

# Setting the standards

## Philips Advance Optanium high efficiency instant start T8 ballasts with arc-reduction technology - UL Type CC

Philips Advance Optanium high-efficiency electronic ballasts are engineered to optimize lighting performance and maximize energy savings. These ballasts provide an unparalleled package of features and benefits to support the wide variety of T8 fluorescent lamps out in the market place.

Optanium ballasts for T8 lamps are part of our effort to promote environmental responsibility through energy efficient products, lighting systems, services, and expertise. They are also one of the charter products of the NEMA Premium® Ballast Program. All of this makes these ballasts part of an overall high-efficiency lighting system that may help you achieve LEED certification, meet ASHRAE standards, become Title 24 compliant, or any other local energy code you or your customers need to be in compliance. It also meets CEE high performance T8 lighting system specifications.

Optanium ballasts will help you and your customers meet a variety of application challenges including design, installation, maintenance, and evolving lamp technology. Optanium ballasts are available in a standard light output design (0.87 ballast factor) and a low-watt design (0.77 ballast factor). Also these ballasts have a cold-starting capability down to -20°F (with standard lamps) These two features combined make it ideal for just about any T8 fixture design and application. Available in a broad range of options, Optanium

ballasts enable T8 lighting systems to reach their full potential and represent the industry's most flexible and comprehensive family of high-efficiency lighting solutions.

### Arc-reduction technology

- UL-Type CC rated

### Promotes sustainability by consuming less input watts than standard efficiency electronic ballasts

- Hi-efficiency ballasts

### Enhances accuracy and ease of ordering while reducing stocking/SKU requirements

- Intellivolt technology (108-305V, 50/60Hz)

### Reduces the potential for lamp striation typically seen when using energy saving lamps

- Striation reduction circuitry

### Smallest housing in the industry

- 9.5" x 1.3" x 1.0"\*

**PHILIPS**  
**ADVANCE**

# Optanium Ballasts for 17W Linear Fluorescent T8 Lamps

Instant Start

| No. of Lamps                             | Input Volts | Catalog Number | Input Power ANSI(Watts) | Ballast Factor | Max. THD % | Line Current (Amps) | Minimum Starting Temp (°F/°C) | Dim. | Wiring Diagram |
|--|-------------|----------------|-------------------------|----------------|------------|---------------------|-------------------------------|------|----------------|
| <b>F17T8 (17W) Normal Ballast Factor</b> |             |                |                         |                |            |                     |                               |      |                |
| 1  | 120         | IOP-1P32-N     | 16                      | 0.90           | 10         | 0.14                | -20/-28                       | B    | 63             |
|  | 230         | IOP-1P32-N     | 16                      | 0.90           | 10         | 0.08                | -20/-28                       | B    | 63             |
|  | 277         | IOP-1P32-N     | 16                      | 0.90           | 10         | 0.07                | -20/-28                       | B    | 63             |
|  | 120         | IOP-2P32-N     | 19                      | 1.06           | 15         | 0.17                | -20/-28                       | B    | 64             |
|  | 230         | IOP-2P32-N     | 19                      | 1.06           | 15         | 0.10                | -20/-28                       | B    | 64             |
|  | 277         | IOP-2P32-N     | 19                      | 1.06           | 15         | 0.08                | -20/-28                       | B    | 64             |
| 2  | 120         | IOP-2P32-N     | 31                      | 0.90           | 10         | 0.26                | -20/-28                       | B    | 64             |
|  | 230         | IOP-2P32-N     | 31                      | 0.90           | 10         | 0.13                | -20/-28                       | B    | 64             |
|  | 277         | IOP-2P32-N     | 31                      | 0.90           | 10         | 0.11                | -20/-28                       | B    | 64             |
|  | 120         | IOP-3P32-N     | 35                      | 1.01           | 15         | 0.30                | -20/-28                       | B    | 65             |
|  | 230         | IOP-3P32-N     | 35                      | 1.01           | 15         | 0.17                | -20/-28                       | B    | 65             |
|  | 277         | IOP-3P32-N     | 35                      | 1.01           | 15         | 0.14                | -20/-28                       | B    | 65             |
| 3  | 120         | IOP-3P32-N     | 45                      | 0.90           | 10         | 0.38                | -20/-28                       | B    | 65             |
|  | 230         | IOP-3P32-N     | 45                      | 0.90           | 10         | 0.21                | -20/-28                       | B    | 65             |
|  | 277         | IOP-3P32-N     | 45                      | 0.90           | 10         | 0.17                | -20/-28                       | B    | 65             |
|  | 120         | IOP-4P32-N     | 49                      | 1.00           | 15         | 0.41                | -20/-28                       | B    | 66             |
|  | 230         | IOP-4P32-N     | 49                      | 1.00           | 15         | 0.22                | -20/-28                       | B    | 66             |
|  | 277         | IOP-4P32-N     | 49                      | 1.00           | 15         | 0.18                | -20/-28                       | B    | 66             |
| 4  | 120         | IOP-4P32-N     | 58                      | 0.90           | 10         | 0.49                | -20/-28                       | B    | 66             |
|  | 230         | IOP-4P32-N     | 58                      | 0.90           | 10         | 0.27                | -20/-28                       | B    | 66             |
|  | 277         | IOP-4P32-N     | 58                      | 0.90           | 10         | 0.22                | -20/-28                       | B    | 66             |
| <b>F17T8 (17W) Low Ballast Factor</b>    |             |                |                         |                |            |                     |                               |      |                |
| 1  | 120         | IOP-1P32-LW-N  | 15                      | 0.80           | 10         | 0.13                | -20/-28                       | B    | 63             |
|  | 230         | IOP-1P32-LW-N  | 15                      | 0.80           | 10         | 0.07                | -20/-28                       | B    | 63             |
|  | 277         | IOP-1P32-LW-N  | 15                      | 0.80           | 10         | 0.06                | -20/-28                       | B    | 63             |
|  | 120         | IOP-2P32-LW-N  | 18                      | 0.90           | 20         | 0.15                | -20/-28                       | B    | 64             |
|  | 230         | IOP-2P32-LW-N  | 18                      | 0.90           | 20         | 0.08                | -20/-28                       | B    | 64             |
|  | 277         | IOP-2P32-LW-N  | 18                      | 0.90           | 20         | 0.07                | -20/-28                       | B    | 64             |
| 2  | 120         | IOP-2P32-LW-N  | 27                      | 0.80           | 10         | 0.23                | -20/-28                       | B    | 64             |
|  | 230         | IOP-2P32-LW-N  | 27                      | 0.80           | 10         | 0.12                | -20/-28                       | B    | 64             |
|  | 277         | IOP-2P32-LW-N  | 27                      | 0.80           | 10         | 0.10                | -20/-28                       | B    | 64             |
|  | 120         | IOP-3P32-LW-N  | 31                      | 0.87           | 20         | 0.26                | -20/-28                       | B    | 65             |
|  | 230         | IOP-3P32-LW-N  | 31                      | 0.87           | 20         | 0.14                | -20/-28                       | B    | 65             |
|  | 277         | IOP-3P32-LW-N  | 31                      | 0.87           | 20         | 0.12                | -20/-28                       | B    | 65             |
| 3  | 120         | IOP-3P32-LW-N  | 40                      | 0.81           | 10         | 0.34                | -20/-28                       | B    | 65             |
|  | 230         | IOP-3P32-LW-N  | 40                      | 0.81           | 10         | 0.18                | -20/-28                       | B    | 65             |
|  | 277         | IOP-3P32-LW-N  | 40                      | 0.81           | 10         | 0.15                | -20/-28                       | B    | 65             |
|  | 120         | IOP-4P32-LW-N  | 43                      | 0.85           | 20         | 0.36                | -20/-28                       | B    | 66             |
|  | 230         | IOP-4P32-LW-N  | 43                      | 0.85           | 20         | 0.19                | -20/-28                       | B    | 66             |
|  | 277         | IOP-4P32-LW-N  | 43                      | 0.85           | 20         | 0.17                | -20/-28                       | B    | 66             |
| 4  | 120         | IOP-4P32-LW-N  | 53                      | 0.81           | 10         | 0.45                | -20/-28                       | B    | 66             |
|  | 230         | IOP-4P32-LW-N  | 53                      | 0.81           | 10         | 0.23                | -20/-28                       | B    | 66             |
|  | 277         | IOP-4P32-LW-N  | 53                      | 0.81           | 10         | 0.20                | -20/-28                       | B    | 66             |

