Short Form Work Paper WPSDGENRLG0084

**Revision 0**

**San Diego Gas & Electric**

**Energy Efficiency Engineering**

**LED T8 Replacement Lamps UL Type A**

**August 14, 2017**

# LED T8 Replacement Lamp UL Type A

# Short Form WP

## Introduction

This short form workpaper documents the values adopted from SCE’s workpaper entitled “LED T8 Replacement Lamp UL Type A” (SCE17LG117.0\_LED\_T8\_Lamp\_Type\_A\_Final.doc). SDG&E adopts all of the values in SCE17LG117 LED T8 Replacement Lamp UL Type A with these exceptions:

1. SDG&E will not be offering LED T8 Lamp measure through SDGE’s Multifamily Energy Efficiency Rebate (MFEER) Program.
2. SDG&E will not be offering measure through a midstream Lighting Distributor program.
3. SDGE&E for Section 1.3 removed pre/post inspection requirements for SW Direct Install program (3226) given that the third party contractor performs energy efficiency audits prior to all installations.

## Document Revision History

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| --- | --- | --- | --- |
| **Rev** | **Date** | **Author** | **Summary of Changes** |
| 0 | 08/14/2017 | Eduardo Reynoso, SDG&E | Adopted from SCE, SCE17LG117.0\_LED\_T8\_Lamp\_Type\_A\_Final.docx |
|  |  |  |  |

