

## Dairy Energy Efficiency Program (DEEP) Lighting Specifications

### L-A. Cold Cathode Fluorescent Lamps

A cold cathode lamp must replace an incandescent lamp of at least 10 Watts. Cold cathode lamps must range from 2 Watts to 8 Watts and may be medium (Edison) or candelabra base. Cold cathode lamps must be rated for at least 18,000 average life hours.

### L-B. Compact Fluorescent Lamps (CFLs)

CFLs must replace incandescent lamps. Replacing CFLs with CFLs is not allowed. Rebates will not be paid for a customer location that has previously received a rebate for a CFL without a pre-installation inspection. Customers requesting a rebate for additional fixtures at a service location that previously participated in this measure are subject to pre-inspection. Lamps purchased at retail outlets do not qualify for a rebate if the price has been reduced through a utility buy-down program.

**Self-ballasted** (one-piece screw-in) lamps must be ENERGY STAR<sup>®</sup>-qualified. Visit [www.energystar.gov](http://www.energystar.gov) for a list of qualifying lamps.

**Modular** (two-piece lamp and ballast adapter) units  $\geq 15$  watts must have electronic ballasts and meet the minimum efficacy requirements in Table 1 and the minimum lumen output requirements in Table 2.

**Table 1: Minimum Efficacy Requirements**

Lamp Power & Configurations		Minimum Efficacy (Lumens Per Watt, Based on Initial Lumen Data)
Bare Lamp	Power < 15	45.0
	Power $\geq 15$	60.0
Covered Lamp (no reflector)	Lamp Power < 15	40.0
	Lamp Power $\geq 15$ and < 19	48.0
	Lamp Power $\geq 19$ and < 25	50.0
	Lamp Power $\geq 25$	50.0
Covered Lamp (with reflector)	Lamp Power < 20	33.0
	Lamp Power $\geq 20$	40.0

**Table 2: Minimum Lumen Output Requirements**

Wattages of A-Shaped Incandescent Bulb	CFL Minimum Lumen Output (based on 100 hour initial values)
40	Minimum of 450
60	Minimum of 800
75	Minimum of 1,100
100	Minimum of 1,600
150	Minimum of 2,600

### L-C. Compact and Linear Fluorescent Fixtures

Only complete new fixtures or modular retrofits with hardwired electronic ballasts qualify, and must replace an incandescent or mercury vapor fixture. CFLs/ ballasts must meet the minimum efficacy requirements of Table 1 above. CFL ballasts must be Programmed-start or Programmed Rapid-start with a Power Factor (PF) of  $\geq 0.90$  and Total Harmonic Index Distortion (THD) of  $\leq 20\%$ . Linear fluorescent lamps/ballasts must meet the specifications defined in Measure L-E below. Compact and Linear Fluorescent Fixtures are not eligible for rebates under Measures L-B, L-E, and L-H. Fixtures purchased at retail outlets do not qualify for a rebate if the price has been reduced through a utility buy-down program.

### L-D. Induction Lamps and Fixtures

Only complete new induction fixtures  $\geq 55$  Watts that replace existing incandescent or mercury vapor fixtures qualify. Induction lamps < 55 Watts are considered CFLs and may qualify under Measure B. Each new fixture must have a mean lamp/ballast efficacy > 50 Lumens per Watt (LPW). Indoor, outdoor area, and parking lot lighting qualify, but roadway and street lighting do not.

## DEEP Lighting Specifications—cont.

### L-E. T8 or T5 Linear Fluorescent Lamps with Electronic Ballasts

Rebate applies to existing T12 lamps and magnetic ballasts that are replaced by T8 or T5 lamps with electronic, high frequency ( $\geq 20$  kHz), Underwriters Laboratory (UL) listed ballasts that are warranted against mechanical or electrical defects for five years, and have a PF of  $\geq 0.90$ . At full light output, ballasts for 4-foot and 8-foot lamps must have THD of  $\leq 20\%$ , while ballasts for 2-foot and 3-foot lamps must have THD of  $\leq 32\%$ .

Programmed Start/Programmed Rapid-start ballasts must be used for T5 lamp installations. Replacement T5 lamps in low bay installations (under 15') must provide indirect lighting only. T8 and T5 replacement lamps must meet the Color Rendering Index (CRI) and Rated Lamp Life standards listed in Table 3 below, and the manufacturer’s specification sheet must document these characteristics for each ballast type.

When T8 lamps are being installed for general illumination purposes, Instant Start ballasts must be used. When occupancy sensors are installed to control circuits in lamp/ballast retrofits, Programmed Start/Programmed Rapid-start ballasts are recommended in order to maximize lamp life. Occupancy sensor rebates are allowed with linear fluorescent lighting retrofits, but must meet the requirements of Measure L-J. Replacement lamps and ballasts rebated in Measure L-E are not eligible for rebates under Measures L-C and L-H.

