Lamp / Ballast / Driver Training
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Specification Sales Manager
Mid-Atlantic Region

November 7, 2012
# T8 Portfolio – New Lamp Life Ratings

<table>
<thead>
<tr>
<th>Products</th>
<th>Instant Start&lt;sup&gt;1&lt;/sup&gt;</th>
<th>Programmed Start&lt;sup&gt;2&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3 hours</td>
<td>12 hours</td>
</tr>
<tr>
<td>T8 700 &amp; 800 Series</td>
<td>24,000</td>
<td>30,000</td>
</tr>
<tr>
<td>Advantage T8 (High Lumen)</td>
<td>24,000</td>
<td>30,000</td>
</tr>
<tr>
<td>PLUS T8 (Life)</td>
<td>30,000</td>
<td>36,000</td>
</tr>
<tr>
<td>T8 Energy Advantage &amp; Value Energy Advantage</td>
<td>32,000</td>
<td>38,000</td>
</tr>
<tr>
<td>25W and 28W</td>
<td></td>
<td></td>
</tr>
<tr>
<td>32W Extra Long Life (XLL)</td>
<td>40,000</td>
<td>46,000</td>
</tr>
<tr>
<td>Energy Advantage T8 25W &amp; 28W Extra Long Life</td>
<td>40,000</td>
<td>46,000</td>
</tr>
</tbody>
</table>

1) Average life under engineering data on instant start ballast with lamps turned off and restarted once every 3 or 12 operating hours as indicated.
2) Average life under engineering data on programmed start ballast with lamps turned off and restarted once every 3 or 12 operating hours as noted.
## T8 Portfolio – New Lamp Warranty Periods

<table>
<thead>
<tr>
<th>Philips Lamp</th>
<th>Instant Start Warranty (3hr/12hr starts)</th>
<th>Programmed Start Warranty (3hr/12hr starts)</th>
</tr>
</thead>
<tbody>
<tr>
<td>T8 700 &amp; 800 Series</td>
<td>30/30 months</td>
<td>30/36 months</td>
</tr>
<tr>
<td>Advantage T8 32W High Lumen</td>
<td>30/30 months</td>
<td>36/36 months</td>
</tr>
<tr>
<td>Plus T8 32W</td>
<td>36/42 months</td>
<td>42/48 months</td>
</tr>
<tr>
<td>Energy Advantage &amp; Value Energy Advantage 25W and 28W</td>
<td>36/42 months</td>
<td>48/54 months</td>
</tr>
<tr>
<td>T8 32W Extra Long Life (XLL)</td>
<td>42/48 months</td>
<td>48/60 months</td>
</tr>
<tr>
<td>Energy Advantage T8 25W &amp; 28W (XLL) Extra Long Life</td>
<td>42/48 months</td>
<td>48/60 months</td>
</tr>
</tbody>
</table>

* Conditions apply - Based on maximum annual burn hours of 5110, use of other equipment (including sensors) will void warranty
# T5/T5HO PORTFOLIO

## LIFE RATINGS & WARRANTY PERIODS

<table>
<thead>
<tr>
<th>Products</th>
<th>Programmed Start&lt;sup&gt;2&lt;/sup&gt;</th>
<th>Warranty Period</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3 hours</td>
<td>12 hours</td>
</tr>
<tr>
<td>T5HE – 14W, 21W, 28W &amp; 35W</td>
<td>25,000</td>
<td>35,000</td>
</tr>
<tr>
<td>T5HE – Energy Advantage</td>
<td>35,000</td>
<td>40,000</td>
</tr>
<tr>
<td>F28T5/800/EURO/ALTO 25W</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T5HO – 24W, 39W, 54W &amp; 80W</td>
<td>25,000</td>
<td>35,000</td>
</tr>
<tr>
<td>T5HO – Energy Advantage</td>
<td>35,000</td>
<td>40,000</td>
</tr>
<tr>
<td>F54T5/800/HO/EA/ALTO 49W</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T5HO – Extra Energy Advantage</td>
<td>35,000</td>
<td>40,000</td>
</tr>
</tbody>
</table>

1) Average life under engineering data on instant start ballast with lamps turned off and restarted once every 3 or 12 operating hours as indicated.