## Measure Summary

Table : Measure Summary Table

| **Section** | **Value** |
| --- | --- |
| **Summary & Purpose** | This work paper documents the values adopted from SCE’s workpaper entitled “LED T8 Replacement Lamp UL Type A” (SCE17LG117 Rev 0). SDG&E adopts all requirements and assumptions. This is based on workpaper details the replacement of 4-foot Linear Fluorescent T8 lamps with LED T8 Lamp UL Type A. |
| **1.1 Measure & Baseline Data** | This short form workpaper summarizes the replacement of 4-foot linear fluorescent T8 lamp with LED T8 lamp UL Type A. The LED T8 lamp must replace a 4-foot linear fluorescent lamp on a 1-for-1 basis.   |  |  | | --- | --- | | **Case** | **Description of Typical Scenario** | | Measure | LED T8 Lamp UL Type A 4 foot | | Existing Condition | Linear Fluorescent T8 Lamp 4 foot | | Code/Standard | F32T8 Linear Fluorescent Lamp | | Industry Standard Practice | N/A |  |  |  |  |  | | --- | --- | --- | --- | | Measure Code | | | Measure Name | | SDG&E | SCE | PG&E | | 463991  463992  463993 | LT-11950 |  | 4 foot LED T8 Lamp UL Type A Replacing Linear Fluorescent T8 Lamp | | 463994 | LT-11966 |  | 4 foot LED T8 Lamp UL Type A Replacing Linear Fluorescent T8 Lamp (Common Area) | | 463995 | LT-19146 |  | 4 foot LED T8 Lamp UL Type A Replacing Linear Fluorescent T8 Lamp (Dwelling Area) | |
| **1.2 Technical Description** | To qualify for financial incentives, the LED tube must be 4-foot and designated as UL Type A. The lamp must be listed under the Primary Use Category “Replacement Lamps (“plug and play”) (UL Type A)” on the DLC’s Qualified Products List (QPL) and meet additional criteria outlined below. The LED T8 Lamp specification sheet must also list all of the compatible ballast model numbers to ensure proper operation of the measure.  The products on the QPL will be filtered and must meet the specs as listed below.   |  |  |  |  | | --- | --- | --- | --- | | **Performance Metric** | **Performance Metric** | **DLC Tolerance** | **SCE Program Requirement (no tolerance)** | | Luminaire Efficacy | Luminaire Efficacy | -3% | ≥110 LPW | | CRI | CRI | -2 points | ≥80 | | CCT | CCT | N/A | ≤ 5,000K | | Power Factor | Power Factor | -3% | ≥0.9 | | Total Harmonic Distortion | Total Harmonic Distortion | +5% | ≤20% | | Lumen Maintenance | Lumen Maintenance | N/A | L70≥50,000 | | Minimum Warranty | Minimum Warranty | N/A | 5 years | |
| Code for Measures | F32T8 Linear Fluorescent Lamp |
| **1.3 Installation Type and Delivery Mechanisms** |  |
| Installation Type | * Early Retirement (ER) |
| Delivery Mechanisms | |  |  | | --- | --- | | Delivery Type | SDG&E Solution Code  (Implement ID) | | Financial Support / Direct Install | 463991 (Non-Res); 463994 & 463995 (Res) | | Financial Support / Down-Stream Incentive – Deemed | 463992 | | Financial Support / Up-Stream Incentive (Midstream)– Deemed | 463993 |   **Commercial Direct Install Program** contractors have extensive knowledge of the lighting products they use for the DI Program.  Direct Install contractors will confirm LED T8 lamps installed are compatible, per manufacturer’s specifications, with the existing ballasts.  Documentation can be provided regarding the lamp/ballast compatibility for the various components used and encountered in their Direct Install.  **Commercial Downstream Deemed Program** would require applicants to submit manufacturer’s specification sheets detailing compatible ballasts and circling the one in their location. LED T8 tubes without this information available will not be eligible for the program. Ballasts will then be checked during inspections aligned with current inspection policy.  **Midstream Program** will verify the LED T8 Lamp specification sheet by working with lighting distributors who provide incentives on qualified lighting products.  Distributors have extensive knowledge of their lighting inventory and will provide incentives on products that meet SDG&E’s requirements.  LED T8 Lamps will be pre-approved for use in the Midstream program to ensure that only LED T8 lamps with specification sheets that list the ballast model tested are eligible for incentives.  Distributors will provide the necessary documentation to SDG&E requirements to verify the product is eligible for incentives.  Distributors will also let their customers know that they carry products that list compatible ballasts and should be verified before making the purchase.  The **Multifamily Energy Efficiency Rebate (MFEER) Program** offers rebates on a wide variety of energy-saving products and services to motivate the multifamily property owners/managers to install energy efficient products in both common and dwelling areas of multifamily complexes. |
| Incentive Method Descriptions | |  |  | | --- | --- | | Incentive Method | Description | | Direct Install | The program implements energy efficiency measures for qualifying customers, at no cost to the customer. | | Down-Stream Incentive | The customer installs qualifying energy efficient equipment and submits an incentive application to the utility program. Upon application approval, the utility program pays an incentive to the customer. Such an incentive may be deemed or customized. | | Mid-Stream Incentive  Mid-Stream Buy Down | The program gives a financial incentive to a midstream market actor (distributor, vendor, or retailer) to encourage the promotion of efficient measures. Buy Down means that the incentive is required to be passed down to the end-use customer. | |
| **1.4.1 DEER Data** |  |
| DEER Measure ID | Adopting SCE Deemed workpaper “SCE17LG117 Rev 0”. |
| Net-to-Gross Ratio | All-Default<=2yrs |
| GSIA ID | Def-GSIA = 1.0 |
| Effective and Remaining Useful Life | ILtg-Lfluor-Elec; EUL=15 years; RUL = 5years |
| **Section 2. Calculation Methodology** | Adopted SCE’s workpaper, SCE17LG117 Rev 0, calculation methodology. |
| Energy Savings/Peak Demand Reduction Measure | Various per building type and climate zone to account for HOU and HVAC interactive effects (IE). Refer to SDGE’s ex-ante data file submission. c ) |
| **Section 3. Load Shapes** | SDGE:DEER::Indoor\_Non-CFL Ltg ; Annual |
| **Section 4. Costs** | Adopted SCE’s workpaper base cost and measure cost as stated in SCE17LG117 Rev0.  Base Cost   |  |  |  |  | | --- | --- | --- | --- | | **Solution Codes** | **Material** | **Labor** | **Total** | | All Solution Codes | $3.61 | $8.47 | $12.08 |     Measure Cost   |  |  |  |  |  | | --- | --- | --- | --- | --- | | **Measure Code** | **Measure Name** | **Material** | **Labor** | **Total** | | All Solution Codes | 4 foot LED T8 Lamp UL Type A Replacing Linear Fluorescent T8 Lamp | $10.00 | $8.47 | $18.47 |   IMC= (18.47) –(12.08) = $6.39  For Direct Install delivery the actual third party contracted cost shall be used. |