# Optanium Ballasts for 25W Linear Fluorescent T8 Lamps

Instant Start

| No. of Lamps                             | Input Volts | Catalog Number | Input Power ANSI(Watts) | Ballast Factor | Max. THD % | Line Current (Amps) | Minimum Starting Temp (°F/°C) | Dim. | Wiring Diagram |
|--|-------------|----------------|-------------------------|----------------|------------|---------------------|-------------------------------|------|----------------|
| <b>F25T8 (25W) Normal Ballast Factor</b> |             |                |                         |                |            |                     |                               |      |                |
| 1  | 120         | IOP-1P32-N     | 23                      | 0.88           | 10         | 0.20                | -20/-28                       | B    | 63             |
|  | 230         | IOP-1P32-N     | 23                      | 0.88           | 10         | 0.11                | -20/-28                       | B    | 63             |
|  | 277         | IOP-1P32-N     | 23                      | 0.88           | 10         | 0.09                | -20/-28                       | B    | 63             |
|  | 120         | IOP-2P32-N     | 28                      | 1.05           | 10         | 0.23                | -20/-28                       | B    | 64             |
|  | 230         | IOP-2P32-N     | 28                      | 1.05           | 10         | 0.12                | -20/-28                       | B    | 64             |
|  | 277         | IOP-2P32-N     | 28                      | 1.05           | 10         | 0.10                | -20/-28                       | B    | 64             |
| 2  | 120         | IOP-2P32-N     | 43                      | 0.88           | 10         | 0.37                | -20/-28                       | B    | 64             |
|  | 230         | IOP-2P32-N     | 43                      | 0.88           | 10         | 0.19                | -20/-28                       | B    | 64             |
|  | 277         | IOP-2P32-N     | 43                      | 0.88           | 10         | 0.16                | -20/-28                       | B    | 64             |
|  | 120         | IOP-3P32-N     | 49                      | 1.00           | 10         | 0.42                | -20/-28                       | B    | 65             |
|  | 230         | IOP-3P32-N     | 49                      | 1.00           | 10         | 0.22                | -20/-28                       | B    | 65             |
|  | 277         | IOP-3P32-N     | 49                      | 1.00           | 10         | 0.18                | -20/-28                       | B    | 65             |
| 3  | 120         | IOP-3P32-N     | 64                      | 0.88           | 10         | 0.54                | -20/-28                       | B    | 65             |
|  | 230         | IOP-3P32-N     | 63                      | 0.88           | 10         | 0.29                | -20/-28                       | B    | 65             |
|  | 277         | IOP-3P32-N     | 63                      | 0.88           | 10         | 0.24                | -20/-28                       | B    | 65             |
|  | 120         | IOP-4P32-N     | 71                      | 0.97           | 10         | 0.59                | -20/-28                       | B    | 66             |
|  | 230         | IOP-4P32-N     | 70                      | 0.97           | 10         | 0.31                | -20/-28                       | B    | 66             |
|  | 277         | IOP-4P32-N     | 70                      | 0.97           | 10         | 0.26                | -20/-28                       | B    | 66             |
| 4  | 120         | IOP-4P32-N     | 85                      | 0.88           | 10         | 0.72                | -20/-28                       | B    | 66             |
|  | 230         | IOP-4P32-N     | 84                      | 0.88           | 10         | 0.37                | -20/-28                       | B    | 66             |
|  | 277         | IOP-4P32-N     | 83                      | 0.88           | 10         | 0.31                | -20/-28                       | B    | 66             |
| <b>F25T8 (25W) Low Ballast Factor</b>    |             |                |                         |                |            |                     |                               |      |                |
| 1  | 120         | IOP-1P32-LW-N  | 21                      | 0.78           | 10         | 0.17                | -20/-28                       | B    | 63             |
|  | 230         | IOP-1P32-LW-N  | 21                      | 0.78           | 10         | 0.09                | -20/-28                       | B    | 63             |
|  | 277         | IOP-1P32-LW-N  | 21                      | 0.78           | 10         | 0.08                | -20/-28                       | B    | 63             |
|  | 120         | IOP-1P32-LW-N  | 24                      | 0.90           | 10         | 0.20                | -20/-28                       | B    | 64             |
|  | 230         | IOP-1P32-LW-N  | 24                      | 0.90           | 10         | 0.11                | -20/-28                       | B    | 64             |
|  | 277         | IOP-1P32-LW-N  | 24                      | 0.90           | 10         | 0.09                | -20/-28                       | B    | 64             |
| 2  | 120         | IOP-2P32-LW-N  | 39                      | 0.78           | 10         | 0.32                | -20/-28                       | B    | 64             |
|  | 230         | IOP-2P32-LW-N  | 39                      | 0.78           | 10         | 0.17                | -20/-28                       | B    | 64             |
|  | 277         | IOP-2P32-LW-N  | 39                      | 0.78           | 10         | 0.14                | -20/-28                       | B    | 64             |
|  | 120         | IOP-3P32-LW-N  | 43                      | 0.86           | 10         | 0.36                | -20/-28                       | B    | 65             |
|  | 230         | IOP-3P32-LW-N  | 43                      | 0.86           | 10         | 0.19                | -20/-28                       | B    | 65             |
|  | 277         | IOP-3P32-LW-N  | 43                      | 0.86           | 10         | 0.16                | -20/-28                       | B    | 65             |
| 3  | 120         | IOP-3P32-LW-N  | 57                      | 0.79           | 10         | 0.48                | -20/-28                       | B    | 65             |
|  | 230         | IOP-3P32-LW-N  | 56                      | 0.79           | 10         | 0.25                | -20/-28                       | B    | 65             |
|  | 277         | IOP-3P32-LW-N  | 56                      | 0.79           | 10         | 0.21                | -20/-28                       | B    | 65             |
|  | 120         | IOP-4P32-LW-N  | 62                      | 0.85           | 10         | 0.52                | -20/-28                       | B    | 66             |
|  | 230         | IOP-4P32-LW-N  | 61                      | 0.85           | 10         | 0.27                | -20/-28                       | B    | 66             |
|  | 277         | IOP-4P32-LW-N  | 61                      | 0.85           | 10         | 0.22                | -20/-28                       | B    | 66             |
| 4  | 120         | IOP-4P32-LW-N  | 76                      | 0.79           | 10         | 0.64                | -20/-28                       | B    | 66             |
|  | 230         | IOP-4P32-LW-N  | 75                      | 0.79           | 10         | 0.33                | -20/-28                       | B    | 66             |
|  | 277         | IOP-4P32-LW-N  | 75                      | 0.79           | 10         | 0.27                | -20/-28                       | B    | 66             |

