

March 2012

Palram Sees the Light “Goes Green to Save Green”



AMERICAS

READING ELECTRIC, in conjunction with Palram, provides this information as an educational service to the Region's Industrial and Commercial Businesses.

Palram is one of the world's largest and most advanced manufacturers of polycarbonate, PVC and other thermoplastic sheets for a variety of industries including construction, graphics and display, architecture, and for the do-it-yourself market (DIY).

Palram Americas is a division of Palram Industries, the world's leader in flat and corrugated thermoplastic sheets with over \$200 million in annual sales. With manufacturing, distribution and sales operations reaching across six continents and over 120 countries around the world, Palram is truly a global enterprise. More than 25 years ago, Palram began marketing its thermoplastic sheets in North America. This has proven to be one of the most important components of the company's success during its 45-year history. www.palramamericas.com



Problem Identification

Located in the Lehigh Valley, Palram had the combined goal of reducing its carbon footprint, while also lowering its operating expenses.



In 2009, Palram decided to analyze the economics of changing the low efficiency metal halide lighting for the higher efficiency lighting system in the high bay areas of its manufacturing and warehousing operations. This totaled approximately 197,600 square feet.

The replacement light system would need to provide a 'Return on Investment' in one year or less through direct electrical energy savings as well as significantly reduce the carbon footprint.



Reading Electric Lighting Case Study: Palram Goes Green to Save Green

Problem Solution

The T5 Lighting System was ultimately chosen because of the quality of light, shorter start up time and a 20% longer life than metal halide lighting. Reading Electric was the General Contractor. As in past major projects, Reading Electric utilized Illuminations, Inc. as the lighting system consultant in the system design, layout, and occupancy study.



The TS Lighting System Description

The Lighting System Program was completed using a combination of Lithonia and Lux Dynamics T5 fixtures. Palram replaced 230 lights in the P2000 building and 139 lights in the PPI building for a total of 368 lights replaced.

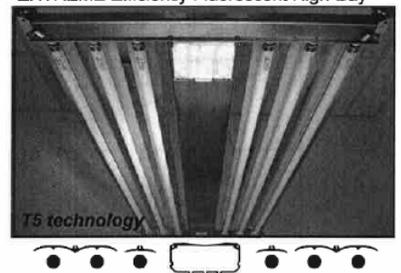
In areas of the facility where manufacturing operations were taking place (material extruding), higher than normal ambient air temperatures could be expected which required the use of special fixtures made from Extruded Aluminum. These fixtures, manufactured by Lux Dynamics are superior in heat dissipation. This area also utilized 54 watt T5 bulbs with Amalgam bulbs to ensure expected Lumen output at the higher temperatures.

LUX LHB

(LUX HIGH BAY)

Medium Distribution
Industrial Application

EXTREME Efficiency Fluorescent High-Bay



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Lux Dynamics Data

PHOTOMETRICS

Calculated using the zonal cavity method in accordance with IESNA procedures. Lamp configurations shown are typical. All data based on 25°C. Full photometric data on these and other configurations available upon request. This test was performed using the calibrated photodetector methods of absolute photometry.

LHB-654-UNV-MD-WD

Report:LTL20855

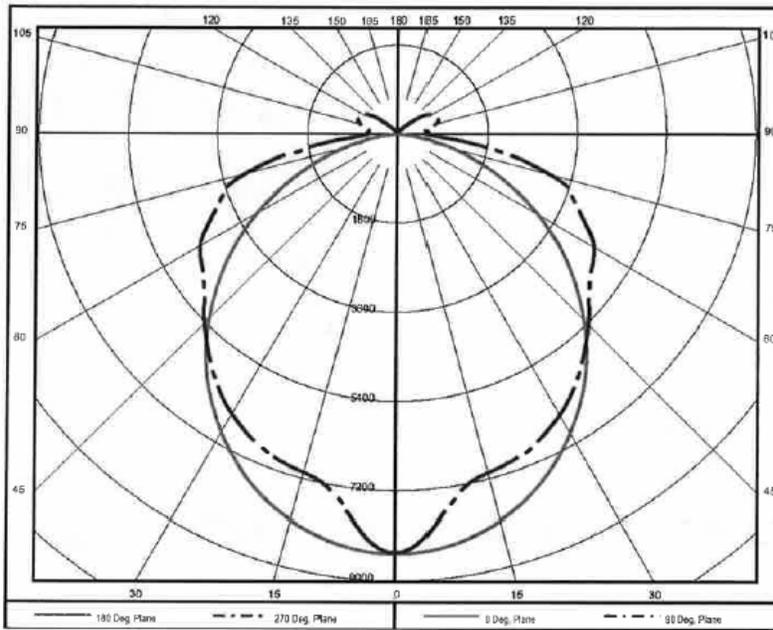
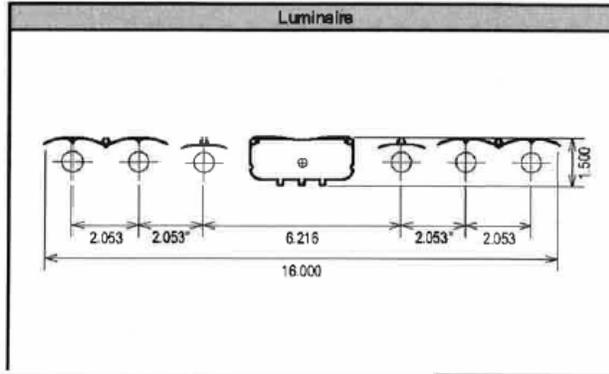
LUMENS PER LAMP: 4400

