education - Primary School			20	F44LL	112	2.24	NONE	
84	RETROFIT			Cafeteria	Other	INTERIOR	Education - Primary School			24	F44LL	112	2.69	NONE	
85													0.00	NONE	
86													0.00	NONE	
87													0.00	NONE	
88													0.00	NONE	
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200													0.00	NONE	

	BASELINE (NEW CONSTRUCTION)				POST-INSTALLATION							Energy Calculations										
Line Item	Units e.g. Square Feet (ft^2) If multiple fixture types are used, please only enter the total area/distance/qty once per space.		Lighting Power Density (W/unit)	Baseline kW / Space (kW)	Post Fixture Qty	Post Fixture Code	Post Watts/ Fixture (W)	Post kW / Space (kW)	Are Occupancy Sensors Required by Code?	Proposed Control drop down	Proposed Sensor Quantity When applicable	Change in Connected Load (kW)	Applicant Coincidence Factor (CF) Estimate	Coincidence Factor	Interactive Factor (demand)	Interactive Factor (energy)	Pre Controls Factor	Post Controls Factor	Demand Savings (kW)	Applicant Equivalent Full Load Hours (EFLH) Estimate	Prescribed Equivalent Full Load Hours	Annual kWh Saved
e.g.					*3*	*CFT55/1-BX*	*56*	*0.17*	*No*	*OCC*	*3*	*0.17*	*84%*	*84%*	*34%*	*12%*	*0%*	*30%*	*0.19*	*2.808*	*3.435*	*646*
e.g.	*500*	*linear ft*	*3.8*	*1.88*	*5*	*Example Cut Sheet 2*	*25*	*0.13*	*Yes*	*DAY*	*5*	*1.75*	*88%*	*89%*	*34%*	*12%*	*0%*	*0%*	*2.09*	*8.760*	*3.068*	*6.013*
1					8	CUT SHEET 6	234	1.87	No	NONE		1.79	1.00	100%	34%	12%	0%	0%	2.40	2880	2.880	5.780
2					8	CUT SHEET 2	38	0.30	No	NONE		0.17		57%	34%	12%	0%	0%	0.13		2.080	391
3					1	CUT SHEET 2	38	0.04	No	NONE		0.02	1.00	100%	34%	12%	0%	0%	0.03		2.080	49
4					1	CUT SHEET 2	38	0.04	No	NONE		0.02		57%	34%	12%	0%	0%	0.02		2.080	49
5					1	CUT SHEET 2	38	0.04	No	NONE		0.02	1.00	100%	34%	12%	0%	0%	0.03	8760	8.760	206
6					2	CUT SHEET 2	38	0.08	No	NONE		0.04	1.00	100%	34%	12%	0%	0%	0.06	2880	2.880	135
7					2	CUT SHEET 2	38	0.08	No	NONE		0.04	1.00	100%	34%	12%	0%	0%	0.06	2880	2.880	135
8					2	CUT SHEET 2	38	0.08	No	NONE		0.04		57%	34%	12%	0%	0%	0.03		2.080	98
9					2	CUT SHEET 2	38	0.08	No	NONE		0.04		57%	34%	12%	0%	0%	0.03		2.080	98
10					2	CUT SHEET 2	38	0.08	No	NONE		0.04		57%	34%	12%	0%	0%	0.03		2.080	98
11					2	CUT SHEET 2	38	0.08	No	NONE		0.04	1.00	100%	34%	12%	0%	0%	0.06	2880	2.880	135
12					2	CUT SHEET 2	38	0.08	No	NONE		0.04	1.00	100%	34%	12%	0%	0%	0.06	2880	2.880	135
13					2	CUT SHEET 2	38	0.08	No	NONE		0.04		57%	34%	12%	0%	0%	0.03		2.080	98
14					2	CUT SHEET 2	38	0.08	No	NONE		0.04		57%	34%	12%	0%	0%	0.03		2.080	98
15					3	CUT SHEET 2	38	0.11	No	NONE		0.06		57%	34%	12%	0%	0%	0.05		2.080	147
16					3	CUT SHEET 2	38	0.11	No	NONE		0.06		57%	34%	12%	0%	0%	0.05		2.080	147
17					4	CUT SHEET 2	38	0.15	No	NONE		0.08		57%	34%	12%	0%	0%	0.06		2.080	196
18					4	CUT SHEET 2	38	0.15	No	NONE		0.08		57%	34%	12%	0%	0%	0.06		2.080	196
19					5	CUT SHEET 2	38	0.19	No	NONE		0.11		57%	34%	12%	0%	0%	0.08		2.080	245
20					5	CUT SHEET 2	38	0.19	No	NONE		0.11		57%	34%	12%	0%	0%	0.08		2.080	245
21					6	CUT SHEET 2	38	0.23	No	NONE		0.13	1.00	100%	34%	12%	0%	0%	0.17	2880	2.880	406
22					7	CUT SHEET 2	38	0.27	No	NONE		0.15	1.00	100%	34%	12%	0%	0%	0.20	2880	2.880	474
23					7	CUT SHEET 2	38	0.27	No	NONE		0.15		57%	34%	12%	0%	0%	0.11		2.080	342
24					7	CUT SHEET 2	38	0.27	No	NONE		0.15	1.00	100%	34%	12%	0%	0%	0.20	2880	2.880	474
25					8	CUT SHEET 2	38	0.30	No	NONE		0.17	1.00	100%	34%	12%	0%	0%	0.23	2880	2.880	542
26					19	CUT SHEET 2	38	0.72	No	NONE		0.40	1.00	100%	34%	12%	0%	0%	0.53	2880	2.880	1.287
27					22	CUT SHEET 2	38	0.84	No	NONE		0.46	1.00	100%	34%	12%	0%	0%	0.62	2880	2.880	1.490
28					1	CUT SHEET 4	77	0.08	No	NONE		0.04		57%	34%	12%	0%	0%	0.03		2.080	96
29					1	CUT SHEET 4	77	0.08	No	NONE		0.04		57%	34%	12%	0%	0%	0.03		2.080	96
30					2	CUT SHEET 4	77	0.15	No	NONE		0.08	1.00	100%	34%	12%	0%	0%	0.11	2880	2.880	264
31					2	CUT SHEET 4	77	0.15	No	NONE		0.08	1.00	100%	34%	12%	0%	0%	0.11	2880	2.880	264
32					3	CUT SHEET 4	77	0.23	No	NONE		0.12		57%	34%	12%	0%	0%	0.09		2.080	287
33					3	CUT SHEET 4	77	0.23	No	NONE		0.12		57%	34%	12%	0%	0%	0.09		2.080	287
34					3	CUT SHEET 4	77	0.23	No	NONE		0.12		57%	34%	12%	0%	0%	0.09		2.080	287
35					4	CUT SHEET 4	77	0.31	No	NONE		0.16		57%	34%	12%	0%	0%	0.13		2.080	382
36					4	CUT SHEET 4	77	0.31	No	NONE		0.16		57%	34%	12%	0%	0%	0.13		2.080	382
37					4	CUT SHEET 4	77	0.31	No	NONE		0.16		57%	34%	12%	0%	0%	0.13		2.080	382
38					5	CUT SHEET 4	77	0.39	No	NONE		0.21		57%	34%	12%	0%	0%	0.16		2.080	478
39					6	CUT SHEET 4	77	0.46	No	NONE		0.25	1.00	100%	34%	12%	0%	0%	0.33		2.080	573
40					6	CUT SHEET 4	77	0.46	No	NONE		0.25		57%	34%	12%	0%	0%	0.19		2.080	573
41					7	CUT SHEET 4	77	0.54	No	NONE		0.29		57%	34%	12%	0%	0%	0.22		2.080	669
42					8	CUT SHEET 4	77	0.62	No	NONE		0.33		57%	34%	12%	0%	0%	0.25		2.080	764
43					8	CUT SHEET 4	77	0.62	No	NONE		0.33		57%	34%	12%	0%	0%	0.25		2.080	764
44					8	CUT SHEET 4	77	0.62	No	NONE		0.33		57%	34%	12%	0%	0%	0.25		2.080	764
45					8	CUT SHEET 4	77	0.62	No	NONE		0.33		57%	34%	12%	0%	0%	0.25		2.080	764
46					8	CUT SHEET 4	77	0.62	No	NONE		0.33		57%	34%	12%	0%	0%	0.25		2.080	764
47					8	CUT SHEET 4	77	0.62	No	NONE		0.33		57%	34%	12%	0%	0%	0.25		2.080	764
48					8	CUT SHEET 4	77	0.62	No	NONE		0.33		57%	34%	12%	0%	0%	0.25		2.080	764
49					11	CUT SHEET 4	77	0.85	No	NONE		0.45		57%	34%	12%	0%	0%	0.34		2.080	1.051
50					12	CUT SHEET 4	77	0.92	No	NONE		0.49		57%	34%	12%	0%	0%	0.38		2.080	1.146
51					2	CUT SHEET 3	59	0.12	No	NONE		0.06		57%	0%	0%	0%	0%	0.03		2.080	125
52					12	CUT SHEET 6	234	2.81	No	NONE		2.69	1.00	100%	0%	0%	0%	0%	2.69	2880	2.880	7.741
53					2	CUT SHEET 4	77	0.15	No	NONE		0.07		57%	0%	0%	0%	0%	0.04		2.080	146
54					2	CUT SHEET 4	77	0.15	No	NONE		0.07		57%	0%	0%	0%	0%	0.04		2.080	146
55					2	CUT SHEET 4	77	0.15	No	NONE		0.07		57%	0%	0%	0%	0%	0.04		2.080	146
56					2	CUT SHEET 4	77	0.15	No	NONE		0.07		57%	0%	0%	0%	0%	0.04		2.080	146
57					2	CUT SHEET 4	77	0.15	No	NONE		0.07		57%	0%	0%	0%	0%	0.04		2.080	146
58					2	CUT SHEET 4	77	0.15	No	NONE		0.07		57%	0%	0%	0%	0%	0.04		2.080	146
59					3	CUT SHEET 4	77	0.23	No	NONE		0.11		57%	0%	0%	0%	0%	0.06		2.080	218
60					4	CUT SHEET 4	77	0.31	No	NONE		0.14	1.00	100%	0%	0%	0%	0%	0.14	2880	2.880	403
61					4	CUT SHEET 4	77	0.31	No	NONE		0.14		57%	0%	0%	0%	0%	0.08		2.080	291
62					6	CUT SHEET 4	77	0.46	No	NONE		0.21		57%	0%	0%	0%	0%	0.12		2.080	437
63					6	CUT SHEET 4	77	0.46	No	NONE		0.21		57%	0%	0%	0%	0%	0.12		2.080	437
64					6	CUT SHEET 4	77	0.46	No	NONE		0.21		57%	0%	0%	0%	0%	0.12		2.080	437
65					6	CUT SHEET 4	77	0.46	No	NONE		0.21		57%	0%	0%	0%	0%	0.12		2.080	437
66					6	CUT SHEET 4	77	0.46	No	NONE		0.21		57%	0%	0%	0%	0%	0.12		2.080	437
67					6	CUT SHEET 4	77	0.46	No	NONE		0.21		57%	0%	0%	0%	0%	0.12		2.080	437
68					6	CUT SHEET 4	77	0.46	No	NONE		0.21		57%	0%	0%	0%	0%	0.12		2.080	437
69					6	CUT SHEET 4	77	0.46	No	NONE		0.21		57%	0%	0%	0%	0%	0.12		2.080	437
70					6	CUT SHEET 4	77	0.46	No	NONE		0.21		57%	0%	0%	0%	0%	0.12		2.080	437
71					6	CUT SHEET 4	77	0.46	No	NONE		0.21		57%	0%	0%	0%	0%	0.12		2.080	437
72					6	CUT SHEET 4	77	0.46	No	NONE		0.21		57%	0%	0%	0%	0%	0.12		2.080	437
73					6	CUT SHEET 4	77	0.46	No	NONE		0.21		57%	0%	0%	0%	0%	0.12		2.080	437
74					6	CUT SHEET 4	77	0.46	No	NONE		0.21		57%	0%	0%	0%	0%	0.12		2.080	437
75					6	CUT SHEET 4	77	0.46	No	NONE		0.21		57%	0%	0%	0%	0%	0.12		2.080	437
76					8	CUT SHEET 4	77	0.62	No	NONE		0.28		57%	0%	0%	0%	0%	0.16		2.080	582
77					8	CUT SHEET 4	77	0.62	No	NONE		0.28		57%	0%	0%	0%	0%	0.16		2.080	582
78					8	CUT SHEET 4	77	0.62	No	NONE		0.28		57%	0%	0%	0%	0%	0.16		2.080	582
79					8	CUT SHEET 4	77	0.62	No	NONE		0.28		57%	0%	0%	0%	0%	0.16		2.080	582
80					8	CUT SHEET 4	77	0.62	No	NONE		0.28		57%	0%	0%	0%	0%	0.16		2.080	582
81					12	CUT SHEET 4	77	0.92	No	NONE		0.42		57%	0%	0%	0%	0%	0.24		2.080	874
82					18	CUT SHEET 4	77	1.39	No	NONE		0.63		57%	0%	0%	0%	0%	0.36		2.080	1.310
83					20	CUT SHEET 4	77	1.54	No	NONE		0.70	1.00	100%	0%	0%	0%	0%	0.70		2.080	1.456
84					24	CUT SHEET 4	77	1.85	No	NONE		0.84	1.00	100%	0%	0%	0%	0%	0.84		2.080	1.747
85								0.00		NONE		0.00										0
86								0.00		NONE		0.00										0
87								0.00		NONE		0.00										0
88								0.00		NONE		0.00										0
89								0.00		NONE		0.00										0
90								0.00		NONE		0.00										0
91								0.00		NONE		0.00										0
92								0.00		NONE		0.00										0
93								0.00		NONE		0.00										0
94								0.00		NONE		0.00										0
95								0.00		NONE		0.00										0
96								0.00		NONE		0.00										0
97								0.00		NONE		0.00										0
98								0.00		NONE		0.00										0
99								0.00		NONE		0.00										0
100								0.00		NONE		0.00										0
101								0.00		NONE		0.00										0
102								0.00		NONE		0.00										0
103								0.00		NONE		0.00										0
104								0.00		NONE		0.00										0
105								0.00		NONE		0.00										0
106								0.00		NONE		0.00										0
107								0.00		NONE		0.00										0
108								0.00		NONE		0.00										0
109								0.00		NONE		0.00										0
110								0.00		NONE		0.00										0
111								0.00		NONE		0.00										0
112								0.00		NONE		0.00										0
113								0.00		NONE		0.00										0
114								0.00		NONE		0.00										0
115								0.00		NONE		0.00										0
116								0.00		NONE		0.00										0
117								0.00		NONE		0.00										0
118								0.00		NONE		0.00										0
119								0.00		NONE		0.00										0
120								0.00		NONE		0.00										0
121								0.00		NONE		0.00										0
122								0.00		NONE		0.00										0
123								0.00		NONE		0.00										0
124								0.00		NONE		0.00										0
125								0.00		NONE		0.00										0
126								0.00		NONE		0.00										0
127								0.00		NONE		0.00										0
128								0.00		NONE		0.00										0
129								0.00		NONE		0.00										0
130								0.00		NONE		0.00										0
131								0.00		NONE		0.00										0
132								0.00		NONE		0.00										0
133								0.00		NONE		0.00										0
134								0.00		NONE		0.00										0
135								0.00		NONE		0.00										0
136								0.00		NONE		0.00										0
137								0.00		NONE		0.00										0
138								0.00		NONE		0.00										0
139								0.00		NONE		0.00										0
140								0.00		NONE		0.00										0
141								0.00		NONE		0.00										0
142								0.00		NONE		0.00										0
143								0.00		NONE		0.00										0
144								0.00		NONE		0.00										0
145								0.00		NONE		0.00										0
146								0.00		NONE		0.00										0
147								0.00		NONE		0.00										0
148								0.00		NONE		0.00										0
149								0.00		NONE		0.00										0
150								0.00		NONE		0.00										0
151								0.00		NONE		0.00										0
152								0.00		NONE		0.00										0
153								0.00		NONE		0.00										0
154								0.00		NONE		0.00										0
155								0.00		NONE		0.00										0
156								0.00		NONE		0.00										0
157								0.00		NONE		0.00										0
158								0.00		NONE		0.00										0
159								0.00		NONE		0.00										0
160								0.00		NONE		0.00										0
161								0.00		NONE		0.00										0
162								0.00		NONE		0.00										0
163								0.00		NONE		0.00										0
164								0.00		NONE		0.00										0
165								0.00		NONE		0.00										0
166								0.00		NONE		0.00										0
167								0.00		NONE		0.00										0
168								0.00		NONE		0.00										0
169								0.00		NONE		0.00										0
170								0.00		NONE		0.00										0
171								0.00		NONE		0.00										0
172								0.00		NONE		0.00										0
173								0.00		NONE		0.00										0
174								0.00		NONE		0.00										0
175								0.00		NONE		0.00										0
176								0.00		NONE		0.00										0
177								0.00		NONE		0.00										0
178								0.00		NONE		0.00										0
179								0.00		NONE		0.00										0
180								0.00		NONE		0.00										0
181								0.00		NONE		0.00										0
182								0.00		NONE		0.00										0
183								0.00		NONE		0.00										0
184								0.00		NONE		0.00										0
185								0.00		NONE		0.00										0
186								0.00		NONE		0.00	100%							2.880		0
187								0.00		NONE		0.00										0
188								0.00		NONE		0.00										0
189								0.00		NONE		0.00										0
190								0.00		NONE		0.00										0
191								0.00		NONE		0.00										0
192								0.00		NONE		0.00										0
193								0.00		NONE		0.00										0
194								0.00		NONE		0.00										0
195								0.00		NONE		0.00										0
196								0.00		NONE		0.00										0
197								0.00		NONE		0.00										0
198								0.00		NONE		0.00										0
199								0.00		NONE		0.00										0
200								0.00		NONE		0.00										0

