

“DARK MATTERS” BEHIND THE LIGHT SWITCH

David Colasante



Incentive Programs are Universal with:

- N-STAR
- N-GRID
- CAPE LIGHT
- UNITIL
- WESTERN MASS ELECTRIC



Benefits of New Incentives

- Profitability of incentives and technology offered
- You are not in business to save money, but with a combination of incentives, the correct lighting and power reduction it will equal a stronger bottom line, thus **more cash to invest in your business**



New Technology

- The term “technology” refers to the application of knowledge for practical purposes
- The human species use of technology began with the conversion of natural resources into simple tools.
- At it’s current rate of increase, the energy demand for lighting alone will be 80% higher in 2030 than it is today.

Green Technology Means doing more with less

- Reduction of energy consumption is and will be a high priority now and in the future.
- To Balance this it must be:
 - Flexible
 - Practical
 - Cost Effective
 - Efficient
 - Long term



Got Windows?

Ideas to provide greater efficiency of existing fluorescent lighting

Daylight harvesting

- Natural sunlight, best light source in the universe
- Combination of a photo cell and dimming ballast
- Will reduce lighting power when natural sunlight enters the room
- Automatically maintains preset minimum light levels
- Helps reduce peak demand loads
- Easily integrated into building design
- An energy saving system that can reduce lighting energy costs by up to 70%
- Product types will vary depending on application

Product Types

- Sensor manufacturers have a variety of photocells for this purpose.
- All lamp and ballast manufacturers can provide the necessary dimming ballasts needed.
- Above products will or may require external wiring and controls.
- All in one technology: Ballast, switch and photocell all prewired out of the box
- Designed to set and install quickly
- Fixed level reduction dip-switch control wired
- Install ballast in fixture
- Photocell pre-wired to ballast
- Drill hole in ceiling secure photocell
- Pre-set switch to fixed light level wanted

Demand Control Lighting

- A DCL system puts you in command and control of your lighting energy costs.
- Energy savings:
 - Ability to tune the ballast factor.
 - High efficiency program start ballasts
 - A programmable ballast that provides flexibility
- Light level
 - 1) can be pre-set at the factory
 - 2) you can set program at panel
 - 3) or install DCL controls at panel
- Uses existing power line for communication (No wiring)
- Control entire building lighting system from your laptop or your existing energy management systems.
- Network managed systems via the internet
- Allows for participation in utility demand response programs providing peak load charge avoidance.

DCL Controlled System

- Power level tuning potential to 50%
- Install the same as PRS ballasts
- Exceeds CEE T-8 requirements
- Can instantly reduce lighting by 15 to 20% with no discernable difference

Implement with various controls and systems:

- Bas systems
- Photo cells
- Occupancy sensors
- Contact closure

- Control each circuit separately
- DCL provides flexibility for a wide variety of control applications:
 - Office buildings, Warehouse facilities, Schools, Health care, Retail

The Evolving Technology of Lamps and Fixtures

Induction Lighting: A brief history

Nikola Tesla

- Born: July 1856 , Died: January 1943
- Inventor, mechanical engineer and electrical engineer

- He was one of the most important contributors to the birth of commercial electricity.
- Best known for his many revolutionary developments in the field of electromagnetism.

- Tesla's patents and work formed the basis of modern alternating current (AC), which included his invention of the ac motor and the induction coil.

- Tesla also had a total of 700 inventions and over 100 patents.

- One of which was induction lighting (1891).

What Is Induction Lighting?

