How many of you have heard this old wives tale? Do you honestly believe that batteries reach boiling temperatures? What I will agree with is this...batteries can & will gas heavily – i.e. making bubbling noises & possibly lose electrolyte out of the fill caps, when charged too aggressively &/or at high ambient temperatures. A battery case can get very warm to the touch & excessive heat causes internal components to distort & swell too. I will also state that excessive gassing is likely an issue with the battery versus a defective power converter... or inverter/charger... or high output from the chassis alternator. Only proper testing can answer that.

Here are few comments regarding automotive & deep cycle batteries:

- Batteries are a chemical storage device.....i.e. they store electrons!
- Batteries have an internal resistance... i.e. less resistance in a discharged condition & an increasing resistance as the battery charge level rises.
- Construction materials used to manufacture a battery can vary widely.
- Batteries do not tolerate high temperatures well...without a negative consequence.
- Batteries must be secure & installed to limit vibration / bouncing & cable connections remain clean & tight.

Battery manufacturers build Automotive & Marine batteries with varying electrical capacities, but they are required by the BCI (Battery Council International) to use standardized case sizes...i.e. lengths, widths, & height. These sizes are referred to as Groups.

Here are several groups commonly used in RVs and a few specification ranges...

- **Group 24** – Range 75 – 95 Ampere Hours – Typically called 80 AH
- **Group 27** – Range 85 – 115 Ampere Hour – Typically called 100 AH
- **Group 30** – Range 115 – 130 Ampere Hour – Typically called 130 AH

The battery case size has a direct bearing on the size of the lead plates, but that’s where things can change. Cases can be a hard rubber or plastic, and the purity of the lead & the alloys of lead used directly affect the performance & storage capacity of a battery. It also affects costs associated to manufacture a battery.

**Diagnosing Power Converters**

Parallax Power LLC recently posted diagnostic flow chart information to their public web-site to aid in proper diagnosis of their products. These flow charts are intended for the ‘average Joe’ and do a fair job in providing basic voltage threshold information, but this may be insufficient information to properly diagnose certain problems. The ‘suggestions’ listed below are worth some time for review & consideration by an RV technician. Additionally, any technical representatives assisting an RV tech with diagnosing converter performance issues will require very specific & accurate measurements, so it’s important to consider the resources available early in the process...i.e. - work smarter – not harder...

For example:

1. First & foremost, if a test is worth taking, it’s worth the time to document the results as this substantiates & validate his/her diagnostic efforts.
2. Power Source – Verify the AC power source to the converter – is it 120V AC... perhaps less? Why would this matter? Record your reading.
3. What is the status of the Electrical System - Are the house batteries 'on-line' or 'off-line'? Again, why would this matter? Verify operation of the battery disconnect relay and record the status.
4. What is the Converters status – Is testing performed with the converter connected to the coach or isolated completely from the coach electrical system. Document testing methods & record your readings.
5. Test Points – Should testing / measurements be taken at the batteries... or should testing be performed ‘only’ at the converters output terminals. Perhaps both! Why should this even be considered?

A True Statement regarding Converter Performance: The operating condition of a power converter is impossible to determine without measuring both the converters output voltage and current.
Charged vs. Discharged Batteries

<table>
<thead>
<tr>
<th>State of Charge</th>
<th>Specific Gravity @ 80°F</th>
<th>Battery Voltage 12-volt / 6-volt</th>
</tr>
</thead>
<tbody>
<tr>
<td>100%</td>
<td>1.265</td>
<td>12.7 / 6.3</td>
</tr>
<tr>
<td>75%</td>
<td>1.225</td>
<td>12.4 / 6.2</td>
</tr>
<tr>
<td>50%</td>
<td>1.190</td>
<td>12.2 / 6.1</td>
</tr>
<tr>
<td>25%</td>
<td>1.155</td>
<td>12.0 / 6.0</td>
</tr>
<tr>
<td>Discharged</td>
<td>1.120</td>
<td>11.9 / &gt; 6.0</td>
</tr>
</tbody>
</table>

The Progressive Dynamics 9200-Series Power converters are currently being used on 2014 & 2015 products. This information is taken directly from the Owner’s Manual:

- The INTELI-POWER 9200 series 120 VAC to 12 VDC power converters are state-of-the-art electronic converter / battery chargers. The INTELI-POWER 9200’s are UL and CUL (Canadian) listed.

- Their compact size and quiet operation gives greater flexibility in selecting the mounting location for either OEM installation or after market replacement.

- The INTELI-POWER 9200 series converters have the Charge Wizard controlled charging module built in. The Charge Wizard is a microprocessor-controlled device incorporated in Progressive Dynamics 9200 Series Inteli-Power Converters. It constantly monitors the RV battery, and then automatically adjusts the converter output voltage based on its charge status. The Charge Wizard has four (4) operating Modes (BOOST, NORMAL, STORAGE AND EDQUALIZE). Each Mode is automatically selected by the Charge Wizard and ensures a fast yet safe recharge for your RV battery. See chart below for details.

Specific Gravity
Specific Gravity is the ratio of the weight of a given volume of any substance to that of the same volume of some other substance taken as a standard. In the case of lead acid batteries, it’s the ratio of the battery acid to the weight of water. Water has a Specific Gravity of 1.0. Specific Gravity is measured with a hydrometer. Worth noting, the temperature of the substance being measured must be measured & factored-in.

The electrolyte in a wet-cell battery is a combination of sulfuric acid & water. As a battery loses its charge, the sulfur reacts / bonds to the plates resulting in a reduced concentration of sulfur in the electrolyte... eventually leaving water. This is why batteries freeze & crack.

The Progressive Dynamics 9200- Series Inteli-Power Converters are state-of-the-art electronic converter / battery chargers. The INTELI-POWER 9200’s are UL and CUL (Canadian) listed.

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