



PLATTE RIVER
POWER AUTHORITY

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LIGHTENUP De-lamping Retrofit Kit Specifications Guide

This document is intended to help guide you in selecting the appropriate retrofit kit or new fixture for your project applications and to qualify for the bonus retrofit kit (RFK) or new fixture rebate for de-lamping T8 and T12 linear fluorescent fixtures.

We believe that deeper savings can be achieved by using a retrofit kit when de-lamping fluorescent fixtures by increasing the overall fixture efficiency by 20%. These deeper savings may be achieved by using a retrofit kit when de-lamping older T8 fluorescent fixtures (primarily four foot) and T12 fluorescent fixtures and utilizing low ballast factor, high efficiency electronic ballast, reduced wattage T8 lamps, new 90%+ reflector, new lamp sockets and socket brackets. New LED or T5 fluorescent fixtures or retrofit kits qualify for this bonus rebate too.

1. Retrofit Kit Bonus Rebate & Specifications:

We are now offering a \$0.10 per Watt reduction bonus rebate for the use of retrofit kits or new fixtures for retrofitting or replacing linear fluorescent fixtures; including two, four, and eight foot fluorescent fixtures.

Fixture type		2011 \$/Watt	New \$/Watt Rebate with RFK Bonus	Notes
4 ft linear, 1 to 4 lamp, T12 /magnetic ballast	4 lamp	\$0.35	\$0.45	Incentive is based on upgrading existing 4 foot fluorescent fixtures with new T8 (32W, 28W, etc.) lamps and high efficiency electronic ballasts, incl. de-lamping, new fixture, removing fixture, etc.
	3 lamp	\$0.40	\$0.40	
	1, 2 lamp	\$0.45	\$0.45	
8 ft linear, 1 to 4 lamp, T12 /magnetic ballast		\$0.50	\$0.60	Incentive is based on upgrading 8 foot fixtures with T8 lamps and high efficiency electronic ballast retrofits, de-lamping, new or removing fixtures, etc.
2, 4, to 8 ft linear, 1 to 4 lamp, T8 /		\$0.55	\$0.65	Incentive is based on upgrading existing

standard electronic ballast			2 to 8 ft fluorescent fixtures equipped with standard T8 system with new T8 (32W, 28W, etc.) lamps and high efficiency electronic ballasts, incl. de-lamping, new fixture, removing fixture, etc.
Retrofit kit or new fixture bonus for retrofitting/replacing two, four, eight foot linear fluorescent fixtures	\$0.00	+\$0.10	Requires 4 ft (or less) fixtures to be de-lamped with retrofit kit or new fixture. 8 ft fixtures do not have to be de-lamped, but must use four foot fluorescent lamps and new reflector to qualify for the bonus rebate.

Retrofit kits requirements for bonus rebate for different types of linear fluorescent fixtures

include: The following information also applies to new fixtures.