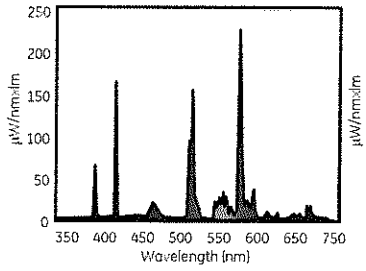
Lighting Form

PROJECT BASIC INFORMATION										PRE-INSTALLATION (RETROFIT)						BASELINE (NEW CONSTRUCTION)			POST-INSTALLATION							Energy Calculations										
Line Item	New Construction or Retrofit	Building Address	Floor	Area Description	Space Description	Interior or Exterior Fixture	Predominant Space Type	Exterior Lighting Description (Exterior Lighting Only)	Area Cooling	Pre Fixture Qty	Pre Fixture Code	Pre Watts / Fixture (W)	Pre kW / Space (kW)	Existing Control drop down	Existing Sensor Quantity When applicable	Units e.g. Square Feet (ft^2) If multiple fixture types are used, please only enter the total area/distance/qty once per space.	Lighting Power Density (W/unit)	Baseline kW / Space (kW)	Post Fixture Qty	Post Fixture Code	Post Watts/ Fixture (W)	Post kW / Space (kW)	Are Occupancy Sensors Required by Code?	Proposed Control drop down	Proposed Sensor Quantity When applicable	Change in Connected Load (kW)	Applicant Coincidence Factor (CF) Estimate	Coincidence Factor	Interactive Factor (demand)	Interactive Factor (energy)	Pre Controls Factor	Post Controls Factor	Demand Savings (kW)	Applicant Equivalent Full Load Hours (EFLH) Estimate	Prescribed Equivalent Full Load Hours	Annual kWh Saved
201													0.00	NONE								0.00		NONE		0.00										0
202													0.00	NONE								0.00		NONE		0.00										0
203													0.00	NONE								0.00		NONE		0.00										0
204													0.00	NONE								0.00		NONE		0.00										0
205													0.00	NONE								0.00		NONE		0.00										0
206													0.00	NONE								0.00		NONE		0.00										0
207													0.00	NONE								0.00		NONE		0.00										0
208													0.00	NONE								0.00		NONE		0.00										0
209													0.00	NONE								0.00		NONE		0.00										0
210													0.00	NONE								0.00		NONE		0.00										0
211													0.00	NONE								0.00		NONE		0.00										0
212													0.00	NONE								0.00		NONE		0.00										0
213													0.00	NONE								0.00		NONE		0.00										0
214													0.00	NONE								0.00		NONE		0.00										0
215													0.00	NONE								0.00		NONE		0.00										0
216													0.00	NONE								0.00		NONE		0.00										0
217													0.00	NONE								0.00		NONE		0.00										0
218													0.00	NONE								0.00		NONE		0.00										0
219													0.00	NONE								0.00		NONE		0.00										0
220													0.00	NONE								0.00		NONE		0.00										0
221													0.00	NONE								0.00		NONE		0.00										0
222													0.00	NONE								0.00		NONE		0.00										0
223													0.00	NONE								0.00		NONE		0.00										0
224													0.00	NONE								0.00		NONE		0.00										0
225													0.00	NONE								0.00		NONE		0.00										0
226													0.00	NONE								0.00		NONE		0.00										0
227													0.00	NONE								0.00		NONE		0.00										0
228													0.00	NONE								0.00		NONE		0.00										0
229													0.00	NONE								0.00		NONE		0.00										0
230													0.00	NONE								0.00		NONE		0.00										0
231													0.00	NONE								0.00		NONE		0.00										0
232													0.00	NONE								0.00		NONE		0.00										0
233													0.00	NONE								0.00		NONE		0.00										0
234													0.00	NONE								0.00		NONE		0.00										0
235													0.00	NONE								0.00		NONE		0.00										0
236													0.00	NONE								0.00		NONE		0.00										0
237													0.00	NONE								0.00		NONE		0.00										0
238													0.00	NONE								0.00		NONE		0.00										0
239													0.00	NONE								0.00		NONE		0.00										0
240													0.00	NONE								0.00		NONE		0.00										0
241													0.00	NONE								0.00		NONE		0.00										0
242													0.00	NONE								0.00		NONE		0.00										0
243													0.00	NONE								0.00		NONE		0.00										0
244													0.00	NONE								0.00		NONE		0.00										0
245													0.00	NONE								0.00		NONE		0.00										0
246													0.00	NONE								0.00		NONE		0.00										0
247													0.00	NONE								0.00		NONE		0.00										0
248													0.00	NONE								0.00		NONE		0.00										0
249													0.00	NONE								0.00		NONE		0.00										0
250													0.00	NONE								0.00		NONE		0.00										0
Totals										632			57.04						502			36.73				20.31							17.59		2,302	50,328

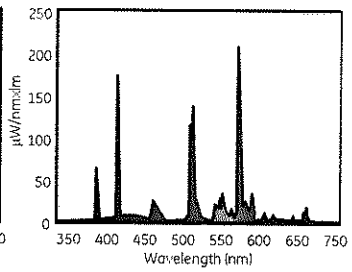
F32T8/25W/SPX/ECO Specs

Product Description	F32T8/25W/SPX30/ECO	F32T8/25W/SPX35/ECO	F32T8/25W/SPX41/ECO	F32T8/25W/SPX50/ECO
Product Code	72128	72129	72130	72131
Case Quantity	36	36	36	36
Physical Characteristics				
Bulb Designation	T8	T8	T8	T8
Bulb Material	Soda Lime	Soda Lime	Soda Lime	Soda Lime
Max Bulb Diameter (D)	1.10" (27.9mm)	1.10" (27.9mm)	1.10" (27.9mm)	1.10" (27.9mm)
Nominal Bulb Diameter (D)	1" (25.4mm)	1" (25.4mm)	1" (25.4mm)	1" (25.4mm)
Base Type	Medium Bipin (G13)	Medium Bipin (G13)	Medium Bipin (G13)	Medium Bipin (G13)
Max Face to End of Opposing Pin (B)	47.50" (1206.5mm)	47.50" (1206.5mm)	47.50" (1206.5mm)	47.50" (1206.5mm)
Min Face to End of Opposing Pin (B)	47.40" (1204.0mm)	47.40" (1204.0mm)	47.40" (1204.0mm)	47.40" (1204.0mm)
Max Overall Length (C)	47.78" (1213.6)	47.78" (1213.6)	47.78" (1213.6)	47.78" (1213.6)
Nominal Overall Length (C)	48"	48"	48"	48"
TCLP Compliant	yes	yes	yes	yes
Low Mercury	yes	yes	yes	yes
Electrical Characteristics				
Nominal Lamp Watts (W)	25	25	25	25
Nominal Lamp Voltage (V)	105	105	105	105
Nominal Lamp Current (A)	0.238	0.238	0.238	0.238
Minimum Starting Temp (°F)	60	60	60	60
Photometric Characteristics				
Reference - Initial Lumens	2400	2400	2400	2350
- Mean Lumens (40% rated life)	2256	2256	2256	2209
Nominal Efficacy (Lumens/Watt)	96	96	96	94
Avg Rated Life (hrs) 3 hr cycle - IS ballast	36000	36000	36000	36000
Avg Rated Life (hrs) 12 hr cycle - IS ballast	40000	40000	40000	40000
Avg Rated Life (hrs) 3 hr cycle - RS ballast	40000	40000	40000	40000
Avg Rated Life (hrs) 12 hr cycle - RS ballast	46000	46000	46000	46000
Color Rendering Index (Ra) CRI	85	85	85	80
Correlated Color Temperature (Kelvin)	3000	3500	4100	5000

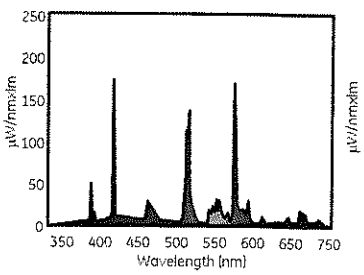
Spectral Power Distribution (3000K)



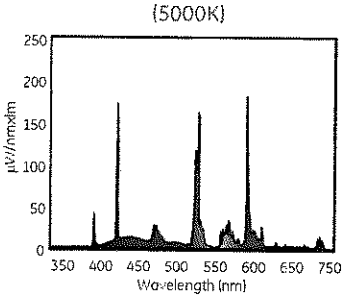
Spectral Power Distribution (3500K)



