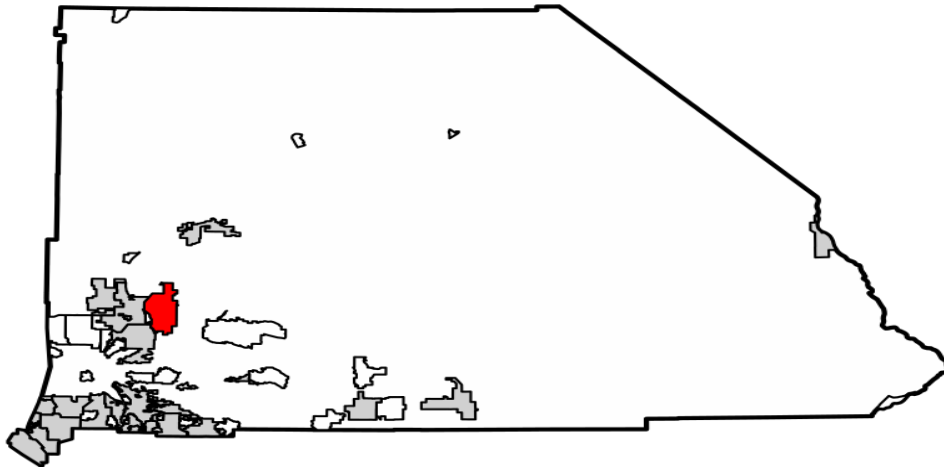


Water System Energy Efficiency Assessment Apple Valley Heights Community Water District

PWS CA3600009



Apple Valley Heights Community Water District Energy Efficiency Assessment California Rural Water Association January 2019

The Mission of the California Rural Water Association is to provide training, technical assistance, resources and information to assist water and wastewater utilities in achieving high standards of service.

Energy Efficiency Program Overview:

The California Rural Water Association has implemented a program to assist water and wastewater utility systems to evaluate and lower their energy consumption and associated costs. Your energy efficiency assessment considers current and past energy use, identifies the primary energy consuming components, and identifies methods to lower energy use and costs. The California Rural Water Association Energy Efficiency Program is made possible through a grant to the National Rural Water Association from the United States Department of Agriculture. The Energy Efficiency Program is just one of many initiatives that are currently in place to support the mission of the California Rural Water Association. Please visit our website to learn more about all the services available from your association. www.calruralwater.org





Executive Summary:

The CRWA Energy Efficiency Circuit Rider (Jim Caporusso) toured the District's facilities on January 22nd, 2019 accompanied by General Manager Dan Smith. An area for potential energy and cost savings in the arena of lighting systems has become available. Re-lamping to take advantage of LED technology may reduce annual lighting energy consumption by 30 percent. The total cost of the re-lamping project is about \$80 resulting in a very attractive return on investment of only about 9 months.

Project Overview:

Apple Valley is located in the Victor Valley of San Bernardino County. The area known as Apple Valley is east of the neighboring cities of Victorville and Hesperia, 35 miles (56 km) south of Barstow and 49 miles (79 km) north of San Bernardino through the Cajon Pass. Apple Valley was home to Roy Rogers and Dale Evans, whose museum was first established in Apple Valley (in 1967) before the museum was relocated to Victorville in 1976. Since 2003, the museum has been in Branson, Missouri.

The District provides domestic water service for a population of about 950 persons through approximately 285 active service connections. The source water for the District is groundwater produced from 2 wells. The District's interior and exterior lighting systems are older T-12 fluorescent tubes, Halogen Flood Lamps and Incandescent Bulbs. The scope of the energy efficiency assessment is limited to interior/exterior lighting at the District's facilities.



APPLE VALLEY HEIGHTS



COUNTY WATER DISTRICT
760-247-7330



OPEN

Energy Efficiency Observations/Opportunities:

The District has a history of selecting pumping equipment that is energy efficient. However, the District could very easily improve overall energy efficiency by implementing a re-lamping program to take advantage of the maturing LED lighting technology. Prices for LED lamps have come down dramatically over the past few years with more and more manufacturers entering the market. The District purchases electric power from Southern California Edison at a pricing rate of about 18 cents per kWh. It is estimated the District is currently consuming about 1100 kWh's each year for lighting alone. A simple re-lamping program will significantly reduce energy consumption associated with lighting. The District office building utilizes standard 48-inch T-12 fluorescent lamps, Halogen Flood lamps and Incandescent bulbs for the lighting of the interior & exterior of the Districts Office.