# Optanium Ballasts for 32W Linear Fluorescent T8 Lamps

Instant Start

| No. of Lamps  | Input Volts | Catalog Number | Input Power ANSI(Watts) | Ballast Factor | Max. THD % | Line Current (Amps) | Minimum Starting Temp (°F/°C) | Dim. | Wiring Diagram |
|---|-------------|----------------|-------------------------|----------------|------------|---------------------|-------------------------------|------|----------------|
| <b>F32T8, FBO32T8, F32T8/U6 (32W) Normal Ballast Factor</b> |             |                |                         |                |            |                     |                               |      |                |
| 1   | 120         | IOP-1P32-N     | 28                      | 0.87           | 10         | 0.25                | -20/-28                       | B    | 63             |
|   | 230         | IOP-1P32-N     | 28                      | 0.87           | 10         | 0.13                | -20/-28                       | B    | 63             |
|   | 277         | IOP-1P32-N     | 28                      | 0.87           | 10         | 0.11                | -20/-28                       | B    | 63             |
|   | 120         | IOP-2P32-N     | 35                      | 1.05           | 10         | 0.30                | -20/-28                       | B    | 64             |
|   | 230         | IOP-2P32-N     | 35                      | 1.05           | 10         | 0.16                | -20/-28                       | B    | 64             |
|   | 277         | IOP-2P32-N     | 35                      | 1.05           | 10         | 0.13                | -20/-28                       | B    | 64             |
| 2   | 120         | IOP-2P32-N     | 55                      | 0.87           | 10         | 0.47                | -20/-28                       | B    | 64             |
|   | 230         | IOP-2P32-N     | 54                      | 0.87           | 10         | 0.24                | -20/-28                       | B    | 64             |
|   | 277         | IOP-2P32-N     | 54                      | 0.87           | 10         | 0.20                | -20/-28                       | B    | 64             |
|   | 120         | IOP-3P32-N     | 63                      | 1.00           | 10         | 0.53                | -20/-28                       | B    | 65             |
|   | 230         | IOP-3P32-N     | 62                      | 1.00           | 10         | 0.28                | -20/-28                       | B    | 65             |
|   | 277         | IOP-3P32-N     | 62                      | 1.00           | 10         | 0.23                | -20/-28                       | B    | 65             |
| 3   | 120         | IOP-3P32-N     | 82                      | 0.87           | 10         | 0.70                | -20/-28                       | B    | 65             |
|   | 230         | IOP-3P32-N     | 81                      | 0.87           | 10         | 0.36                | -20/-28                       | B    | 65             |
|   | 277         | IOP-3P32-N     | 80                      | 0.87           | 10         | 0.30                | -20/-28                       | B    | 65             |
|   | 120         | IOP-4P32-N     | 90                      | 0.97           | 10         | 0.75                | -20/-28                       | B    | 66             |
|   | 230         | IOP-4P32-N     | 89                      | 0.97           | 10         | 0.39                | -20/-28                       | B    | 66             |
|   | 277         | IOP-4P32-N     | 88                      | 0.97           | 10         | 0.32                | -20/-28                       | B    | 66             |
| 4   | 120         | IOP-4P32-N     | 109                     | 0.87           | 10         | 0.92                | -20/-28                       | B    | 66             |
|   | 230         | IOP-4P32-N     | 107                     | 0.87           | 10         | 0.47                | -20/-28                       | B    | 66             |
|   | 277         | IOP-4P32-N     | 106                     | 0.87           | 10         | 0.39                | -20/-28                       | B    | 66             |
| <b>F32T8, FBO32T8, F32T8/U6 (32W) Low Ballast Factor</b>    |             |                |                         |                |            |                     |                               |      |                |
| 1   | 120         | IOP-1P32-LW-N  | 25                      | 0.77           | 10         | 0.22                | -20/-28                       | B    | 63             |
|   | 230         | IOP-1P32-LW-N  | 25                      | 0.77           | 10         | 0.11                | -20/-28                       | B    | 63             |
|   | 277         | IOP-1P32-LW-N  | 25                      | 0.77           | 10         | 0.10                | -20/-28                       | B    | 63             |
|   | 120         | IOP-2P32-LW-N  | 31                      | 0.90           | 10         | 0.26                | -20/-28                       | B    | 64             |
|   | 230         | IOP-2P32-LW-N  | 31                      | 0.90           | 10         | 0.14                | -20/-28                       | B    | 64             |
|   | 277         | IOP-2P32-LW-N  | 31                      | 0.90           | 10         | 0.11                | -20/-28                       | B    | 64             |
| 2   | 120         | IOP-2P32-LW-N  | 48                      | 0.77           | 10         | 0.41                | -20/-28                       | B    | 64             |
|   | 230         | IOP-2P32-LW-N  | 48                      | 0.77           | 10         | 0.20                | -20/-28                       | B    | 64             |
|   | 277         | IOP-2P32-LW-N  | 48                      | 0.77           | 10         | 0.17                | -20/-28                       | B    | 64             |
|   | 120         | IOP-3P32-LW-N  | 55                      | 0.85           | 10         | 0.46                | -20/-28                       | B    | 65             |
|   | 230         | IOP-3P32-LW-N  | 54                      | 0.85           | 10         | 0.24                | -20/-28                       | B    | 65             |
|   | 277         | IOP-3P32-LW-N  | 54                      | 0.85           | 10         | 0.20                | -20/-28                       | B    | 65             |
| 3   | 120         | IOP-3P32-LW-N  | 73                      | 0.77           | 10         | 0.62                | -20/-28                       | B    | 65             |
|   | 230         | IOP-3P32-LW-N  | 72                      | 0.77           | 10         | 0.32                | -20/-28                       | B    | 65             |
|   | 277         | IOP-3P32-LW-N  | 71                      | 0.77           | 10         | 0.27                | -20/-28                       | B    | 65             |
|   | 120         | IOP-4P32-LW-N  | 80                      | 0.84           | 10         | 0.67                | -20/-28                       | B    | 66             |
|   | 230         | IOP-4P32-LW-N  | 79                      | 0.84           | 10         | 0.35                | -20/-28                       | B    | 66             |
|   | 277         | IOP-4P32-LW-N  | 79                      | 0.84           | 10         | 0.29                | -20/-28                       | B    | 66             |
| 4   | 120         | IOP-4P32-LW-N  | 96                      | 0.77           | 10         | 0.81                | -20/-28                       | B    | 66             |
|   | 230         | IOP-4P32-LW-N  | 95                      | 0.77           | 10         | 0.43                | -20/-28                       | B    | 66             |
|   | 277         | IOP-4P32-LW-N  | 94                      | 0.77           | 10         | 0.35                | -20/-28                       | B    | 66             |