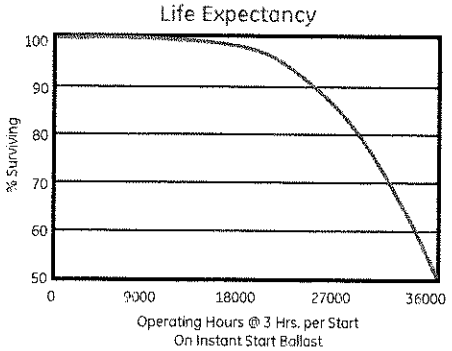
Spectral Power Distribution (4100K)



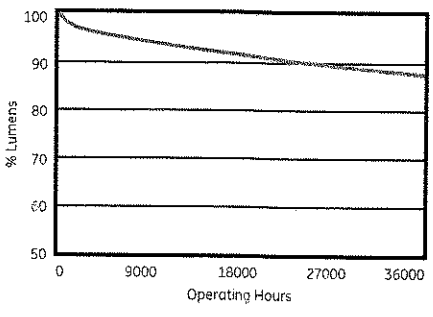
Spectral Power Distribution (5000K)



Life Expectancy



Lumen Maintenance



For additional product and application information, please consult GE's Website: www.gelighting.com

72520 9/2007 Printed in USA

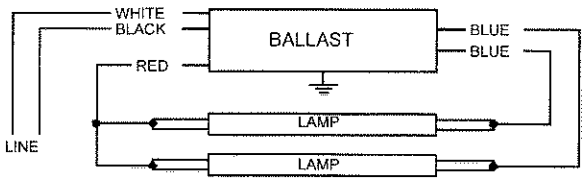
PHILIPS
ADVANCE

IOP2P32LWSC@120V	
Brand Name	OPTANIUM 2.0
Ballast Type	Electronic
Starting Method	Instant Start
Lamp Connection	Parallel
Input Voltage	120-277
Input Frequency	50/60 HZ
Status	Active

Electrical Specifications

Lamp Type	Num. of Lamps	Rated Lamp Watts	Min. Start Temp (°F/C)	Input Current (Amps)	Input Power (ANSI Watts)	Ballast Factor	MAX THD %	Power Factor	MAX Lamp Current Crest Factor	B.E.F.
F32T8/ES (25W)	1	25	60/16	0.20	24	0.90	10	0.99	1.6	3.75
* F32T8/ES (25W)	2	25	60/16	0.32	38	0.77	10	0.99	1.6	2.03

Wiring Diagram



Diag. 64

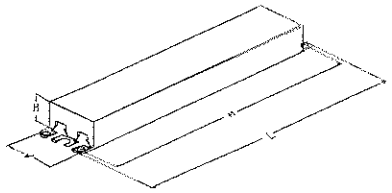
The wiring diagram that appears above is for the lamp type denoted by the asterisk (*)

Standard Lead Length (inches)

	in.	cm.
Black	25	63.5
White	25	63.5
Blue	31	78.7
Red	37	94
Yellow		0
Gray		0
Violet		0

	in.	cm.
Yellow/Blue		0
Blue/White		0
Brown		0
Orange		0
Orange/Black		0
Black/White		0
Red/White		0

Enclosure



Enclosure Dimensions

OverAll (L)	Width (W)	Height (H)	Mounting (M)
9.50 "	1.7 "	1.18 "	8.90 "
9 1/2	1 7/10	1 9/50	8 9/10
24.1 cm	4.3 cm	3 cm	22.6 cm

Revised 08/23/2006

Data is based upon tests performed by Philips Lighting Electronics N.A. in a controlled environment and is representative of relative performance. Actual performance can vary depending on operating conditions. Specifications are subject to change without notice. All specifications are nominal unless otherwise noted.

PHILIPS LIGHTING ELECTRONICS N.A.

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Customer Support/Technical Service: 800-372-3331 · OEM Support: 866-915-5886

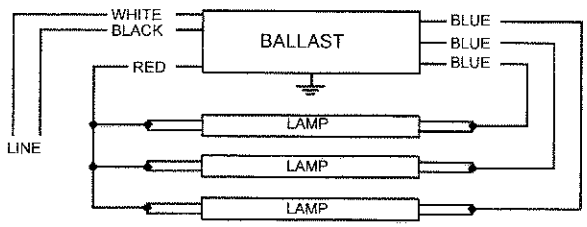
PHILIPS
ADVANCE

IOPA3P32LWSC@120V	
Brand Name	OPTANIUM 2.0
Ballast Type	Electronic
Starting Method	Instant Start
Lamp Connection	Parallel
Input Voltage	120-277
Input Frequency	50/60 HZ
Status	Active

Electrical Specifications

Lamp Type	Num. of Lamps	Rated Lamp Watts	Min. Start Temp (°F/C)	Input Current (Amps)	Input Power (ANSI Watts)	Ballast Factor	MAX THD %	Power Factor	MAX Lamp Current Crest Factor	B.E.F.
F32T8/ES (25W)	2	25	60/16	0.36	43	0.86	10	0.99	1.6	2.00
* F32T8/ES (25W)	3	25	60/16	0.49	58	0.77	10	0.99	1.6	1.33

Wiring Diagram

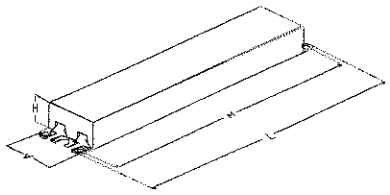


Diag. 65

The wiring diagram that appears above is for the lamp type denoted by the asterisk (*)

Standard Lead Length (inches)

Enclosure



Enclosure Dimensions

OverAll (L)	Width (W)	Height (H)	Mounting (M)
9.50 "	1.7 "	1.18 "	8.90 "
9 1/2	1 7/10	1 9/50	8 9/10
24.1 cm	4.3 cm	3 cm	22.6 cm

Revised 04/02/2009

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Customer Support/Technical Service: 800-372-3331 · OEM Support: 866-915-5886

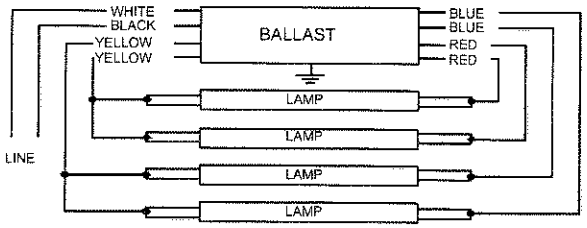
PHILIPS
ADVANCE

IOPA4P32LWSC@120V	
Brand Name	OPTANIUM 2.0
Ballast Type	Electronic
Starting Method	Instant Start
Lamp Connection	Parallel
Input Voltage	120-277
Input Frequency	50/60 HZ
Status	Active

Electrical Specifications

Lamp Type	Num. of Lamps	Rated Lamp Watts	Min. Start Temp (°F/C)	Input Current (Amps)	Input Power (ANSI Watts)	Ballast Factor	MAX THD %	Power Factor	MAX Lamp Current Crest Factor	B.E.F.
F32T8/ES (25W)	3	25	60/16	0.52	62	0.85	10	0.99	1.6	1.37
* F32T8/ES (25W)	4	25	60/16	0.52	77	0.77	10	0.99	1.6	1.00

Wiring Diagram



Diag. 66

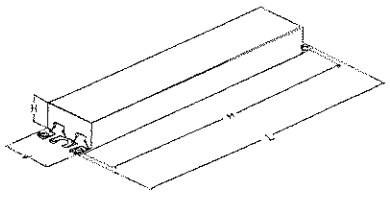
The wiring diagram that appears above is for the lamp type denoted by the asterisk (*)

Standard Lead Length (inches)

	in.	cm.
Black	25	63.5
White	25	63.5
Blue	31	78.7
Red	31	78.7
Yellow	39	99.1
Gray		0
Violet		0

	in.	cm.
Yellow/Blue		0
Blue/White		0
Brown		0
Orange		0
Orange/Black		0
Black/White		0
Red/White		0

Enclosure



Enclosure Dimensions

OverAll (L)	Width (W)	Height (H)	Mounting (M)
9.50 "	1.7 "	1.18 "	8.90 "
9 1/2	1 7/10	1 9/50	8 9/10
24.1 cm	4.3 cm	3 cm	22.6 cm

Revised 03/25/2009

Data is based upon tests performed by Philips Lighting Electronics N.A. in a controlled environment and is representative of relative performance. Actual performance can vary depending on operating conditions. Specifications are subject to change without notice. All specifications are nominal unless otherwise noted.

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Customer Support/Technical Service: 800-372-3331 · OEM Support: 866-915-5886

For 54-80W Lamps

HIGH POWER FACTOR SOUND RATED A

No. of Lamps	Input Volts	Lamp Starting Method	Ballast Family	Catalog Number	Input Power ANSI (Watts)	Ballast Factor	Max. THD %	Line Current (Amps)	Min. Starting Temp. (°F/°C)	Dim.	Wiring Dia.
F54T5/HO (54W)											
1	120-277	PS	Centium	ICN-2S54+	62	1.02	10	0.52-0.23	-20/-29	D	73
				ICN-2S54-90C+							
				ICN-2S54-90C-SC						B	TBD
			Optanium	IOP-2PSP54-SC	60	1.00	10	0.50 - 0.22			
	347-480		Centium	HCN-2S54-90C-WL	62	1.02	10	0.18-0.13		L	73
2	120-277	PS	Centium	ICN-2S54+	120-117	1.00	10	1.00-0.43	-20/-29	D	74
				ICN-2S54-90C+							
				ICN-2S54-90C-SC						B	TBD
			Optanium	IOP-2PSP54-SC	117-114	1.00	10	0.98 - 0.41			
	347-480		Centium	HCN-2S54-90C-WL	120-119	1.00	10	0.35-0.25		L	74
3	120-277	PS	Centium	ICN-4S54-90C-2LS	182-179	1.00	10	1.52-0.66	-20/-29	E	75A
				ICN-4S54-90C-2LS-G						G	TBD
			Optanium	IOP-4PSP54-2LS-G	176-174	1.00	10	1.47-0.83			
	347-480		Centium	HCN-4S54-90C-2LS-G	188-186	1.04	10	0.54-0.39			75
4	120-277	PS	Centium	ICN-4S54-90C-2LS	240-234	1.00	10	2.00-0.86	-20/-29	E	75
				ICN-4S54-90C-2LS-G						G	TBD
			Optanium	IOP-4PSP54-2LS-G	235-229	1.00	10	1.96-0.83			
	347-480		Centium	HCN-4S54-90C-2LS-G	239-237	1.00	10	0.69-0.50			75
F80T5/HO (80W)											
1	120-277	PS	Centium	ICN-1S80	91-89	1.00	10	0.76-0.33	0/-18	D	73

+ Also available with leads (ICN-2S24-WL, ICN-2S54-WL or ICN-2S54-90C-WL)

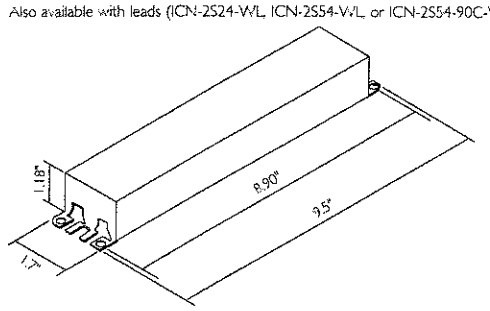


Fig. B

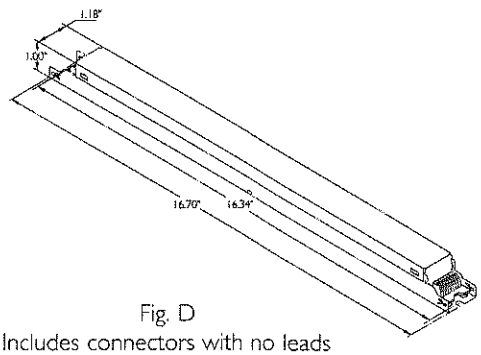


Fig. D
Includes connectors with no leads

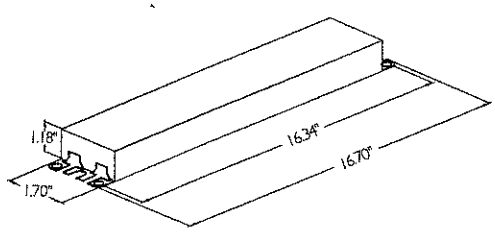


Fig. G

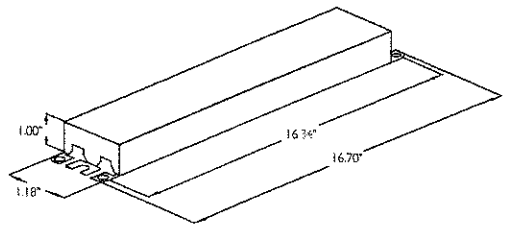
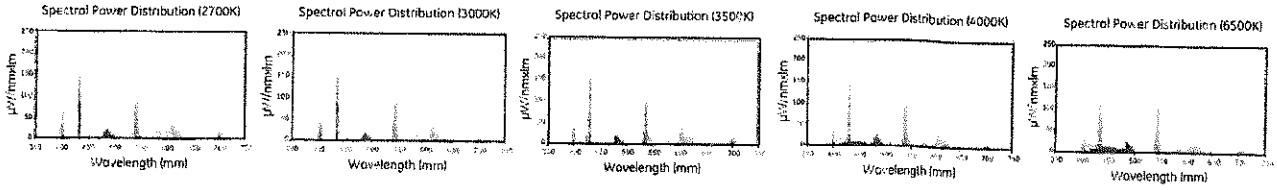