Energy Efficiency Recommendations:

A simple project to re-lamp the indoor fluorescent/incandescent fixtures and the Halogen Floods located on the exterior has the potential to save 615 kWh of energy every year with an annual cost savings of \$111.82. The initial capital investment for the project is about \$80 and could be accomplished using in-house personnel. The Return on Investment for the lighting project is only about 9 months. Please See Table 1: Apple Valley Heights Lighting Analysis for details regarding each opportunity for lighting retro-fit. Please note that any retro-fit to LED lighting has benefits beyond cost and energy savings. LED bulbs and tubes last many times longer than traditional fluorescent and incandescent lamps. Also, LED tubes contain no mercury and thereby eliminates an environmental hazard.

Attachments:

Table 1: Apple Valley Heights Lighting Analysis

Description of Suggested Items;

4 ft. LED Tubes, (PLT-11218CS)

LED Flood, (EURI IRT-10144)

LED Bulb, (PLT-11210)

Note* Attachments include related pricing Information, Cut Sheet, Ballast Compatibility Chart, Spec Sheet and Installation Guide.

Sources of Funding:

Funding for the capital expense of re-lamping to LED Technology may be available from Funding for the capital expense of re-lamping to LED Technology may be available from Southern California Edison. SCE Business Link is here: <https://home.rebatebus.com/southern-california-edison/>

Funding may also be available through the USDA Rural Utility Service (see attached Area Specialist directory)

Important Final Notes:

This report is not to be used as a final Bill-of-Materials for the bulk purchase of LED Lamps. More and more new products are coming into the market almost every day. The suggested LED Replacement tubes are known as Type B tubes. Please refer to descriptions/information listed below. It is strongly suggested the District purchase just a few lamps that are of similar characteristics to those shown in this report to further verify compatibility, light color, and intensity. Lamps have been selected that are reasonably priced, correct for the application, and of similar light quality to the lamps being replaced. Try before you buy in bulk!

Color Temperature

Measured in Kelvin (K), color temperature is a scale describing how warm (yellow) or cold (blue) the color output of a light or fixture. Warm T8 tubes are in the 3000-3500K range and recommended for reception areas, hotel lobbies, and other locations where you want an inviting atmosphere. Cooler color temperatures in the 3500-5000K range give a brighter, cleaner look for office buildings, classrooms, hospitals, and commercial kitchens.

Direct Wire vs. Plug-n-Play

The technology for T8 tubes has advanced to the point where they are available in the traditional direct wire or the newer plug-and-play options. Plug-and-play T8 lamps operate with the fixture's existing fluorescent ballast, so no rewiring is necessary. The direct wire LED tubes run off of the line voltage that flows straight to the sockets. With this option the fixture's ballast must be bypassed and removed. Direct wire LED tube lights were traditionally wired at just one end and required the use of non-shunted tombstones only. Double-ended LED tubes, these tube light bulbs are wired at both ends to utilize non-shunted or shunted lamp holders. If you're not sure which installation method is right for you, there is also a third option. Hybrid LED tubes these can use either installation method, so it can plug in directly to the fluorescent fixture and work with a compatible ballast when first installed. Then, once the life of the ballast has run out, you can bypass the ballast without needing a new lamp. Check the Ballast Compatibility PDF to help you find the correct fluorescent replacement tubes. Because fluorescent ballasts use a small amount of electricity, direct wire LED tubes offer more in energy savings over the life of the light bulb compared to ballast compatible LED tubes. LED tubes are an excellent way to retrofit fluorescent fixtures without having to replace the entire housing. Depending on the manufacturer, these lights may be called type A, type B, or type A/B.

- Type A: These are ballast compatible lamps, but not every LED tube will be compatible with all ballasts. When replacing fluorescent tubes, make sure to check the Ballast Compatibility PDF on the LED tube product page prior to purchase.
- Type B: Direct wire lamps that are not ballast compatible. These tubes require the ballast to be disconnected and removed from the fixture prior to installation. These lamps are wired directly to line voltage and often require non-shunted sockets, so you may need to change the sockets at the same time.
- Type A/B: Hybrid T8 linear tubes. Similar to type A tubes, these lamps are not compatible with all ballasts. Check the Ballast Compatibility PDF or spec sheet for a full list of fluorescent ballasts that are compatible with these LED tube lights. Alternatively, these tubes can also be used as a direct wire tube which makes these a flexible option. Check the installation instructions or confirm with a licensed electrician if you choose to bypass the ballast.