2) Average life under engineering data on programmed start ballast with lamps turned off and restarted once every 3 or 12 operating hours as noted.
Philips Consistency and Performance Over Time

1. Philips buys Advance 1959
2. Philips buys EBT 1992
3. Philips buys Lumisistemas 2001
4. Philips buys Bodine 2006

= Ballast Exit
Fluorescent Ballasts
Electronic Ballast
Lamp Starting Circuits

- Instant Start
- Rapid Start
- Programmed Start
Lamp/Ballast Interaction

**Instant Start Circuits**
High starting current  
No cathode watts!  
80% of electronic ballasts  
Shorter lamp life (except PLC!)

**Rapid Start Circuits**
Warms cathodes before starting  
High starting current  
Continues to heat cathodes

**Programmed Start Circuits**
Ramps up current to provide 700C cathode heating and smooth starting  
Longer Lamp Life

**LAMP MORTALITY**
- emitter depletion  
- starting frequency  
- starting method

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**Diagram:**
- Envelope or tube
- phosphors  
- mercury  
- emitter  
- cathode  
- base

**Legend:**
- Envelope or tube
- phosphors  
- mercury  
- emitter  
- cathode  
- base
Ballast Factor

• Ballast Factor is the measurement of how much light the lamps will actually produce when connected to the ballast.

• It is the percentage of light output from a commercial ballast vs. light output from a laboratory reference ballast specified by ANSI or ‘Perfect Ballast’.

Ballast Factor ~ ‘Multiplier’...

... and it enables “Tweaking”
Using the Ballast Factor

Ballast Factor multiplies light output

- Light output on a commercial ballast
- Rated lumens on reference ballast

### Ballast Factor

- **1.38**
  - 8280 Lumens /2 lamps
  - 80 Watts

- **1.18**
  - 7080 Lumens /2 lamps
  - 72 Watts

- **1.00**
  - 6000 Lumens /2 lamps
  - 64 Watts

- **.87**
  - 5220 Lumens /2 lamps
  - 54 Watts

- **.77**
  - 4620 Lumens /2 lamps
  - 48 Watts

### Lumens

- 2400
- 3200
- 4800
- 6400

2 F32T8/ADV lamps at 3000 Mean Lumens each
Optanium ballasts
T12 Magnetic to Electronic Conversion
Codes driving change

- EISA
- Epact 2007
- Title 24
- Ashrae 2010
What’s Driving the Change?

The Energy Policy Act of 2005 (EPAct) and previously enacted DOE legislation set new efficiency standards for T12 ballasts... after July 2010 magnetic ballasts will no longer be Available

- EPAct Timing:
  - July 2005 OEM (All fixtures now come with electronic ONLY)
  - July 2010 Ballast Manufacturers can no longer sell magnetic to Distributors
- The Window of Change is Closing Quickly
# T12 Electronic Portfolio

<table>
<thead>
<tr>
<th>Application</th>
<th>Magnetic</th>
<th>Electronic</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Lamp Four Foot 34W or 40W</td>
<td>R140-TP</td>
<td>RELB-2S40-N</td>
</tr>
<tr>
<td></td>
<td>V140-TP</td>
<td>ICN-2S40-N</td>
</tr>
<tr>
<td>(2) Lamp Four Foot 34W or 40W</td>
<td>R2S34-TP</td>
<td>RELB-2S40-N</td>
</tr>
<tr>
<td></td>
<td>R2S40-TP</td>
<td>ICN-2S40-N</td>
</tr>
<tr>
<td></td>
<td>V2S34-TP</td>
<td></td>
</tr>
<tr>
<td></td>
<td>V2S40-TP</td>
<td></td>
</tr>
<tr>
<td>(1) or (2) 60W or 75W Slimline</td>
<td>R2E75-S-TP</td>
<td>ICN-2P60-SC</td>
</tr>
<tr>
<td></td>
<td>V2E75-S-TP</td>
<td></td>
</tr>
<tr>
<td>(1) or (2) 95W or 110W HO</td>
<td>RS-110-TP</td>
<td>ICN-2S110-SC</td>
</tr>
<tr>
<td></td>
<td>VS-110-TP</td>
<td></td>
</tr>
<tr>
<td></td>
<td>R-2S110-TP</td>
<td></td>
</tr>
<tr>
<td></td>
<td>V-2S110-TP</td>
<td></td>
</tr>
</tbody>
</table>
Controllable Ballast Families
Continuous or Step Dimming