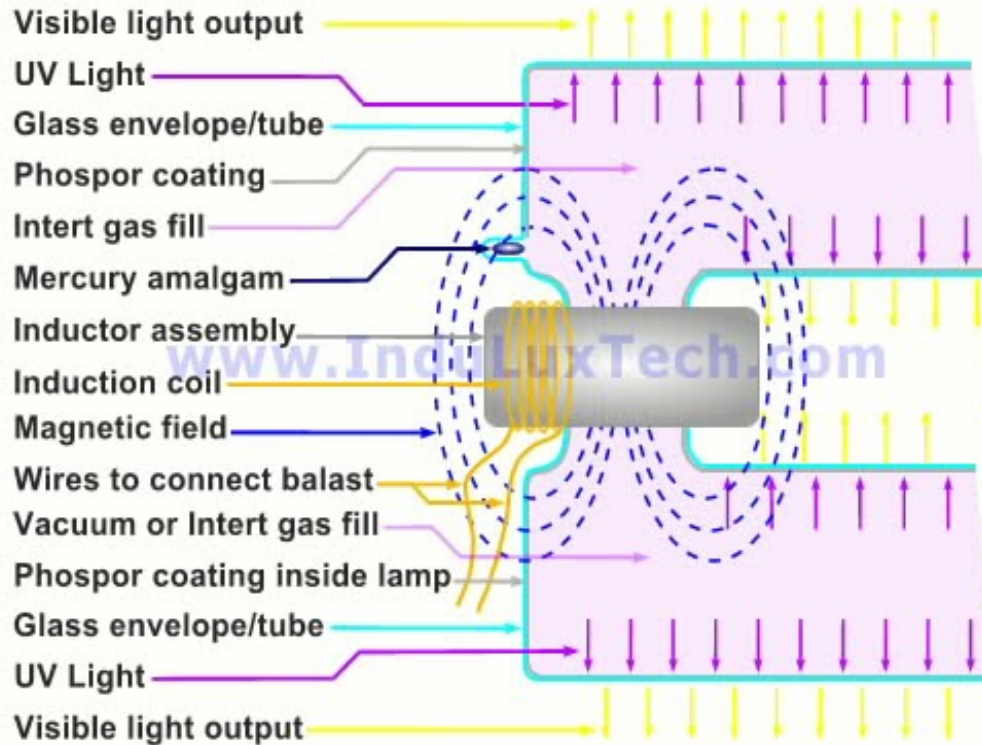
- Essentially, an induction lamp is an electrodeless fluorescent vessel.
- It lights using the principles of electromagnetic induction.
- In external inductor lamps, high frequency energy, from the generator (ballast) is sent through the wires, creating a powerful magnetic field.

Comprised of 3 components

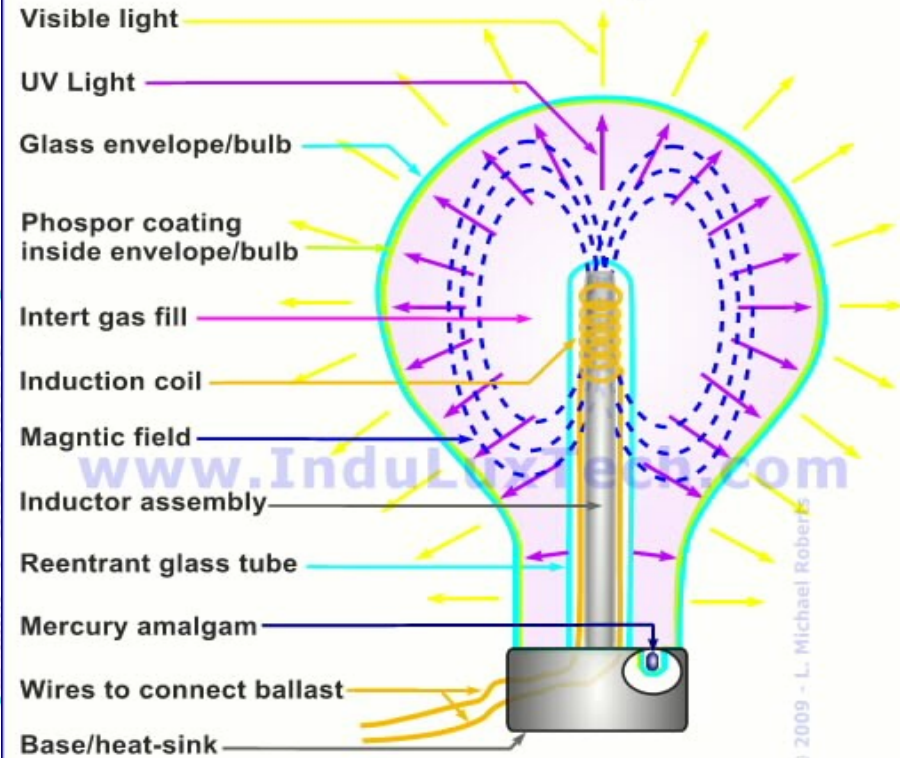
- 1) the generator (ballast)
- 2) the power coupler
- 3) vessel (lamp)



