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## 302842 Rev1 Addendum to Sentinel Manual OCV & Net Power Degradation

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**ALL SECTIONS OF THIS ADDENDUM TO SUPERSEDE EQUIVALENT SECTIONS IN  
302842 REV1 - SENTINEL MANUAL**

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## **5 MAINTENANCE**

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**Read all product documentation before performing service or maintenance on the Sentinel TEG and ensure that you are thoroughly familiar with the product's sub-systems and key components. Service and maintenance of the Sentinel TEG must be performed by technically qualified personnel as outlined in Section 1.2.**

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### **5.1 RECOMMENDED PERIODIC MAINTENANCE**

The Sentinel Thermoelectric Generator is a highly reliable, solid-state appliance that requires very little maintenance; however, it should be checked regularly to ensure product longevity. The maintenance frequency on the Sentinel may vary depending on site conditions and usage. As a minimum, perform the following checks and maintenance once per year.

1. Verify Open Circuit Voltage:
  - a. Determine OCV target based on ambient temperature and altitude – refer to Section 4.1.
  - b. Determine OCV degradation due to days of operation – refer to Section 5.1.2.
  - c. Measure OCV – refer to Section 4.3.2.
  - d. Compare measurement and target.
  - e. If the measured OCV differs by more than 1 VDC from the calculated target OCV, adjust the fuel pressure – refer to Section 4.3.3.
  - f. If target OCV cannot be achieved, see Troubleshooting – refer to Section 6.
2. Replace the fuel filter cartridge— refer to Section 5.2.1. Remember that fuel outside of the specifications outlined in Section 2.3 may increase service interval.
3. Check all fuel line connections for leaks.
4. Remove any debris, sand or dust from the inlet screen, cooling fins, cabinet, and ducts.
5. Check all bolts and wire connections for tightness.
6. Restart the TEG— refer to Section 4.2.

#### **5.1.1 START-UP BATTERY PACK REPLACEMENT INTERVAL**

Replace start-up battery pack during an annual maintenance every 5 years of service.

#### **5.1.2 DETERMINING OCV VALUE AFTER CATALYTIC HEATER CARTRIDGE DEGRADATION**

To determine OCV value after operating the Sentinel Catalyst Cartridge for some time:

1. Determine correction factors for current site conditions as described in Section 4.1. Correction Factors can be combined into a single value by multiplying the 2 factors. For example: Temperature correction factor = 0.90 and Altitude correction factor = 0.95, overall correction factor =  $0.90 * 0.95 = 0.855$ .
2. Determine number of days of operation of the Catalyst cartridge – refer to MAINTENANCE AND PERFORMANCE LOG.

Use Figure 21 to determine target OCV based on correction factors and days of operation. For example: using example in step 1, overall correction factor = 0.855 (we will round to 0.85) and days of operation = 250 days. Target OCV based on CF 0.85 line of chart = ~18.25 VDC.

