



# *Another Reflexor® Success Story...*

---

Lighting Retrofit at Worthington Machine Technology in Columbus, Ohio, increases light levels 28 percent without an increase in power consumption.

---

### *Retrofit Site*

Worthington Machine Technology, a Worthington Industries Company in Columbus, Ohio, recently completed a lighting retrofit which jumped lighting levels 28 percent with no additional power requirements.

After finishing an expansion on a separate Worthington facility, Worthington Machine Technology employees noticed how bright and well lighted the expansion was. They questioned why lighting in their tool and die shop was so poor; Paul Nawrocki, Industrial Engineer, investigated the situation.

### *Preliminary Findings*

Comparing the lighting in the tool shop to the expansion, it was discovered luminaire spacing was approximately the same, and that both facilities used the same High Pressure Sodium lamps. The only explanation for the outstanding light in the expansion was the luminaires. The tool shop's spun aluminum reflectors were about 70 percent efficient, while the clear acrylic prismatic LexaLite Reflexors in the expansion were over 90 percent efficient. With more precise down light reflection and added refracted light coming through the prismatic reflector, the LexaLite luminaires were utilizing 25 percent more of the lamp lumens than the tool shop's luminaires.



See the difference! This lighting retrofit at Worthington Machine Technology shows the difference between aluminum reflectors (before) and acrylic prismatic reflectors (after).

### *Retrofit Strategy*

The decision was made to upgrade the lighting in the tool and die shop, as well as to improve the overall environment by painting the ceiling and walls with a highly reflective white paint. Half of the tool shop was then painted, and besides having a nicer appearance, the more reflective surfaces (walls and ceilings) actually increased the light levels by about

five-and-a-half percent. The next step was to improve the lighting by replacing the metal reflectors with LexaLite's clear acrylic prismatic Reflexors. The photo above shows these results.

*Continued on next page...*



# Another Reflexor® Success Story...

---

LexaLite's Reflexors utilize 25 percent more of the lamp lumens than aluminum reflectors.

---

## *Retrofitting Results*

After retrofitting, employees noticed an immediate improvement. Footcandle readings in the retrofitted half of the building showed an overall increase of nearly 28 percent.

The combination of painting and retrofit accounted for this increase without adding a single watt of electricity. In addition to the higher illuminance, uniformity increased, Max. to Min. went from 5:1, to 2.4:1, and Avg. to Min. went from 3:1, to 1.7:1.

The tool shop's environment, which was shadowy with dark spots, is now an efficient and brightly illuminated place of work.

Because of the outstanding results, Worthington Machine Technology has subsequently painted and retrofitted the other half of the tool shop.

How can we help you create your success story? Please call us for more information (231) 547-6584.

## *Foot Candle Levels*

	Before Painting	After Painting	After Painting and Retrofit
Max.	89	92	100
Min.	16	18	41
Avg.	51	54	69
Max./Min.	5.6:1	5.1:1	2.4:1
Avg./Min.	3.2:1	3.0:1	1.7:1



# Another Reflexor® Success Story...

---

Lighting upgrade at PPG plant in Lexington, North Carolina, saves 2.86 million kilowatt hours of electricity annually.

---

## *Retrofit Site*

PPG's glass fiber plant in Lexington, North Carolina is a 1.5 million square foot facility, which operates 24 hours per day, 365 days a year. The main plant area is equipped with a moving crane that runs from one end of the plant to the other, and lighting equipment must be mounted and maintained above the crane.

## *Preliminary Findings*

The existing fluorescent system was over 23 years old and was not meeting the needs of the critical manufacturing processes being conducted. If upgraded, the new lighting system would need to provide higher illuminance levels, excellent color rendering, and require less maintenance.

## *Retrofit Testing*

To investigate and evaluate upgrade options, the Industrial Engineering Group of PPG installed 12 luminaires from four manufacturers. Three of these test systems included luminaires equipped with aluminum reflectors and acrylic drop lens bottom enclosures. The fourth system installed was equipped with LexaLite's Reflexors (generically known as prismatic reflectors). A survey of 110 PPG employees showed a clear preference for the luminaires equipped with LexaLite's acrylic prismatic reflectors.



See the difference! This lighting retrofit at a PPG plant in Lexington, North Carolina shows the outstanding illumination achieved with a retrofit from eight-foot industrial fluorescents to fixtures with LexaLite's prismatic reflectors.

## *Installation*

The new system with LexaLite's prismatic reflectors required new branch circuit wiring, and had spacings of 14' x 14' in the assembly area, and 14' x 17' in the production area, while the existing eight-foot industrial fluorescent fixtures ran in continuous rows on 10 foot centers.

## *Retrofitting Results*

PPG reported reduced electrical demand, resulting in a 40 percent return on investment (including the costs of demolition and installation), after retrofitting only 493,000 square feet of the 1.5 million square foot facility.

*Continued on next page...*



# Another Reflexor® Success Story...

Even with the dramatic energy savings, the light levels increased from an average maintained 35 horizontal footcandles to 63 horizontal footcandles.

Significant savings were realized in fixture maintenance, as the new lamp's life is twice that of the old. Previously, relamping required the use of a man lift in order to reach over the twist mills, this can now be accomplished with an extension pole from the floor.