**Table 3: Lamp and Ballast Requirements**

Lamp Type & Size	Ballast Type	CRI	Minimum Rated Lamp Life (3 hrs/start)
T8 – 2-ft, 3-ft, 4-ft	Programmed Start/ Programmed Rapid-start	$\geq 80$	24,000 hours
T8 – All sizes	Instant Start	$\geq 80$	18,000 hours
T5 – All sizes	Programmed Start/ Programmed Rapid-start	$\geq 82$	20,000 hours

A de-lamping rebate may also apply. De-lamping is the permanent removal of existing T12 lamps/ballasts and unused lamp holders (tomb stones) from existing fixtures without replacing the lamps. To receive credit for de-lamping, customers must not remove more than half of the existing lamps and ballasts (along with lamp holders) from each fixture. The total number of lamps claimed for de-lamping may not be more than the number of replacement T8 or T5 lamps installed. Customers are responsible for deciding whether de-lamping will maintain adequate light levels.

### L-F. High-Intensity Discharge (HID) Fixtures, Pulse Start

Only complete new HID (metal halide or high-pressure sodium) fixtures that replace, one for one, existing incandescent or mercury vapor fixtures qualify. The HID system must have a mean lamp/ballast efficacy of 45 Lumens Per Watt (LPW) for compact sources ( $\leq 100$  Watts), and 55 LPW for standard or full-size sources ( $> 100$  Watts). Metal halide fixtures under 400 Watts can use either electronic or electromagnetic ballasts. Roadway and street lighting do not qualify.

### L-G. Ceramic Metal Halide (CMH) Fixtures

Only complete new CMH fixtures that replace, one for one, existing incandescent, halogen, or halogen infrared fixtures qualify. CMH lamps must be  $< 75$  Watts with mean lamp/ballast efficiency  $> 55$  LPW.

## DEEP Lighting Specifications—cont.

### L-H. Interior High Bay Linear Fluorescent Fixtures

Only complete new T8 or T5 fixtures with 4 or more lamps qualify. New fixtures must not exceed 244 watts each. High bay fixtures must use T8 or T5 lamps and ballasts as specified in Measure L-E. New fixtures must replace, one for one, existing incandescent **fixture ≥ 400 watts**, T12 F96 Very High Output fluorescent **fixture ≥ 400 watts**, or High Intensity Discharge (HID) **fixtures ≥ 400 watts** in interior installations over 15 feet. All fixtures must have a reflector with a minimum of 90% reflectivity. Exterior installations do not qualify. High bay fixtures are not eligible for rebates under Measures L-C and L-E, but may qualify for an occupancy sensor rebate under Measure L-J, provided all requirements are met.

### L-I. Interior Pulse Start Metal Halide Fixtures

Only Pulse-Start metal halide lamps and ballasts ≤ 350 Watts that replace existing standard metal halide lamps and ballasts ≥ 400 Watts qualify. Both retrofit kits and new fixtures qualify.

### L-J. Occupancy Sensors

This rebate applies to hardwired passive infrared and/or ultrasonic detectors that control interior lighting fixtures only. Self-contained wall-box lighting sensors are defined as units without an exterior switch pack or relay that are designed to replace a standard wall switch. Integrated sensors in high bay fixtures are permanently installed in the lighting fixture and must control all lamps in the fixture. Wattage controlled requirements are listed in the table below where applicable.

Measure	Occupancy Sensor Type	Wattage Controlled
L-J1	Wall-box	N/A
L-J2	Wall or Ceiling Mounted	< 500 watts
L-J3	Wall or Ceiling Mounted	≥ 500 watts
L-J4	Integrated Sensor in High Bay Fixture	N/A

### L-K. Photocells

Rebate applies to built-in or stand-alone photoelectric cells that switch outdoor lighting loads on at dusk and off at dawn.

### L-L. Time Clocks

Time clocks must control lighting equipment. All units must feature a minimum 3-hour battery back-up to avoid time loss during power outages. For outdoor lighting without a photocell, astronomical time clocks (where on-off time follows sunset and sunrise) are required.

### L-M. Exit Signs- Light Emitting Diode (LED)

Only new exit signs that replace incandescent exit signs qualify. Non-electrified (such as tritium) and remote exit signs are not eligible. All new exit signs must meet UL-924 requirements. Exit signs must have a usage level ≤ 5 watts and a minimum product life of 10 years or be listed as ENERGY STAR<sup>®</sup>-qualified. Manufacturer's information stating the model number and ENERGY STAR<sup>®</sup> qualification or other qualifying specification sheet must be submitted with each rebate form. New exit signs must meet local fire codes. Retrofit kits are not eligible.

### L-N. Channel Signs (LED)

This measure must replace incandescent-lighted or neon-lighted channel letter signs. Retrofit kits or complete replacement LED signs are eligible. Replacement signs cannot use more than 20% of the actual input power of the sign that is replaced. Measure the length of the sign as follows:

1. Measure the length of each individual letter at the centerline. Do not measure the distance between letters.
2. Add up the measurements of each individual letter to get the length of the entire sign being replaced.