External Inductor Lamp



Internal Inductor Lamp



Advantages of Induction Lamps

- life of up to 100,000 hours
- up to 90 cri crisp white light
- choice of color temps of 3k, 4k, 5k and 6k
- produces 85 lumens per watt plus 90 LPW in high wattage 250 to 400 in external inductor models.
- instant on
- wattage reduction to metal halide runs 40% to 60 % less depending on application
- can operate from -40 F to as high as 130F
- environmentally friendly uses less mercury per hour of operation than conventional lighting.
- proven durability in high-vibration & gusty applications.
- many wattages available from 15 to 400 plus
- no flickering, no strobing, no noise
- produces more lumens than led. *Example:* a 200 watt induction fixture will produce 16,000 lumens while the LED version will produce only 11,000 (31%) less light
- cost effective savings over t-5 fluorescent
- high power factor and high frequency electronic generators makes them 95% to 98% efficient.
- universal operating position
- The major difference between the technologies (led / induction) other than lifespan is in conversion efficiency (energy utilization) and costs.

Case Study: McDonald's (Vernon, Connecticut)



The Connecticut Energy Efficiency Fund and CL&P helped one McDonald's restaurant:

- Save approximately \$8,917 and 67,048 kilowatt-hours annually.
- Defray their investment with a \$16,769 incentive.
- Achieve a lifetime savings of over 821,653 kilowatt-hours.

Case Study: McDonald's (Vernon, Connecticut)

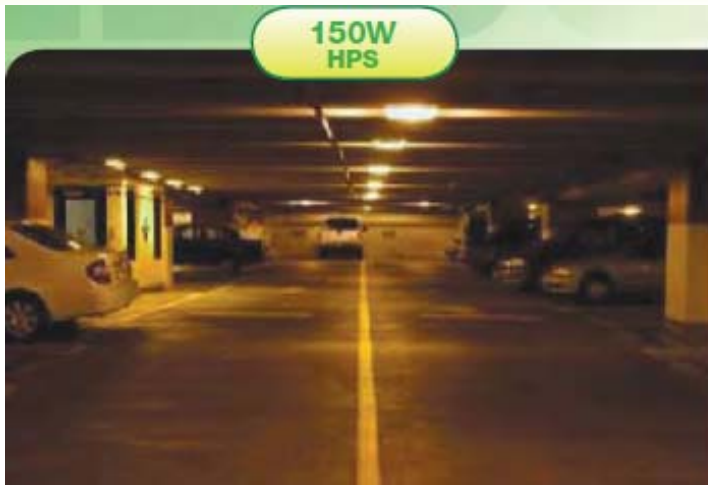
The electricity saved on this project over the lifetime of the measures is the equivalent of approximately:

- 33,848 gallons of oil not burned, or
- 881,172 pounds of carbon dioxide (CO₂) emissions avoided, or
- 411,763 pounds of coal not burned, or
- 98 homes provided with electricity for one year, or
- 77 cars taken off the roads



INDUCTION VS LED / METAL HALIDE / HIGH PRESSURE SODIUM

	INDUCTION	LED	MH	HPS
SOURCE POINT	AREA	PROJECTION	POINT	POINT
LAMP LIFE (Hours)	60k - 100k	30k - 50k	10k - 15k	15k - 24k
LIGHTING EFFICIENCY Lm/Wt	65 - 90	40 - 65	60 - 110	60 - 120
CRI	> 80	> 70	> 70	> 20
S/P RATIO	1.46 - 2.25	1.96	1.49	0.62
LUMEN MAINTENANCE	Reference Graph Below			
COLOR TEMPERATURE	Full Range	Limited Range	Limited Range	Limited Range
START	INSTANT	INSTANT	DELAY	DELAY
MERCURY	<10mg.	N/A	10-150mg.	10-50mg.