Even with the dramatic energy savings, the light levels increased from an average maintained 35 horizontal footcandles to 63 horizontal footcandles, and machine maintenance no longer requires flashlights or task lighting. The new luminaires provide added uplight and high angle

distribution that creates a cheerful atmosphere; a big improvement over the dark cave effect created by the original system.

The 1,880 new H.I.D. luminaires have a 327 kw per hour energy savings over the old 4,425 fluorescent luminaires, equating to a reduction in power demand and reduced emissions. If we were to translate this figure into national average conversion factors, carbon dioxide (CO<sub>2</sub>) is reduced by over 2,100 tons, sulfur dioxide (SO<sub>2</sub>) by over 18 tons, and nitrogen oxide (NO<sub>x</sub>) by over seven-and-a-half tons. These figures demonstrate the dramatic positive effect 327 kw savings can have on the environment.

By taking advantage of this lighting upgrade opportunity, PPG is saving 2.86 million kw hours of electricity each year. Also, they have provided a safer and more pleasant place to work by retrofitting with a cost-effective, high-performance lighting solution.

How can we help you create your success story? Please call us for more information (231) 547-6584.

## Retrofitting Results

<i>Description</i>	<i>Original System</i>	<i>Upgrade System</i>
Number of Luminaires	4,425	1,880
Type of Luminaire	8' industrial fluorescent	Hi-Tek THR400M PA22 H.I.D. industrial luminaire with LexaLite's 22" Reflexor
Luminaire Efficiency	67%	92%
Luminaire Uplight	15%	20%
Type of Lamps # Per Unit	2 @ F96 T12 CW	1 @ MH 400/BU/C
Lamp Lumens	15,000 Lumens	40,000 Lumens
Lamp Life	10,000 Hours	20,000 Hours
Color Rendering Index	62 CRI	70 CRI
Connected Wattage	222 or 415	455
Luminaire Layout	Randomly Spaced Continuous 10' on Center	14' x 14' or 14' x 17' Spacings
Luminaire Mounting Height	20 to 24 Feet	20 to 22 Feet
Operational Cycle	24 Hours/365 Days	24 Hours/365 Days
Average Light Level	35 Footcandles	63 Footcandles
Relamping Method	Spot, Using Scaffold & Picker	Spot & Group Using Pole
Total Connected Watts	1,188,079	855,400
Square Footage	493,000	493,000
Watts Per Square Foot	2.5	1.74



# *Another Reflexor® Success Story...*

---

**Canadian Tire retrofit saves energy while increasing light levels 70%.**

---

## *Retrofit Site*

The seasonal selling area of Canadian Tire in Markham, ON, needed dramatic lighting improvements. A change in merchandising strategy, of displaying up to 12 feet instead of 60 inches, has made the store and aisles dark.

The seasonal area, with 20 foot high shelves, 25 foot high ceilings and seven aisles, eight feet in width, needed higher vertical footcandles on merchandise and better illumination.

## *Retrofit Testing*

To test this potential retrofit application, 400W fixtures in three aisles were upgraded by replacing brushed aluminum reflectors with LexaLite's acrylic prismatic Reflexors, while existing ballasts and lamps were left untouched. Before-and-after footcandle readings were taken in these aisles 48 inches from the floor; the readings showed a 70% average increase in footcandle levels.

## *Installation*

Because of the outstanding increase in illumination, the retrofit was extended throughout the seasonal area by retrofitting all 45 400W high-bay fixtures with LexaLite's clear acrylic prismatic Reflexors.

*Continued on next page...*



See the difference! This lighting retrofit at Canadian Tire in Markham, ON, involved retrofitting traditional 400W high-bay fixtures (top photo) with LexaLite's acrylic prismatic Reflexors (bottom photo) to boost lighting levels and save energy.



*Reprinted Courtesy of Lighting Magazine and  
Energy Manager Magazine.*



# *Another Reflexor® Success Story...*

---

The energy load for lighting was reduced from 4.3 watts per square foot to 3.01 watts per square foot.

---

## *Retrofitting Results*

John Mara, Canadian Tire Associate Store Owner, had not contemplated a complete lighting retrofit for his store. It was only when he saw the results achieved in the entire seasonal selling high-bay area that he realized an overall retrofit could dramatically improve lighting levels and save on energy costs.

Tests were conducted to determine how the Reflexor could be used in the general retail area of the store. The general retail area consisted of two parts; the larger part with a T-bar ceiling at 15 feet, and the smaller part with a T-bar ceiling at 18 feet.

After studying various mounting methods, new 400W fixtures with LexaLite Reflexors were installed throughout the store. In the 15 foot ceiling area, the fixture was chain hung from the deck above, such that the top of the Reflexor was flush with the T-bar ceiling. In the 18 foot ceiling part of the store, the fixture was chain hung such that the whole fixture was visible. In both cases, the uplight was effectively reflected to create a bright ceiling. Light levels were more than double those that had previously existed. All together, 131 units were installed.

The existing 240 fluorescent slimline fixtures and HID units were eliminated.

The energy load for lighting was reduced from 4.3 watts per square foot to 3.01 watts per square foot.

Mara's "seeing is believing" philosophy has convinced other store owners as well. The Canadian Tire Corporation has specified LexaLite's acrylic Reflexor for several upcoming retrofits.

How can we help you create your success story? Please call us for more information at (231) 547-6584.

*Reprinted Courtesy of Lighting Magazine and Energy Manager Magazine.*