# Optanium Ballasts for 25W Energy Savings Linear Fluorescent T8 Lamps

Instant Start

| No. of Lamps  | Input Volts | Catalog Number | Input Power ANSI(Watts) | Ballast Factor | Max. THD % | Line Current (Amps) | Minimum Starting Temp (°F/°C) | Dim. | Wiring Diagram |
|---|-------------|----------------|-------------------------|----------------|------------|---------------------|-------------------------------|------|----------------|
| <b>F32T8/ES (25W Philips Lamps) Normal Ballast Factor</b> |             |                |                         |                |            |                     |                               |      |                |
| 1   | 120         | IOP-1P32-N     | 23                      | 0.87           | 10         | 0.20                | 60/15                         | B    | 63             |
|   | 230         | IOP-1P32-N     | 23                      | 0.87           | 10         | 0.11                | 60/15                         | B    | 63             |
|   | 277         | IOP-1P32-N     | 23                      | 0.87           | 10         | 0.09                | 60/15                         | B    | 63             |
|   | 120         | IOP-2P32-N     | 27                      | 1.05           | 10         | 0.23                | 60/15                         | B    | 64             |
|   | 230         | IOP-2P32-N     | 27                      | 1.05           | 10         | 0.12                | 60/15                         | B    | 64             |
|   | 277         | IOP-2P32-N     | 27                      | 1.05           | 10         | 0.10                | 60/15                         | B    | 64             |
| 2   | 120         | IOP-2P32-N     | 44                      | 0.87           | 10         | 0.37                | 60/15                         | B    | 64             |
|   | 230         | IOP-2P32-N     | 43                      | 0.87           | 10         | 0.19                | 60/15                         | B    | 64             |
|   | 277         | IOP-2P32-N     | 43                      | 0.87           | 10         | 0.16                | 60/15                         | B    | 64             |
|   | 120         | IOP-3P32-N     | 49                      | 1.00           | 10         | 0.42                | 60/15                         | B    | 65             |
|   | 230         | IOP-3P32-N     | 49                      | 1.00           | 10         | 0.22                | 60/15                         | B    | 65             |
|   | 277         | IOP-3P32-N     | 49                      | 1.00           | 10         | 0.18                | 60/15                         | B    | 65             |
| 3   | 120         | IOP-3P32-N     | 65                      | 0.87           | 10         | 0.55                | 60/15                         | B    | 65             |
|   | 230         | IOP-3P32-N     | 64                      | 0.87           | 10         | 0.29                | 60/15                         | B    | 65             |
|   | 277         | IOP-3P32-N     | 64                      | 0.87           | 10         | 0.24                | 60/15                         | B    | 65             |
|   | 120         | IOP-4P32-N     | 70                      | 0.97           | 10         | 0.59                | 60/15                         | B    | 66             |
|   | 230         | IOP-4P32-N     | 69                      | 0.97           | 10         | 0.31                | 60/15                         | B    | 66             |
|   | 277         | IOP-4P32-N     | 69                      | 0.97           | 10         | 0.26                | 60/15                         | B    | 66             |
| 4   | 120         | IOP-4P32-N     | 87                      | 0.87           | 10         | 0.73                | 60/15                         | B    | 66             |
|   | 230         | IOP-4P32-N     | 85                      | 0.87           | 10         | 0.37                | 60/15                         | B    | 66             |
|   | 277         | IOP-4P32-N     | 85                      | 0.87           | 10         | 0.31                | 60/15                         | B    | 66             |
| <b>F32T8/ES (25W Philips Lamps) Low Ballast Factor</b>    |             |                |                         |                |            |                     |                               |      |                |
| 1   | 120         | IOP-1P32-LW-N  | 21                      | 0.77           | 10         | 0.17                | 60/15                         | B    | 63             |
|   | 230         | IOP-1P32-LW-N  | 21                      | 0.77           | 10         | 0.09                | 60/15                         | B    | 63             |
|   | 277         | IOP-1P32-LW-N  | 21                      | 0.77           | 10         | 0.07                | 60/15                         | B    | 63             |
|   | 120         | IOP-2P32-LW-N  | 24                      | 0.90           | 10         | 0.20                | 60/15                         | B    | 64             |
|   | 230         | IOP-2P32-LW-N  | 24                      | 0.90           | 10         | 0.11                | 60/15                         | B    | 64             |
|   | 277         | IOP-2P32-LW-N  | 24                      | 0.90           | 10         | 0.09                | 60/15                         | B    | 64             |
| 2   | 120         | IOP-2P32-LW-N  | 38                      | 0.77           | 10         | 0.32                | 60/15                         | B    | 64             |
|   | 230         | IOP-2P32-LW-N  | 38                      | 0.77           | 10         | 0.17                | 60/15                         | B    | 64             |
|   | 277         | IOP-2P32-LW-N  | 38                      | 0.77           | 10         | 0.14                | 60/15                         | B    | 64             |
|   | 120         | IOP-3P32-LW-N  | 43                      | 0.86           | 10         | 0.36                | 60/15                         | B    | 65             |
|   | 230         | IOP-3P32-LW-N  | 43                      | 0.86           | 10         | 0.19                | 60/15                         | B    | 65             |
|   | 277         | IOP-3P32-LW-N  | 43                      | 0.86           | 10         | 0.16                | 60/15                         | B    | 65             |
| 3   | 120         | IOP-3P32-LW-N  | 58                      | 0.77           | 10         | 0.49                | 60/15                         | B    | 65             |
|   | 230         | IOP-3P32-LW-N  | 57                      | 0.77           | 10         | 0.25                | 60/15                         | B    | 65             |
|   | 277         | IOP-3P32-LW-N  | 57                      | 0.77           | 10         | 0.21                | 60/15                         | B    | 65             |
|   | 120         | IOP-4P32-LW-N  | 62                      | 0.85           | 10         | 0.52                | 60/15                         | B    | 66             |
|   | 230         | IOP-4P32-LW-N  | 61                      | 0.85           | 10         | 0.27                | 60/15                         | B    | 66             |
|   | 277         | IOP-4P32-LW-N  | 61                      | 0.85           | 10         | 0.22                | 60/15                         | B    | 66             |
| 4   | 120         | IOP-4P32-LW-N  | 77                      | 0.77           | 10         | 0.65                | 60/15                         | B    | 66             |
|   | 230         | IOP-4P32-LW-N  | 75                      | 0.77           | 10         | 0.33                | 60/15                         | B    | 66             |
|   | 277         | IOP-4P32-LW-N  | 75                      | 0.77           | 10         | 0.28                | 60/15                         | B    | 66             |