- a) Troffer (or recessed): Typically de-lamping 4ft fixtures to new T8 lamps and high efficiency electronic ballast. Retrofit kit for troffer (recessed) linear fluorescent fixtures must: 1) Result in a fixture efficiency of 80% or greater; includes new fixtures too. 2) New reflector (typically has a reflectivity value greater than 90% to meet fixture efficiency requirement) that matches the new number of new T8 or T5 linear fluorescent lamps; 2) New lamp holder sockets; 3) New socket bracket if needed; 4) New high efficiency electronic ballast(s). This bonus rebate may also include retrofitting U-Tube and 2' x 2' fixtures, new LED or T5 troffer replacements, etc.
- b) Strip: Typically retrofitting 4ft to 8 ft strip, or industrial, fixtures using a retrofit kit. Retrofit kit for strip fixtures must include: 1) New reflector (that has a reflectivity value equal to or greater than 90% and matches the new number of new T8 or T5 linear fluorescent lamps); 2) New lamp holder sockets and new socket bracket that repositions sockets and the new number of T8 lamps to center of the fixture channel; 3) New high efficiency electronic ballast(s). New fixture or retrofit kit bonus rebate may include new LED or T5 replacements.
- c) Wrap Around: Typically retrofitting 4ft wrap around, ceiling mounted, fixtures with two new T8 lamps. Retrofit kit for wrap around fixtures must include: 1) New lamp holder sockets and new socket brackets that repositions sockets and the new number of T8 lamps to center of the fixture; 2) New high efficiency electronic ballast(s). New fixture or retrofit kit bonus rebate may include new LED or T5 replacements.
- d) Suspended/Indirect: Typically these are new fixture types that will be installed to replace older linear fluorescent fixtures; and will qualify for new fixture bonus rebate. Retrofit kits for de-lamping these fixtures must include: 1) New lamp holder sockets and new socket brackets that repositions sockets and the new number of T8 lamps to center of the fixture/original reflector; 2) New high efficiency electronic ballast(s). New fixture or retrofit kit bonus rebate may include new LED or T5 replacements.

Table 1.1: Retrofit Kits Increase Performance

Fixture Description	Retrofit	Typ. De-lamp % Change	De-lamp with RFK % Change	Watt Reduc tion	Est. per Fixture Rebate with Bonus
4 lamp T12 & Magnetic Ballasts	2 lamp (32W) T8 & HE NBF Elec Ballast	-15%	0%	89	\$40+
4 lamp T12 & Magnetic Ballasts	2 lamp (28W) T8 & HE <u>LBF</u> Elec Ballast	-25%	-15%	102	\$46+
4 lamp T12 & Magnetic Ballasts	LED Replacement	NA	-15%	108	\$48+
3 lamp 4 ft T12 & Magnetic Ballasts	2 lamp (28W) T8 & HE LBF Elec Ballast	-10%	-5%	73	\$29+
3 lamp 4 ft T12 & Magnetic Ballasts	LED Replacement (36W)	NA	-5%	79	\$31+
2 lamp 4 ft T12 & Magnetic Ballast	1 lamp (28W) T8 & HE LBF Elec Ballast	-30%	-15%	50	\$23+
2 lamp 4 ft T12 & Magnetic Ballast	LED Replacement (22W)	NA	-15%	50	\$23+
2 lamp 8 ft T12 & Magnetic Ballast	2 lamp (32W) T8 & HE NBF Elec Ballast	-40%	-30%	71	\$43+
4 lamp T8 & Elec Ballast	2 lamp (800) T8 & HE NBF Elec Ballast	-30%	-20%	59	\$38
4 lamp T8 & Elec Ballast	2 lamp (28W) T8 & HE LBF Elec Ballast	-39%	-30%	72	\$47
4 lamp T8 & Elec Ballast	LED Replacement (36W)	NA	-30%	78	\$50
3 lamp T8 & Elec Ballast	2 lamp (800) T8 & HE NBF Elec Ballast	-20%	-5%	30	\$20
3 lamp T8 & Elec Ballast	2 lamp (28W) T8 & HE LBF Elec Ballast	-30%	-20%	43	\$28
3 lamp T8 & Elec Ballast	LED Replacement (36W)	NA	-20%	49	\$31
2 lamp T8 & Elec Ballast	1 lamp (28W) T8 & HE LBF Elec Ballast	-45%	-30%	36	\$23
2 lamp T8 & Elec Ballast	LED Replacement (22W)	NA	-30%	36	\$23

LBF = low ballast factor, NBF = Normal ballast factor, HE = High Efficiency

Note: Table 1.1 is for reference only. Actual lumen output per fixture will vary by application and by as much as 15% more or less. These values are based on estimated mean lumens and fixture efficiency per fixture type. See the LIGHTENUP Custom Lighting Application for other fixture types and estimated lumen outputs.