Fig. L

Refer to page 1-37 and 1-38 for wiring diagrams
Refer to pages 9-24 to 9-28 for lead lengths and shipping data

Starcoat™ T5 High Efficiency (HE) and High Output (HO) Lamp Specifications

Watt	Length mm	Product Description	CCT K	CRI Ra	Rated Average Life 3-hr cycle	Rated Average Life 12-hr cycle	Initial Lumens at 35°C	Initial Lumens at 25°C	EE Class	Product Code	Product Code Ind. Pack
Starcoat™ T5 High Efficiency (ø 16 mm - 5/8")											
14	549	F14W/T5/827	2700	85	30000	36000	1350	1230	A	90230	39965
		F14W/T5/830	3000	85	30000	36000	1350	1230	A	90239	39964
		F14W/T5/835	3500	85	30000	36000	1350	1230	A	90246	39961
		F14W/T5/840	4000	85	30000	36000	1350	1230	A	90247	39973
		F14W/T5/865	6500	85	30000	36000	1250	1140	A	90244	90222
21	849	F21W/T5/827	2700	85	30000	36000	2100	1910	A	90245	39976
		F21W/T5/830	3000	85	30000	36000	2100	1910	A	90248	39976
		F21W/T5/835	3500	85	30000	36000	2100	1910	A	90249	39977
		F21W/T5/840	4000	85	30000	36000	2100	1910	A	90250	39978
		F21W/T5/865	6500	85	30000	36000	1950	1770	A	90251	39979
28	1149	F28W/T5/827	2700	85	30000	36000	2900	2640	A	90252	39980
		F28W/T5/830	3000	85	30000	36000	2900	2640	A	90253	39982
		F28W/T5/835	3500	85	30000	36000	2900	2640	A	90254	39983
		F28W/T5/840	4000	85	30000	36000	2900	2640	A	90255	39984
		F28W/T5/865	6500	85	30000	36000	2700	2450	A	90256	39985
35	1449	F35W/T5/827	2700	85	30000	36000	3650	3320	A	90257	39986
		F35W/T5/830	3000	85	30000	36000	3650	3320	A	90258	39989
		F35W/T5/835	3500	85	30000	36000	3650	3320	A	90259	39990
		F35W/T5/840	4000	85	30000	36000	3650	3320	A	90260	39991
		F35W/T5/865	6500	85	30000	36000	3400	3090	A	90261	39992
Starcoat™ T5 High Output (ø 16 mm - 5/8")											
24	549	F24W/T5/827	2700	85	30000	36000	2000	1750	A	90262	39994
		F24W/T5/830	3000	85	30000	36000	2000	1750	A	90263	39998
		F24W/T5/835	3500	85	30000	36000	2000	1750	A	90264	90196
		F24W/T5/840	4000	85	30000	36000	2000	1750	A	90265	90197
		F24W/T5/865	6500	85	30000	36000	1900	1600	A	90266	90198
39	849	F39W/T5/827	2700	85	30000	36000	3500	3200	A	90267	90200
		F39W/T5/830	3000	85	30000	36000	3500	3200	A	90268	90201
		F39W/T5/835	3500	85	30000	36000	3500	3200	A	90269	90202
		F39W/T5/840	4000	85	30000	36000	3500	3200	A	90270	90203
		F39W/T5/865	6500	85	30000	36000	3330	2950	A	90271	90204
49	1449	F49W/T5/827	2700	85	30000	36000	4900	4450	A	90277	90220
		F49W/T5/830	3000	85	30000	36000	4900	4450	A	90278	90219
		F49W/T5/835	3500	85	30000	36000	4900	4450	A	90279	90221
		F49W/T5/840	4000	85	30000	36000	4900	4450	A	90280	90223
		F49W/T5/865	6500	85	30000	36000	4650	4100	A	90281	90224
54	1149	F54W/T5/827	2700	85	30000	36000	5000	4460	A	90272	90205
		F54W/T5/830	3000	85	30000	36000	5000	4460	A	90273	90232
		F54W/T5/835	3500	85	30000	36000	5000	4460	A	90274	90206
		F54W/T5/840	4000	85	30000	36000	5000	4460	A	90275	90209
		F54W/T5/865	6500	85	30000	36000	4750	4100	A	90276	90211
80	1449	F80W/T5/827	2700	85	30000	36000	7000	6450	A	90282	90225
		F80W/T5/830	3000	85	30000	36000	7000	6450	A	90283	90226
		F80W/T5/840	4000	85	30000	36000	7000	6450	A	90285	90227
		F80W/T5/865	6500	85	30000	36000	6650	5950	A	90286	90228



www.GElighting.com

Exhibit 1

Customer Legal Entity Name: Cardinal Local School District

Site Address: Cardinal Middle School

Principal Address: 16175 Almeda Drive

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	MIDDLE SCHOOL LIGHTING RETROFIT	THE LINEAR FLUORESCENT LIGHITNG SYSTEMS CONSISTING OF A COMBINATION OF 32W T8 LAMPS AND BALLASTS (.88 Ballst Factor) WERE REPLACED WITH THE NEW LIGHTING SYSTEMS CONSISTING OF 25 WATT LAMPS AND LOW BALLAST FACTOR (.77) ELECTRONIC BALLAST. 400 watt metal halide were replaced with 4lamp t5 high bay fixtures	A Fluke 335 True RMS Plant Meter was used by a licensed electrician to take voltage and amperage readings of a sampling of fixtures to determine the energy use of the lighting systems, both on the old existing system and the newly installed system. Volts X Amps = Watts. The results are then multiplied by the number of hours which the system is run to get Kwh savings.	WE WOULD HAVE REPLACED THE LAMPS AND BALLASTS IN EACH FIXTURE AS THEY FAILED. THIS IS COMMON PRACTICE FOR THE MAINTENANCE OF LIGHTING IN A SCHOOL FACILITY. THE ONLY FULL RETROFIT WE WOULD HAVE PERFORMED WOULD HAVE BEEN AREAS UNDERGOING OTHER UPGRADES NO SUCH UPGRADES WERE OR ARE PLANNED FOR THIS FACILITY.	N/A

Docket No. 14-0170

Site: 16175 Almeda Drive

Exhibit 2

Customer Legal Entity Name: Cardinal Local School District
Site Address: Cardinal Middle School
Principal Address: 16175 Almeda Drive

	Unadjusted Usage, kwh (A)	Weather Adjusted Usage, kwh (B)	Weather Adjusted Usage with Energy Efficiency Addbacks, kwh (c) *Note 1*
2012	565,360	565,360	647,248
2011	612,320	612,320	687,458
2010	727,120	727,120	727,120
Average	**634,933**	**634,933**	**687,275**

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	MIDDLE SCHOOL LIGHTING RETROFIT	02/01/2011	$116,194	$58,097	82,112	82,112	24	$4,106	$3,080	
					-	-	-			
					-	-	-			
					-	-	-			
					-	-	-			
					-	-	-			
					-	-	-			
		Total	**$116,194**		**82,112**	**82,112**	**24**	**$4,106**	**$3,080**	**$0**

Docket No. 14-0170
Site: 16175 Almeda Drive

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	82	$ 308	$ 25,313	$ 4,050	$3,080	$821	$ 7,951	**3.2**
Total	**82**	**$ 308**	**25,313**	**4,050**	**$3,080**	**$821**	**7,951**	**3.2**

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)

Cardinal Local School District ~ Cardinal Middle School
Docket No. 14-0170

Site: 16175 Almeda Drive

Project Estimated Annual Savings Summary

Lighting

Estimated Annual kWh Savings	82,112
Total Change in Connected Load	29.53

Annual Estimated Cost Savings	$8,211.20
Annual Operating Hours	2,159

Interior Lighting Incentive @ $0.05/kWh (excluding retrofit CFLs, sensors, or LED exit signs)	$4,105.60
Exterior Lighting Incentive @ $0.05/kWh (excluding retrofit CFLs, sensors, or LED exit signs)	$0.00
Total retrofit CFL Incentive @ $1/screw-in CFL lamp; $15/hard-wired CFL lamp (includes all retrofit CFLs, both interior and exterior)	$0.00
Total retrofit LED Exit Incentive @ $10/exit sign	$0.00
Total Lighting Controls Incentive @ $25/occupancy sensor and $25/daylight sensor (includes all Lighting Controls, both interior and exterior)	$0.00

Total Calculated Incentive	$4,105.60

Total Fixture Quantity excluding retrofit CFLs and LED Exit Signs	624
Total Lamp Quantity for retrofit Screw-In CFLs	0
Total Lamp Quantity for retrofit Hard-Wired CFLs	0
Total Fixture Quantity for retrofit LED Exit Signs	0
Total Quantity for Occupancy Sensors	0
Total Quantity for Daylight Sensors	0

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

Demand Savings (For Internal Use Only)	32.09

Lighting Form

Lighting Inventory Form

Applicant Name: CARDINAL LOCAL SCHOOL DISTRICT
Facility Name: MIDDLE SCHOOL
Date:
Lighting Zone (exterior only): Lighting Zone 3

Instructions: Please use one line for each fixture type in a room or area
For existing or proposed control, choose OCC for Occupany Sensor, DAY for photosensor, Hi-Lo for bi-level sensors or NONE for none. Controls in spaces where existing controls exist do not qualify.
The total of Column S, the quantities of CFLs and exit signs in Column M, and the quantities of sensors in Column R, will be used to calculate your incentive on the NonStandard Lighting form.

PROJECT BASIC INFORMATION

Line Item	New Construction or Retrofit	Building Address	Floor	Area Description	Space Description	Interior or Exterior Fixture	Predominant Space Type	Exterior Lighting Description (Exterior Lighting Only)	Area Cooling
e.g.	*Retrofit*	*400 North Street*	*2*	*Office*	*Other*	*Interior*	*Office - Small*		*Cooled Space*
e.g.	*NewConstruction*	*Example*	*1*	*Restaurant*	*Conference, Meeting or Training Room*	*Exterior*	*Retail - Small*	*Builing facades (liner ft based)*	*Cooled Space*
1	RETROFIT			media center	Other	INTERIOR	Education - Primary School		Cooled Space
2	RETROFIT			girls locker	Other	INTERIOR	Education - Primary School		Cooled Space
3	RETROFIT			boys locker	Other	INTERIOR	Education - Primary School		Cooled Space
4	RETROFIT			Vestibule	Other	INTERIOR	Education - Primary School		Cooled Space
5	RETROFIT			kitchen - freezer	Other	INTERIOR	Education - Primary School		Cooled Space
6	RETROFIT			misc kitchen office	Other	INTERIOR	Education - Primary School		Cooled Space
7	RETROFIT			stage	Other	INTERIOR	Education - Primary School		Cooled Space
8	RETROFIT			girls bath	Other	INTERIOR	Education - Primary School		Cooled Space
9	RETROFIT			boys bath	Other	INTERIOR	Education - Primary School		Cooled Space
10	RETROFIT			chorus & band	Other	INTERIOR	Education - Primary School		Cooled Space
11	RETROFIT			8th grade hallway	Other	INTERIOR	Education - Primary School		Cooled Space
12	RETROFIT			7th grade hallway	Other	INTERIOR	Education - Primary School		Cooled Space
13	RETROFIT			6th grade hallway	Other	INTERIOR	Education - Primary School		Cooled Space
14	RETROFIT			main hallway	Other	INTERIOR	Education - Primary School		Cooled Space
15	RETROFIT			guidance	Other	INTERIOR	Education - Primary School		Cooled Space
16	RETROFIT			principle	Other	INTERIOR	Education - Primary School		Cooled Space
17	RETROFIT			office 1	Other	INTERIOR	Education - Primary School		Cooled Space
18	RETROFIT			office 2	Other	INTERIOR	Education - Primary School		Cooled Space
19	RETROFIT			general office	Other	INTERIOR	Education - Primary School		Cooled Space
20	RETROFIT			storage	Other	INTERIOR	Education - Primary School		Cooled Space
21	RETROFIT			nurse	Other	INTERIOR	Education - Primary School		Cooled Space
22	RETROFIT			cafetorium	Other	INTERIOR	Education - Primary School		Cooled Space
23	RETROFIT			kitchen - staff area	Other	INTERIOR	Education - Primary School		Cooled Space
24	RETROFIT			misc kitchen office	Other	INTERIOR	Education - Primary School		Cooled Space
25	RETROFIT			band office - guess	Other	INTERIOR	Education - Primary School		Cooled Space
26	RETROFIT			chorus & band	Other	INTERIOR	Education - Primary School		Cooled Space
27	RETROFIT			technical room	Other	INTERIOR	Education - Primary School		Cooled Space
28	RETROFIT			art	Other	INTERIOR	Education - Primary School		Cooled Space
29	RETROFIT			misc (rm 2)	Other	INTERIOR	Education - Primary School		Cooled Space
30	RETROFIT			rm 10	Other	INTERIOR	Education - Primary School		Cooled Space
31	RETROFIT			rm 11	Other	INTERIOR	Education - Primary School		Cooled Space
32	RETROFIT			rm 12	Other	INTERIOR	Education - Primary School		Cooled Space
33	RETROFIT			rm 13	Other	INTERIOR	Education - Primary School		Cooled Space
34	RETROFIT			rm 14	Other	INTERIOR	Education - Primary School		Cooled Space
35	RETROFIT			rm 21	Other	INTERIOR	Education - Primary School		Cooled Space
36	RETROFIT			rm 22	Other	INTERIOR	Education - Primary School		Cooled Space
37	RETROFIT			rm 23	Other	INTERIOR	Education - Primary School		Cooled Space
38	RETROFIT			rm 24	Other	INTERIOR	Education - Primary School		Cooled Space
39	RETROFIT			rm 25	Other	INTERIOR	Education - Primary School		Cooled Space
40	RETROFIT			rm 30	Other	INTERIOR	Education - Primary School		Cooled Space
41	RETROFIT			rm 31	Other	INTERIOR	Education - Primary School		Cooled Space
42	RETROFIT			rm 33	Other	INTERIOR	Education - Primary School		Cooled Space
43	RETROFIT			rm 34	Other	INTERIOR	Education - Primary School		Cooled Space
44	RETROFIT			rm 36	Other	INTERIOR	Education - Primary School		Cooled Space
45	RETROFIT			rm 37	Other	INTERIOR	Education - Primary School		Cooled Space
46	RETROFIT			computer room	Other	INTERIOR	Education - Primary School		Cooled Space
47	RETROFIT			media office	Other	INTERIOR	Education - Primary School		Cooled Space
48	RETROFIT			gymnasium	Other	INTERIOR	Education - Primary School		Cooled Space
49	RETROFIT			scene shop	Other	INTERIOR	Education - Primary School		Cooled Space
50	RETROFIT			kitchen	Other	INTERIOR	Education - Primary School		Cooled Space