Table 1: Apple Valley Heights Lighting Analysis

Lighting Location	Existing Lamp Type	Existing Lamp Count	*Actual Watts per Luminary	Total Watts	Total KW	**Hours ON per Year	kWh per year	Cost per kWh (\$)	Annual Power Cost	Replacement Luminary	Actual Watts per Luminary	Total KW	kWh per Year	Energy Savings (kWh)	Cost per Year	Annual Savings	Unit Cost of Retrofit	***Total Cost of Retrofit	ROI (months)
Front Office	4ft - Fluorescent Tube T-12	12	40	480	0.480	2210	1061	\$ 0.1817	\$ 192.75	LED #PLT - 11218CS	18	0.216	477	583	\$ 86.74	\$ 106.01	\$ 3.25	\$ 39.00	4
Storage Room	4ft - Fluorescent Tube T-12	2	40	80	0.080	52	4	\$ 0.1817	\$ 0.76	LED #PLT-11218CS	18	0.036	2	2	\$ 0.34	\$ 0.42	\$ 3.25	\$ 6.50	188
Bath Room	Incandescent	4	60	240	0.240	130	31	\$ 0.1817	\$ 5.67	LED PLT-11210	9	0.036	5	27	\$ 0.85	\$ 4.82	\$ 0.95	\$ 3.80	9
Exterior	Halgen Flood	2	150	300	0.300	12	4	\$ 0.1817	\$ 0.65	EURI LED IRT-10144	19	0.038	0	3	\$ 0.08	\$ 0.57	\$ 15.26	\$ 30.52	641
Totals		18		1100	1.100		1,100		\$ 199.83			0.326	484	615	\$ 88.01	\$ 111.82		\$ 79.82	9
*Actual Watts per Luminary based on Industry Information for Lamp Wattage plus Watts for Ignitor or Ballast																			
** Hours ON per Year based on Operator Report																			
*** Total Cost of Retro-fit does NOT INCLUDE Labor Costs to Remove existing Luminaries and Replace with LED Luminaries																			
MC= Metal Halide																			



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T8 LED Tube - 4 ft. T8 Replacement - 4100 Kelvin

18 Watt - 1650 Lumens - Ballast Must Be Removed - 120-277V - Case of 25 - PLT LBP8F1641B



\$3.25 ea.

Sold **only** by the 25 Case for
\$81.25

Quantity



SKU: PLT-11218CS

Lighting can be confusing!
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PRODUCT DETAILS

REVIEWS

FAQ'S

Brochures & Spec Sheets

 [PLT LBP8F1641B Spec Sheet](#)

 [PLT LBP8F1641B Installation Instructions](#)

Brand:	PLT
MPN (Part No.):	LBP8F1641B
UPC:	815109028967
Dimmable:	No
DLC Listed:	No
Bulb Shape:	T8
Safety Rating:	UL Damp Location
CRI:	83
Color Temperature:	4100 Kelvin
Life Hours:	50,000
Wattage:	18 Watt
Lumens:	1650

Voltage:	120/208/240/277
Base Type:	Medium Bi-Pin
Coating:	Meets NSF/ANSI Standard 2
Fluorescent Equal:	32 Watt
Operation:	Ballast Bypass
Lens:	Frosted Glass
Lampholder(s):	Non-shunted
Length:	48 in.
Diameter:	1 in.
Warranty:	5 Years
Case Quantity:	25

Description

For retrofit installation, use these PLT LED T8 tube lights that bypass traditional fluorescent ballasts and save up to 45 percent in energy cost! Each T8 lamp runs at 17 Watts and features uniform illumination to provide maximum end-to-end light output.

- Suitable for damp locations when used indoors or outdoors in enclosed fixtures
- Non-shunted G13 bi-pin sockets are needed for installation
- Resistant to breakage; meets NSF/ANSI standard 2
- 4100K cool white light helps increase visibility
- Turns on instantly with no delay or flickering
- Replaces 32-Watt fluorescent tubes

Note: These lamps are not for use with dimmers.