2. Illuminance Guide and Retrofit Worksheet:

The following are typical spaces and applications where you may be retrofitting linear fluorescent fixtures. Reference this document for estimated foot candle (FC) or light level changes for common de-lamping retrofits and place in table below to calculate estimate effects of proposed retrofit.

Space Type (A)	Current Average FC level (B)	Target IESNA Average FC Level (C)	Est. % change light levels for Retrofit (D)	Est. FC Change (E)	Est. New FC Level
<i>Example:</i> Office	50 fc	30 to 50 fc	-15%	- 7 fc	43 fc
<i>Retrofit Description for above example:</i> Existing 4 lamp T12 & Magnetic Ballasts retrofitting with new 2 lamp (28W) T8 & HE LBF Elec Ballast and new retrofit kit.					

Directions to filling out the above worksheet:

- (A) Reference Table 2.1 below for space type to enter in cell. If not listed, please reference the current IESNA Lighting Handbook for values.
- (B) Actual measured foot candle readings with illuminance (foot candle) meter placed at 0 or 2.5 ft above finished floor depending on task. Light meter is need to measure actual foot candles in space.
- (C) Reference Table 2.1 below for recommended foot candle levels for space type and enter in cell. If not listed, please reference the current IESNA Lighting Handbook for values.
- (D) Reference above *Table 1.1: Retrofit Kits Increase Performance* for percent estimated change in light level for common retrofits. Also see the LIGHTENUP Custom Lighting Application for more fixture types and estimate light output changes for your retrofit.
- (E) Actual calculated foot candle level change (value is foot candles). Calculated by multiplying cell B and cell D.
- (F) New estimated foot candle level post retrofit for space. Calculated by subtracting cell E from cell B. Compare this value to target foot candle level in cell C.

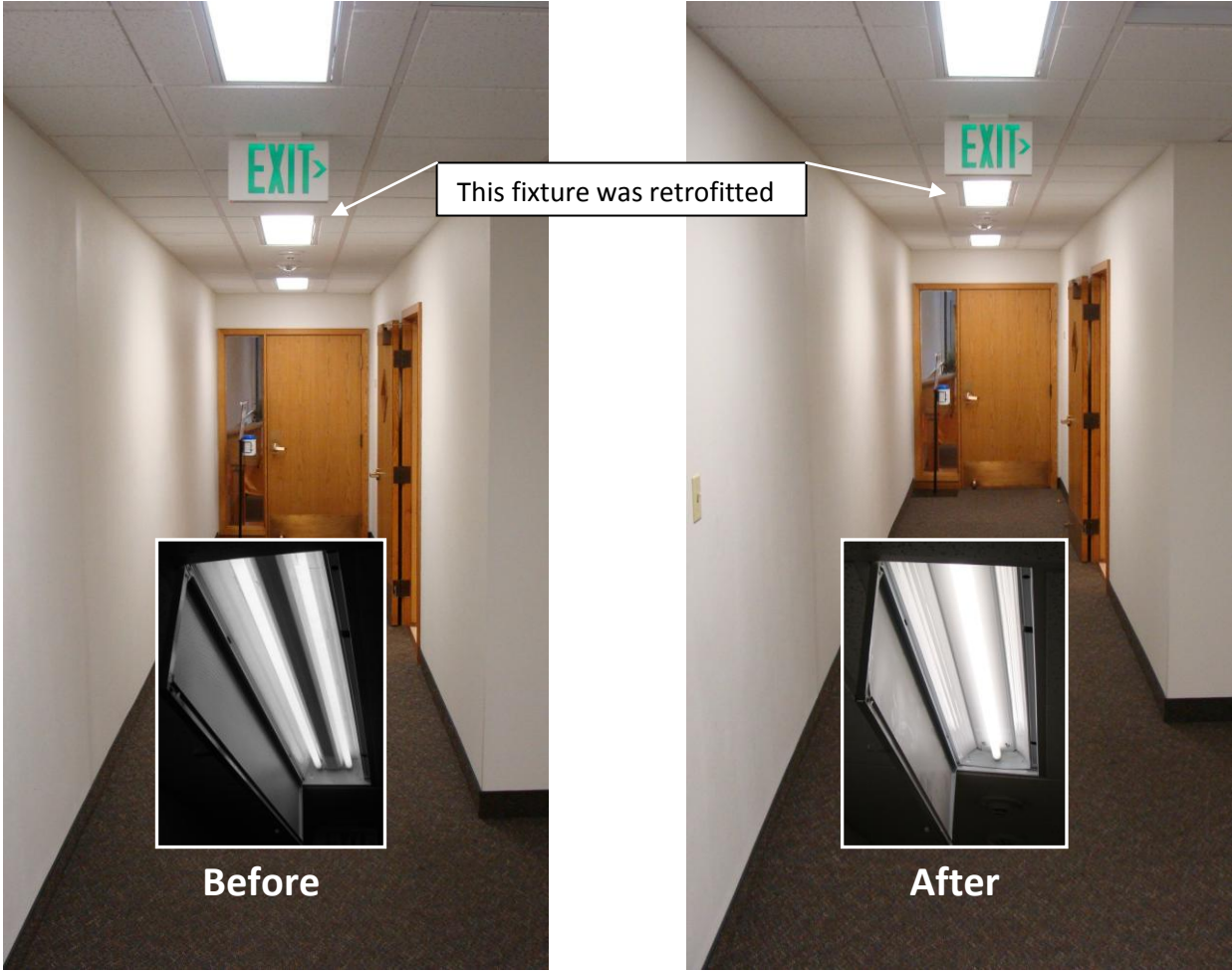
Note: Platte River does not guarantee the information is up to date or correct. This is merely a guide for quick reference of some general applications. Foot candle (fc) values listed below in are derived from