PRE-INSTALLATION (RETROFIT) / BASELINE (NEW CONSTRUCTION) / POST-INSTALLATION

Line Item	Pre Fixture Qty	Pre Fixture Code	Pre Watts / Fixture (W)	Pre kW / Space (kW)	Existing Control drop down	Existing Sensor Quantity When applicable	Units e.g. Square Feet (ft^2) If multiple fixture types are used, please only enter the total area/distance/qty once per space.		Lighting Power Density (W/unit)	Baseline kW / Space (kW)	Post Fixture Qty	Post Fixture Code	Post Watts/ Fixture (W)	Post kW / Space (kW)	Are Occupancy Sensors Required by Code?	Proposed Control drop down	Proposed Sensor Quantity When applicable
e.g.	*3*	*F44ILL*	*112*	*0.34*	*NONE*						*3*	*CFT55/1-BX*	*56*	*0.17*	*No*	*OCC*	*3*
e.g.							*500*	*linear ft*	*3.8*	*1.88*	*5*	*Example Cut Sheet 2*	*25*	*0.13*	*Yes*	*DAY*	*5*
1	16	F42LL	59	0.94	NONE						16	Cut sheet 2	38	0.61	No	NONE	
2	22	F42LL	59	1.30	NONE						22	Cut sheet 2	38	0.84	No	NONE	
3	22	F42LL	59	1.30	NONE						22	Cut sheet 2	38	0.84	No	NONE	
4	3	F42LL	59	0.18	NONE						3	Cut sheet 2	38	0.11	No	NONE	
5	2	F42LL	59	0.12	NONE						2	Cut sheet 2	38	0.08	No	NONE	
6	2	F42LL	59	0.12	NONE						2	Cut sheet 2	38	0.08	No	NONE	
7	10	F42LL	59	0.59	NONE						10	Cut sheet 2	38	0.38	No	NONE	
8	4	F42LL	59	0.24	NONE						4	Cut sheet 2	38	0.15	No	NONE	
9	3	F42LL	59	0.18	NONE						3	Cut sheet 2	38	0.11	No	NONE	
10	18	F42LL	59	1.06	NONE						18	Cut sheet 2	38	0.68	No	NONE	
11	16	F42LL	59	0.94	NONE						8	Cut sheet 4	77	0.62	No	NONE	
12	16	F42LL	59	0.94	NONE						8	Cut sheet 4	77	0.62	No	NONE	
13	16	F42LL	59	0.94	NONE						8	Cut sheet 4	77	0.62	No	NONE	
14	28	F42LL	59	1.65	NONE						14	Cut sheet 4	77	1.08	No	NONE	
15	3	F43ILL/2	90	0.27	NONE						3	cut sheet 5	59	0.18	No	NONE	
16	3	F43ILL/2	90	0.27	NONE						3	Cut sheet 5	59	0.18	No	NONE	
17	2	F43ILL/2	90	0.18	NONE						2	Cut sheet 5	59	0.12	No	NONE	
18	2	F43ILL/2	90	0.18	NONE						2	Cut sheet 5	59	0.12	No	NONE	
19	14	F43ILL/2	90	1.26	NONE						14	Cut sheet 5	59	0.83	No	NONE	
20	6	F43ILL/2	90	0.54	NONE						6	Cut sheet 5	59	0.35	No	NONE	
21	3	F43ILL/2	90	0.27	NONE						3	Cut sheet 5	59	0.18	No	NONE	
22	54	F43ILL/2	90	4.86	NONE						54	Cut sheet 5	59	3.19	No	NONE	
23	8	F43ILL/2	90	0.72	NONE						8	Cut sheet 5	59	0.47	No	NONE	
24	1	F43ILL/2	90	0.09	NONE						1	Cut sheet 5	59	0.06	No	NONE	
25	3	F43ILL/2	90	0.27	NONE						3	Cut sheet 5	59	0.18	No	NONE	
26	36	F43ILL/2	90	3.24	NONE						36	Cut sheet 5	59	2.12	No	NONE	
27	20	F43ILL/2	90	1.80	NONE						20	Cut sheet 5	59	1.18	No	NONE	
28	20	F43ILL/2	90	1.80	NONE						20	Cut sheet 5	59	1.18	No	NONE	
29	20	F43ILL/2	90	1.80	NONE						20	Cut sheet 5	59	1.18	No	NONE	
30	12	F43ILL/2	90	1.08	NONE						12	Cut sheet 5	59	0.71	No	NONE	
31	12	F43ILL/2	90	1.08	NONE						12	Cut sheet 5	59	0.71	No	NONE	
32	12	F43ILL/2	90	1.08	NONE						12	Cut sheet 5	59	0.71	No	NONE	
33	12	F43ILL/2	90	1.08	NONE						12	Cut sheet 5	59	0.71	No	NONE	
34	12	F43ILL/2	90	1.08	NONE						12	Cut sheet 5	59	0.71	No	NONE	
35	12	F43ILL/2	90	1.08	NONE						12	Cut sheet 5	59	0.71	No	NONE	
36	12	F43ILL/2	90	1.08	NONE						12	Cut sheet 5	59	0.71	No	NONE	
37	12	F43ILL/2	90	1.08	NONE						12	Cut sheet 5	59	0.71	No	NONE	
38	12	F43ILL/2	90	1.08	NONE						12	Cut sheet 5	59	0.71	No	NONE	
39	12	F43ILL/2	90	1.08	NONE						12	Cut sheet 5	59	0.71	No	NONE	
40	12	F43ILL/2	90	1.08	NONE						12	Cut sheet 5	59	0.71	No	NONE	
41	12	F43ILL/2	90	1.08	NONE						12	Cut sheet 5	59	0.71	No	NONE	
42	12	F43ILL/2	90	1.08	NONE						12	Cut sheet 5	59	0.71	No	NONE	
43	12	F43ILL/2	90	1.08	NONE						12	Cut sheet 5	59	0.71	No	NONE	
44	12	F43ILL/2	90	1.08	NONE						12	Cut sheet 5	59	0.71	No	NONE	
45	12	F43ILL/2	90	1.08	NONE						12	Cut sheet 5	59	0.71	No	NONE	
46	12	F43ILL/2	90	1.08	NONE						12	Cut sheet 5	59	0.71	No	NONE	
47	10	F43ILL/2	90	0.90	NONE						10	Cut sheet 5	59	0.59	No	NONE	
48	54	MH400/1	458	24.73	NONE						54	Cut sheet 6	234	12.64	No	NONE	
49	3	MH400/1	458	1.37	NONE						3	Cut sheet 6	234	0.70	No	NONE	
50	18	F42LL	59	1.06	NONE						18	Cut sheet 2	38	0.68	No	NONE	
51				0.00	NONE									0.00		NONE	
52				0.00	NONE									0.00		NONE	
53				0.00	NONE									0.00		NONE	
54				0.00	NONE									0.00		NONE	
55				0.00	NONE									0.00		NONE	
56				0.00	NONE									0.00		NONE	
57				0.00	NONE									0.00		NONE	
58				0.00	NONE									0.00		NONE	
59				0.00	NONE									0.00		NONE	
60				0.00	NONE									0.00		NONE	
61				0.00	NONE									0.00		NONE	
62				0.00	NONE									0.00		NONE	
63				0.00	NONE									0.00		NONE	
64				0.00	NONE									0.00		NONE	
65				0.00	NONE									0.00		NONE	
66				0.00	NONE									0.00		NONE	
67				0.00	NONE									0.00		NONE	
68				0.00	NONE									0.00		NONE	
69				0.00	NONE									0.00		NONE	
70				0.00	NONE									0.00		NONE	
71				0.00	NONE									0.00		NONE	
72				0.00	NONE									0.00		NONE	
73				0.00	NONE									0.00		NONE	
74				0.00	NONE									0.00		NONE	
75				0.00	NONE									0.00		NONE	
76				0.00	NONE									0.00		NONE	
77				0.00	NONE									0.00		NONE	
78				0.00	NONE									0.00		NONE	
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81				0.00	NONE									0.00		NONE	
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198				0.00	NONE									0.00		NONE	
199				0.00	NONE									0.00		NONE	
200				0.00	NONE									0.00		NONE	