Zonal Lumen Summary

Zone	Lumens	% of Lamp	% of Luminaire
0-30	5959.3	22.6%	23.1%
0-40	9746.9	36.9%	37.7%
0-60	17512.0	66.3%	67.8%
0-90	24146.0	91.5%	93.4%
90-180	1700.4	6.4%	6.6%
0-180	25846.4	97.9%	100.0%

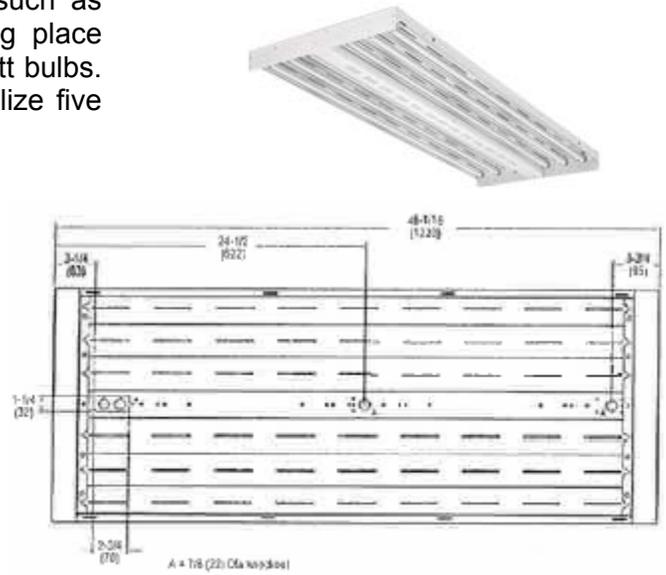
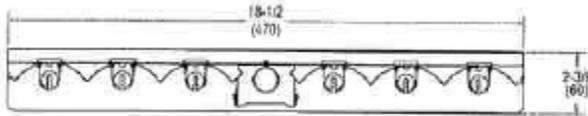
Total luminaire efficiency: 97.9%

CIE Type: Direct
 Spacing Criterion: 0 deg: 1.23 90 deg: 1.17
 180 deg: 1.23 270 deg: 1.17

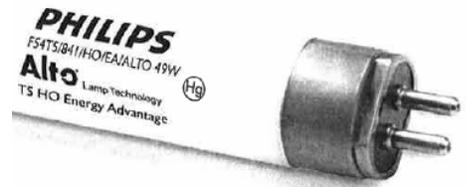


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All other areas of the facility where operations such as warehousing, product inspection, etc. were taking place were outfitted with Lithonia IBZ fixtures with 49 watt bulbs. These bulbs provide the same light output but utilize five (5) watts less energy per bulb.

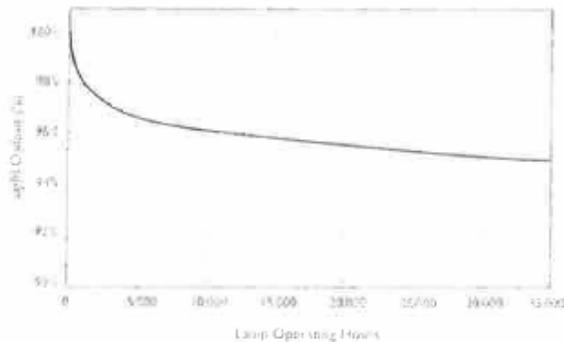


Philips Energy Advantage
T5 HO 49W Lamps

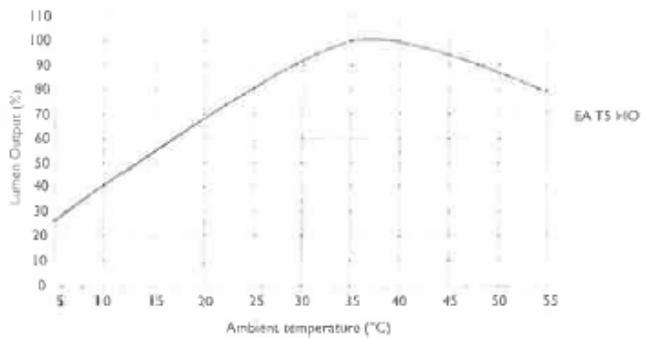


Product Number	Ordering Code	Nom. Watts	Pkg. Qty.	Color Temp. (Kelvin)	Nom. Length (In.)	Rated Average Life (Hrs.) ¹		Approx. Initial Lumens ^{2,3}	Design Lumens ⁴	CRI	Lumen Maint.
						3-hr Start ¹	12-hr Start ¹				
22049-1	F54T5/830/HO/EA/ALTO 49W	49	40	3000	46	25,000	35,000	5000	4750	85	95%
22050-9	F54T5/835/HO/EA/ALTO 49W	49	40	3500	46	25,000	35,000	5000	4750	85	95%
22052-5	F54T5/841/HO/EA/ALTO 49W	49	40	4100	46	25,000	35,000	5000	4750	85	95%
40649-6	F54T5/850/HO/EA/ALTO 49W	49	40	5000	46	25,000	35,000	4850	4625	82	95%

