Electric Sign Energy Certification Service To California Energy Commission Title 24 Technical Requirements and Audit Instructions (ENVS)

Lighting

Electric Sign Energy Certification Service To California Energy Commission Title 24 Technical Requirements and Audit Instructions (ENVS)

Scope

This document provides the audit instructions, responsibilities of the manufacturer, and technical requirements for the certification of electric signs to the California Energy Commission (CEC) 2016 Building Energy Efficiency Standards Title 24, Part 6 of the California Code of Regulation. This service is to be used in conjunction with the UL48 Electric Sign Certification program (UXYT).

These requirements apply only to the sign lighting power sections of Title 24. Sign control requirements of Title 24 are not covered by this service.

This document will be revised as Tile 24 requirements are updated.

UL Electric Sign Energy Certification Service

General: As part of the UL Energy Certification Service for Electric signs in accordance with Title 24, it is required by UL that a UL Field Representative samples the records of signs displaying the dual UL mark for safety and energy certification.

Number of certification audits: shall be 2 per year minimum.

UL Safety Listing: Signs bearing the dual safety plus energy certification mark must also comply with the requirements of UL Sign Certification Program (CCN: UXYT) and bear the appropriate UL listing mark.

Responsibilities of the Manufacturer

UL Markings: Restrict the use of markings that reference Title 24 to those products that are found by the manufacturer's own inspection to comply with the requirements in this document. The use of such markings is further limited by the agreements that have been executed by the subscriber and UL.

Access to facilities: During hours, in which the factory is in operation, permit the Field Representative access to any portion of the premises where the product or components thereof are being fabricated, processed, finished or stored. The Field Representative shall be permitted to audit, prior to shipment, any product bearing or intended to bear markings referencing Title 24 as indicated in this document. If product disassembly is required, the manufacturer shall undertake it.

Resolution of non-conformances: Perform a root cause analysis of nonconforming test results reported by UL in order to determine and implement appropriate corrective actions. Upon request, the manufacturer shall submit the findings of their analysis and action plan for review and/or monitoring by UL.

Manufacturer's Technical Representative (MTR) - Each Manufacturer shall designate and maintain at least one representative that meets the criteria of a Manufacturer's Technical Representative for energy certification of electric signs to Title 24. To qualify, this individual shall successfully complete the UL University Online curriculum for Title 24 Energy Certification. Compliance to this requirement will be verified by the UL representative by requesting the Certificate of Completion of the required UL University Sign Course for the designee(s).

Compliance Assessment Process - The manufacturer is responsible for conducting and documenting the compliance assessment process on a Master Compliance Record (MCR) for all products intended to bear the UL Title 24 mark.

The compliance evaluation is a review of the sign construction in accordance with all applicable requirements and a determination of compliance with those requirements.

1. Required documentation for each sign or sign construction will include the completion of the Master Compliance Record or MCR. A copy of this document is attached as Exhibit A. This form may be completed and stored electronically or in paper form.
2. For multiple signs identical in construction or for a family of similar signs, the documentation needs only to reference a representative sign or signs. Documented records shall be maintained for each product, group, or family of signs that bear the UL Listing Mark.

Responsibilities of the Field Representative

Audits: Perform in-factory audits to review samples of signs bearing, or intending to bear, the UL Title 24 energy efficiency mark. Additionally, the Field Representative is to audit records of past production if production is not available,

MTR Verification: During each Factory Visit, the UL Field Representative will verify the manufacturer has a qualified "Manufacturer's Technical Representative" that meets the requirements specified in the "Responsibilities of the Manufacturer" section above. The manufacturer will be issued a document from UL University indicating successful completion of the course. This document is to be kept on file by the manufacturer to facilitate MTR verification by the Field Representative.

Instructions for Inspection Reports: An Inspection Report is to be completed for the energy inspection and a copy is to be provided to the sign manufacturer. A separate inspection is to be completed for the energy audit; reports are not to be combined with the safety inspection.