- **Continuous**
  - Used to maximize energy savings
  - Less obtrusive to space occupants
  - Typically occupied spaces
    - Offices
- **Step-Dimming**
  - Use when defined levels known
  - Typically unoccupied space
    - Stairs, Hallways, Restrooms, Warehouse aisles
Electronic Controllable

- Line Voltage T8
- 0 – 10 v T8, T5
- DALI
- Step Dim T5 / T5HO
Mark 10 Powerline

- No need to pull additional control wires - great for retrofitting existing installations (big labor savings).
- Saves copper (2 wires) for new installations
- Also called “Phase Cut” or “Triac” dimming

Dimming through the power leads
Mark 10 Powerline Design Highlights

- 100% - 5% full range continuous dimming (T5/HO to 1%)
- Provides up to 65% energy savings over standard fixed output T8 electronic ballasts
- Ease of installation - requires no extra wiring
- Highly flexible and compatible with a wide variety of controls by a broad range of control manufacturers
- Programmed Start operation optimizes lamp life in frequent starting conditions
Mark 10 Powerline Design Highlights

Lamp ignition at any light setting, including the 5% dim level (1% in T5/HO). No ‘flash’ at ignition.

- Operates above 42 kHz, which minimizes risk of interference with infrared remote control systems and provides continuous flicker-free dimming
- Lamp End-of-Life (EOL) protection circuit (CFL and T5/HO models) safely removes power from lamp at end of life
Mark 7 0-10V

- 100% - 3% dimming range (T5/HO to 1%)
- Utilizes 2 low voltage (0-10V) control wires
- Great for applications using daylighting or building management systems

Violet and Grey Control Leads
0-10 VDC
Mark 7 0-10V
Design Highlights

- 100% - 3% full range continuous dimming (T5/HO to 1%) No ‘flash’ at ignition.
- Provides up to 65% energy savings over standard fixed output electronic T8 ballasts
- Direct operation from a 0-10V DC control signal
- Allows for a single control across multiple branch circuits
Mark 7 0-10V Design Highlights

- IntelliVolt® multiple-voltage technology enabling operation at any input voltage from 120 to 277 volts, 50/60 Hz
- Lamp End-of-Life (EOL) protection circuit (CFL and T5/HO models) safely removes power from lamp at end of life
- Programmed Start operation provides extended lamp life in frequent starting applications

End of Lamp Life circuit protects ballast and lampholders
ROVR (DALI)

• 100% - 3% dimming range (T5/HO to 1%)
• Utilizes 2 low voltage DALI digital control wires

Violet Control Leads
ROVR
Design Highlights

- Operates directly from DALI control signal
- Utilizes a global standard, giving a choice of compliant controls
- Supports sustainable design principles such as daylight harvesting
- 100% - 3% full range continuous dimming (T5/HO to 1%)
- IntelliVolt® Technology (120 through 277V - 50/60Hz) ensures shipment of correct voltage ballast or fixture for each application
Optanium Step-Dim
Design Highlights

- 100% - 50% step-dimming
- Provides a 50% energy savings when operated at the low step
- Ease of installation – uses standard wall switches
- Programmed Start operation optimizes lamp life in frequent starting conditions
- Complies with ASHRAE 90.1 2010 standard for auto-on to 50% occupancy sensors
- Complies with Title 24 2014 for classrooms, warehouses and parking garages

T8 Version Available Jan 2013
1 or 2 lamp operation
0.88 BF
Continuous Dimming
Three Main Control Options

- Powerline Control
  - Dimming level controlled through the power leads

- 0-10VDC Analog Control
  - Dimming level controlled via an analog control signal

- DALI Controls
  - Dimming level controlled via a digital control signal
Maximize energy savings by reducing lighting during unoccupied periods with these Philips controls:

**OccuSwitch Wireless**
- Wireless occupancy sensing
- Wireless daylight harvesting and occupancy sensing
- 10-year battery life design*
- Wall Switch and Dimmer