Energy Calculations

Line Item	Change in Connected Load (kW)	Applicant Coincidence Factor (CF) Estimate	Coincidence Factor	Interactive Factor (demand)	Interactive Factor (energy)	Pre Controls Factor	Post Controls Factor	Demand Savings (kW)	Applicant Equivalent Full Load Hours (EFLH) Estimate	Prescribed Equivalent Full Load Hours	Annual kWh Saved
e.g.	*0.17*	*84%*	*84%*	*34%*	*12%*	*0%*	*30%*	*0.19*	*2,808*	*3,435*	*646*
e.g.	*1.75*	*88%*	*89%*	*34%*	*12%*	*0%*	*0%*	*2.09*	*8,760*	*3,068*	*6,013*
1	0.34	1.00	100%	34%	12%	0%	0%	0.45		2,080	783
2	0.46		57%	34%	12%	0%	0%	0.35		2,080	1,076
3	0.46		57%	34%	12%	0%	0%	0.35		2,080	1,076
4	0.06	1.00	100%	34%	12%	0%	0%	0.08	2880	2,880	203
5	0.04		57%	34%	12%	0%	0%	0.03	2080	2,080	98
6	0.04		57%	34%	12%	0%	0%	0.03		2,080	98
7	0.21		57%	34%	12%	0%	0%	0.16	1000	1,000	235
8	0.08	1.00	100%	34%	12%	0%	0%	0.11	2880	2,880	271
9	0.06	1.00	100%	34%	12%	0%	0%	0.08	2880	2,880	203
10	0.38		57%	34%	12%	0%	0%	0.29		2,080	881
11	0.33	1.00	100%	34%	12%	0%	0%	0.44	2880	2,880	1,058
12	0.33	1.00	100%	34%	12%	0%	0%	0.44	2880	2,880	1,058
13	0.33	1.00	100%	34%	12%	0%	0%	0.44	2880	2,880	1,058
14	0.57	1.00	100%	34%	12%	0%	0%	0.77	2880	2,880	1,851
15	0.09		57%	34%	12%	0%	0%	0.07		2,080	217
16	0.09		57%	34%	12%	0%	0%	0.07		2,080	217
17	0.06		57%	34%	12%	0%	0%	0.05		2,080	144
18	0.06		57%	34%	12%	0%	0%	0.05		2,080	144
19	0.43		57%	34%	12%	0%	0%	0.33		2,080	1,011
20	0.19		57%	34%	12%	0%	0%	0.14	1000	1,000	208
21	0.09		57%	34%	12%	0%	0%	0.07		2,080	217
22	1.67	1.00	100%	34%	12%	0%	0%	2.24	2880	2,880	5,400
23	0.25		57%	34%	12%	0%	0%	0.19		2,080	578
24	0.03		57%	34%	12%	0%	0%	0.02		2,080	72
25	0.09		57%	34%	12%	0%	0%	0.07	1000	1,000	104
26	1.12		57%	34%	12%	0%	0%	0.85		2,080	2,600
27	0.62		57%	34%	12%	0%	0%	0.47		2,080	1,444
28	0.62		57%	34%	12%	0%	0%	0.47		2,080	1,444
29	0.62		57%	34%	12%	0%	0%	0.47		2,080	1,444
30	0.37		57%	34%	12%	0%	0%	0.28		2,080	867
31	0.37		57%	34%	12%	0%	0%	0.28		2,080	867
32	0.37		57%	34%	12%	0%	0%	0.28		2,080	867
33	0.37		57%	34%	12%	0%	0%	0.28		2,080	867
34	0.37		57%	34%	12%	0%	0%	0.28		2,080	867
35	0.37		57%	34%	12%	0%	0%	0.28		2,080	867
36	0.37		57%	34%	12%	0%	0%	0.28		2,080	867
37	0.37		57%	34%	12%	0%	0%	0.28		2,080	867
38	0.37		57%	34%	12%	0%	0%	0.28		2,080	867
39	0.37		57%	34%	12%	0%	0%	0.28		2,080	867
40	0.37		57%	34%	12%	0%	0%	0.28		2,080	867
41	0.37		57%	34%	12%	0%	0%	0.28		2,080	867
42	0.37		57%	34%	12%	0%	0%	0.28		2,080	867
43	0.37		57%	34%	12%	0%	0%	0.28		2,080	867
44	0.37		57%	34%	12%	0%	0%	0.28		2,080	867
45	0.37		57%	34%	12%	0%	0%	0.28		2,080	867
46	0.37		57%	34%	12%	0%	0%	0.28		2,080	867
47	0.31		57%	34%	12%	0%	0%	0.24		2,080	722
48	12.10	1.00	100%	34%	12%	0%	0%	16.21	2880	2,880	39,017
49	0.67	1.00	100%	34%	12%	0%	0%	0.90		2,080	1,565
50	0.38		57%	34%	12%	0%	0%	0.29		2,080	881
51	0.00										0
52	0.00										0
53	0.00										0
54	0.00										0
55	0.00										0
56	0.00										0
57	0.00										0
58	0.00										0
59	0.00										0
60	0.00										0
61	0.00										0
62	0.00										0
63	0.00										0
64	0.00										0
65	0.00										0
66	0.00										0
67	0.00										0
68	0.00										0
69	0.00										0
70	0.00										0
71	0.00										0
72	0.00										0
73	0.00										0
74	0.00										0
75	0.00										0
76	0.00										0
77	0.00										0
78	0.00										0
79	0.00										0
80	0.00										0
81	0.00										0
82	0.00										0
83	0.00										0
84	0.00										0
85	0.00										0
86	0.00										0
87	0.00										0
88	0.00										0
89	0.00										0
90	0.00										0
91	0.00										0
92	0.00										0
93	0.00										0
94	0.00										0
95	0.00										0
96	0.00										0
97	0.00										0
98	0.00										0
99	0.00										0
100	0.00										0
101	0.00										0
102	0.00										0
103	0.00										0
104	0.00										0
105	0.00										0
106	0.00										0
107	0.00										0
108	0.00										0
109	0.00										0
110	0.00										0
111	0.00										0
112	0.00										0
113	0.00										0
114	0.00										0
115	0.00										0
116	0.00										0
117	0.00										0
118	0.00										0
119	0.00										0
120	0.00										0
121	0.00										0
122	0.00										0
123	0.00										0
124	0.00										0
125	0.00										0
126	0.00										0
127	0.00										0
128	0.00										0
129	0.00										0
130	0.00										0
131	0.00										0
132	0.00										0
133	0.00										0
134	0.00										0
135	0.00										0
136	0.00										0
137	0.00										0
138	0.00										0
139	0.00										0
140	0.00										0
141	0.00										0
142	0.00										0
143	0.00										0
144	0.00										0
145	0.00										0
146	0.00										0
147	0.00										0
148	0.00										0
149	0.00										0
150	0.00										0
151	0.00										0
152	0.00										0
153	0.00										0
154	0.00										0
155	0.00										0
156	0.00										0
157	0.00										0
158	0.00										0
159	0.00										0
160	0.00										0
161	0.00										0
162	0.00										0
163	0.00										0
164	0.00										0
165	0.00										0
166	0.00										0
167	0.00										0
168	0.00										0
169	0.00										0
170	0.00										0
171	0.00										0
172	0.00										0
173	0.00										0
174	0.00										0
175	0.00										0
176	0.00										0
177	0.00										0
178	0.00										0
179	0.00										0
180	0.00										0
181	0.00										0
182	0.00										0
183	0.00										0
184	0.00										0
185	0.00	100%							2,880		0
186	0.00										0
187	0.00										0
188	0.00										0
189	0.00										0
190	0.00										0
191	0.00										0
192	0.00										0
193	0.00										0
194	0.00										0
195	0.00										0
196	0.00										0
197	0.00										0
198	0.00										0
199	0.00										0
200	0.00										0

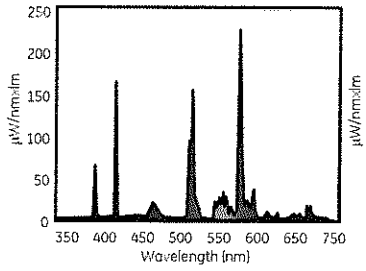
Lighting Form

PROJECT BASIC INFORMATION										PRE-INSTALLATION (RETROFIT)						BASELINE (NEW CONSTRUCTION)			POST-INSTALLATION							Energy Calculations										
Line Item	New Construction or Retrofit	Building Address	Floor	Area Description	Space Description	Interior or Exterior Fixture	Predominant Space Type	Exterior Lighting Description (Exterior Lighting Only)	Area Cooling	Pre Fixture Qty	Pre Fixture Code	Pre Watts / Fixture (W)	Pre kW / Space (kW)	Existing Control drop down	Existing Sensor Quantity When applicable	Units e.g. Square Feet (ft^2) If multiple fixture types are used, please only enter the total area/distance/qty once per space.	Lighting Power Density (W/unit)	Baseline kW / Space (kW)	Post Fixture Qty	Post Fixture Code	Post Watts/ Fixture (W)	Post kW / Space (kW)	Are Occupancy Sensors Required by Code?	Proposed Control drop down	Proposed Sensor Quantity When applicable	Change in Connected Load (kW)	Applicant Coincidence Factor (CF) Estimate	Coincidence Factor	Interactive Factor (demand)	Interactive Factor (energy)	Pre Controls Factor	Post Controls Factor	Demand Savings (kW)	Applicant Equivalent Full Load Hours (EFLH) Estimate	Prescribed Equivalent Full Load Hours	Annual kWh Saved
201													0.00	NONE								0.00		NONE		0.00										0
202													0.00	NONE								0.00		NONE		0.00										0
203													0.00	NONE								0.00		NONE		0.00										0
204													0.00	NONE								0.00		NONE		0.00										0
205													0.00	NONE								0.00		NONE		0.00										0
206													0.00	NONE								0.00		NONE		0.00										0
207													0.00	NONE								0.00		NONE		0.00										0
208													0.00	NONE								0.00		NONE		0.00										0
209													0.00	NONE								0.00		NONE		0.00										0
210													0.00	NONE								0.00		NONE		0.00										0
211													0.00	NONE								0.00		NONE		0.00										0
212													0.00	NONE								0.00		NONE		0.00										0
213													0.00	NONE								0.00		NONE		0.00										0
214													0.00	NONE								0.00		NONE		0.00										0
215													0.00	NONE								0.00		NONE		0.00										0
216													0.00	NONE								0.00		NONE		0.00										0
217													0.00	NONE								0.00		NONE		0.00										0
218													0.00	NONE								0.00		NONE		0.00										0
219													0.00	NONE								0.00		NONE		0.00										0
220													0.00	NONE								0.00		NONE		0.00										0
221													0.00	NONE								0.00		NONE		0.00										0
222													0.00	NONE								0.00		NONE		0.00										0
223													0.00	NONE								0.00		NONE		0.00										0
224													0.00	NONE								0.00		NONE		0.00										0
225													0.00	NONE								0.00		NONE		0.00										0
226													0.00	NONE								0.00		NONE		0.00										0
227													0.00	NONE								0.00		NONE		0.00										0
228													0.00	NONE								0.00		NONE		0.00										0
229													0.00	NONE								0.00		NONE		0.00										0
230													0.00	NONE								0.00		NONE		0.00										0
231													0.00	NONE								0.00		NONE		0.00										0
232													0.00	NONE								0.00		NONE		0.00										0
233													0.00	NONE								0.00		NONE		0.00										0
234													0.00	NONE								0.00		NONE		0.00										0
235													0.00	NONE								0.00		NONE		0.00										0
236													0.00	NONE								0.00		NONE		0.00										0
237													0.00	NONE								0.00		NONE		0.00										0
238													0.00	NONE								0.00		NONE		0.00										0
239													0.00	NONE								0.00		NONE		0.00										0
240													0.00	NONE								0.00		NONE		0.00										0
241													0.00	NONE								0.00		NONE		0.00										0
242													0.00	NONE								0.00		NONE		0.00										0
243													0.00	NONE								0.00		NONE		0.00										0
244													0.00	NONE								0.00		NONE		0.00										0
245													0.00	NONE								0.00		NONE		0.00										0
246													0.00	NONE								0.00		NONE		0.00										0
247													0.00	NONE								0.00		NONE		0.00										0
248													0.00	NONE								0.00		NONE		0.00										0
249													0.00	NONE								0.00		NONE		0.00										0
250													0.00	NONE								0.00		NONE		0.00										0
Totals										662			74.48						624			44.96				29.53							32.09		2,159	82,112

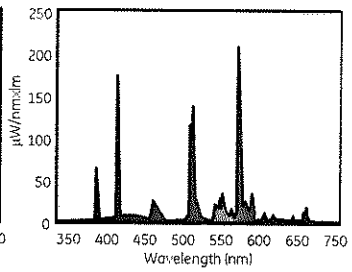
F32T8/25W/SPX/ECO Specs

Product Description	F32T8/25W/SPX30/ECO	F32T8/25W/SPX35/ECO	F32T8/25W/SPX41/ECO	F32T8/25W/SPX50/ECO
Product Code	72128	72129	72130	72131
Case Quantity	36	36	36	36
Physical Characteristics				
Bulb Designation	T8	T8	T8	T8
Bulb Material	Soda Lime	Soda Lime	Soda Lime	Soda Lime
Max Bulb Diameter (D)	1.10" (27.9mm)	1.10" (27.9mm)	1.10" (27.9mm)	1.10" (27.9mm)
Nominal Bulb Diameter (D)	1" (25.4mm)	1" (25.4mm)	1" (25.4mm)	1" (25.4mm)
Base Type	Medium Bipin (G13)	Medium Bipin (G13)	Medium Bipin (G13)	Medium Bipin (G13)
Max Face to End of Opposing Pin (B)	47.50" (1206.5mm)	47.50" (1206.5mm)	47.50" (1206.5mm)	47.50" (1206.5mm)
Min Face to End of Opposing Pin (B)	47.40" (1204.0mm)	47.40" (1204.0mm)	47.40" (1204.0mm)	47.40" (1204.0mm)
Max Overall Length (C)	47.78" (1213.6)	47.78" (1213.6)	47.78" (1213.6)	47.78" (1213.6)
Nominal Overall Length (C)	48"	48"	48"	48"
TCLP Compliant	yes	yes	yes	yes
Low Mercury	yes	yes	yes	yes
Electrical Characteristics				
Nominal Lamp Watts (W)	25	25	25	25
Nominal Lamp Voltage (V)	105	105	105	105
Nominal Lamp Current (A)	0.238	0.238	0.238	0.238
Minimum Starting Temp (°F)	60	60	60	60
Photometric Characteristics				
Reference - Initial Lumens	2400	2400	2400	2350
- Mean Lumens (40% rated life)	2256	2256	2256	2209
Nominal Efficacy (Lumens/Watt)	96	96	96	94
Avg Rated Life (hrs) 3 hr cycle - IS ballast	36000	36000	36000	36000
Avg Rated Life (hrs) 12 hr cycle - IS ballast	40000	40000	40000	40000
Avg Rated Life (hrs) 3 hr cycle - RS ballast	40000	40000	40000	40000
Avg Rated Life (hrs) 12 hr cycle - RS ballast	46000	46000	46000	46000
Color Rendering Index (Ra) CRI	85	85	85	80
Correlated Color Temperature (Kelvin)	3000	3500	4100	5000

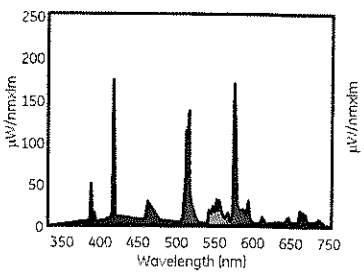
Spectral Power Distribution (3000K)



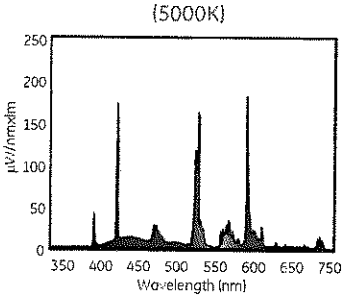
Spectral Power Distribution (3500K)