Instructions for Variation Notices (VNs): Any nonconformance to the technical or documentation requirements found during the audit is to be documented on a Variation Notice. Corrective action is to be taken by the manufacturer if a sign displaying, or intended to display, the Title 24 Energy Certification mark does not conform to the requirements contained in this document.

Technical Requirements - General

General: Sign Lighting Energy Standards apply to both indoor and outdoor signs and contain two different prescriptive compliance options:

- Option A: maximum allowed lighting power (also referred to as the watts per square foot approach)
- Option B: Specific lighting source approach.

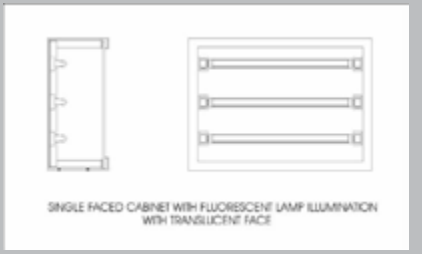
Either approach may be utilized to determine compliance.

Approach 1. Maximum Allowed Lighting Power Approach (watts per square foot approach)

Maximum allowed lighting power approach specifies a maximum lighting power that can be installed, expressed in W/ft2 of sign area. Signs cannot exceed the following power limits:

Internal and external illumination is defined as follows:

Internally Illuminated sign: A sign that illuminated with lamps integral to the sign. Examples fluorescent and HID box signs, neon and LED channel letter signs, changing message boards, and other common types of signs that carry UL safety listings



(Examples of internally illuminated signs)

Externally Illuminated Sign: A sign that is illuminated by a light source directed at the face of the sign. An example is a billboard sign. Externally illuminated signs do not commonly carry UL safety listings.

(Externally Illuminated Sign Example)

- Internally Illuminated – shall not exceed 12 W/ft2
- Externally Illuminated – Shall not exceed 2.3 W/ft2

Steps to determining compliance using the Maximum Allowed Lighting Power Approach:

1. Determine if the is sign internally or externally illuminated.
2. Calculate area of the sign face.
   - For double-face signs, only one side is used for the calculation
   - For changing message boards use the area of the message board face
3. Determine the total input wattage of the sign.
   - For neon, fluorescent, HID and LED signs use the input amperage (A) multiplied by the input volts (V) of all ballasts or transformers; or the marked input wattage rating (if available).
   - For incandescent signs use the wattage specified on the sign re-lamping label.
   - For changing message boards use the input volts x amps and the area of the board face.
4. Divide the input watts by the calculated sign face area (square ft.).
   - Internally Illuminated – shall not exceed 12 W/ft2
   - Externally Illuminated – Shall not exceed 2.3 W/ft2

Approach 2. Specific Lighting Source Approach

The specific lighting source approach specifies that signs illuminated exclusively with efficient lighting sources (e.g. electronic ballasts, high efficiency lamps, efficient power supplies and efficient transformers) comply with the energy requirements, regardless of the power consumed.

To comply with the specific lighting source approach, a sign may only be illuminated by the light sources in Table 1 below:

Table 1 – Approved Sources
High pressure sodium lamps
Pulse-start or ceramic metal halide with a ballast efficiency ≥ 88%
Pulse-start metal halide ≤ 320 watt ≠ 250 or 175 watt, and with a ballast efficiency ≥ 80%
Fluorescent lamps with a minimum color rendering index (CRI) of 80 Note: signs using linear (straight) fluorescent lamps with electronic ballasts may use lamps with a CRI of less than 80 (see the lamp packaging or markings for to determine the CRI).
Any Light emitting diodes (LEDs) with a power supply efficiency ≥ 80% EXCEPTION: LEDs with a power supply > 80% that comply with Appliance Efficiency Regulations (Title 20) may be used. Compliance to the Exception requirement can be determined by searching the appliance efficiency database at http://www.appliances.energy.ca.gov. A LED power supply listed in the CEC database as an “external” LED power supply is compliant.
All Compact fluorescent lamps that do not contain medium based sockets. (E24/E26)
All electronic ballasts operating at ≥ 20 kHz output frequency
Any Neon and cold cathode with a transformer or power supply having: • Efficiency* ≥ 75% with output current < 50 mA, or • Efficiency* ≥ 68% with output current ≥ 50 mA, **Efficiency is defined as the ratio of output wattage to input wattage at 100% tubing load*