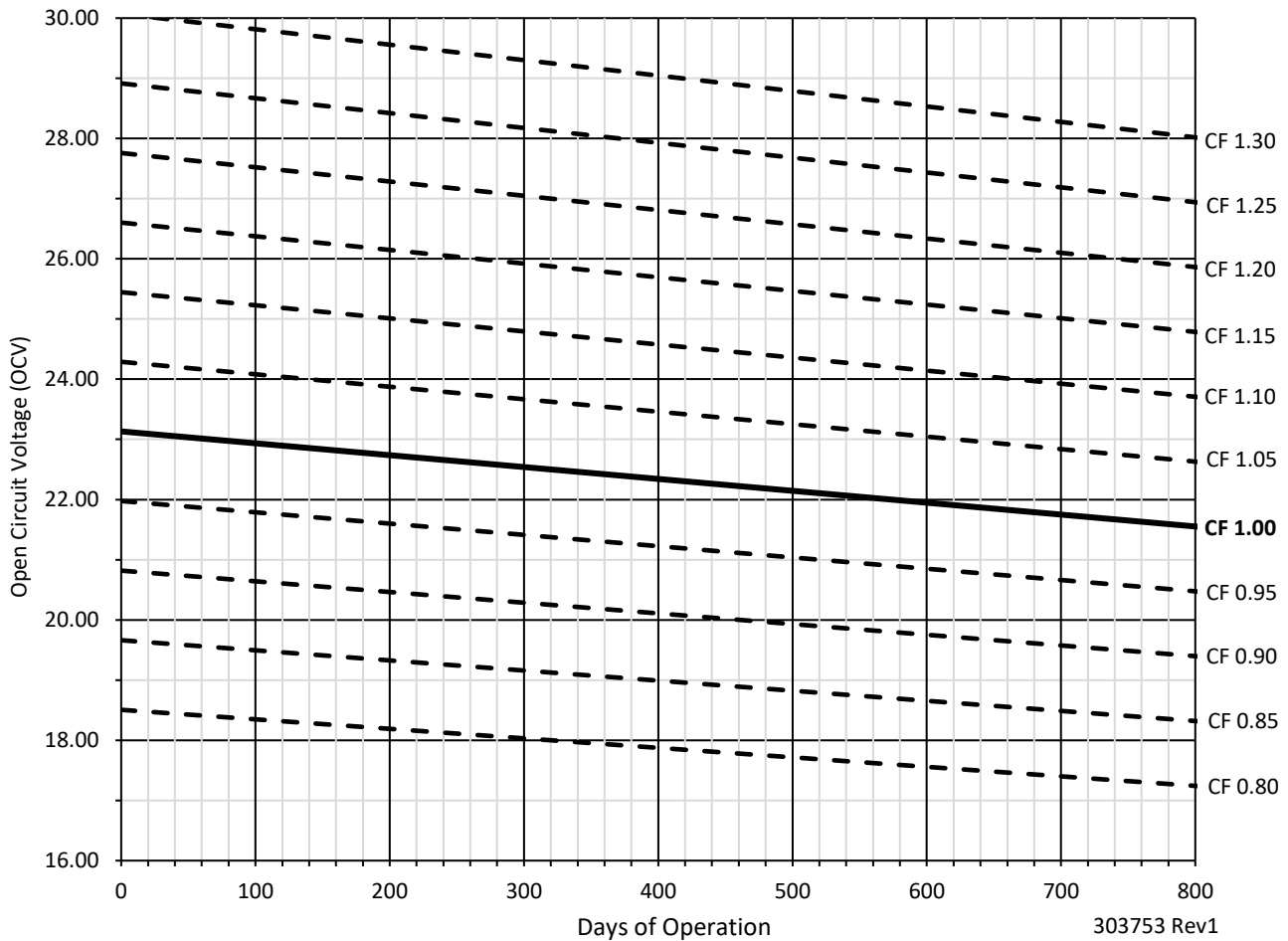


Figure 21 – OCV Degradation vs. Days of Operation

### 5.1.3 DETERMINING CATALYTIC HEATER CARTRIDGE REPLACEMENT INTERVAL BASED ON LOAD REQUIREMENTS

The heat output of the catalyst cartridge will degrade over time, this will affect power available to the load. To ensure that load requirements are met, the cartridge will need to be replaced periodically. To determine the frequency of replacement, based on site load requirements:

1. Determine correction factors for the site as described in Section 4.1, but use Figure 22 and Figure 23, based on worst case (highest) ambient temperature expected and altitude. For example, peak summer temperatures are expected to be 30°C [86F], worst case temperature correction factor = 0.98. Combine this factor with your altitude factor by multiplying the 2 factor values.
2. Determine your minimum power requirement for your load.
3. Refer to Figure 24, follow the correction factor line that is most relevant to factor calculated in step 1 until it crosses the power requirement for your site. The x-axis value at this intersection will be the number of days of operation before a catalyst cartridge replacement will be required. For

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example, overall correction factor determined = 0.85 and minimum load requirement is 8.5 W. Catalytic Heater Cartridge will require replacement after ~350 days.