Bob's Stores- Induction Lighting



Bob's Stores- Induction Lighting



Induction Lighting

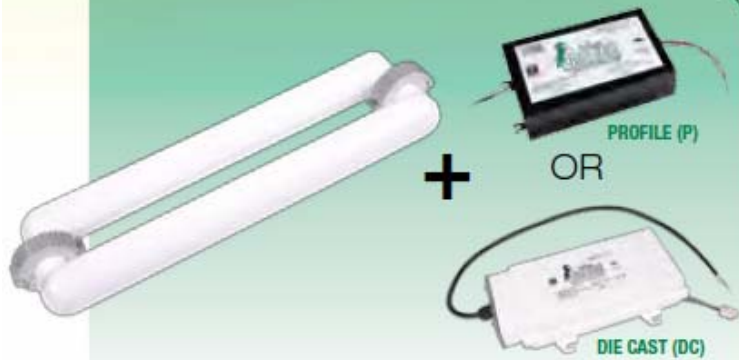
GLOBE SYSTEM



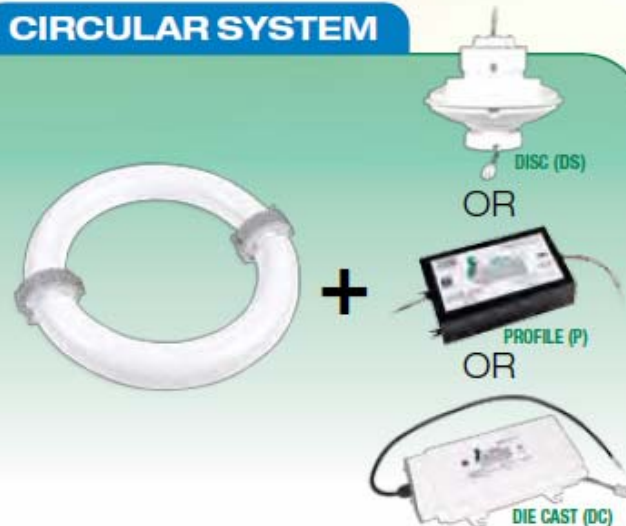
BULB SYSTEM



TUBULAR SYSTEM



CIRCULAR SYSTEM



15w Self Ballasted screw in



Dimensions:
2.3" W x 6.3" H

A19 Medium Base

Features and benefits:

- 50,000 hrs. life
- reduces cost of lamp change outs
- at least six times the life of the ordinary Compact fluorescent lamp
- High CRI 90
- Wide color range temperatures 2700k ~ 6400k
- Instant start up and re-strike.
- Wide voltage range
- 100% flicker free
- Lumen output 1,125 lumens
- Vibration resistant

Applications:

- Down lighting
- Extreme temperature environments
- Difficult to service applications
(for use with many occupancy sensors)
- Outdoor lighting
- Reducing connected electrical loads
- Construction sites
(vibration resistant)

23w Self Ballasted screw in



Dimensions:
3.1" W x 7" H

A19 Medium Base

Features and benefits:

- 50,000 hrs. life
- reduces cost of lamp change outs
- at least six times the life of the ordinary Compact fluorescent lamp
- High CRI 90
- Pupil luminous Flux 150Plm/W
- Wide color range temperatures 2700k ~ 6400k
- Instant start up and re-strike.
- Wide voltage range
- 100% flicker free
- Lumen output 1,840 lumens
- Vibration resistant

Applications:

- Down lighting
- Extreme temperature environments
- Difficult to service applications
(for use with many occupancy sensors)
- Outdoor lighting
- Reducing connected electrical loads
- Construction sites
(vibration resistant)

40w Self Ballasted screw in



Dimensions:
4.5" W x 9.7" H

A19 Medium Base

Features and benefits:

- 50,000 hrs. life
- reduces cost of lamp change outs
- at least six times the life of the ordinary Compact fluorescent lamp
- High CRI 90
- Pupil luminous Flux 150Plm/W
- Wide color range temperatures 2700k ~ 6400k
- Instant start up and re-strike.
- Wide voltage range
- 100% flicker free
- Lumen output 3,200 lumens
- Vibration resistant

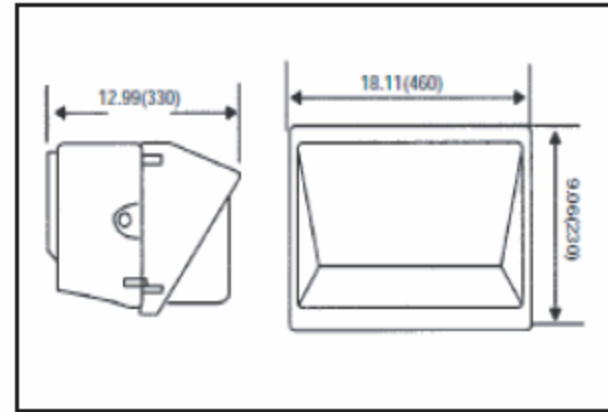
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INDUCTION - WALL PACK - Flood Type Fixtures

100,000 Hrs Life

The Next Generation of Lighting



Specification:

- Ballast Type	Electronic
- Start Method	InstantON
- Hot Re-start	InstantON
- Universal Input Line Voltage	120-277 VAC
- Input Line Frequency	50/60 Hz
- Lamp Life	100,000 Hrs.
- Lumen Maintenance @60,000Hrs	>70%
- Color Temperature	5000°K
- Color Rendering Index (CRI)	83
- Minimum Starting Temperature	-20°F
- Maximum Operating Temperature	160°F
- Lamp Operating Frequency	250 kHz
- Power Factor	> 0.98
- Total Harmonic Distortion	< 10%
- Inrush Current Peak	< 10 Amp
- UL/cUL Listed	Yes
- FCC Compliance	Part 18, Subp. C

Applications, Features, and Benefits

- Flood type wall pack
- Heat and impact resistant tempered glass lens
- Aluminum cast housing with electrocoat gray or brown paint
- Ballast made of long life components
- InstantON(TM) flicker-free Cold Start and Hot Re-Start
- Correlated Color Temperature of 5000°K for greater visibility
- High Power Factor, Low THD Replaceable Ballast
- Concealed continuous gasket seals against harmful dust, dirt, moisture and insects
- UL Listed for Wet Locations
- Advanced phosphors for high Lumen Maintenance and high lumen output
- Aluminum Anodized reflector for superior long term performance
- Up to 20 years Maintenance free operation
- Ideal replacements for HPS and HID floodlights up to 250 Watts

CLP-ACRN



CLP-ACRN Induction Exterior Post Top Fixture

- Lamp Rating: 100,000 Hours for enhanced safety and maintenance
- Lumen Maintenance: 88% maintained lumens over 100,000 Hours
- Energy Savings: Over 57% savings comparing to HPS and other HID sources
- IP Rating: IP55, UL listed for wet location
- Light Output: 5000K, 90 CRI
- Voltage: 120-277v standard, 480 optional
- Applications: Walkways, Parks, Security, Perimeter Lighting
- Warranty: 10 year warranty (see terms and conditions)
- Construction: Heavy duty die cast aluminum base, Formed Clear Prismatic Acrylic lens

Lamp Specifications

Wattage	Lumens	CRI	CCT(KELVIN)	Rated Life
CLP-ACRN-65IND	6,175	90	5000K	100,000 HRS
CLP-ACRN-80IND	7,600	90	5000K	100,000 HRS