Steps to determining compliance using the specific lighting source approach:

1. Determine the lighting source of the sign. If any light source of the sign is not one of the sources specified in Note A (end of document), this approach cannot be used.
2. Review each power source and determine compliance per Note A. If any components do not comply with Note A specifications, then the specific technology approach cannot be used.

Note: Transformer/ballast/driver efficiency is determined by dividing the output wattage by the input wattage at 100% load.

Application of the ULVS Energy Verified Mark to the Product

General: The dual safety and Title 24 certification mark may be applied by the manufacturer to a sign that complies with the requirements in this document and carries the UL safety Listing (UXYT). The energy verified mark cannot be used on a sign that does not bear a UL Safety Listing.

Procurement: Marks are obtained through UL Label Services.

Label Information: The manufacturer shall mark the label, using a permanent pen or similar means, to indicate which approach was used to determine compliance (Maximum allowed lighting power or Specific Lighting Source)

Label Location: The label shall be placed on the sign in accordance with the UL 48 safety certification requirements.

Electric Sign Listing Mark / Energy Mark (Holographic)

Section Sign Listing Mark / Energy Mark (Holographic)

Indoor Electric Sign Listing Mark / Energy Mark (Holographic)

Exhibit A: Master Compliance Record (MCR)

Instructions: The table to the right is a subsection of the master compliance record (MCR) used for the basic UL safety certification of the sign. The manufacturer must complete this subsection in addition the identification elements of the MCR for each sign or family of signs manufactured. As an alternate, the manufacturer may use their own document or form provided the following content is available for review by the UL Field Representative during UL factory audit visits. Electronic records are acceptable. Records must be kept by the manufacturer for a minimum of one year.

California Energy Commission – Title 24 Compliance Record			
Compliance Method: [ ] Maximum Allowed Power [ ] Specific Lighting Source			
Maximum Allowed Power Information		**Specific Lighting Source Information**	
Sign Area (sq ft)		The sign uses only these specific lighting sources (Refer to NOTE A BELOW)	[ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5 [ ] 6 [ ] 7 [ ] 8 [ ] 9 [ ] 10 CHECK ALL THAT APPLY
Sign Illumination Type Internal (I) or External (E)	[ ] I [ ] E		
Watts/sq ft Allowed	[ ] Int=12 [ ] Ext=2.3		
Total Installed Watts			
Complies	[ ] Y [ ] N	Complies	[ ] Y [ ] N

NOTE A: (APPLIES TO SPECIFIC LIGHTING SOURCE METHOD)

1. High pressure sodium lamps
2. Pulse start or ceramic metal halide lamps served by a ballast with ≥ 88% efficiency
3. Pulse start metal halide lamps that are ≤ 320 watts, are not 250 watt or 175 watt lamps, and are served by a ballast with ≥ 80% efficiency
4. Neon or cold cathode lamps with transformer or power supply efficiency ≥ 75% with rated output current < 50 mA
5. Neon or cold cathode lamps with transformer or power supply efficiency ≥ 68% with rated output current ≥ 50 mA
6. Fluorescent lighting systems with a minimum color rendering index (CRI) of 80.
7. Fluorescent lighting systems that use only electronic ballasts with a fundamental output frequency ≥ 20 kHz or
8. Light emitting diodes (LEDs) with a power supply with ≥ 80% efficiency
9. LEDs with a single voltage power supply designed to convert 120 volt AC to lower voltage AC or DC and output power less than or equal to 250 watts that comply with Appliance Efficiency Regulations (Title 20).
10. Compact fluorescent lamps that do not contain a medium screw base sockets (E24/ E26)