**REVISION OF SECTION 614**

**Flashing Beacon (Solar Powered)**

**Section 614 of the Standard Specifications is hereby revised for this project to include the following:**

# DESCRIPTION

This work consists of the construction of a self-contained solar engine and mounting hardware such that the entire assembly can be pole-mounted. The solar engine shall contain all electronics, batteries & solar panel and be self contained on the pole. The system shall conform to all provisions of the MUTCD

**MATERIALS**

*(a) Mechanical:* The solar engine shall be constructed from powder coated aluminum. The Solar panel shall be integrated to the solar engine. All batteries and electronics shall be mounted in the solar engine, with a pole mounted control cabinet or battery cabinet. The solar engine shall be vented to provide cooling of the battery and electronic system. Venting shall be covered by wire mesh to prevent intrusion of insects.

(1) The overall weight of the assembly, including mounting hardware and solar engine shall not exceed 43 lbs.

(2) The entire system must be delivered as a complete unit ready to install and requiring no assembly.

(3) Top of solar engine must be completely flat to the ground such that mounting in any orientation will keep the solar engine level.

*(b) Mounting:* The entire assembly, including solar engine, signal housing and LED module, and bracket shall be provided with hardware for mounting on to the top of a 4” diameter round Flashing Beacon post. The entire assembly shall mount at one point. Separate mounting for the signal head or any other component shall not be required.

*(c) Solar / Battery System:* The solar engine shall include one 150-watt solar panel no larger than the footprint of the housing. The solar engine shall house a single, field replaceable sealed lead acid battery no greater than 24 Ah. Solar panel and battery system shall be 12 Volt DC. When mounted, the solar panel shall not be visible from ground level.

The solar panel shall meet the design qualification and type approval of photovoltaic modules in accordance with IEC 61215. This specification includes radiation testing, thermal testing, and mechanical testing for environmental conditions such as UV-exposure, thermal cycling, as well as degradation of maximum power output.

The solar panel shall consist of one single solar panel, mounted to the solar engine with an aluminum flashing.

Battery shall be mechanically secured into the housing. Battery bracket shall enclose the battery in a manner to restrict the thermal expansion of the battery.

(d) Signal Housing: The signal housing shall meet the equipment standard of the Institute of Transportation Engineers (ITE) Vehicle Traffic Control Signal Heads (VTCSH) Chapter 2.

The signal head shall be easily removable from the assembly. The bracket assembly shall be constructed such that the signal head can be removed easily in the field without removing the solar engine. The bracket assembly shall be designed to take the torsion and bending load of the solar engine. The signal head shall not be subjected to the torsional or bending load of the solar engine.

The signal housing must be able to rotate independent from the bracket for lens alignment.

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(e) Operational: The beacon shall operate continuously when the battery is connected. The beacon shall have the option to be turned on by a third party switch or third party device with a compatible contact closure output.

The system shall be able to withstand and operate at temperature extremes of -40 deg F to +122 deg F.

The system shall be designed and constructed to withstand (120 mph) wind loads in conformance with the requirements of the AASHTO publication.

The electronic circuit board housing, wire harnessing and connectors shall be designed and tested in accordance to IEC International Standard 60529, Ingress Protection IP67 requiring that the enclosure be dust tight and remain completely sealed when immersed in water to a depth of 1 meter for 1 hour.

Integrated solar charger shall be approved to CSA and UL standards.

The product must be FCC certified to comply with all 47 CFR FCC Part 15 Subpart B Emission requirements.

The system, including battery pack, solar panel, LED module and all components, shall be guaranteed for a minimum of three years.

Manufacturer must be ISO 9001 certified.

**CONSTRUCTION REQUIREMENTS**

The Solar Collection System shall be pole-mounted per manufacturers’ recommendations, as approved by the Engineer

**METHOD OF MEASUREMENT**

Solar Collection System will be measured by the actual number that are installed and accepted.

**BASIS OF PAYMENT**

Payment will be made under:

Pay Item Pay Unit

Flashing Beacon (Solar Powered) Each

Payment will be full compensation for all work, materials, and equipment required to install a fully operational solar-panel and is fully operating the equipment has shown in the plan sheets.

Solar power system’s on/off switch and lockable container will not be measured and paid for separately, but shall be included in the work.