Ballast Specifications

System Wattage	Input Voltage	Input Current	Input Frequency	Power Factor	Ambient Temp	THD
70W	120-277VAC	0.77-0.47A	233KHz	.99	-31°F- 239°F	<10%
84W	120-277VAC	1.06-0.35A	233KHz	.99	-31°F- 239°F	<10%

Ordering Guide

Example: (CLP-ACRN-80IND-50-120/277V-BZ-PC)

CLP-ACRN						
MODEL	WATTS	COLOR TEMP	VOLTAGE	MOUNTING	FINISH	OPTIONS
CLP-ACRN POST TOP	65W-65IND 80W-80IND	27-2700K 35-3500K 41-4100K 47-4700K 50-5000K 60-6000K	120-277V 480V	POLE MOUNT	BLK-BLACK BZ-BRONZE CUS-CUSTOM	DIM- DIMMING PC-PHOTOCELL ST-SOLID TOP

CLC-RC08



CLC-RC08 Induction Non-IC Recessed Can Fixture

- Lamp Rating: 100,000 Hours for enhanced safety and maintenance
- Lumen Maintenance: 88% over 100,000 Hours
- Energy Savings: Over 57% savings comparing to HPS and other HID sources
- UL listed for damp location
- Light Output: 5000K, 90 CRI
- Voltage: 120-277v standard, 480v optional
- Applications: New construction only, high ceilings, commercial lighting and other interior spaces
- Warranty: 10 year warranty (see terms and conditions)
- Construction: Heavy duty galvanized steel body,
- Also available: IC rated, Air tight, sloped cans, remodeling style cans

Lamp Specifications

Wattage	Lumens	CRI	CCT(KELVIN)	Rated Life
CLC-RC08-15IND	1,425	90	5000k	100,000 HRS
CLC-RC08-23IND	2,185	90	5000K	100,000 HRS

Ballast Specifications

System Wattage	Input Voltage	Input Current	Input Frequency	Power Factor	Ambient Temp	THD
19W	120-277VAC	0.21-0.13A	233KHz	.99	-31°F- 239°F	<10%
27w	120-277VAC	0.38-0.17A	233KHz	.99	-31°F- 239°F	<10%

Ordering Guide

Example: (CLC-RC08-23IND-50-120/277V-AA-DM)

CLC-RC08						
MODEL	WATTS	COLOR TEMP	VOLTAGE	MOUNTING	FINISH	OPTIONS
CLC-RC08 RECESSED CAN	15W-15IND 23W-23IND 40W-40IND	27-2700K 35-3500K 41-4100K 47-4700K 50-5000K 60-6000K	120-277V 480V	RECESSED CEILING MOUNT	AA-ANODIZED CUS-CUSTOM	DIM- DIMMING

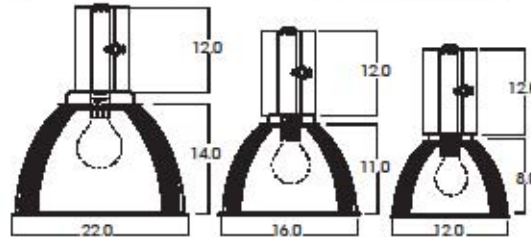


**LUMEN MAX
PR-INDUCTION SERIES**
250 WATT MAX

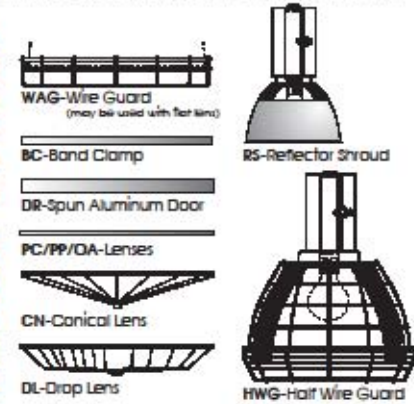
**DU
LUMEN MAX
SERIES**

PRODUCT INFORMATION:

- The LUMEN MAX DU Series uses the 100,000 hour lamp technology with the style of the Spectrum high bays.
- PROCT style is elegant and compact.
- Energy-efficient lamps and ballasts.
- Lexalite® prismatic refractor allows up-light component. Opal and Etched diffuse finishes are available.
- Good color rendering.
- Low energy usage.
- Wide choice of mounting options.
- 20 Powdercoat colors available. (Glass White is standard).
- Damp location listed.
- Manufactured and tested to UL Standard no. 1598. ETL Listed.