| No. of Lamps                                | Input Volts | Catalog Number | Input Power ANSI(Watts) | Ballast Factor | Max. THD % | Line Current (Amps) | Minimum Starting Temp (°F/°C) | Dim. | Wiring Diagram |
|---|-------------|----------------|-------------------------|----------------|------------|---------------------|-------------------------------|------|----------------|
| <b>F32T8/ES (28W) Normal Ballast Factor</b> |             |                |                         |                |            |                     |                               |      |                |
| 1   | 120         | IOP-1P32-N     | 25                      | 0.87           | 10         | 0.22                | 60/15                         | B    | 63             |
|   | 230         | IOP-1P32-N     | 25                      | 0.87           | 10         | 0.11                | 60/15                         | B    | 63             |
|   | 277         | IOP-1P32-N     | 25                      | 0.87           | 10         | 0.10                | 60/15                         | B    | 63             |
|   | 120         | IOP-2P32-N     | 31                      | 1.05           | 10         | 0.26                | 60/15                         | B    | 64             |
|   | 230         | IOP-2P32-N     | 31                      | 1.05           | 10         | 0.14                | 60/15                         | B    | 64             |
|   | 277         | IOP-2P32-N     | 31                      | 1.05           | 10         | 0.11                | 60/15                         | B    | 64             |
| 2   | 120         | IOP-2P32-N     | 48                      | 0.87           | 10         | 0.41                | 60/15                         | B    | 64             |
|   | 230         | IOP-2P32-N     | 47                      | 0.87           | 10         | 0.21                | 60/15                         | B    | 64             |
|   | 277         | IOP-2P32-N     | 47                      | 0.87           | 10         | 0.18                | 60/15                         | B    | 64             |
|   | 120         | IOP-3P32-N     | 55                      | 1.00           | 10         | 0.46                | 60/15                         | B    | 65             |
|   | 230         | IOP-3P32-N     | 54                      | 1.00           | 10         | 0.25                | 60/15                         | B    | 65             |
|   | 277         | IOP-3P32-N     | 54                      | 1.00           | 10         | 0.20                | 60/15                         | B    | 65             |
| 3   | 120         | IOP-3P32-N     | 72                      | 0.87           | 10         | 0.61                | 60/15                         | B    | 65             |
|   | 230         | IOP-3P32-N     | 71                      | 0.87           | 10         | 0.31                | 60/15                         | B    | 65             |
|   | 277         | IOP-3P32-N     | 71                      | 0.87           | 10         | 0.26                | 60/15                         | B    | 65             |
|   | 120         | IOP-4P32-N     | 79                      | 0.97           | 10         | 0.66                | 60/15                         | B    | 66             |
|   | 230         | IOP-4P32-N     | 78                      | 0.97           | 10         | 0.34                | 60/15                         | B    | 66             |
|   | 277         | IOP-4P32-N     | 78                      | 0.97           | 10         | 0.28                | 60/15                         | B    | 66             |
| 4   | 120         | IOP-4P32-N     | 96                      | 0.87           | 10         | 0.81                | 60/15                         | B    | 66             |
|   | 230         | IOP-4P32-N     | 94                      | 0.87           | 10         | 0.41                | 60/15                         | B    | 66             |
|   | 277         | IOP-4P32-N     | 94                      | 0.87           | 10         | 0.35                | 60/15                         | B    | 66             |
| <b>F32T8/ES (28W) Low Ballast Factor</b>    |             |                |                         |                |            |                     |                               |      |                |
| 1   | 120         | IOP-1P32-LW-N  | 22                      | 0.77           | 10         | 0.19                | 60/15                         | B    | 63             |
|   | 230         | IOP-1P32-LW-N  | 22                      | 0.77           | 10         | 0.10                | 60/15                         | B    | 63             |
|   | 277         | IOP-1P32-LW-N  | 22                      | 0.77           | 10         | 0.08                | 60/15                         | B    | 63             |
|   | 120         | IOP-2P32-LW-N  | 26                      | 0.90           | 10         | 0.22                | 60/15                         | B    | 64             |
|   | 230         | IOP-2P32-LW-N  | 26                      | 0.90           | 10         | 0.12                | 60/15                         | B    | 64             |
|   | 277         | IOP-2P32-LW-N  | 26                      | 0.90           | 10         | 0.10                | 60/15                         | B    | 64             |
| 2   | 120         | IOP-2P32-LW-N  | 42                      | 0.77           | 10         | 0.35                | 60/15                         | B    | 64             |
|   | 230         | IOP-2P32-LW-N  | 42                      | 0.77           | 10         | 0.19                | 60/15                         | B    | 64             |
|   | 277         | IOP-2P32-LW-N  | 42                      | 0.77           | 10         | 0.15                | 60/15                         | B    | 64             |
|   | 120         | IOP-3P32-LW-N  | 47                      | 0.86           | 10         | 0.40                | 60/15                         | B    | 65             |
|   | 230         | IOP-3P32-LW-N  | 47                      | 0.86           | 10         | 0.21                | 60/15                         | B    | 65             |
|   | 277         | IOP-3P32-LW-N  | 47                      | 0.86           | 10         | 0.18                | 60/15                         | B    | 65             |
| 3   | 120         | IOP-3P32-LW-N  | 64                      | 0.77           | 10         | 0.54                | 60/15                         | B    | 65             |
|   | 230         | IOP-3P32-LW-N  | 63                      | 0.77           | 10         | 0.28                | 60/15                         | B    | 65             |
|   | 277         | IOP-3P32-LW-N  | 63                      | 0.77           | 10         | 0.23                | 60/15                         | B    | 65             |
|   | 120         | IOP-4P32-LW-N  | 69                      | 0.85           | 10         | 0.58                | 60/15                         | B    | 66             |
|   | 230         | IOP-4P32-LW-N  | 68                      | 0.85           | 10         | 0.30                | 60/15                         | B    | 66             |
|   | 277         | IOP-4P32-LW-N  | 68                      | 0.85           | 10         | 0.25                | 60/15                         | B    | 66             |
| 4   | 120         | IOP-4P32-LW-N  | 84                      | 0.77           | 10         | 0.71                | 60/15                         | B    | 66             |
|   | 230         | IOP-4P32-LW-N  | 82                      | 0.77           | 10         | 0.36                | 60/15                         | B    | 66             |
|   | 277         | IOP-4P32-LW-N  | 82                      | 0.77           | 10         | 0.30                | 60/15                         | B    | 66             |

