

# High Performance T8 Fluorescent Lighting Systems

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## Background

Over the years there has been an ongoing improvement in fluorescent lighting systems. A significant step was made in the early 1990s when T8 lamps and electronic ballasts became widely available. This technology was promoted by electric utilities through rebates as a replacement for the current standard T12 and magnetic ballasts. As a result, from 1996 to 1999, sales of T8 lamps jumped from 34 percent to 61 percent of the four-foot fluorescent market.<sup>1</sup>

Continuing improvements in both fluorescent lamps and electronic ballasts have now made it possible to identify a new standard for 4-foot fluorescent systems.

## High Performance T8 Lamps

Each of the major lamp manufacturers has a number of different 4-foot T8 lamps available. Typically each has three or four product lines, with 30 or more different lamps available. The main performance features of lamps are the initial lumens, lumen maintenance, lamp life, color rendering index (CRI), and low-mercury.

Table 1, below, shows typical performance for three generic categories of 4-foot T8 fluorescent lamps. Taken all together, the array of products can be confusing, but there is a significant opportunity to improve lighting efficiency by selecting the most efficient products.

**Table 1 – F32 T8 Lamp Performance Comparison**

	<b>700 Series T8</b>	<b>800 Series T8</b>	<b>High Performance T8</b>
Initial Lumens	2800	2950	3100
Mean Lumens	2520	2800	2950
Lumen Maintenance	90%	95%	95%
Lamp Life	20,000	20,000	24,000
CRI	75	85	86
Relative Light Output	100%	111%	117%

Table 2 shows typical costs for several generic lamp types. Pricing will vary on quantities purchased, location, and source.

**Table 2 - F32 T8 Lamp Costs**

<b>T8 Lamp</b>	<b>End User Cost</b>	<b>Incremental Cost</b>
Standard, 700 series	\$1.65	---
Spec Grade	\$2.05	\$0.40
Premium	\$2.35	\$0.70
Super	\$3.35	\$1.70

Source: Oregon Energy Trust

## High Performance Electronic Ballasts

Several ballast manufacturers have recently introduced high efficiency electronic ballasts. These ballasts provide savings of around 5 percent over standard T8 electronic ballasts.

### Lamp/Ballast System Performance

$$\text{Lamp/Ballast Efficacy} = \frac{\text{Initial Lamp Lumens} \times \text{No. of Lamps} \times \text{Ballast Factor}}{\text{Ballast Input Watts}}$$

**Alternate Compliance Method:** In lieu of Lamp/Ballast Efficacy documentation, lamps and ballast may qualify separately as follows:

Lamp Type	Ballast Type	
	Instant Start	Programmed Rapid Start
1-lamp F32T8	----	BEF = 2.75
2-lamp F32T8	BEF = 1.6	BEF = 1.47
3-lamp F32T8	BEF = 1.06	BEF = 0.97
4-lamp F32T8	BEF = 0.81	BEF = 0.75
For all Lamps: Lamp Lumens $\geq$ 3100		
Ballast Efficacy Factor (BEF) = Ballast Factor * 100 / Ballast Input Watts		

### Current High Performance Lamp and Ballast Offerings

Manufacturer	Ballast Family Name
Advance	Optanium
Sylvania	Xtreme System
GE Lighting	UltraMax
Universal Lighting Technologies	Triad High Efficiency

Manufacturer	Lamp Family Name
Phillips	Advantage
Sylvania	Octron XPS
GE Lighting	Starcoat HL