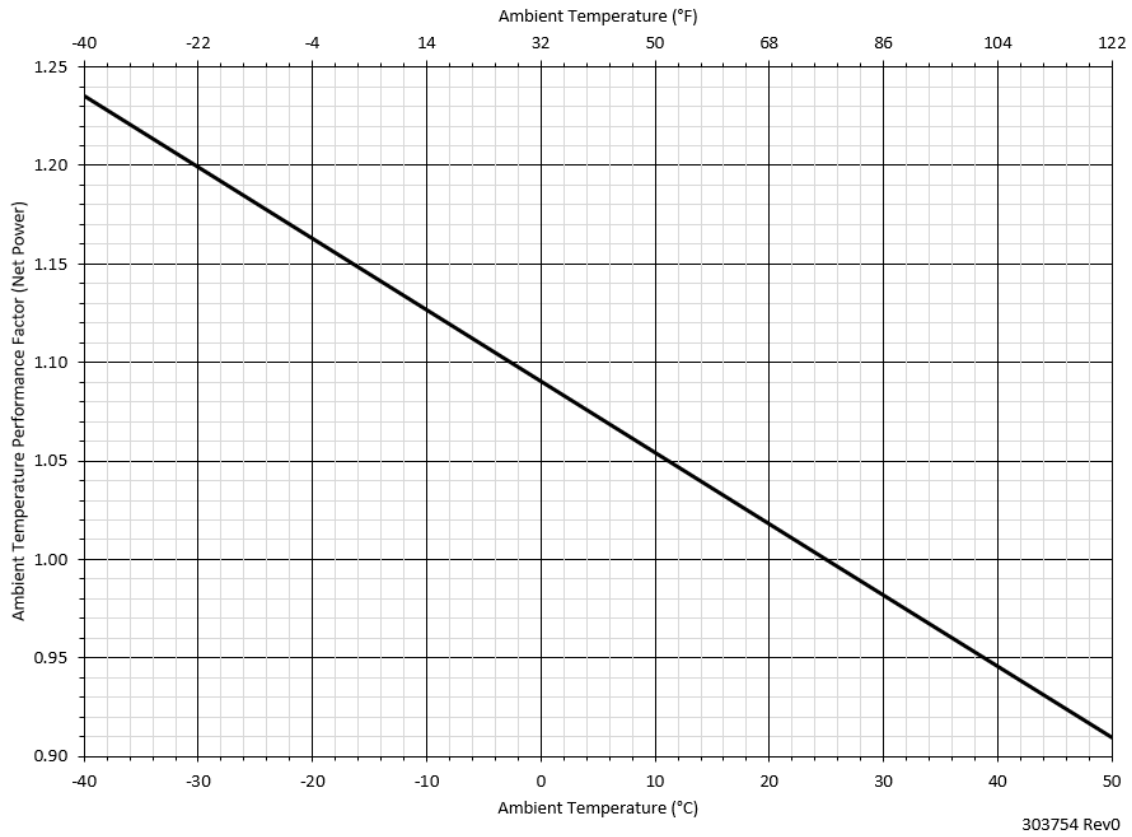


Figure 22 – Net Power Ambient Temperature Correction Factor

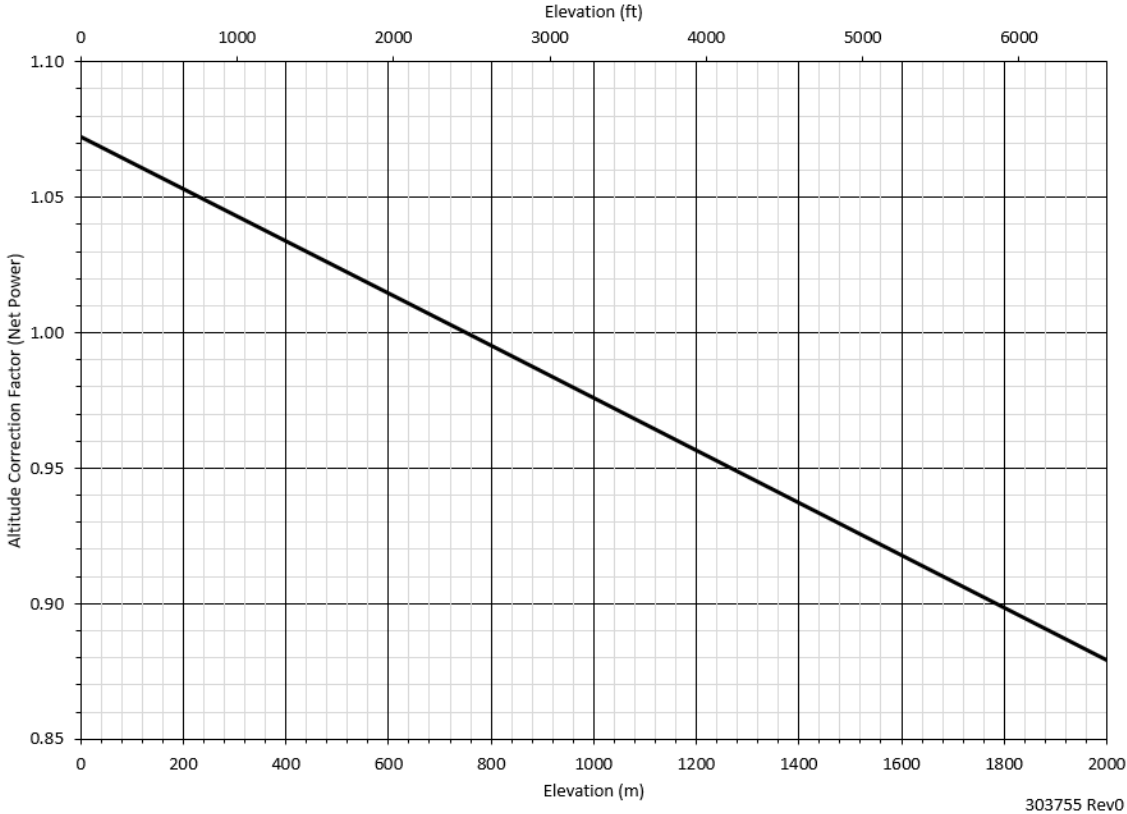


Figure 23 – Net Power Altitude Correction Factor

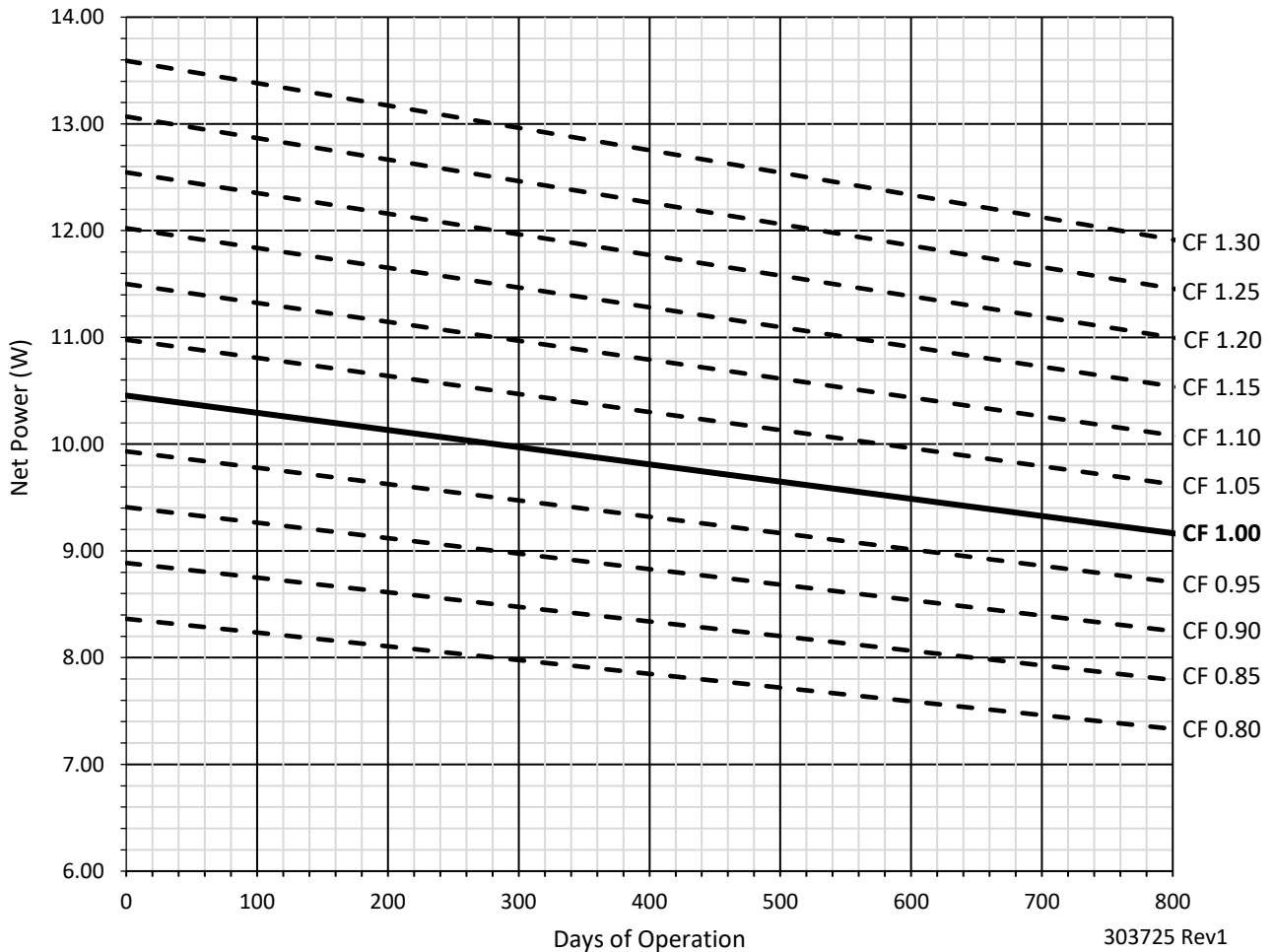


Figure 24 – Sentinel Net Power vs. Days of Operation

Before performing any service or maintenance on the Sentinel TEG:

- ✓ Shut down the unit by closing the manual shut-off valve below the regulator
- ✓ De-classify the area ensuring that there is no explosive gas present before and during service or maintenance activities.
- ✓ De-energize the system by disconnecting the wiring connector from the start-up battery pack.
- ✓ Allow the unit to cool for at least one hour before beginning any service or maintenance activity.



**WARNING!** Ensure that no explosive gas hazard is present prior to opening the instrumentation enclosure and performing any service on the Sentinel TEG. The Sentinel enclosure must not be opened when an explosion or gas hazard may be present.