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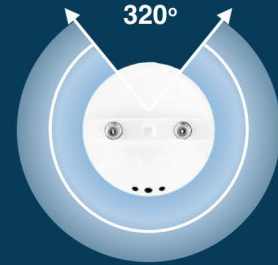
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Type-B I Ballast Bypass

Replaces 32W 4ft Fluorescent T8



Superior All-Around Light Distribution

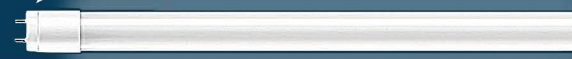


FEATURES

- Bypass the Existing Ballast - Easy Direct-Wire Installation
- Full Glass Lens with 320° Light Distribution
- Uniform Light Output From End-to-End
- Universal Input Voltage - 120-277V
- 3-Year, 50,000 Hr Warranty
- Instant-ON with No Flicker
- UL Listed



Proprietary IC-Driver design allows for high efficiency and exceptional longterm performance



ARCHIPELAGO® Light Engine produces uniform light output from end-to-end

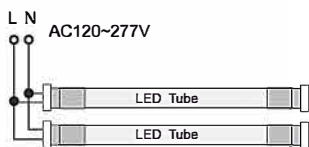


Specifications and Technical (ECO T8 I Type-B)

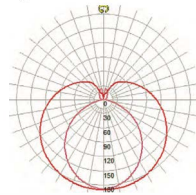
MODEL	BASE TYPE	WATTS / EQV.	LUMEN	CCT	LENGTH	VOLTAGE	CRI	PF	CARTON QTY	LIGHT DISTRIBUTION
LBP8F1641B	Bi-Pin G13	18W / 32W	1650LM	4100K	4FT	120-277V	83	>0.9	25	320°
LBP8F1750B	Bi-Pin G13	18W / 32W	1700LM	5000K	4FT	120-277V	83	>0.9	25	320°
LBP8F2241B	Bi-Pin G13	18W / 32W	2200LM	4100K	4FT	120-277V	83	>0.9	25	320°
LBP8F2350B	Bi-Pin G13	18W / 32W	2300LM	5000K	4FT	120-277V	83	>0.9	25	320°

- * Not for use where exposed to the weather or moisture
- ** Suitable for use in totally enclosed fixtures
- *** Suitable for damp locations.

Installation Configuration



Light Distribution

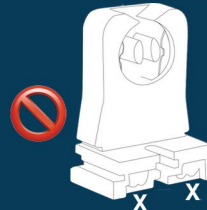


CAUTION: Single-ended input CANNOT be used with shunted lampholders

Non-Shunted:



Shunted:



WARNING – To prevent wiring damage or abrasion, do not expose wiring to edges of sheet metal or other sharp objects.

WARNING – To avoid potential fire or shock hazard, do not use this retrofit kit in luminaires employing shunted bi-pin lamp holders. Note: Shunted lamp holders are found only in fluorescent luminaires with Instant-Start ballasts.





RETROFIT LED T8 LAMP INSTALLATION GUIDE

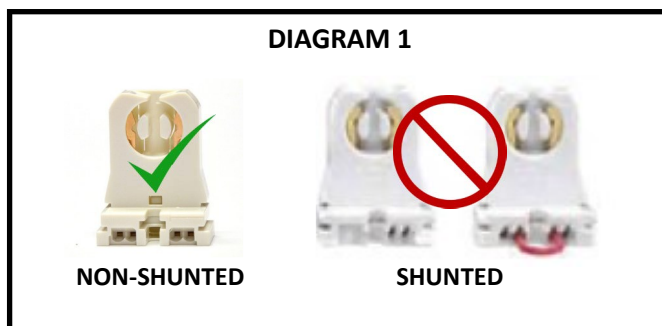
The retrofit kit includes one (1) LED tube, one (1) installation instruction, and one (1) field-applied “Modified Luminaire” label.

The T8 LED tubes are intended to retrofit a type Non-IC or type IC recessed enclosed fluorescent luminaire with straight tubular lamps.

CAUTIONS AND WARNINGS

This product must be installed in accordance with the applicable installation code by a person familiar with the construction and operation of the product and the hazards involved.