**OccuSwitch Classic**
- Wired wall switch and ceiling sensors
- Automated occupancy sensing
- Automatic time-out and intelligent self-adjustment
- Mount on wall

* Product has a 2-year limited warranty
Mark 7 0-10V
Design Highlights

- 100% - 5% full range continuous dimming (T5/HO to 1%)
- Provides up to 65% energy savings over standard fixed output electronic T8 ballasts
- Direct operation from a 0-10V DC control signal
- Allows for a single control across multiple branch circuits
- Utilize in daylight harvesting applications
- IntelliVolt® multiple-voltage technology enabling operation at any input voltage from 120 to 277 volts, 50/60 Hz
Maximize energy savings by reducing lighting during unoccupied periods with these Philips controls:

**MicroLuxSense**
- Automated daylight
- Potential energy savings of up to 32%*
- Regulate up to 20 luminaires
- Install in luminaire

**LuxSense**
- Automated daylight harvesting
- Potential energy savings of up to 32%*
- Install in luminaire or clip on to fixture or T5 lamp**

**ActiLume 1-10V**
- Automated daylight harvesting and occupancy sensing
- Potential energy savings of up to 65%*
- True plug-and-play system
- Install in luminaire

**OccuSwitch Classic**
- Automated daylight harvesting
- Automatic time-out and intelligent self-adjustment
- Mount on ceiling

** External installation of class 2 wiring where allowed by local codes
What is DALI?

**Configuration**

DALI is an **open architecture** that allows **flexibility** of devices to create a complete lighting system.

Each DALI loop can control up to **64 devices**, each of which is **individually addressable**.

One DALI system allows the creation of up to **16 groups**, each of which can have up to **16 settings**.

System configuration can be modified **without changing any of the installation itself**.

For more information about DALI, consult “The ABC’s of DALI,” available at www.advance.philips.com
Philips Control Compatibility

*Daylight Harvesting and Occupancy Sensing*

Maximize energy savings by reducing lighting during unoccupied periods with these Philips controls:

**ActiLume DALI Lighting Control System**
- Automated daylight harvesting and occupancy sensing
- True “plug and play” system
- Includes sensor and control

**Philips Dynalite Networked Lighting Control System**
- Automated daylight harvesting and occupancy sensing
- Flexible zone control
- Highly adaptable to changing needs
Electronic HID
Why eHID?

1. Constant lamp power

- Regardless of line voltage variations (e.g. 108-305V)
- Regardless of lamp voltage rise over life

2. Precise, prescribed starting, warm-up & operation
Industry Trends

- Further miniaturization

- Continued decreased ballast cost per socket (Lower cost platforms, Multi-lamp ballasts)

- Systems (CosmoPolis, mini MasterColor, Master Color Elite)
**e HID Ballasts**

- Lamps are continually changing, so ballasts must change with them.
- More than ever, lamp-ballast compatibility is an issue. Be VERY sure. Use ANSI codes.
e-HID

Electronic operation is gentler to the lamp.

Dimming options available, full and step (50%)

Sensors detect overheating and lamp EOL

Small size, feature packed, still a little pricey.
Luminaire Based Control

Device controls a 0-10v LED Driver or 0-10v e-HID ballast. Controller is pre-programmed with different levels of light output at different times of night.

Device controls a standard CWA ballast to dim lights to a fixed level for a fixed period of time during the night.
Wireless Telemanagement

Control of Individual Light Points
Reporting and Monitoring is Automatic
Eliminates lamp scouting and calls from annoyed people
Programmable for on/off/dim
Twists into the photocell receptacle
Web Based Telemanagement

Lighting is controlled via a manned control station.

Uses existing wiring

One photocell for consistancy.

Lamp failure notification, alarm

Burn hours reporting

Full dimming available

Recording and documentation

Sectors controlled separately based on need

Maximum energy savings
PLUS90 Warranty
Philips-Advance Plus 90 Warranty

• Exclusive Plus 90 Protection® provides freedom from concerns about warranty coverage for lighting systems

• Matches the published system warranty of any major lamp manufacturer, fluorescent or HID, and extends it for an additional 90 days

• Give the end-user the freedom to use any major lamp brand-now or in the future

• Warrants both the lamps and ballasts
QUESTIONS?