the IESNA Lighting Ready Reference Guide (RR-03), A Compendium of Materials from the IESNA Lighting Handbook, 9th Edition. Reference your detailed applications in the current version of the Illuminating Engineering Society of North America (IESNA) Lighting Handbook.

Space Type	Recommended IESNA Illuminance Level (fc)	Space Type	Recommended IESNA Illuminance Level (fc)
Auditoriums	5 to 20	Lobby	5 to 10
Auto Repair	50 to 75	Retail – Sales Counters	30
Auto Body Shop	75 to 100	Retail – Circulation	5 to 10
Auto Showroom	50 to 75	Retail – General Display	30 to 50
Banks – General	10 to 20	Manufacturing	
Banks – Teller Stations	50	Assembly and inspection Easy	30
Barbershop/Salon	50	Medium	50
Church	20 to 25	Fine	75 to 100+
Office – Open and Private Intense to some computer use	30 to 50	Material Handling	30 to 50
Conference Rooms	30	Packaging, wrapping, labeling, shipping/receive	30
Classrooms and Reading	30 to 50	Reading on computers	10 to 30
Dining Areas	10 to 20	Restrooms	5 to 20
Engineering and Drafting	50 to 75	Stairwells and Hallways	5 to 10
Gymnasiums Recreational	30	Warehouse Inactive storage	5 to 10
Elementary/club	50	Big items/Loading docks	10

High school to competitive	80 to 100	Small items	10 to 30
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Example 1.1: Platte River Test of Retrofit Kit – 2 Lamp T8 retrofitted with 1 lamp T8 and retrofit kit



Existing	Proposed	Rebate per Watt Reduction	Est. Rebate per fixture	Est SPB in years with rebate	Light level change
2 T8 (28W) lamps std NBF electronic ballast = 48W	1 T8 (28W) lamp HE LBF (.78 BF) electronic ballast = 23W	\$0.65	\$17	2 to 3	- 30% or 80 fc post

Prepared by: Adam Perry, Platte River Power Authority, October 7, 2011