- **WARNING— RISK OF FIRE OR ELECTRIC SHOCK.** LED Retrofit Kit installation requires knowledge of luminaires electrical systems. Installation should be performed only by a qualified electrician in accordance with the National Electrical Code and relevant local code.
- **WARNING— RISK OF FIRE OR ELECTRIC SHOCK.** Install this kit only in luminaires that has the construction features and dimensions shown in the photographs and/or drawings.
- **WARNING** – To prevent wiring damage or abrasion, do not expose wiring to edges of sheet metal or other sharp objects. Do not make or alter any open holes in an enclosure of wiring or electrical components during kit installation.
- **WARNING – RISK OF FIRE OR ELECTRIC SHOCK.** This item is rated **120-277V**. The installer must determine whether line voltage 120-277V is available at the luminaire before installation.
- **DANGER—RISK OF ELECTRIC SHOCK.** Disconnect power before installation.
- **WARNING** – To avoid potential fire or shock hazard, do not use this retrofit kit in luminaires employing shunted bi-pin lampholders. Note: Shunted lampholders are found only in fluorescent luminaires with Instant-Start ballasts. Instant-start ballasts can be identified by the words “instant start” or I.S.” marked on the ballast. This designation may be in the form of a statement pertaining to the ballast itself, or may be combined with the marking for the lamps with which the ballast is intended to be used, for example F40T12/IS. For more information, contact the LED luminaire retrofit kit manufacturer.
- Suitable for use with **NON-SHUNTED** Lampholders only. See Diagram 1 below.
- Installers should not disconnect existing wires from lampholder terminals to make new connections at lampholder terminals. Instead, installers should cut existing lampholder leads away from the lampholder and make new electrical connections to the lampholder lead wires by employing applicable connectors.
- The products are suitable for use in DAMP locations.
- This lamp is non-dimmable. Not for use with Dimmers.
- Not intended for use with emergency exit fixtures or emergency exit lights.
- Complies with Part 15 of FCC. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received including interference that may cause undesired operation.



RETROFIT LED T8 LAMP INSTALLATION GUIDE

Step 1: Verify that all contents of the retrofit kit are included. Read the entire installation guide before proceeding on to the next step.

Step 2: Disconnect power to the circuit at the breaker.

Step 3: Remove lens, if applicable, remove fluorescent lamps and ballast cover.

Step 4: As shown by Diagram 2, cut all wires that connect to the ballast. Cut the wires close to the ballast to allow for longer lengths of wire connected to the lampholder. Properly discard ballast or leave it in the fixture with the wires capped off.

Step 5a: If applicable, replace lampholders at the power-end of the luminaire with non-shunted lampholders. Otherwise, Proceed to Step 6.

Step 5b: As shown by Diagram 3, connect Live/Hot (L) from the power source into the one end of the lampholder and connect the Neutral (N) from the power source into the other end of the lampholder. Proceed to Step 7.

Step 6: As shown by Diagram 4, connect Live/Hot (L) from power source to one wire of a lampholder and connect Neutral (N) from the power source to the other wire of the lampholder.

Step 7: If installing multiple lamps, repeat step 6 as shown by Diagram 5.

Step 8: The lamps are powered on one end ONLY. The end is marked by "L" and "N".

Step 9: Install lamp with the "L" and "N" inserted into the wired lampholder end, as shown by Diagram 6.

Step 10: Apply the "Modified Luminaire Label" to the fixture.

Step 11: Reconnect power to the circuit. Test lamps for proper operation.