DIFFUSER OPTIONS



MODEL	LAMP TYPE	GENERATOR	MOUNTING	REFRACTOR	DIFFUSER OPTIONS																												
PROCT12-12" x 8" (85w MAX)	DU-40w DU-80w DU-100w	3K -3000° Kelvin 4K -4000° Kelvin 5K -5000° Kelvin	G1 -QL Generator 120v G2 -QL Generator 277v	HM* -Hang-Straight Pendant (3/8 IPS) PM* -Rigid Pendant (3/8 IPS) CD* -Aircraft Cable, Straight Cord SM -Surface Mount SC1 -Safety Cable HC -Hook & Cord NM2 -1/2" Hub NM3 -3/4" Hub	PR12 -12" Clear Prismatic PR16 -16" Clear Prismatic PR22 -22" Clear Prismatic OP12 -12" Opal Birch OP16 -16" Opal Birch OP22 -22" Opal Birch DF12 -12" Diffuse DF16 -16" Diffuse DF22 -22" Diffuse SC2 -Safety Cable, refractor to trim																												
PROCT16-16" x 11" (85w MAX)	DU-120w DU-160w DU-200w DU-250w				<table border="0"> <tr> <td>MOUNTING</td> <td>LENS</td> </tr> <tr> <td>WAG12-12" Wire Guard</td> <td>PC -Clear Polycarbonate</td> </tr> <tr> <td>WAG16-16" Wire Guard</td> <td>PP -Prismatic Polycarbonate</td> </tr> <tr> <td>WAG22-22" Wire Guard</td> <td>OP1 -Opal Acrylic</td> </tr> <tr> <td>DR12-12" Spun Door</td> <td>CN -Conical Lens</td> </tr> <tr> <td>DR16-16" Spun Door</td> <td>DL -Drop Lens</td> </tr> <tr> <td>DR22-22" Spun Door</td> <td></td> </tr> <tr> <td>BC12-12" Band Clamp</td> <td></td> </tr> <tr> <td>BC16-16" Band Clamp</td> <td></td> </tr> <tr> <td>BC22-22" Band Clamp</td> <td></td> </tr> <tr> <td>HWG22-22" Half Wire Guard</td> <td></td> </tr> <tr> <td>RS12-12" Reflector Shroud</td> <td></td> </tr> <tr> <td>RS16-16" Reflector Shroud</td> <td></td> </tr> <tr> <td>RS22-22" Reflector Shroud</td> <td></td> </tr> </table>	MOUNTING	LENS	WAG12-12" Wire Guard	PC -Clear Polycarbonate	WAG16-16" Wire Guard	PP -Prismatic Polycarbonate	WAG22-22" Wire Guard	OP1 -Opal Acrylic	DR12-12" Spun Door	CN -Conical Lens	DR16-16" Spun Door	DL -Drop Lens	DR22-22" Spun Door		BC12-12" Band Clamp		BC16-16" Band Clamp		BC22-22" Band Clamp		HWG22-22" Half Wire Guard		RS12-12" Reflector Shroud		RS16-16" Reflector Shroud		RS22-22" Reflector Shroud	
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PROCT16	DU250	3K	G1	NM2	PR22																												

* Specify Length in 6" increments

Induction Lamps

- These benefits offer a considerable cost savings of between 40% and 55% in energy.
- In some applications, advanced energy savings technologies incorporated into the fixtures can provide energy savings as high as 75%.
- The cost of maintenance for induction lamps compared to other types of lamps that they replace is considerably less.