# Optanium Ballasts for 30W Energy Savings Linear Fluorescent T8 Lamps

Instant Start

| No. of Lamps                                | Input Volts | Catalog Number | Input Power ANSI(Watts) | Ballast Factor | Max. THD % | Line Current (Amps) | Minimum Starting Temp (°F/°C) | Dim. | Wiring Diagram |
|---|-------------|----------------|-------------------------|----------------|------------|---------------------|-------------------------------|------|----------------|
| <b>F32T8/ES (30W) Normal Ballast Factor</b> |             |                |                         |                |            |                     |                               |      |                |
| 1   | 120         | IOP-1P32-N     | 27                      | 0.87           | 10         | 0.23                | 60/15                         | B    | 63             |
|   | 230         | IOP-1P32-N     | 27                      | 0.87           | 10         | 0.12                | 60/15                         | B    | 63             |
|   | 277         | IOP-1P32-N     | 27                      | 0.87           | 10         | 0.10                | 60/15                         | B    | 63             |
|   | 120         | IOP-2P32-N     | 33                      | 1.05           | 10         | 0.28                | 60/15                         | B    | 64             |
|   | 230         | IOP-2P32-N     | 33                      | 1.05           | 10         | 0.15                | 60/15                         | B    | 64             |
|   | 277         | IOP-2P32-N     | 33                      | 1.05           | 10         | 0.12                | 60/15                         | B    | 64             |
| 2   | 120         | IOP-2P32-N     | 52                      | 0.87           | 10         | 0.44                | 60/15                         | B    | 65             |
|   | 230         | IOP-2P32-N     | 51                      | 0.87           | 10         | 0.23                | 60/15                         | B    | 65             |
|   | 277         | IOP-2P32-N     | 51                      | 0.87           | 10         | 0.19                | 60/15                         | B    | 65             |
|   | 120         | IOP-3P32-N     | 59                      | 1.00           | 10         | 0.50                | 60/15                         | B    | 64             |
|   | 230         | IOP-3P32-N     | 58                      | 1.00           | 10         | 0.25                | 60/15                         | B    | 64             |
|   | 277         | IOP-3P32-N     | 58                      | 1.00           | 10         | 0.21                | 60/15                         | B    | 64             |
| 3   | 120         | IOP-3P32-N     | 77                      | 0.87           | 10         | 0.65                | 60/15                         | B    | 65             |
|   | 230         | IOP-3P32-N     | 76                      | 0.87           | 10         | 0.34                | 60/15                         | B    | 65             |
|   | 277         | IOP-3P32-N     | 76                      | 0.87           | 10         | 0.28                | 60/15                         | B    | 65             |
|   | 120         | IOP-4P32-N     | 84                      | 0.97           | 10         | 0.70                | 60/15                         | B    | 66             |
|   | 230         | IOP-4P32-N     | 83                      | 0.97           | 10         | 0.36                | 60/15                         | B    | 66             |
|   | 277         | IOP-4P32-N     | 82                      | 0.97           | 10         | 0.30                | 60/15                         | B    | 66             |
| 4   | 120         | IOP-4P32-N     | 102                     | 0.87           | 10         | 0.86                | 60/15                         | B    | 66             |
|   | 230         | IOP-4P32-N     | 101                     | 0.87           | 10         | 0.45                | 60/15                         | B    | 66             |
|   | 277         | IOP-4P32-N     | 100                     | 0.87           | 10         | 0.37                | 60/15                         | B    | 66             |
| <b>F32T8/ES (30W) Low Ballast Factor</b>    |             |                |                         |                |            |                     |                               |      |                |
| 1   | 120         | IOP-1P32-LW-N  | 24                      | 0.77           | 10         | 0.20                | 60/15                         | B    | 63             |
|   | 230         | IOP-1P32-LW-N  | 24                      | 0.77           | 10         | 0.11                | 60/15                         | B    | 63             |
|   | 277         | IOP-1P32-LW-N  | 24                      | 0.77           | 10         | 0.09                | 60/15                         | B    | 63             |
|   | 120         | IOP-2P32-LW-N  | 28                      | 0.90           | 10         | 0.24                | 60/15                         | B    | 64             |
|   | 230         | IOP-2P32-LW-N  | 28                      | 0.90           | 10         | 0.12                | 60/15                         | B    | 64             |
|   | 277         | IOP-2P32-LW-N  | 28                      | 0.90           | 10         | 0.10                | 60/15                         | B    | 64             |
| 2   | 120         | IOP-2P32-LW-N  | 45                      | 0.77           | 10         | 0.38                | 60/15                         | B    | 65             |
|   | 230         | IOP-2P32-LW-N  | 45                      | 0.77           | 10         | 0.20                | 60/15                         | B    | 65             |
|   | 277         | IOP-2P32-LW-N  | 45                      | 0.77           | 10         | 0.17                | 60/15                         | B    | 65             |
|   | 120         | IOP-3P32-LW-N  | 51                      | 0.85           | 10         | 0.43                | 60/15                         | B    | 64             |
|   | 230         | IOP-3P32-LW-N  | 51                      | 0.85           | 10         | 0.23                | 60/15                         | B    | 64             |
|   | 277         | IOP-3P32-LW-N  | 51                      | 0.85           | 10         | 0.19                | 60/15                         | B    | 64             |
| 3   | 120         | IOP-3P32-LW-N  | 68                      | 0.77           | 10         | 0.57                | 60/15                         | B    | 65             |
|   | 230         | IOP-3P32-LW-N  | 67                      | 0.77           | 10         | 0.30                | 60/15                         | B    | 65             |
|   | 277         | IOP-3P32-LW-N  | 67                      | 0.77           | 10         | 0.25                | 60/15                         | B    | 65             |
|   | 120         | IOP-4P32-LW-N  | 75                      | 0.84           | 10         | 0.63                | 60/15                         | B    | 66             |
|   | 230         | IOP-4P32-LW-N  | 74                      | 0.84           | 10         | 0.32                | 60/15                         | B    | 66             |
|   | 277         | IOP-4P32-LW-N  | 74                      | 0.84           | 10         | 0.27                | 60/15                         | B    | 66             |
| 4   | 120         | IOP-4P32-LW-N  | 90                      | 0.77           | 10         | 0.76                | 60/15                         | B    | 66             |
|   | 230         | IOP-4P32-LW-N  | 88                      | 0.77           | 10         | 0.40                | 60/15                         | B    | 66             |
|   | 277         | IOP-4P32-LW-N  | 88                      | 0.77           | 10         | 0.33                | 60/15                         | B    | 66             |



