

L-858 LED Guidance Signs.

- A. Description.** The Electrical contractor shall install new LED illuminated L-858(L) signs as shown on the plans. The installation shall include the furnishing and installing of all isolation transformers, wire and cable connections, fittings for complete installation and all incidentals necessary to place the guidance signs in operation as completed units to the satisfaction of the Engineer.

DEFINITION FOR WAIVER

To meet FAA AIP fund requirements for specific type equipment, a waiver may need to be in place to specify the use of LED illuminated L-858(L) guidance signs, for energy efficiency requirements on a project. In accordance with CFR Title 49 Part 18.36:

- (7) Grantees and subgrantees are encouraged to use value engineering clauses in contracts for construction projects of sufficient size to offer reasonable opportunities for cost reductions. Value engineering is a systematic and creative analysis of each contract item or task to ensure that its essential function is provided at the overall lower cost.**

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- (13) Mandatory standards and policies relating to energy efficiency which are contained in the state energy conservation plan issued in compliance with the Energy Policy and Conservation Act (Pub. L. 94-163, 89 Stat. 871).**

The initial cost of signs in excess of incandescent illuminated airfield signs is more than recovered over the lifetime of the sign. The power consumption for the LED-L858(L) represents a 75% reduction on average from traditional incandescent illumination. Add to this the replacement cost of incandescent lamps with labor and the reduced VA size requirement for Constant Current Regulators, the LED L-858(L) signs more than meet the 20% increase in efficiency set forth by the Energy Policy and Conservation Act.

- B. Materials.** The LED L-858(L) signs shall conform to the requirements FAA Advisory Circular 150/5345-44 (latest revision) "Specification for Runway and Taxiway Signs" and FAA LED "Engineering Brief No. 67" (current edition). The LED L-858(L) signs shall be ETL certified

LED L-858(L) signs shall be supplied in the quantities specified in the plans with 1 or 2 pre-attached tethers per sign. Each lot shipment shall include two Instruction Manuals.

To insure reduced energy and maintenance requirements, the L-858(L) sign light source shall utilize individual Light Emitting Diode (LED) assemblies. The sign must maintain constant brightness at all CCR step settings.

The LED power supply circuit in each sign shall output a regulated DC voltage. To maximize maintenance personnel safety, there should be no more than 51V DC at any point inside the sign. The LED power supply circuit shall not require field calibration or adjustment. For maximum efficiency the LED L-858 sign shall have an input Power Factor >0.9 on the primary of the L-830 isolation transformer. The VA loading requirements should be below the maximums listed in the table below:

L-858(L) Size	1.0 - 1.5 Module	2.0 - 2.5 Module	3.0 – 3.5 Module	4.0 Module
Size 1	38	40	47	55
Size 2	40	55	65	77
Size 3	47	65	80	96
Size 4	40			
Size 5	40			

To provide the greatest power savings on the project, the total VA load of the LED L-858(L) equipment should be such that a lower KW value Constant Current Regulator(s) may be used. All bids should be compared for maximum energy savings by comparing the total VA loads of the L-858(L) equipment and preference should be for the bid with the lowest total VA. If alternate equipment is provided, the next regulator greater in size must be provided to accommodate the increased VA load

The sign shall impose a low (VA) load on 3-step or 5-step constant current regulators, and use an internal constant 50V LED power supply circuit, modular in construction and located inside the sign. To minimize spare parts requirements, the internal LED power supply circuit shall be the same for 3-step or 5-step 60Hz series circuits. The internal LED power supply circuit shall not require field calibration or adjustment of any kind.

The electrical design of the sign shall insure conformance with FAA AC 150/5345-44J, par. 3.2.5.7. This paragraph states:

“The failure of any light source within a sign must not result in a potential miscommunication of the intended message to a pilot. If the failure of an internal lamp(s) in a sign causes a panel or any section of a panel to be dark, or have an average luminance less than the minimum required in paragraph 3.2.5.6, sign operation must be automatically discontinued.”

The L858(L) equipment must also be designed to be compliant with the FAA Engineering Brief 67 par. 2.6:

Fixtures Using Multiple Light Devices - If multiple light devices to produce a single source are used, the design must ensure the fixture meets the light

output specification while it is on, and it must turn off if more than 25% of the light devices fail.

Isolation transformer secondary power wiring shall be routed through the sign leg. If a factory installed on/off switch is provided it must isolate and short the secondary output of the isolation transformer, effectively de-energizing and isolating the sign's circuitry from the airfield circuit.

To insure maximum pilot visibility, the sign shall have illumination uniformity exceeding the FAA minimum specifications. The measured points on the panel are defined in AC 150/5345-44 par. 4.1.1.3. Measurements must be made on a 3 in. grid over the entire face of the sign, with no measurement closer than 3 in. to the sign frame. The average of all measurements must be between 10 and 30 foot-Lamberts. The ratio between maximum and minimum luminance over the whole sign face must not exceed 5:1. Adjacent grid measurements must not exceed a 1.5:1 luminance ratio.

The length of the sign and visible face shall be the minimal required to meet FAA character spacing requirements and not solely based on standard module sizes. Legends that traditionally require five module signs may be provided as a four module sign where determined by sign manufacturer characters will fit per specification. Otherwise they should be provided as a multi-sign array that facilitates the legend communication and coordinates with existing concrete pads as appropriate.

The legends for each sign shall be as shown on the plans. Provide single or double faced signs as required.

The signs shall be Mode 2 – able to withstand wind loads of 200 mph (322 kph) minimum. The sign floor flange shall have two mounting holes to expedite installation and minimized the structural impact of the sign mounting pad.

The installation shall include the sign, isolation transformer, connectors, cables, and any other required materials as shown on the plans.

A 2 year warranty on sign parts and labor, and a 4 year warranty on the LED light source from the sign manufacturer shall be provided.

C. Construction. The contractor shall furnish and install each L-858(L) sign as specified in the proposal and shown in the plans.

The sign system shall be fully tested by continuous operation for not less than 24 hours as a completed system prior to acceptance. The test shall include operating the constant current regulator in each step for a 3-step or 5-step circuit not less than 10 times at the beginning and end of the 24-hour test.

D. Method of Measurement. Payment will be made at the price per each L-858(L) Guidance Sign as shown on the plans.

E. Basis of Payment. The price shall be full compensation for signs, concrete bases, lamps, isolation transformers, grounding, labor, equipment, excavation, backfill and incidental items necessary to complete the work, per each.

Payment will be made at the price per each for installing guidance signs. Pay Items for this Work are noted as follows:

Pay Item X000## L-858(L) LED Guidance Sign, Size __, Style__, Class 2, __. __ Module Length, Single Face, Per Each.

Pay Item X000## L-858(L) LED Guidance Sign, Size __, Style__, Class 2, __. __ Module Length, Double Face, Per Each.