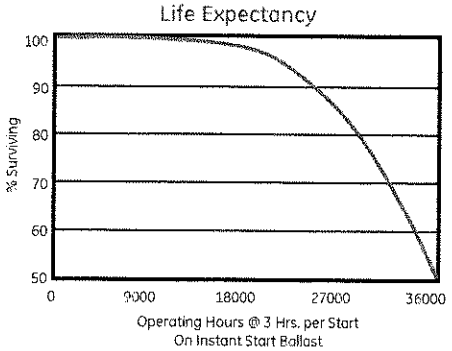
Spectral Power Distribution (4100K)



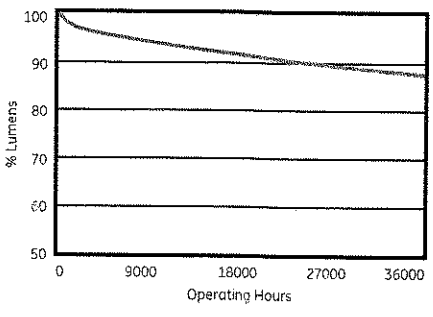
Spectral Power Distribution (5000K)



Life Expectancy



Lumen Maintenance



For additional product and application information, please consult GE's Website: www.gelighting.com

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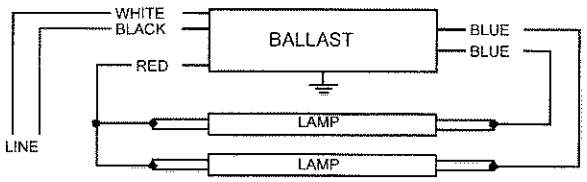
IOP2P32LWSC@120V	
Brand Name	OPTANIUM 2.0
Ballast Type	Electronic
Starting Method	Instant Start
Lamp Connection	Parallel
Input Voltage	120-277
Input Frequency	50/60 HZ
Status	Active

Electrical Specifications

Lamp Type	Num. of Lamps	Rated Lamp Watts	Min. Start Temp (°F/C)	Input Current (Amps)	Input Power (ANSI Watts)	Ballast Factor	MAX THD %	Power Factor	MAX Lamp Current Crest Factor	B.E.F.
F32T8/ES (25W)	1	25	60/16	0.20	24	0.90	10	0.99	1.6	3.75
* F32T8/ES (25W)	2	25	60/16	0.32	38	0.77	10	0.99	1.6	2.03

Wiring Diagram



Diag. 64

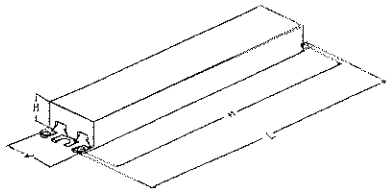
The wiring diagram that appears above is for the lamp type denoted by the asterisk (*)

Standard Lead Length (inches)

	in.	cm.
Black	25	63.5
White	25	63.5
Blue	31	78.7
Red	37	94
Yellow		0
Gray		0
Violet		0

	in.	cm.
Yellow/Blue		0
Blue/White		0
Brown		0
Orange		0
Orange/Black		0
Black/White		0
Red/White		0

Enclosure



Enclosure Dimensions

OverAll (L)	Width (W)	Height (H)	Mounting (M)
9.50 "	1.7 "	1.18 "	8.90 "
9 1/2	1 7/10	1 9/50	8 9/10
24.1 cm	4.3 cm	3 cm	22.6 cm

Revised 08/23/2006

Data is based upon tests performed by Philips Lighting Electronics N.A. in a controlled environment and is representative of relative performance. Actual performance can vary depending on operating conditions. Specifications are subject to change without notice. All specifications are nominal unless otherwise noted.

PHILIPS LIGHTING ELECTRONICS N.A.

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Customer Support/Technical Service: 800-372-3331 · OEM Support: 866-915-5886

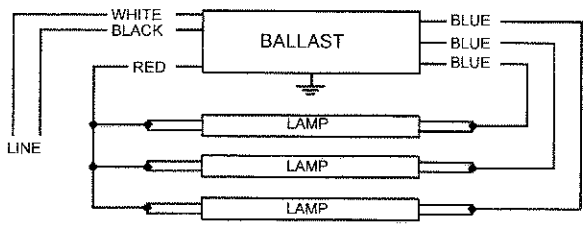
PHILIPS
ADVANCE

IOPA3P32LWSC@120V	
Brand Name	OPTANIUM 2.0
Ballast Type	Electronic
Starting Method	Instant Start
Lamp Connection	Parallel
Input Voltage	120-277
Input Frequency	50/60 HZ
Status	Active

Electrical Specifications

Lamp Type	Num. of Lamps	Rated Lamp Watts	Min. Start Temp (°F/C)	Input Current (Amps)	Input Power (ANSI Watts)	Ballast Factor	MAX THD %	Power Factor	MAX Lamp Current Crest Factor	B.E.F.
F32T8/ES (25W)	2	25	60/16	0.36	43	0.86	10	0.99	1.6	2.00
* F32T8/ES (25W)	3	25	60/16	0.49	58	0.77	10	0.99	1.6	1.33

Wiring Diagram

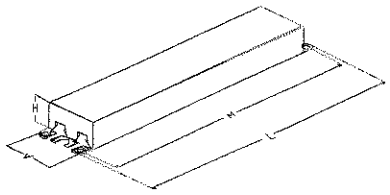


Diag. 65

The wiring diagram that appears above is for the lamp type denoted by the asterisk (*)

Standard Lead Length (inches)

Enclosure



Enclosure Dimensions

OverAll (L)	Width (W)	Height (H)	Mounting (M)
9.50 "	1.7 "	1.18 "	8.90 "
9 1/2	1 7/10	1 9/50	8 9/10
24.1 cm	4.3 cm	3 cm	22.6 cm

Revised 04/02/2009

Data is based upon tests performed by Philips Lighting Electronics N.A. in a controlled environment and is representative of relative performance. Actual performance can vary depending on operating conditions. Specifications are subject to change without notice. All specifications are nominal unless otherwise noted.

PHILIPS LIGHTING ELECTRONICS N.A.

10275 WEST HIGGINS ROAD · ROSEMONT, IL 60018

Tel: 800-322-2086 · Fax: 888-423-1882 · www.philips.com/advance

Customer Support/Technical Service: 800-372-3331 · OEM Support: 866-915-5886

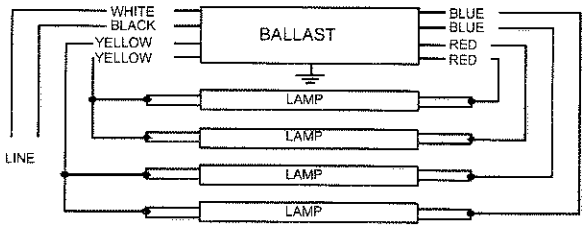
PHILIPS
ADVANCE

IOPA4P32LWSC@120V	
Brand Name	OPTANIUM 2.0
Ballast Type	Electronic
Starting Method	Instant Start
Lamp Connection	Parallel
Input Voltage	120-277
Input Frequency	50/60 HZ
Status	Active

Electrical Specifications

Lamp Type	Num. of Lamps	Rated Lamp Watts	Min. Start Temp (°F/C)	Input Current (Amps)	Input Power (ANSI Watts)	Ballast Factor	MAX THD %	Power Factor	MAX Lamp Current Crest Factor	B.E.F.
F32T8/ES (25W)	3	25	60/16	0.52	62	0.85	10	0.99	1.6	1.37
* F32T8/ES (25W)	4	25	60/16	0.52	77	0.77	10	0.99	1.6	1.00

Wiring Diagram



Diag. 66

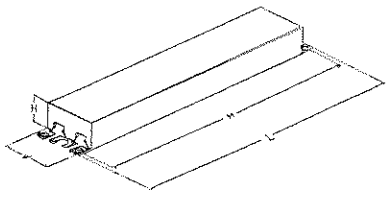
The wiring diagram that appears above is for the lamp type denoted by the asterisk (*)

Standard Lead Length (inches)

	in.	cm.
Black	25	63.5
White	25	63.5
Blue	31	78.7
Red	31	78.7
Yellow	39	99.1
Gray		0
Violet		0

	in.	cm.
Yellow/Blue		0
Blue/White		0
Brown		0
Orange		0
Orange/Black		0
Black/White		0
Red/White		0

Enclosure



Enclosure Dimensions

OverAll (L)	Width (W)	Height (H)	Mounting (M)
9.50 "	1.7 "	1.18 "	8.90 "
9 1/2	1 7/10	1 9/50	8 9/10
24.1 cm	4.3 cm	3 cm	22.6 cm

Revised 03/25/2009

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For 54-80W Lamps

HIGH POWER FACTOR SOUND RATED A

No. of Lamps	Input Volts	Lamp Starting Method	Ballast Family	Catalog Number	Input Power ANSI (Watts)	Ballast Factor	Max. THD %	Line Current (Amps)	Min. Starting Temp. (°F/°C)	Dim.	Wiring Dia.
F54T5/HO (54W)											
1	120-277	PS	Centium	ICN-2S54+	62	1.02	10	0.52-0.23	-20/-29	D	73
				ICN-2S54-90C+							
				ICN-2S54-90C-SC						B	TBD
			Optanium	IOP-2PSP54-SC	60	1.00	10	0.50 - 0.22			
	347-480		Centium	HCN-2S54-90C-WL	62	1.02	10	0.18-0.13		L	73
2	120-277	PS	Centium	ICN-2S54+	120-117	1.00	10	1.00-0.43	-20/-29	D	74
				ICN-2S54-90C+							
				ICN-2S54-90C-SC						B	TBD
			Optanium	IOP-2PSP54-SC	117-114	1.00	10	0.98 - 0.41			
	347-480		Centium	HCN-2S54-90C-WL	120-119	1.00	10	0.35-0.25		L	74
3	120-277	PS	Centium	ICN-4S54-90C-2LS	182-179	1.00	10	1.52-0.66	-20/-29	E	75A
				ICN-4S54-90C-2LS-G						G	TBD
			Optanium	IOP-4PSP54-2LS-G	176-174	1.00	10	1.47-0.83			
	347-480		Centium	HCN-4S54-90C-2LS-G	188-186	1.04	10	0.54-0.39			75
4	120-277	PS	Centium	ICN-4S54-90C-2LS	240-234	1.00	10	2.00-0.86	-20/-29	E	75
				ICN-4S54-90C-2LS-G						G	TBD
			Optanium	IOP-4PSP54-2LS-G	235-229	1.00	10	1.96-0.83			
	347-480		Centium	HCN-4S54-90C-2LS-G	239-237	1.00	10	0.69-0.50			75
F80T5/HO (80W)											
1	120-277	PS	Centium	ICN-1S80	91-89	1.00	10	0.76-0.33	0/-18	D	73

+ Also available with leads (ICN-2S24-WL, ICN-2S54-WL or ICN-2S54-90C-WL)

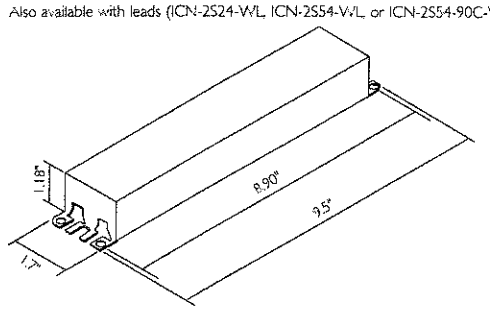


Fig. B

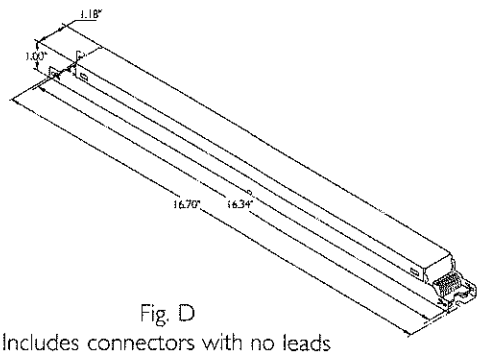


Fig. D
Includes connectors with no leads

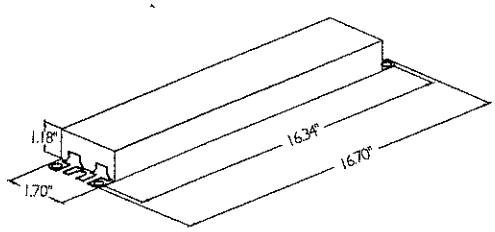


Fig. G

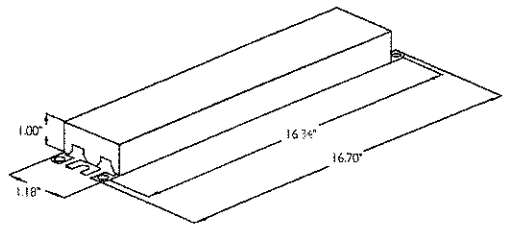
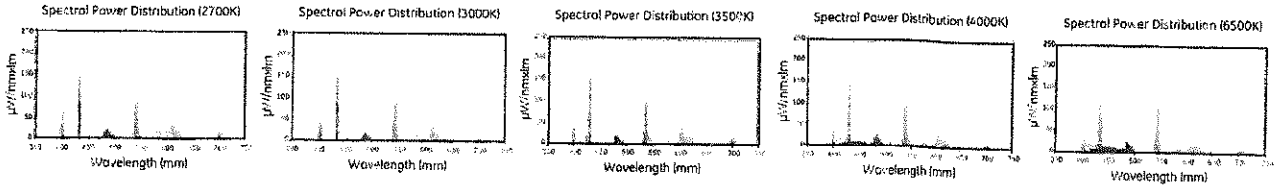


