

U.S. Department of Energy Issues New Lamp Efficiency Rules

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In July 2009, the Department of Energy issued new energy efficiency standards for commercial general-service fluorescent lamps and incandescent (and halogen) reflector lamps. **The new rules take effect July 14, 2012** and will basically eliminate products with the lowest efficiency and lowest cost. In the case of fluorescent lamps, equivalent-performance products are readily available, such as T8 lamps, and the market is expected to shift to that and other technologies. In the case of incandescent reflector lamps, only a few equivalent-performance products are readily available that comply, such as infrared-coated halogen lamps, and manufacturers are expected to develop new substitutes.

First, let's look at the specifics of the general-service fluorescent lamp rules.

The government began regulating general-service fluorescent lamps with the passage of the Energy Policy Act of 1992. The new DOE rules expand on these regulations by making the energy efficiency standards more strict for each lamp type, while adding 8-ft. T8 lamps, 4-ft. T5 lamps and a broader range of wattages for 4-ft. T8 and T12 lamps.

The new lamp standards are summarized in Table 1. Products failing to achieve the new standards will be prohibited from manufacture in the United States. **The least-efficient and lowest-cost products will be eliminated from the market—including most 4-ft. linear and 2-ft. U-shaped T12 lamps, many 8-ft. T12 and T12HO and some lower-color-rendering 4-ft. T8 lamps—**resulting in fewer, higher-priced products being available.

Table 1. Summary of DOE's 2012 standards for general-service fluorescent lamps.

Lamp	Correlated color temperature	Energy conservation standard (lumens/W)
4-ft. (T8-T12) medium bi-pin >25W	<4500K	89
	>4500K and <7,000K	88
2-ft. (T8-T12) U-shaped >25W	<4500K	84
	>4500K and <7,000K	81
8-ft. (T8-T12) Slimline >52W	<4500K	97
	>4500K and <7,000K	93
8-ft. (T8-T12) HO	<4500K	92
	>4500K and <7,000K	88
4-ft. (T5) miniature bi-pin standard output >26W	<4500K	86
	>4500K and <7,000K	81
4-ft. (T5) miniature bi-pin HO >49W	<4500K	76
	>4500K and <7,000K	72

Specifically, these lamp types will no longer be manufactured:

- Most 4-ft. linear full-wattage and energy-saving T12 lamps
- All 2-ft. full-wattage and energy-saving U-shaped T12 lamps
- All 75W F96T12 and 110W F96T12HO lamps
- Most 60W F96T12/ES and 95W F96T12/ES/HO lamps
- All 4-ft. T8 basic-grade 700/SP series lamps rated at 2,800 lumens
- Some 8-ft. T8 Slimline single-pin 700/SP series and 8-ft. T8 HO RDC-base lamps

Note that non-compliant products may continue to be available for some time after the regulation's effective date, as distributors will not be prohibited from selling them and will likely continue doing so until inventories are emptied. Nonetheless, on July 14, 2012, the new baseline will be more-efficient lamps that may provide additional performance benefits such as higher color rendering and longer service life. There are many better-performing alternatives to T12 lighting, such as T8 and T5 lighting.

There are a few notable exemptions, including lamps with a CRI rating of 87 or better, lamps designed for cold-weather applications, ultraviolet lamps and some other specialty lamps. These exceptions will continue to be exempted after July 13, 2012.

Note that these rules take effect after the fluorescent magnetic T12 ballast also goes the way of the dinosaur. The Energy Policy Act of 2005 expanded earlier DOE regulations to include ballasts operating 4- and 8-ft. energy-saving as well as full-wattage T12 lamps. After June 30, 2010, manufacturers will be prohibited from making these ballasts even for replacement purposes.

Magnetic-ballasted T12 lighting had a good run, but now it's time to step aside for younger, more-efficient technology. In the future, existing buildings will eventually likely convert to T8 lamp and ballast systems, unless they relight with new fixtures, in which case they could switch to T8, T5 or other options. This may present retrofit opportunities.

Next, let's look at the specifics of the incandescent reflector lamp rules.

As with general-service fluorescent lamps, the government began regulating incandescent reflector lamps with the passage of the Energy Policy Act of 1992. These standards were subsequently expanded by the Energy Independence and Security Act of 2007 and now new DOE standards that take effect in 2012 along with the fluorescent standards. The new standards, summarized in Table 2, cover reflector lamps with medium-screw (E26) bases, 115-130V, 40-205W and >2.5 in. diameter. The result is many incandescent and halogen reflector lamps (R, PAR, BR, ER, BPAR and similar bulb shapes) will be eliminated in favor of more-efficient infrared-coated halogen lamps. Additionally, 130V products, typically used on 120V systems to approximately double lamp life at a cost of 15% less light output, will also be eliminated.

Table 2. Summary of DOE's 2012 standards incandescent reflector lamps.

Lamp watts	Lamp type	Diameter	Volts	Minimum efficacy (lumens/W), expressed as range for 40-205W
		>2.5 in. (PAR30,	>125 (130V)	18.4-31.9

	spectrum	PAR38, BR30, ER30, BR40, ER40)	<125 (120V)	16.0-27.6
		<2.5 in. (R20, PAR20)	>125 (130V)	15.4-26.7
			<125 (120V)	13.5-23.4
40-205	Modified spectrum	Standards approximately 17% less stringent as standard spectrum lamps.		

Infrared-coated halogen reflector lamps—commonly designated by the abbreviation IRC (Philips), IR (Sylvania) or HIR (GE)—heat the filament, producing visible light and infrared energy. This heat is reflected back to the filament to increase its temperature, thereby increasing light output without increasing wattage, which improves efficacy. The result is a product that costs 2-3 times more than standard halogen but offers a 20-30% increase in efficacy, according to one manufacturer.

Not all infrared-coated lamps will survive, even. According to another lamp manufacturer, generally, replacements will be infrared-coated “plus” lamps or silver reflector infrared-coated lamps. Manufacturers now have three years to figure out what their new product offering will be, and will likely publish substitution guides to help lighting practitioners understand their new options.

The new DOE rule maintains the exemptions recognized by the Energy Independence and Security Act of 2007, including 50W and lower-wattage BR30, BR40, ER30 and ER40 lamps; 45W and lower-wattage R20 lamps; and 65W BR30, BR40 and ER40 lamps. Commonly used in indoor hospitality, small business and residential applications, these exemptions are slated to expire in July 2013, per pending energy legislation.

Other options include low-voltage halogen systems, self-ballasted ceramic metal halide lamps, compact fluorescent lamps and LED lamps. For applications where 130V lamps were used, long-life lamps can be substituted. For applications requiring equivalent performance, infrared-coated lamps—which provide the benefits of easy dimming, light quality, maximum beam candlepower, instant ON, etc.—will be the new baseline.

As with the new fluorescent rules impacting available options for existing and new buildings, lighting practitioners may find it beneficial to advise their customers about the impact of the rules on lamp choices, and recommend good alternatives.