# Optanium Ballasts for 40W Linear Fluorescent T8 Lamps

Instant Start

| No. of Lamps                       | Input Volts | Catalog Number | Input Power ANSI(Watts) | Ballast Factor | Max. THD % | Line Current (Amps) | Minimum Starting Temp (°F/°C) | Dim. | Wiring Diagram |
|------------------------------------|-------------|----------------|-------------------------|----------------|------------|---------------------|-------------------------------|------|----------------|
| <b>F40T8 Normal Ballast Factor</b> |             |                |                         |                |            |                     |                               |      |                |
| 1                                  | 120         | IOP-2P32-N     | 41                      | 1.01           | 10         | 0.35                | 32/0                          | B    | 64             |
|                                    | 230         | IOP-2P32-N     | 41                      | 1.01           | 10         | 0.18                | 32/0                          | B    | 64             |
|                                    | 277         | IOP-2P32-N     | 41                      | 1.01           | 10         | 0.15                | 32/0                          | B    | 64             |
| 2                                  | 120         | IOP-3P32-N     | 74                      | 0.97           | 10         | 0.64                | 32/0                          | B    | 65             |
|                                    | 230         | IOP-3P32-N     | 73                      | 0.97           | 10         | 0.33                | 32/0                          | B    | 65             |
|                                    | 277         | IOP-3P32-N     | 72                      | 0.97           | 10         | 0.27                | 32/0                          | B    | 65             |
| 3                                  | 120         | IOP-4P32-N     | 110                     | 0.93           | 10         | 0.92                | 32/0                          | B    | 66             |
|                                    | 230         | IOP-4P32-N     | 108                     | 0.93           | 10         | 0.46                | 32/0                          | B    | 66             |
|                                    | 277         | IOP-4P32-N     | 107                     | 0.93           | 10         | 0.38                | 32/0                          | B    | 66             |
| <b>F40T8 Low Ballast Factor</b>    |             |                |                         |                |            |                     |                               |      |                |
| 1                                  | 120         | IOP-2P32-LW-N  | 35                      | 0.87           | 10         | 0.29                | 32/0                          | B    | 64             |
|                                    | 230         | IOP-2P32-LW-N  | 35                      | 0.87           | 10         | 0.16                | 32/0                          | B    | 64             |
|                                    | 277         | IOP-2P32-LW-N  | 35                      | 0.87           | 10         | 0.13                | 32/0                          | B    | 64             |
| 2                                  | 120         | IOP-3P32-LW-N  | 67                      | 0.85           | 10         | 0.58                | 32/0                          | B    | 65             |
|                                    | 230         | IOP-3P32-LW-N  | 66                      | 0.85           | 10         | 0.30                | 32/0                          | B    | 65             |
|                                    | 277         | IOP-3P32-LW-N  | 66                      | 0.85           | 10         | 0.25                | 32/0                          | B    | 65             |
| 3                                  | 120         | IOP-4P32-LW-N  | 98                      | 0.84           | 10         | 0.82                | 32/0                          | B    | 66             |
|                                    | 230         | IOP-4P32-LW-N  | 96                      | 0.84           | 10         | 0.43                | 32/0                          | B    | 66             |
|                                    | 277         | IOP-4P32-LW-N  | 96                      | 0.84           | 10         | 0.35                | 32/0                          | B    | 66             |



\* Based on published data as of November 2012

1. As a licensee in the NEMA Premium Ballast Program, Philips Lighting Electronics North America has determined that these product meet the NEMA Premium specification for premium energy efficiency
2. Restrictions on Hazardous Substances (RoHS) is a European directive (2002/95/ EC) designed to limit the content of 6 substances [lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB), and polybrominated diphenyl ethers (PBDE)] in electrical and electronic products. For products used in North America compliance to RoHS is voluntary and self-certified.