DIAGRAM 2

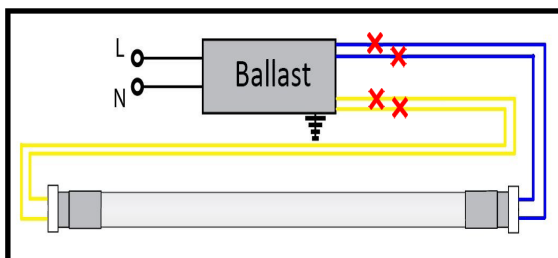


DIAGRAM 3

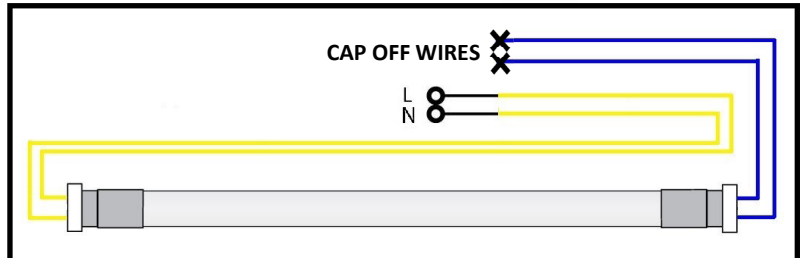


DIAGRAM 4



DIAGRAM 5

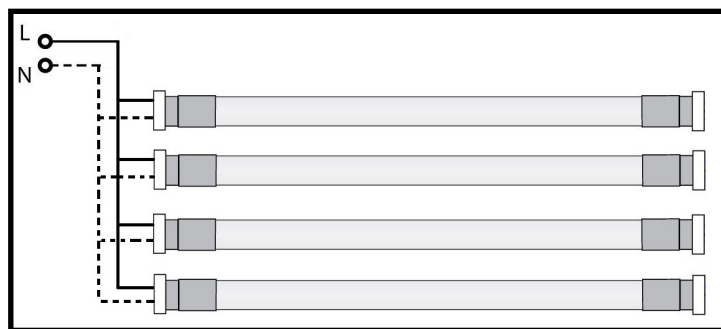
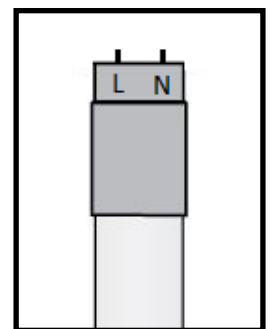


DIAGRAM 6





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LED - A19 - 9 Watt - 60W Incandescent Equal

750 Lumens - 4000 Kelvin Cool White - PLTL6C123



\$0.95 ea
Retail Price \$1.49

Quantity



SKU: PLT-11210

Lighting can be confusing!
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PRODUCT DETAILS

REVIEWS

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Brochures & Spec Sheets

 [PLTL6C123 Spec Sheet](#)

Brand:	PLT
MPN (Part No.):	PLTL6C123
UPC:	810665027881
Dimmable:	No
Energy Star:	No
Bulb Shape:	A19
Safety Rating:	UL Damp Location
CRI:	80
Color:	Cool White
Color Temperature:	4000 Kelvin
Life Hours:	10,000
Wattage:	9 Watt

Incandescent Equal:	60 Watt
Lumens per Watt:	83
Lumens:	750
Enclosed Fixture Rated:	No
Voltage:	120
Beam Angle:	240 Degree
Base Type:	Medium (E26)
Height:	4.25 in.
Diameter:	2.36 in.
Warranty:	5 Years
Case Quantity:	50

Description

Keep the lights on longer with the PLTL6C123 LED A19 light bulb and its bright, 60-Watt equivalent output. This standard bulb is applicable to sensitive light displays due to its very low heat generation.

- UL approved for damp locations, can withstand outdoor humidity when protected from the elements
- Long-life LEDs outlast outdated incandescent bulbs and save up to 85 percent in energy costs
- Cool white color temperature helps reduce eye strain
- Frosted plastic construction is shatter resistant

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A19 9W
PLT11208

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&



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80% ENERGY SAVINGS

\$151

SAVINGS
PER YEAR

- Exceptional efficacy 83 LPW in halogen white
- Comfortable diffused light
- 40% more energy savings than CFL
- Natural a-lamp shape fits all applications
- Ideal for table lamps, floor lamps, and pendant fixtures



10,000 hrs



5 Years



LM 79

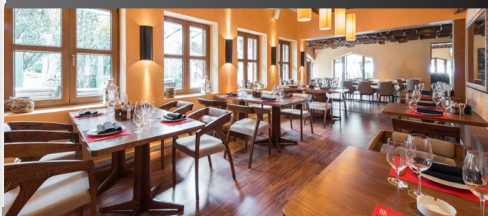
LM 80

TM 21

IES



APPLICATIONS



TYPE	BASE	POWER	VOLTAGE	COLOR	CRI	LUMENS	EFFICACY	BEAM ANGLE	DIMMABLE	POWER FACTOR	LIFE HOURS
A19	E26	9	120V	3000K	80	750	83	240	No	0.5	10,000 hrs

DIMENSIONS: 2.36" x 4.25"

Community Programs

About the Programs

USDA Rural Development's Community Programs help create and maintain strong, vibrant rural communities through investments in essential public services and infrastructure projects. Eligible applicants include public bodies, nonprofits and federally-recognized tribes, and population limits vary by program. For complete details on our Community Facilities or Water and Wastewater programs visit us online at www.rd.usda.gov/ca or contact one of our staff near you.

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