95% Lumen Maintenance
Energy Advantage T5 HO 49W



Lumens vs. Ambient Temperature
Energy Advantage T5 HO 49W



Reading Electric Lighting Case Study: Palram Goes Green to Save Green

The TS Lighting System Description (continued)

Temperature issues above the molding area required special fixtures and bulbs with Amalgam in them for higher temps.

The Team (Palram, Reading Electric, Illuminations) also conducted an Occupancy Study that allowed the team to Pin Point those areas that would provide the greatest ROI based on the additional costs of installing the sensors.

Implementation and Associated Issues:

As with any complex Solution, there are dozens of details that needed to have special focus to ensure success of the Program in terms of performance and schedule. These details were:

- 1) Project Management Team consisting of decision makers at Palram and Reading Electric
- 2) Monthly status meetings with virtual Electronic Meetings / communications as required
- 3) The Palram / Reading Team prepared and processed the pre-approval and final project submittal applications to qualify for the Act 129 process and First Energy rebates
- 4) Detailed installation and test schedules
- 5) Detailed plan and schedule for commissioning and tie-in to the Facility electrical power grid

The Program time line was:

System Investigation / Selection / Engineering / Pre-approval Rebate Process	52+ weeks
Equipment Delivery -	12 weeks
Installation -	6 weeks
Planned Commissioning & Tie-in –	4 hours
Final Rebate Submittal -	1 week

Careful coordination among Reading Electric and Palram Personnel resulted in Commissioning and Tie-in one light fixture at a time safeguarding Palram's operations. This approach avoided the situation of 'lights out' if a problem arose. Final commissioning and testing took place in January 2011.

Installation Considerations

The Team coordinated the installation schedule to allow the System to be installed during regular Facility Operation hours on 1st Shift. This required significant coordination and support from Production Operations in the extruding and inspection areas.

It was decided that installation during Production Hours, while creating some 'work-arounds' and adjustments, would be better than off hour installation and the possibly of creating 'unwanted surprises' for Production at the start of the shifts.

The T5 Lighting System Advantages

The T5 lighting has a shorter start up time and a 20% longer life than metal halide lighting. The long life of the T5 lighting will allow for reduction in maintenance and lamp replacement costs. The initial start up and restart time of the T5 lighting is less than 1.5 seconds, up to a 160% reduction in start up time and up to a 400% reduction in restart time versus the metal halide lighting.

The faster restart of the T5 lights also adds safety value in the production halls and warehouses during power outages. Motion sensing detectors were also installed in some areas for even greater energy usage reductions.

The new T5 lighting also produces a higher and more consistent lumen per watt output value versus the metal halide lighting. The T5 lights start bright and stay bright while the metal halides will fade significantly over time. In addition, T5 lights have a greater Color Rendition Index (CRI).

The CRI is the ability of a light source to mimic natural light when viewing colors. This helps to reduce the effect of metamerism, specifically illuminant metameric failure, where colors will appear differently in different sources of light. Natural light is the best source for color comparisons. **With the addition of the T5 lighting, Palram has increased the production area CRI by 40%**, which is excellent news for color production monitoring and observation.

The T5 Lighting System – Achieving the stated combined Goal

Palram replaced 230 lights in the P2000 building and 139 lights in the PPI building for a total of 368 lights replaced.

Palram achieved the total annual electricity consumption reduction of 681, 547 KWH for the project and reduced their carbon footprint by more than 400 metric tons or 883,950 lbs of CO₂. (Conversion = .0005883 metric tons or 1.297 lbs of CO₂ per KWH)

The T5 Lighting System had a capital cost of approximately \$120,000 and the resultant energy savings provide a 'Return on Investment' in less than twelve (12) months.

These are conservative numbers that do not factor the motion sensing detectors installed in the P2000 warehouses. These lights only illuminate when employees are in the immediate area.

What do all the numbers mean to the Community?

The United States Department of Energy (USDOE) ¹ states that, in 2008, the average annual electricity consumption for a US residential utility customer was 11,040 KWH. Palram's new T5 lighting is saving 681,547.78 KWH per year. The energy consumption reduction realized by Palram could power over 61 average American homes each year. Palram is proud of this achievement and will continue to implement green initiatives designed to improve the sustainability of the earth and the communities in which Palram operates.

Energy Efficient Lighting Systems Information Resources

For additional information on Energy Efficient Lighting Systems, contact Russ Yerger, Reading Electric Phone: 610-929-5777; email: ryerger@readingelectric.com

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