Fig. L

Refer to page 1-37 and 1-38 for wiring diagrams
Refer to pages 9-24 to 9-28 for lead lengths and shipping data

Starcoat™ T5 High Efficiency (HE) and High Output (HO) Lamp Specifications

Watt	Length mm	Product Description	CCT K	CRI Ra	Rated Average Life 3-hr cycle	Rated Average Life 12-hr cycle	Initial Lumens at 35°C	Initial Lumens at 25°C	EE Class	Product Code	Product Code Ind. Pack
Starcoat™ T5 High Efficiency (ø 16 mm - 5/8")											
14	549	F14W/T5/827	2700	85	30000	36000	1350	1230	A	90230	39965
		F14W/T5/830	3000	85	30000	36000	1350	1230	A	90239	39964
		F14W/T5/835	3500	85	30000	36000	1350	1230	A	90246	39961
		F14W/T5/840	4000	85	30000	36000	1350	1230	A	90247	39973
		F14W/T5/865	6500	85	30000	36000	1250	1140	A	90244	90222
21	849	F21W/T5/827	2700	85	30000	36000	2100	1910	A	90245	39976
		F21W/T5/830	3000	85	30000	36000	2100	1910	A	90248	39976
		F21W/T5/835	3500	85	30000	36000	2100	1910	A	90249	39977
		F21W/T5/840	4000	85	30000	36000	2100	1910	A	90250	39978
		F21W/T5/865	6500	85	30000	36000	1950	1770	A	90251	39979
28	1149	F28W/T5/827	2700	85	30000	36000	2900	2640	A	90252	39980
		F28W/T5/830	3000	85	30000	36000	2900	2640	A	90253	39982
		F28W/T5/835	3500	85	30000	36000	2900	2640	A	90254	39983
		F28W/T5/840	4000	85	30000	36000	2900	2640	A	90255	39984
		F28W/T5/865	6500	85	30000	36000	2700	2450	A	90256	39985
35	1449	F35W/T5/827	2700	85	30000	36000	3650	3320	A	90257	39986
		F35W/T5/830	3000	85	30000	36000	3650	3320	A	90258	39989
		F35W/T5/835	3500	85	30000	36000	3650	3320	A	90259	39990
		F35W/T5/840	4000	85	30000	36000	3650	3320	A	90260	39991
		F35W/T5/865	6500	85	30000	36000	3400	3090	A	90261	39992
Starcoat™ T5 High Output (ø 16 mm - 5/8")											
24	549	F24W/T5/827	2700	85	30000	36000	2000	1750	A	90262	39994
		F24W/T5/830	3000	85	30000	36000	2000	1750	A	90263	39998
		F24W/T5/835	3500	85	30000	36000	2000	1750	A	90264	90196
		F24W/T5/840	4000	85	30000	36000	2000	1750	A	90265	90197
		F24W/T5/865	6500	85	30000	36000	1900	1600	A	90266	90198
39	849	F39W/T5/827	2700	85	30000	36000	3500	3200	A	90267	90200
		F39W/T5/830	3000	85	30000	36000	3500	3200	A	90268	90201
		F39W/T5/835	3500	85	30000	36000	3500	3200	A	90269	90202
		F39W/T5/840	4000	85	30000	36000	3500	3200	A	90270	90203
		F39W/T5/865	6500	85	30000	36000	3330	2950	A	90271	90204
49	1449	F49W/T5/827	2700	85	30000	36000	4900	4450	A	90277	90220
		F49W/T5/830	3000	85	30000	36000	4900	4450	A	90278	90219
		F49W/T5/835	3500	85	30000	36000	4900	4450	A	90279	90221
		F49W/T5/840	4000	85	30000	36000	4900	4450	A	90280	90223
		F49W/T5/865	6500	85	30000	36000	4650	4100	A	90281	90224
54	1149	F54W/T5/827	2700	85	30000	36000	5000	4460	A	90272	90205
		F54W/T5/830	3000	85	30000	36000	5000	4460	A	90273	90232
		F54W/T5/835	3500	85	30000	36000	5000	4460	A	90274	90206
		F54W/T5/840	4000	85	30000	36000	5000	4460	A	90275	90209
		F54W/T5/865	6500	85	30000	36000	4750	4100	A	90276	90211
80	1449	F80W/T5/827	2700	85	30000	36000	7000	6450	A	90282	90225
		F80W/T5/830	3000	85	30000	36000	7000	6450	A	90283	90226
		F80W/T5/840	4000	85	30000	36000	7000	6450	A	90285	90227
		F80W/T5/865	6500	85	30000	36000	6650	5950	A	90286	90228



www.GElighting.com

Mercantile Customer Project Commitment Agreement
Cash Rebate Option

THIS MERCANTILE CUSTOMER PROJECT COMMITMENT AGREEMENT ("Agreement") is made and entered into by and between The Cleveland Electric Illuminating Company, its successors and assigns (hereinafter called the "Company") and Cardinal Local School District, Taxpayer ID No. 34-6004291 its permitted successors and assigns (hereinafter called the "Customer") (collectively the "Parties" or individually the "Party") and is effective on the date last executed by the Parties as indicated below.

WITNESSETH

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

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

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

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

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

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

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

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

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

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

a. By committing the Customer Energy Project(s) to the Company, Customer acknowledges and agrees that the Company shall control the use of the kWh and kW reductions resulting from said projects for purposes of complying with the Statute. By committing the Customer Energy Project(s), Customer has the ability to either:

i. Take ownership of the Energy Efficiency resource credits resulting from their Customer Energy Project(s) and may be able to bid - or sell - the Energy Efficiency resource credits into the market operated by the grid operator, PJM Interconnection, Inc. (PJM), provided several prerequisites are met; or

ii. Allow the Company to take ownership of the Energy Efficiency resource credits associated with their Customer Energy Project(s). The Company shall, at its sole discretion, aggregate said capacity into the PJM market through an auction. Any proceeds from any such bids accepted by PJM will be used to offset the costs charged to the Customer and other of the Company's customers for compliance with state mandated energy efficiency and/or peak demand requirements.

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

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

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

b. The Company acknowledges that some of Customer's Energy Projects contemplated in this paragraph may have been performed under certain other federal and/or state programs in which certain parameters are required to be maintained in order to retain preferential financing or other government benefits (individually and collectively, as appropriate, "Benefits"). In the event that the use of any such project by the Company in any way affects such Benefits, and upon written request from the Customer, Company will release said Customer's Energy Project(s) to the extent necessary for Customer to meet the prerequisites for such Benefits. Customer acknowledges that such release (i) may affect Customer's cash rebate discussed in Article 3 below; and (ii) will not affect any of Customer's other requirements or obligations.

c. Any future Customer Energy Project(s) committed by Customer shall be subject to a separate application and, upon approval by the Commission, said projects shall become part of this Agreement.

d. Customer will provide Company or Company's agent(s) with reasonable assistance in the preparation of the Commission's standard joint application for approval of this Agreement ("Joint Application") that will be filed with the Commission, with such Joint Application being consistent with then current Commission requirements.

e. Upon written request and reasonable advance notice, Customer will grant employees or authorized agents of either the Company or the Commission reasonable, pre-arranged access to the Customer Energy Project(s) for purposes of measuring and verifying energy savings and/or peak demand reductions resulting from the Customer Energy Project(s). It is expressly agreed that consultants of either the Company or the Commission are their respective authorized agents.

2. **Joint Application to the Commission.** The Parties will submit the Joint Application using the Commission's standard "Application to Commit Energy Efficiency/Peak Demand Reduction Programs" ("Joint Application") in which they will seek the Commission's approval of (i) this

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

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

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

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

   a. Customer acknowledges: i) that the Company will cap the Cash Rebate at the lesser of 50% of Customer Energy Project(s) costs or $250,000; ii) the maximum rebate that the Customer may receive per year is $500,000 per Taxpayer Identification Number per utility service territory; and iii) if the Customer Energy Project qualifies for a rebate program approved by the Commission and offered by the Company, Customer may still elect to file such project under the Company's mercantile customer self direct program, however the Cash Rebate that will be paid shall be discounted by 25%; and

   b. Customer acknowledges that breaches of this Agreement, include, but are not limited to:

      i. Customer's failure to comply with the terms and conditions set forth in the Agreement, or its equivalent, within a reasonable period of time after receipt of written notice of such non-compliance;

      ii. Customer knowingly falsifying any documents provided to the Company or the Commission in connection with this Agreement or the Joint Application.

   c. In the event of a breach of this Agreement by the Customer, Customer agrees and acknowledges that it will repay to the Company, within 90 days of receipt of written notice of said breach, the full amount of the Cash Rebate paid under this Agreement. This remedy is in addition to any and all other remedies available to the Company by law or equity.

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

   a. If the Commission fails to approve the Joint Agreement;

   b. Upon order of the Commission; or

   c. At the end of the life of the last Customer Energy Project subject to this Agreement.

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

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

5. **Confidentiality**. Each Party shall hold in confidence and not release or disclose to any person any document or information furnished by the other Party in connection with this Agreement that is designated as confidential and proprietary ("Confidential Information"), unless: (i) compelled to disclose such document or information by judicial, regulatory or administrative process or other provisions of law; (ii) such document or information is generally available to the public; or (iii) such document or information was available to the receiving Party on a non-confidential basis at the time of disclosure.

   a. Notwithstanding the above, a Party may disclose to its employees, directors, attorneys, consultants and agents all documents and information furnished by the other Party in connection with this Agreement, provided that such employees, directors, attorneys, consultants and agents have been advised of the confidential nature of this information and through such disclosure are deemed to be bound by the terms set forth herein.

   b. A Party receiving such Confidential Information shall protect it with the same standard of care as its own confidential or proprietary information.

   c. A Party receiving notice or otherwise concluding that Confidential Information furnished by the other Party in connection with this Agreement is being sought under any provision of law, to the extent it is permitted to do so under any applicable law, shall endeavor to: (i) promptly notify the other Party; and (ii) use reasonable efforts in cooperation with the other Party to seek confidential treatment of such Confidential Information, including without limitation, the filing of such information under a valid protective order.

   d. By executing this Agreement, Customer hereby acknowledges and agrees that Company may disclose to the Commission or its Staff any and all Customer information, including Confidential Information, related to a Customer Energy Project, provided that Company uses reasonable efforts to seek confidential treatment of the same.

6. **Taxes.** Customer shall be responsible for all tax consequences (if any) arising from the payment of the Cash Rebate.

7. **Notices**. Unless otherwise stated herein, all notices, demands or requests required or permitted under this Agreement must be in writing and must be delivered or sent by overnight express mail, courier service, electronic mail or facsimile transmission addressed as follows:

If to the Company:

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

If to the Customer:

Cardinal Local School District
15982 E. High Street,
Middlefield 44062
Attn:Dr. Scott Hunt
Telephone:440-632-0261
Fax:
Email:scott.hunt@cardinalschools.org

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.

The Cleveland Electric Illuminating Company
(Company)

By: John C. Dargis

Title: V.P. Of Energy Efficiency

Date: 2-3-14

Cardinal Local School District
(Customer)

By: DR. SCOTT J. HUNT

Title: SUPT.

Date: 1-8-14

Affidavit of Cardinal Local School District – Exhibit _A _

STATE OF OHIO)
) SS:
COUNTY OF Geauga)

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

1. I am the Superintendent of Cardinal Local School District ("Customer") As part of my duties, I oversee energy related matters for the Customer.
2. The Customer has agreed to commit certain energy efficiency projects to The Cleveland Electric Illuminating Company ("Company"), which are the subject of the agreement to which this affidavit is attached ("Project(s)").
3. In exchange for making such a commitment, the Company has agreed to provide Customer with Cash ("Incentive"). This Incentive was a critical factor in the Customer's decision to go forward with the Project(s) and to commit the Project(s) to the Company.
4. All information related to said Project(s) that has been submitted to the Company is true and accurate to the best of my knowledge.

FURTHER AFFIANT SAYETH NAUGHT.

Sworn to before me and subscribed in my presence this 8 day of Jan., 2014

Notary

CYNTHIA A. SAGUE
NOTARY PUBLIC, STATE OF OHIO
MY COMMISSION EXP. 11-27-17
RECORDED IN GEAUGA COUNTY

Summary: Application to Commit Energy Efficiency/Peak Demand Reduction Programs of The Cleveland Electric Illuminating Company and Cardinal Local School District electronically filed by Ms. Jennifer M. Sybyl on behalf of The Cleveland Electric Illuminating Company and Cardinal Local School District