## Dimensions

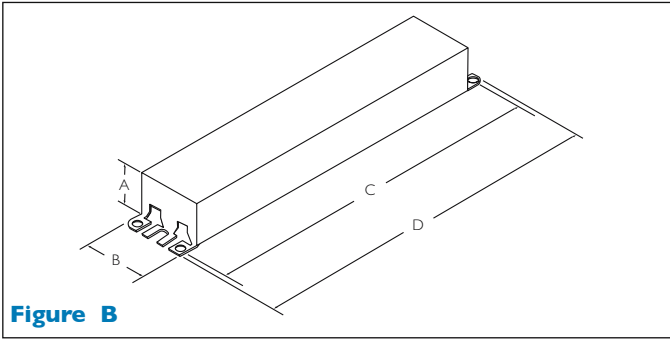
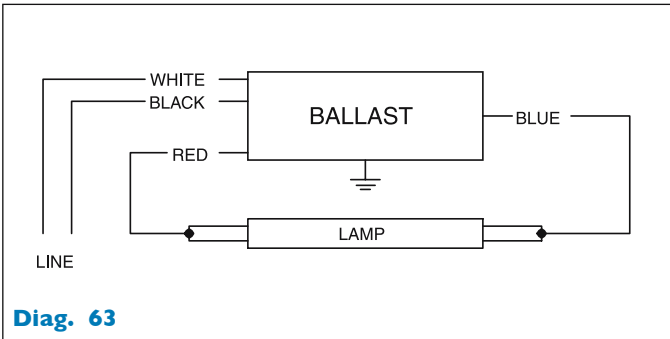


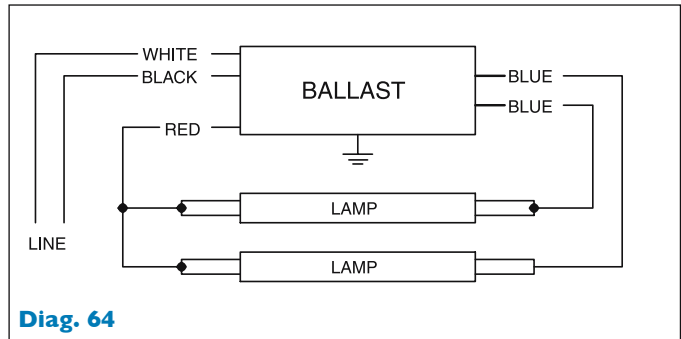
Figure B

| Figure | A    | B     | C     | D     |
|--------|------|-------|-------|-------|
| B      | 1.0" | 1.30" | 8.90" | 9.50" |

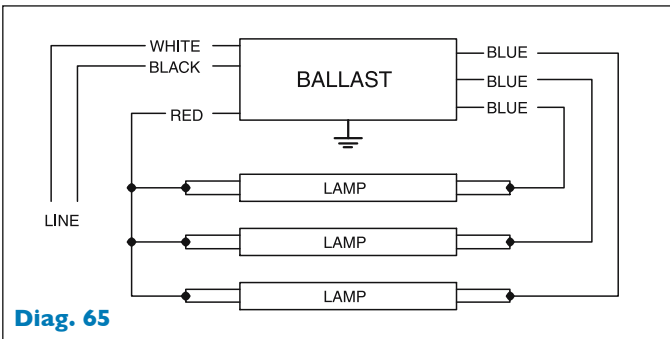
## Wiring Diagrams



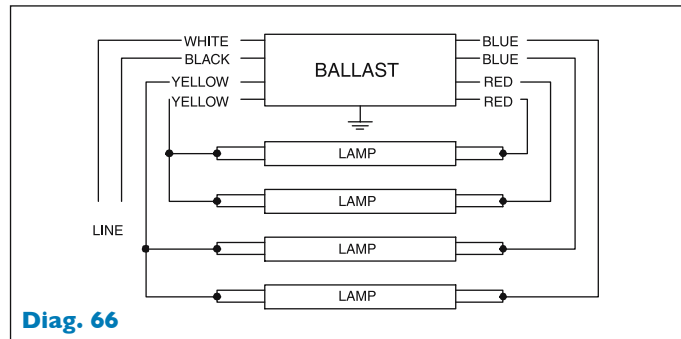
Diag. 63



Diag. 64



Diag. 65



Diag. 66

## Ballast Specification

### Section I - Physical Characteristics

- 1.1 Ballast shall be physically interchangeable with standard electromagnetic or standard electronic ballasts, where applicable.
- 1.2 Ballast shall be provided with integral leads color-coded per ANSI C82.11.

### Section II - Performance Requirements

- 2.1 Ballast shall be Instant Start.
- 2.2 Ballast shall provide Independent Lamp Operation (ILO) for Instant Start ballasts allowing remaining lamp(s) to maintain full light output when one or more lamps fail.
- 2.3 Ballast shall contain auto restart circuitry in order to restart lamps without resetting power.
- 2.4 Ballast shall operate from 50/60 Hz input source of 120V through 277V with sustained variations of +/- 10% (voltage and frequency) with no damage to the ballast.
- 2.5 Ballast shall be high frequency electronic type and operate lamps at a frequency between 42 kHz and 52kHz to avoid interference with infrared devices, eliminate visible flicker and avoid Article Surveillance Systems, such as anti-theft devices.
- 2.6 Ballast shall have a Power Factor greater than 0.98 for primary lamp.
- 2.7 Ballast shall have a minimum ballast factor for primary lamp application as follows: 0.75 for Low Watt, 0.85 for Normal Light Output, and 1.20 for High Light.
- 2.8 Ballast shall provide for a Lamp Current Crest Factor of 1.7 or less in accordance with lamp manufacturer recommendations.
- 2.9 Ballast input current shall have Total Harmonic Distortion (THD) of less than 10% when operated at normal line voltage with primary lamp.
- 2.10 Ballast shall have a Class A sound rating.
- 2.11 Ballast shall have a minimum starting temperature of -18°C (0°F) for standard T8 lamps and 16°C (60°F) energy saving T8 lamps.

- 2.12 Ballast shall tolerate sustained open circuit and short circuit output conditions without damage.
- 2.13 Ballast shall contain an anti-striation circuit to reduce striation on energy-saving T8 lamps.

### Section III - Regulatory Requirements

- 3.1 Ballast shall not contain any Polychlorinated Biphenyl (PCB).
- 3.2 Ballast shall be Underwriters Laboratories (UL) listed, Class P and Type I Outdoor; and Canadian Standards Association (CSA) certified where applicable.
- 3.3 Ballast shall comply with ANSI C62.41 Category A for Transient protection.
- 3.4 Ballast shall comply with ANSI C82.11 where applicable.
- 3.5 Ballast shall comply with the requirements of the Federal Communications Commission (FCC) rules and regulations, Title 47 CFR part 18, Non-Consumer (Class A) for EMI/RFI (conducted and radiated).

### Section IV - Other

- 4.1 Ballast shall be manufactured in a factory certified to ISO 9002 Quality System Standards.
- 4.2 Ballast shall carry a \_\_\_\_\_ warranty from date of manufacture against defects in material or workmanship for operation at a maximum case temperature of \_\_\_\_\_ (Go to our web site for up-to-date warranty information: [www.advancetransformer.com/warranty](http://www.advancetransformer.com/warranty)).
- 4.3 Manufacturer shall have a fifteen-year history of producing electronic ballasts for the North American market.
- 4.4 Ballast shall be Philips Advance part # \_\_\_\_\_ or approved equal.





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